



THE PRINTING  
REVOLUTION IN  
EARLY MODERN  
EUROPE

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## INTRODUCTION

I do ingenuously confess that in attempting this history of Printing I have undertaken a task much too great for my abilities the extent of which I did not so well perceive at first.<sup>1</sup>

Joseph Ames, June 7, 1749

I first became concerned with the topic of this book in the early 1960s after reading Carl Bridenbaugh's presidential address to the American Historical Association. This address, which was entitled "The Great Mutation," belonged to an apocalyptic genre much in vogue at that time (and unfortunately still ubiquitous).<sup>2</sup> It raised alarms about the extent to which a "run-away technology" was severing all bonds with the past and portrayed contemporary scholars as victims of a kind of collective amnesia. Bridenbaugh's description of the plight confronting historians; his lament over "the loss of mankind's memory" in general and over the disappearance of the "common culture of Bible reading" in particular seemed to be symptomatic rather than diagnostic. It lacked the capacity to place present alarms in some kind of perspective – a capacity which the study of history, above all other disciplines, ought to be able to supply. It seemed unhistorical to equate the fate of the "common culture of Bible reading"

<sup>1</sup> Joseph Ames, preface to *Typographical Antiquities or the History of Printing in England, Scotland and Ireland*, ed. Thomas Dibdin (London, 1810), I:12.

<sup>2</sup> Carl Bridenbaugh, "The Great Mutation," *The American Historical Review* LXVIII (January 1963): 315–31. Other essays on the same theme appearing at the same time are noted in E. L. Eisenstein, "Clio and Chronos," *History and Theory*, Beiheft 6 (1966): 36–65.

with that of all of Western civilization when the former was so much more recent – being the by-product of an invention which was only five hundred years old. Even after Gutenberg, moreover, Bible reading had remained *uncommon* among many highly cultivated Western Europeans and Latin Americans who adhered to the Catholic faith.

In the tradition of distinguished predecessors, such as Henry Adams and Samuel Eliot Morison, the president of the American Historical Association appeared to be projecting his own sense of a growing distance from a provincial American boyhood upon the entire course of Western civilization. As individuals grow older they *do* become worried about an unreliable memory. Collective amnesia, however, did not strike me as a proper diagnosis of the predicament which the historical profession confronted. Judging by my own experience and that of my colleagues, it was recall rather than oblivion which presented the unprecedented threat. So many data were impinging on us from so many directions and with such speed that our capacity to provide order and coherence was being strained to the breaking point (or had it, perhaps, already snapped?). If there was a “run-away” technology which was leading to a sense of cultural crisis among historians, perhaps it had more to do with an increased rate of publication than with new audiovisual media?

While mulling over this question and wondering whether it was wise to turn out more monographs or instruct graduate students to do the same – given the indigestible abundance now confronting us and the difficulty of assimilating what we have – I ran across a copy of Marshall McLuhan’s *The Gutenberg Galaxy*. In sharp contrast to the American historian’s lament, the Canadian professor of English seemed to take mischievous pleasure in the loss of familiar historical perspectives. He pronounced historical modes of inquiry to be obsolete and the age of Gutenberg at an end. Here again, I felt symptoms of cultural crisis were being offered in the guise of diagnosis. McLuhan’s book itself seemed to testify to the special problems posed by print culture rather than those produced by newer media. It provided additional evidence of how ~~overload~~ could lead

to incoherence. At the same time it also stimulated my curiosity (already aroused by considering Bible printing) about the specific historical consequences of the fifteenth-century communications shift. I had long been dissatisfied with prevailing explanations for the intellectual revolutions of early modern times. Some of the changes to which McLuhan alluded suggested new ways of dealing with some long-standing problems. But McLuhan raised a number of questions about the actual effects of the advent of printing. They would have to be answered before other matters could be explored. What were some of the most important consequences of the shift from script to print? Anticipating a strenuous effort to master a large literature, I began to investigate what had been written on this obviously important subject. To my surprise, I did not find even a small literature available for consultation. No one had yet attempted to survey the consequences of the fifteenth-century communications shift.

While recognizing that it would take more than one book to remedy this situation, I also felt that a preliminary effort, however inadequate, was better than none and embarked on a decade of study – devoted primarily to becoming acquainted with the special literature (alas, all too large and rapidly growing) on early printing and the history of the book. Between 1968 and 1971 some preliminary articles were published to elicit reactions from scholars and to take advantage of informed criticism. My full-scale work, *The Printing Press as an Agent of Change*, appeared in 1979. When it was abridged and retitled for the general reader in 1983, illustrations were added but footnotes were dropped. They have been restored for this new second edition. Nevertheless, any reader seeking full identification of all citations and references should consult the bibliographical index in the unabridged version.

My treatment falls into two main parts. Part I focuses on the shift from script to print in Western Europe and tries to block out the main features of the communications revolution. Part II deals with the relationship between the communications shift and other developments conventionally associated with the transition from medieval to early modern times. I have concentrated on cultural and intellectual movements, postponing for another book problems pertaining to

political ones.) The second part thus takes up familiar developments and attempts to view them from a new angle of vision. The first part, however, covers unfamiliar territory – unfamiliar to most historians, at least (albeit not to specialists in the history of the book) and especially exotic to this historian (who had previously specialized in the study of the French Revolution and early nineteenth-century French history).

While trying to cover this unfamiliar ground, I discovered (as all neophytes do) that what seemed relatively simple on first glance became increasingly complex on examination and that new areas of ignorance opened up much faster than old ones could be closed. As one might expect from a work long in progress, first thoughts had to be replaced by second ones; even third thoughts have had to be revised. Especially when I was writing about the preservative powers of print (a theme assigned special importance and hence repeatedly sounded in the book), I could not help wondering about the wisdom of presenting views that were still in flux in so fixed and permanent a form. The reader should keep in mind the tentative, provisional character of what follows. This book should be read as an extended essay and not as a definitive text.

It also should be noted at the outset that my treatment is primarily (though not exclusively) concerned with the effects of printing on written records and on the views of already literate elites. Discussion centers on the shift from one kind of literate culture to another (rather than from an oral to a literate culture). This point needs special emphasis because it runs counter to present trends. When they do touch on the topic of communications, historians have been generally content to note that their field of study, unlike archeology or anthropology, is limited to societies which have left written records. The special form taken by these written records is considered of less consequence in defining fields than the overriding issue of whether any written records have been left. Concern with this overriding issue has been intensified recently by a double-pronged attack on older definitions of the field, emanating from African historians on the one hand and social historians dealing with Western civilization on the other. The former have had to challenge

the requirement that written records be supplied. The latter object to the way this requirement has focused attention on the behavior of a small literate elite while encouraging neglect of the vast majority of the people of Western Europe. New approaches are being developed – often in collaboration with Africanists and anthropologists – to handle problems posed by the history of the “inarticulate” (as presumably talkative albeit unlettered people are sometimes oddly called). These new approaches are useful not only for redressing an old elitist imbalance but also for adding many new dimensions to the study of Western history. Work in progress on demographic and climatic change, family structure, child rearing, crime and punishment, festivals, funerals, and food riots, to mention but a few of the new fields that are now under cultivation, will surely enrich and deepen historical understanding.

But although the current vogue for “history from below” is helpful for many purposes, it is not well suited for understanding the purposes of this book. When Jan Vansina, who is both an anthropologist and a historian of precolonial Africa, explores “the relationship of oral tradition to written history,” he naturally skips over the difference between written history produced by scribes and written history after print.<sup>3</sup> When Western European historians explore the effect of printing on popular culture, they naturally focus attention on the shift from an oral folk culture to a print-made one. In both cases, attention is deflected away from the issues that the following chapters will explore. This is not to say that the spread of literacy will be completely ignored. New issues posed by vernacular translation and popularization had significant repercussions within the Commonwealth of Learning as well as outside it. Nevertheless, it is not the spread of literacy but how printing altered written communications within the Commonwealth of Learning which provides the main focus of this book. It is primarily concerned with the fate of the unpopular (and currently unfashionable) “high” culture of Latin-reading professional elites.

<sup>3</sup> Jan Vansina, *Oral Tradition: A Study in Historical Methodology*, tr. H. M. Wright (London, 1973), pt. 1, sec. 2, 2 ff.

I have also found it necessary to be unfashionably parochial and stay within a few regions located in Western Europe. Thus the term "print culture" is used throughout this book in a special parochial Western sense: to refer to post-Gutenberg developments in the West while setting aside its possible relevance to pre-Gutenberg developments in Asia. Not only earlier developments in Asia, but also later ones in Eastern Europe, the Near East, and the New World, have been excluded. Occasional glimpses of possible comparative perspectives are offered, but only to bring out the significance of certain features which seem to be peculiar to Western Christendom. Because very old messages affected the uses to which the new medium was put and because the difference between transmission by hand copying and by means of print cannot be seen without mentally traversing many centuries, I have had to be much more elastic with chronological limits than with geographical ones: reaching back occasionally to the Alexandrian Museum and early Christian practices; pausing more than once over medieval bookhands and stationers' shops; looking ahead to observe the effects of accumulation and incremental change.

One final comment is in order. As the title of my large version indicates, I regard printing as *an agent*, not *the agent*, let alone *the only agent*, of change in Western Europe. It is necessary to draw these distinctions because the very idea of exploring the effects produced by any particular innovation arouses suspicion that one favors a monocausal interpretation or that one is prone to reductionism and technological determinism.

Of course, disclaimers offered in a preface should not be assigned too much weight and will carry conviction only if substantiated by the bulk of a book. Still, it seems advisable to make clear from the outset that my aim is to enrich, not impoverish, historical understanding and that I regard monovariable interpretations as antipathetic to that aim. As *an agent* of change, printing altered methods of data collection, storage and retrieval systems, and communications networks used by learned communities throughout Europe. It warrants special attention because it had special effects. In this book I am trying to describe these effects and to suggest how they may

be related to other concurrent developments. The notion that these other developments could ever be reduced to nothing but a communications shift strikes me as absurd. The way they were reoriented by such a shift, however, seems worth bringing out. Insofar as I side with revisionists and express dissatisfaction with prevailing schemes, it is to make more room for a hitherto neglected dimension of historical change. When I take issue with conventional multivariable explanations (as I do on several occasions), it is not to substitute a single variable for many but to explain why many variables, long present, began to interact in new ways.

It is perfectly true that historical perspectives are difficult to preserve when claims made for a particular technological innovation are pressed too far. But this means that one must exercise discrimination and weigh the relative importance of diverse claims. To leave significant innovations out of account may also skew perspectives. I am convinced that prolonged neglect of a shift in communications has led to setting perspectives ever more askew as time goes on.

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I am grateful to several institutions for partial support during the interval when I worked on this book. The University of Michigan at Ann Arbor and the John Simon Guggenheim Memorial Foundation helped me at the beginning. Work was completed during my term as a Fellow at the Center for Advanced Study in the Behavioral Sciences at Stanford, where support was provided by the National Endowment for the Humanities (Grant FC-20029-82) and the Andrew W. Mellon Foundation.

## DEFINING THE INITIAL SHIFT

We should note the force, effect, and consequences of inventions which are nowhere more conspicuous than in those three which were unknown to the ancients, namely, printing, gunpowder, and the compass. For these three have changed the appearance and state of the whole world.

Francis Bacon, *Novum organum*, Aphorism 129

To dwell on why Bacon's advice ought to be followed by others is probably less helpful than trying to follow it oneself. This task clearly outstrips the competence of any single individual. It calls for the pooling of many talents and the writing of many books. Collaboration is difficult to obtain as long as the relevance of the topic to different fields of study remains obscure. Before aid can be enlisted, it seems necessary to develop some tentative hypotheses relating the shift from script to print to significant historical developments.

This task, in turn, seems to call for a somewhat unconventional point of departure and for a reformulation of Bacon's advice. Instead of trying to deal with "the force, effect, and consequences" of a single postclassical invention that is coupled with others, I will be concerned with a major transformation that constituted a large cluster of changes in itself. Indecision about what is meant by the advent of printing has, I think, helped to muffle concern about its possible consequences and made them more difficult to track down. It is difficult to find what happened in a particular Mainz workshop in the 1450s. When pursuing other inquiries, it seems almost prudent to bypass so problematic an event. This does not apply to the appearance of new

occupational groups who employed new techniques and installed new equipment in new kinds of workshops while extending trade networks and seeking new markets to increase profits made from sales. Unknown anywhere in Europe before the mid-fifteenth century, printers' workshops would be found in every important municipal center by 1500. They added a new element to urban culture in hundreds of towns. To pass by all that, when dealing with other problems, would seem to be incautious. For this reason, among others, we will skip over the perfection of a new process for printing with movable types and will not pause over the massive literature devoted to explanations of Gutenberg's invention. We will take the term "printing" to serve simply as a convenient label, as a shorthand way of referring to a cluster of innovations (entailing the use of movable metal type, oil-based ink, wooden handpress, and so forth). Our point of departure will not be one printing shop in Mainz. Instead, we will begin where many studies end: after the first dated printed products had been issued and the inventor's immediate successors had set to work.

The advent of printing, then, is taken to mean the establishment of presses in urban centers beyond the Rhineland during an interval that begins in the 1460s and coincides, very roughly, with the era of incunabula. So few studies have been devoted to this point of departure that no conventional label has yet been attached to it. One might talk about a basic change in a mode of book production or about a communications or media revolution or perhaps, most simply and explicitly, about a shift from script to print. Whatever label is used, it should be understood to cover a large cluster of relatively simultaneous, interrelated changes, each of which needs closer study and more explicit treatment — as the following quick sketch may suggest.

First of all, the marked increase in the output of books and the drastic reduction in the number of man-hours required to turn them out deserve stronger emphasis. At present there is a tendency to think of a steady increase in book production during the first century of printing. An evolutionary model of change is applied to a

situation that seems to call for a revolutionary one:

A man born in 1453, the year of the fall of Constantinople, could look back from his fiftieth year on a lifetime in which about eight million books had been printed, more perhaps than all the scribes of Europe had produced since Constantine founded his city in A.D. 330.<sup>1</sup>

The actual production of "all the scribes of Europe" is inevitably open to dispute. Even apart from the problem of trying to estimate numbers of books that went uncatalogued and then were destroyed, contemporary evidence must be handled with caution, for it often yields false clues to the numbers of books involved. Since it was customary to register many texts bound within one set of covers as but one book, the actual number of texts in a given manuscript collection is not easily ascertained. That objects counted as one book often contained a varying combination of many provides yet another example of the difficulty of quantifying data provided in the age of scribes. The situation is similar when we turn to the problem of counting the man-hours required to copy manuscript books. Old estimates based on the number of months it took forty-five scribes working for the Florentine manuscript book dealer, Vespasiano da Bisticci, to produce two hundred books for Cosimo de Medici's Badia library have been rendered virtually worthless by recent research.

Thus the total number of books produced by "all the scribes of Europe" since 330, or even since 1400, is likely to remain elusive. Nevertheless, some comparisons are possible and they place the output of printers in sharp contrast to preceding trends. "In 1483, the Ripoli Press charged three florins per quinterno for setting up and printing Ficino's translation of Plato's *Dialogues*. A scribe might have charged one florin per quinterno for duplicating the same work. The Ripoli Press produced 1,025 copies; the scribe would have turned out

<sup>1</sup> Michael Clapham, "Printing," *A History of Technology*, vol. 3, *From the Renaissance to the Industrial Revolution*, ed. Charles Singer, E. G. Holmyard, A. R. Hall, and Trevor Williams (Oxford, 1957), 37.

one.”<sup>2</sup> Given this kind of comparison, it seems misguided to suggest that “the multiplication of identical copies” was merely “intensified” by the press.<sup>3</sup> Doubtless, hand copying could be quite efficient for the purpose of duplicating a royal edict or papal bull. Sufficient numbers of copies of a newly edited Bible were produced in the thirteenth century for some scholars to feel justified in referring to a Paris “edition” of a manuscript Bible. To turn out one single whole “edition” of any text was no mean feat in the thirteenth century, however. The one thirteenth-century scribal “edition” might be compared with the large number of Bible editions turned out in the half-century between Gutenberg and Luther. When scribal labor was employed for multiplying edicts or producing a whole “edition” of scripture, moreover, it was diverted from other tasks.

Many valued texts were barely preserved from extinction; untold numbers failed to survive. Survival often hinged on the occasional copy being made by an interested scholar who acted as his own scribe. In view of the proliferation of “unique” texts and of the accumulation of variants, it is doubtful whether one should refer to “identical copies” being “multiplied” before print. This point is especially important when considering technical literature. The difficulty of making even one “identical” copy of a significant technical work was such that the task could not be trusted to any hired hands. Men of learning had to engage in “slavish copying” of tables, diagrams, and unfamiliar terms. The output of whole editions of sets of astronomical tables did not merely “intensify” previous trends. It reversed

<sup>2</sup> Albinia De la Mare, “Vespasiano da Bisticci Historian and Bookseller,” (Ph.D. diss., London University, 1965), 207.

<sup>3</sup> J. H. Harrington, “The Production and Distribution of Books in Western Europe to the Year 1500” (Ph.D. diss., Columbia University, 1956), 3.

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Maps 1 and 2 (opposite and overleaf). The spread of printing in Western Europe during the age of incunabula. These maps, designed by Henri-Jean Martin, show the spread of printing before 1471; from 1471 to 1480; from 1481 to 1490; and from 1491 to 1500. Reprinted from L. Febvre and H.-J. Martin, *L'Apparition du livre (Evolution de l'humanité series)* (Paris: Albin Michel, 1958, facing p. 272), with kind permission of H.-J. Martin and Editions Albin Michel.

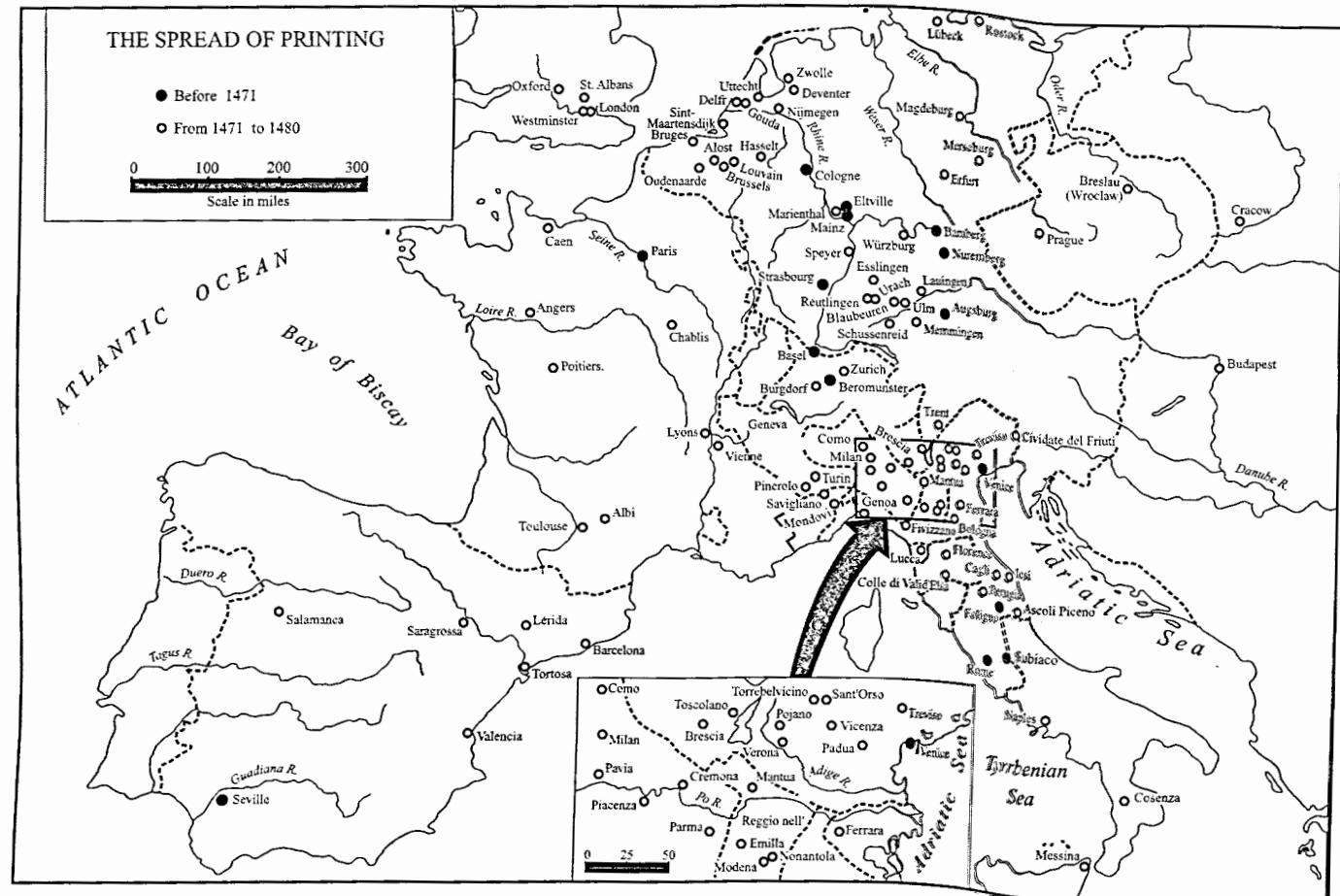
## THE SPREAD OF PRINTING

● Before 1471

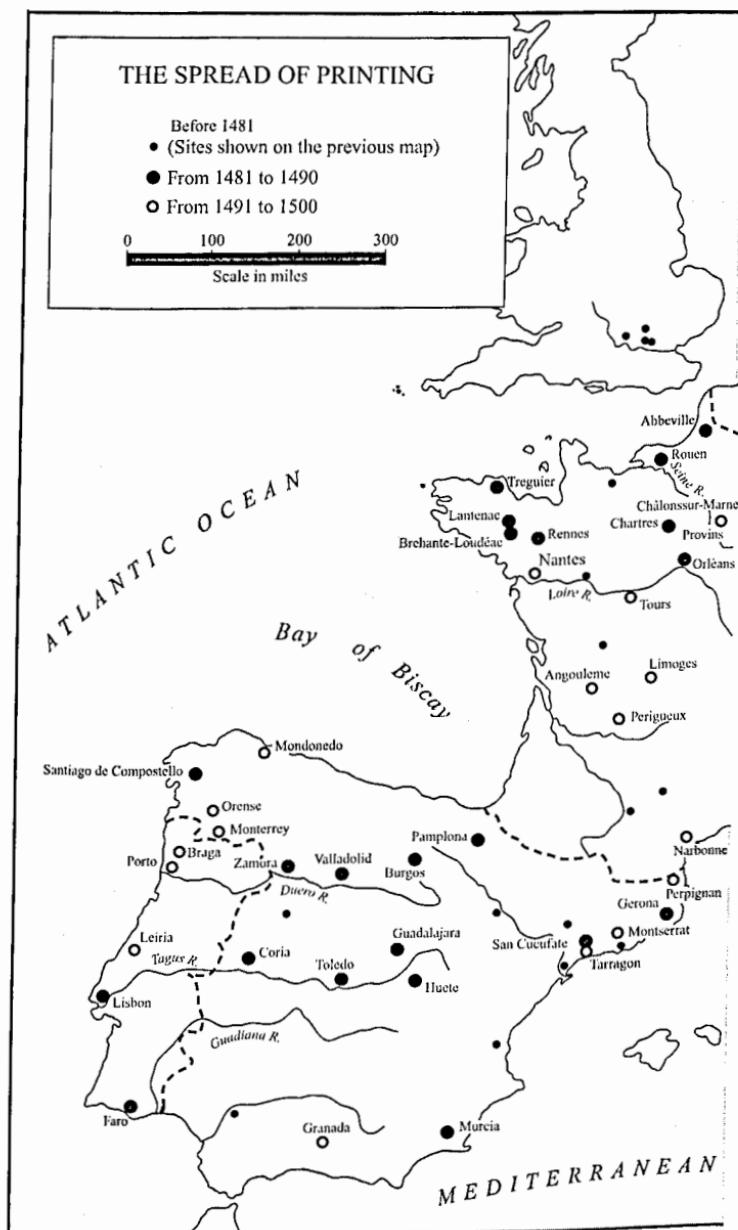
○ From 1471 to 1480

0 100 200 300

Scale in miles



Map I.



Map 2.



Map 2 (continued).

them, producing a new situation which released time for observation and research.

The previous introduction of paper into thirteenth-century Europe, it should be noted, did not have anything like a "similar" effect. Paper production served the needs of merchants, bureaucrats, preachers, and literati; it quickened the pace of correspondence and enabled more men of letters to act as their own scribes. But the same number of man-hours was still required to turn out a given text. Shops run by stationers or *cartolai* multiplied in response to an increasing demand for tablets, notebooks, prepared sheets, and other supplies. In addition to selling writing materials and schoolbooks as well as bookbinding materials and services, some merchants helped book-hunting patrons by locating valued works. They had copies made on commission and kept some for sale in their shops. But their involvement in the book trade was more casual than one might think. "The activities of the *cartolai* were multifarious . . . Those who specialized in the sale and preparation of book materials or in bindings were probably concerned little, if at all, with the production or sale of manuscripts and (later) printed books, either new or secondhand."<sup>4</sup>

Even the retail book trade that was conducted by Vespasiano da Bisticci, the most celebrated Florentine book merchant, who served prelates and princes and "did everything possible" to attract patrons and make sales, never verged on becoming a wholesale business. Despite Vespasiano's unusually aggressive tactics in promoting sales and matching books with clients, he showed no signs of ever "having made much money" from all his transactions.<sup>5</sup> He did win notable patrons, however, and achieved considerable celebrity as "prince of publishers." His shop was praised by humanist poets along lines which were similar to those used in later tributes to Gutenberg and Aldus Manutius. His posthumous fame – achieved only in the nineteenth century after the publication of his memoirs and their

<sup>4</sup> Albinia De la Mare, "Bartolomeo Scala's Dealings with Booksellers, Scribes and Illuminators, 1459–63," *Journal of the Warburg and Courtauld Institutes* XXXIX (1976): 241.

<sup>5</sup> De la Mare, "Vespasiano," pp. 95–7, 226.

use by Jacob Burckhardt – is perhaps even more noteworthy. Vespasiano's *Lives of Illustrious Men* contains a reference to the beautifully bound manuscript books in the Duke of Urbino's library and snobbishly implies that a printed book would have been "ashamed" in such elegant company. This one reference by an atypical and obviously prejudiced bookdealer has ballooned into many misleading comments about the disdain of Renaissance humanists for vulgar machine-made objects. Actually, Florentine bibliophiles were sending to Rome for printed books as early as 1470. Under Guidobaldo da Montefeltro, the ducal library at Urbino acquired printed editions and (shamelessly or not) had them bound with the same magnificent covers as manuscripts. The same court also sponsored the establishment of an early press in 1482. That Vespasiano was indulging in wishful and nostalgic thinking is suggested by his own inability to find sufficient support from princely patrons to persist in his exclusive trade. His chief rival in Florence, Zanobi di Mariano, managed to stay in business until his death in 1495. "Zanobi's readiness to sell printed books – a trade which Vespasiano spurned – explains his survival as a bookseller in the tricky years of the late fifteenth century. Vespasiano dealing exclusively in manuscripts was forced out of business in 1478."<sup>6</sup>

One must wait for Vespasiano to close shop before one can say that a genuine wholesale book trade was launched:

As soon as Gutenberg and Schoeffer had finished the last sheet of their monumental Bible, the financier of the firm, John Fust, set out with a dozen copies or so to see for himself how he could best reap the harvest of his patient investments. And where did he turn first of all to convert his Bibles into money? He went to the biggest university town in Europe, to Paris, where ten thousand or more students were filling the Sorbonne and the colleges. And what did he, to his bitter discomfiture, find there? A well organized and powerful guild of the booktrade, the Confrérie des Libraires, Relieurs, Enlumineurs, Ecrivains et Parcheminiers... founded in 1401... Alarmed at the appearance of an outsider with such

<sup>6</sup> De la Mare, "Bartolomeo Scala's Dealings," 241.

an unheard of treasure of books; when he was found to be selling one Bible after another, they soon shouted for the police, giving their expert opinion that such a store of valuable books could be in one man's possession through the help of the devil himself and Fust had to run for his life or his first business trip would have ended in a nasty bonfire.<sup>7</sup>

This story, as told by E. P. Goldschmidt, may be just as unfounded as the legend that linked the figure of Johan Fust with that of Dr. Faustus. The adverse reaction it depicts should not be taken as typical; many early references were at worst ambivalent. The ones that are most frequently cited associate printing with divine rather than diabolic powers. But then the most familiar references come either from the blurbs and prefaces composed by early printers themselves or from editors and authors who were employed in printing shops. Such men were likely to take a more favorable view than were the guildsmen who had made a livelihood from manuscript books. The Parisian *libraires* may have had good reason to be alarmed, although they were somewhat ahead of the game; the market value of hand-copied books did not drop until after Fust was dead.<sup>8</sup> Other members of the *confrérie* could not foresee that most bookbinders, rubricators, illuminators, and calligraphers would be kept busier than ever after early printers set up shop. Whether the new art was considered a blessing or a curse, whether it was consigned to the Devil or attributed to God, the fact remains that the initial increase in output did strike contemporary observers as sufficiently remarkable to suggest supernatural intervention. Even incredulous modern scholars may be troubled by trying to calculate the number of calves required to supply enough skins for vellum copies of Gutenberg's Bible. It should not be too difficult to obtain agreement that an abrupt rather than a gradual increase did occur in the second half of the fifteenth century.

<sup>7</sup> E. P. Goldschmidt, *Gothic and Renaissance Bookbindings* (Amsterdam, 1967), I:43–4.

<sup>8</sup> De la Mare, "Vespasiano," 113.

Scepticism is much more difficult to overcome when we turn from consideration of quantity to that of quality. If one holds a late manuscript copy of a given text next to an early printed one, one is likely to doubt that any change at all has taken place, let alone an abrupt or revolutionary one.

Behind every book which Peter Schoeffer printed stands a published manuscript... The decision on the kind of letter to use, the selection of initials and decoration of rubrications, the determination of the length and width of the column, planning for margins... all were prescribed by the manuscript copy before him.<sup>9</sup>

Not only did early printers such as Schoeffer try to copy a given manuscript as faithfully as possible, but fifteenth-century scribes returned the compliment. As Curt Bühler has shown, a large number of the manuscripts made during the late fifteenth century were copied from early printed books.<sup>10</sup> Thus handwork and presswork continued to appear almost indistinguishable, even after the printer had begun to depart from scribal conventions and to exploit some of the new features inherent in his art.

That there were new features and they were exploited needs to be given due weight. Despite his efforts to duplicate manuscripts as faithfully as possible, the fact remains that Peter Schoeffer, printer, was following different procedures than had Peter Schoeffer, scribe. The absence of any apparent change in product was combined with a complete change in methods of production, giving rise to the paradoxical combination of seeming continuity with radical change. Thus the temporary resemblance between handwork and presswork seems to support the thesis of a very gradual evolutionary change; yet the opposite thesis may also be supported by underlining the marked difference between the two different modes of production and noting

<sup>9</sup> Hellmut Lehmann-Haupt, *Peter Schoeffer of Gernsheim and Mainz* (Rochester, NY, 1950), 37-8.

<sup>10</sup> Curt Bühler, *The Fifteenth-Century Book, the Scribes, the Printers, the Decorators* (Philadelphia, 1960), 16.

the new features that began to appear before the fifteenth century had come to an end.

Concern with surface appearance necessarily governed the hand-work of the scribe. He was fully preoccupied trying to shape evenly spaced uniform letters in a pleasing symmetrical design. An altogether different procedure was required to give directions to compositors. To do this, one had to mark up a manuscript while scrutinizing its contents. Every manuscript that came into the printer's hands, thus, had to be reviewed in a new way — one which encouraged more editing, correcting, and collating than had the hand-copied text. Within a generation the results of this review were being aimed in a new direction — away from fidelity to scribal conventions and toward serving the convenience of the reader. The highly competitive commercial character of the new mode of book production encouraged the relatively rapid adoption of any innovation that commended a given edition to purchasers. Well before 1500, printers had begun to experiment with the use "of graduated types, running heads . . . footnotes . . . tables of contents . . . superior figures, cross references . . . and other devices available to the compositor" — all registering "the victory of the punch cutter over the scribe."<sup>11</sup> Title pages became increasingly common, facilitating the production of book lists and catalogues, while acting as advertisements in themselves.<sup>12</sup> Hand-drawn illustrations were replaced by more easily duplicated woodcuts and engravings — an innovation which eventually helped to revolutionize technical literature by introducing "exactly repeatable pictorial statements" into all kinds of reference works.

The fact that identical images, maps, and diagrams could be viewed simultaneously by scattered readers constituted a kind of communications revolution in itself. This point has been made most forcefully by William Ivins, a former curator of prints at the Metropolitan Museum.<sup>13</sup> Although Ivins's special emphasis on

<sup>11</sup> Steinberg, *Five Hundred Years*, 28.

<sup>12</sup> *Ibid.*, 145.

<sup>13</sup> William M. Ivins Jr., *Prints and Visual Communication* (Cambridge, MA, 1953).

**Q**uid loquar de sceli hominibz  
ius Paulus uas eleemos et magistrorum  
genauum. qui de constanza tua in se hos  
pros loquuntur dicens. An experimentum querimus  
eius qui in me loquitur illius. Post Damas-  
cum Iulianusq; lustrum ascenderet psalmam  
ut uidet Petrum. et manserit apud eum diebus  
quindam. Hoc enim mysteria abdumadis et og-  
tadis futurus genitum predicatorum instruendus  
erat. Kursusq; post annos quatuordecim assumptus  
et Barnaba et Tito expulserit cum apostolo  
euangelium. ne formam misericordie nunc auar-  
rister. **H**abebit uelatio quid latentes energie  
vive uocis actus. et in aures discipuli de auctoribus  
acte transuersa foratus sonat. Et Iude et Etymes  
in Rodi exhalant. et leguntur illa Demosthenes  
oratio quam aduersus eum habuerat. in manibus  
auctis atque laudabilitibz suspirans ant. **F**undit  
ipsam audirens bestiam sua uestra resonantem.

**Q**uid loquar de sceli hominibz  
ius aplius paulus uas electorum.  
et magistrorum genitum. qui de conscientia  
taciti se hospitis loquuntur dices. An  
experimentum querimus eius qui in me  
loquitur Christus. Post damascum arabianum  
lustratum. alcedit iherosolimam ut uidet  
petrum et malum apud eum diebus quindam.  
Hoc cui multio abdumadis et og-  
tadis futurus genitum predicatorum instruendus  
erat. Kursusq; post annos quatuor-  
decim assumptus barnaba et tito. ego  
sicut eum euangelium. ne forte in va-  
cuum curaret aut rururisset. **H**abebit  
uelatio quid latentes energie. vive uocis  
actus. et in aures discipuli de auctoribus

Fig. 2. The similarity of handwork and presswork is demonstrated by these two pages, one taken from a hand-copied Bible (the so-called Giant Bible of Mainz) and the other from a printed Bible (the celebrated Gutenberg Bible). Reproduced by kind permission of the Rare Book and Special Collections Division of the Library of Congress.

"the exactly repeatable pictorial statement" has found favor among historians of cartography,<sup>14</sup> his propensity for overstatement has provoked objections from other specialists. Repeatable images, they argue, go back to ancient seals and coins, while exact replication was scarcely fostered by woodblocks, which got worn and broken after repeated use. Here as elsewhere, one must be wary of underrating as well as of overestimating the advantages of the new technology. Even while noting that woodcuts did get corrupted when copied for insertion in diverse kinds of texts, one should also consider the corruption that occurred when hand-drawn images had to be copied into hundreds of books. Although pattern books and "pouncing" techniques were available to some medieval illuminators, the precise reproduction of fine detail remained elusive until the advent of woodcarving

<sup>14</sup> See, e.g., Leo Bagrow, *History of Cartography*, rev. and ed. R. A. Skelton (Cambridge, MA, 1964), 89; R. A. Skelton, *Maps: A Historical Survey* (Chicago, 1972), 12; and Arthur H. Robinson, "Map Making and Map Printing," in *Five Centuries of Map Printing*, ed. David Woodward (Chicago, 1975), 1.

and engraving. Blocks and plates did make repeatable visual aids feasible for the first time. In the hands of expert craftsmen using good materials and working under supervision, even problems of wear and tear could be circumvented: worn places could be sharpened, blurred details refined, and a truly remarkable durability achieved.

It is not so much in his special emphasis on the printed image but rather in his underrating the significance of the printed text that Ivins seems to go astray. Although he mentions in passing that the history of prints as "an integrated series" begins with their use "as illustrations in books printed from movable types,"<sup>15</sup> his analysis elsewhere tends to detach the fate of printed pictures from that of printed books. His treatment implies that the novel effects of repeatability were confined to pictorial statements. Yet these effects were by no means confined to pictures or, for that matter, to pictures and words. Mathematical tables, for example, were also transformed. For scholars concerned with scientific change, what happened to numbers and equations is surely just as significant as what happened to either images or words. Furthermore, many of the most important pictorial statements produced during the first century of printing employed various devices – banderoles, letter-number keys, indication lines – to relate images to texts. To treat the visual aid as a discrete unit is to lose sight of the connecting links which were especially important for technical literature because they expressed the relationship between words and things.

Even though block print and letterpress may have originated as separate innovations and were initially used for diverse purposes (so that playing cards and saints' images, for example, were being stamped from blocks at the same time that hand illumination continued to decorate many early printed books), the two techniques soon became intertwined. The use of typography for texts led to that of xylography for illustration, sealing the fate of the illuminator along with that of the scribe. When considering how technical literature was affected by the shift from script to print, it seems reasonable to

<sup>15</sup> Ivins, *Prints and Visual Communication*, 27.

adopt George Sarton's strategy of envisaging a "double invention; typography for the text, engraving for the images."<sup>16</sup> The fact that letters, numbers, and pictures were all subject to repeatability by the end of the fifteenth century needs more emphasis. That the printed book made possible new forms of interplay between these diverse elements is perhaps even more significant than the change undergone by picture, number, or letter alone.

The preparation of copy and illustrative material for printed editions also led to a rearrangement of book-making arts and routines. Not only did new skills, such as typefounding and presswork, involve veritable occupational mutations, but the production of printed books also gathered together in one place more traditional variegated skills. In the age of scribes, book making had occurred under the diverse auspices represented by stationers and lay copyists in university towns; illuminators and miniaturists trained in special ateliers; goldsmiths and leather workers belonging to special guilds; monks and lay brothers gathered in scriptoria; royal clerks and papal secretaries working in chanceries and courts; preachers compiling books of sermons on their own; humanist poets serving as their own scribes. The advent of printing led to the creation of a new kind of shop structure; to a regrouping which entailed closer contacts among diversely skilled workers and encouraged new forms of cross-cultural interchange.

Thus it is not uncommon to find former priests among early printers or former abbots serving as editors and correctors. University professors also often served in similar capacities and thus came into closer contact with metal workers and mechanics. Other fruitful forms of collaboration brought together astronomers and engravers, physicians and painters, dissolving older divisions of intellectual labor and encouraging new ways of coordinating the work of brains, eyes, and hands. Problems of financing the publication of the large Latin volumes that were used by late medieval faculties of theology, law, and medicine also led to the formation of partnerships that

<sup>16</sup> George Sarton, *The Appreciation of Ancient and Medieval Science during the Renaissance 1450–1600*, 2nd ed. (New York, 1958), xi.

brought rich merchants and local scholars into closer contact. The new financial syndicates that were formed to provide master printers with needed labor and supplies brought together representatives of town and gown.

As the key figure around whom all arrangements revolved, the master printer himself bridged many worlds. He was responsible for obtaining money, supplies, and labor, while developing complex production schedules, coping with strikes, trying to estimate book markets, and lining up learned assistants. He had to keep on good terms with officials who provided protection and lucrative jobs, while cultivating and promoting talented authors and artists who might bring his firm profits or prestige. In those places where his enterprise prospered and he achieved a position of influence with fellow townsmen, his workshop became a veritable cultural center attracting local literati and celebrated foreigners, providing both a meeting place and message center for an expanding cosmopolitan Commonwealth of Learning.

Some manuscript bookdealers, to be sure, had served rather similar functions before the advent of printing. That Italian humanists were grateful to Vespasiano da Bisticci for many of the same services that were later rendered by Aldus Manutius has already been noted. Nevertheless, the shop structure over which Aldus presided differed markedly from that known to Vespasiano. As the prototype of the early capitalist as well as the heir to Atticus and his successors, the printer embraced an even wider repertoire of roles. Aldus's household in Venice, which contained some thirty members, has recently been described by Martin Lowry as an "almost incredible mixture of the sweat shop, the boarding house and the research institute."<sup>17</sup> A most interesting study might be devoted to a comparison of the occupational culture of Peter Schoeffer, printer, with that of Peter Schoeffer, scribe. Unlike the shift from stationer to publisher, the shift from scribe to printer represented a genuine occupational mutation. Although Schoeffer was the first to make the leap, many others took the same route before the century's end.

<sup>17</sup> Martin Lowry, *The World of Aldus Manutius: Business and Scholarship in Renaissance Venice* (Oxford, 1979), 94.

Judging by Lehmann-Haupt's fine monograph, many of Schoeffer's pioneering activities were associated with the shift from a retail trade to a wholesale industry. "For a while the trade in printed books flowed within the narrow channels of the manuscript book market. But soon the stream could no longer be contained." New distribution outlets were located; handbills, circulars, and sales catalogues were printed; and the books themselves were carried down the Rhine, across the Elbe, west to Paris, south to Switzerland. The drive to tap markets went together with efforts to hold competitors at bay by offering better products or, at least, by printing a prospectus advertising the firm's "more readable" texts, "more complete and better arranged" indexes, "more careful proof-reading" and editing. Officials serving archbishops and emperors were cultivated, not only as potential bibliophiles and potential censors, but also as potential customers who issued a steady flow of orders for the printing of ordinances, edicts, bulls, indulgences, broadsides, and tracts. By the end of the century, Schoeffer had risen to a position of eminence in the city of Mainz. He commanded a "far-flung sales organization," had become a partner in a joint mining enterprise, and had founded a printing dynasty. His supply of types went to his sons upon his death, and the Schoeffer firm continued in operation, expanding to encompass music printing, through the next generation.<sup>18</sup>

As the foregoing may suggest, there are many points of possible contrast between the activities of the Mainz printer and those of the Paris scribe. Competitive and commercial drives were not entirely absent among the stationers who served university faculties, the lay scribes who were hired by mendicant orders, or the semi-lay copyists who belonged to communities founded by the Brethren of the Common Life. But they were muted in comparison with the later efforts of Schoeffer and his competitors to recoup initial investments, pay off creditors, use up reams of paper, and keep pressmen employed. The manuscript bookdealer did not have to worry about idle machines or striking workmen as did the printer. It has been suggested, indeed, that the mere act of setting up a press in a monastery or in affiliation

<sup>18</sup> See Lehmann-Haupt, *Peter Schoeffer*, passim.

Q V I N T A  
M U S C U L O -  
R V M T A -  
B R L A .

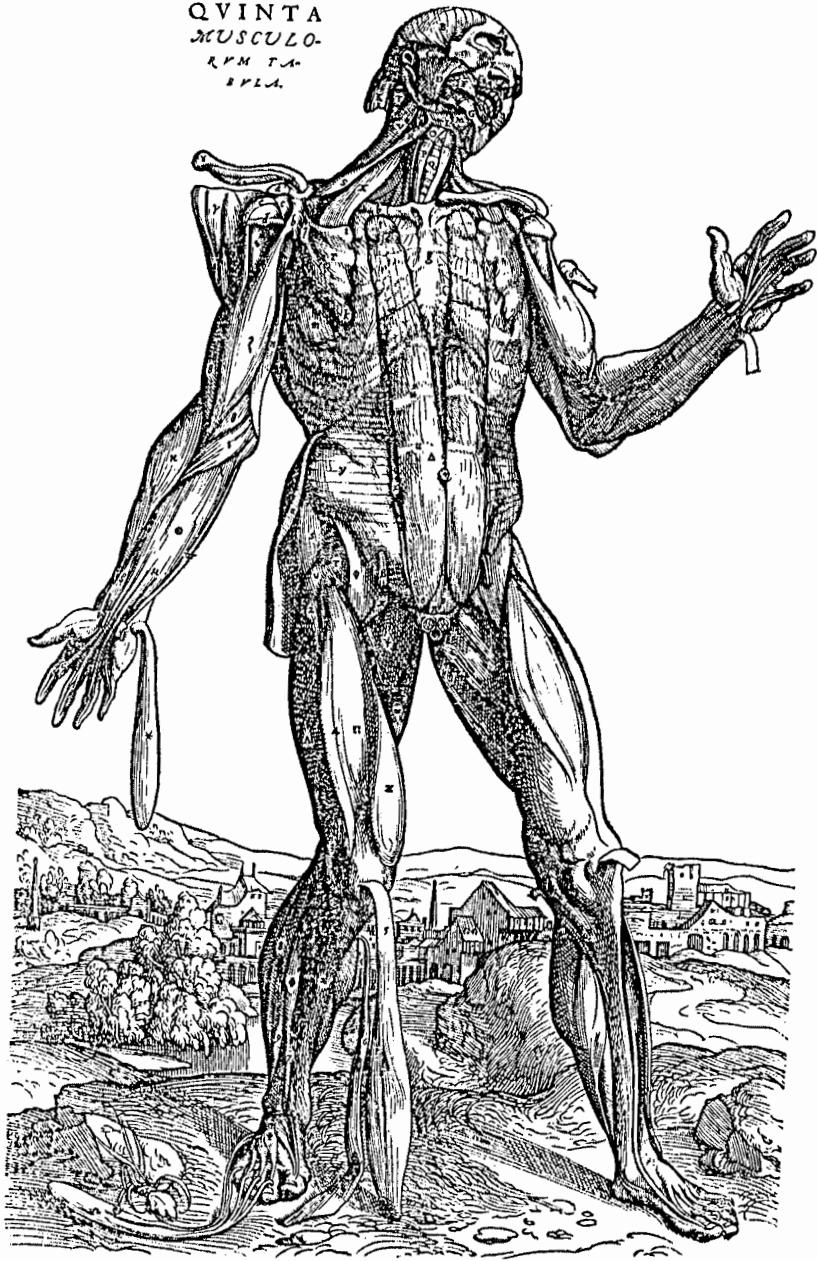


Fig. 3 (above and opposite). This example of a visual aid keyed to a text comes from Andreas Vesalius, *De humani corporis fabrica libri septem* (Basel: Johann Oporinus, 1555, pp. 224–5). Reproduced by kind permission of the Folger Shakespeare Library.

*L* Os v imaginem referens, à quo primum & secundum & tertium par eorum qui id mouent musculorum recessimus.

*M* Primus & secundus linguae musculi ab osse v referente pronati.

*N* Laryngis cartilago scutum referens, & iam narrandi musculi adhuc obtecta.

*O* Dexter duorum muscularum, qui ab ossे v referente, in cartilaginem scutum similem inferuntur.

*P* Dexter duorum muscularum, qui à pectoris ossе scutum imitanti laryngis cartilagini inferuntur. Ad huius musculi extermus latus, congeries iusit soporarie arterie, interior uena iugularis, & sexti cerebri nervorum pars.

*Q* Asperae arterie anterior sedes.

*R,S* Musculus q̄si v referenti proprius, & a capite superiori costa enatus. Singuli characteres singulos ipsius indicant ventres. Pars autem in horum medio confertens, eius musculi sedes est, tendinis substantiae non absimilis.

*T* Portio muscularum secundi paris caput mouentium.

*U* Tertius scapulam mouentium musculus, ex transuersis superiorum cervicis vertebrarum processibus initium ducens.

*X* Quoniam hic locus nihil aliud peculiariter, quam septima tabula in homine ostendit: & quia in Galeni uerba iurata, ipsius sententia, quem hac pingitur, plus aquo fauimus: musculum hic ex cane delineatum certis, quo homines prorsus desinuntur, & qui Galeno tertius thoracem mouentium habent, sequentia tabula integrerat Γ non tardus.

*Y* Dexiri lateris claviculam hic à pectoris ossе auius simus, adhuc summum humero connexam, & sibi adhuc muscularum seruantem, qui thoracis motorum primus numerabitur, hicq; Z insignitur.

*a* Summus humerus, seu caput elatior processus.

*b* Interior demissor ue scapule processus.

*c* Ligamentum brachij ossis ad scapulam articuli peculiarium quarum ab interiori capite processu summum petens humerum.

*d* Ligamentum teres, ab apice interioris scapule processus, in anteriorem sedem externi capiti humeri inferum, ac huius articuli, post membrane omnibus articulis commune, primum.

*e* Aliud teres ligamentum, ex eminentissima scapule acetabuli sede, ad externum quoq; humericu caput processens, atq; huius articuli peculiarium ligamentorum secundum.

*f* Ita sepe duo ligamenta, d & e insignita, suis lateribus uniuersit, & uelut transuersum efformant ligamentum, transmittens caput externum musculi cubitum flecentium anterioris, ac mox 3 notandi.

*g* Pectoris os, cui septem superiorum costalarum cartilagineis strinq; connectuntur.

*h* Prima thoraci costa: reliqua deinde etiam, una cum ipsarum interervallo, circa characterum open sunt conspicue.

*Γ* Musculus scapulam mouentium primus. i & k huius musculi principium notant, quandam manus speciem i,k,l. perinde in exortu, ac musculus ipsius succumbens, & m insignitus, in insertione representans. l tendens presentis musculi indicat. Porro i,k & l simul, huius musculi trianguli speciem quodammodo ostendunt.

*m* Musculus, qui à scapule basi pronatis, oculo superioribus thoraci costis inscribitur.

*Δ* Dexter rectorum abdominis muscularum. Ac n carneum recti abdominis musculi principium, triangulo non n,o. absimile notato, o principium eiusdem musculi nerveum inscribitur, penè uniuersum efformans musculum. Trop. q. to interuerso, à p ad q pertinente, recti abdominis musculi interni suis lateribus inuicem contingunt. Tota autem sedes supra q, aut mox supra umbilicum consistente, tanto magis musculi tenuis sciunguntur, quanto altius descendunt. Ceterum q notabili etiam obliquorum abdominis muscularum nerveos tenuitatis, ad transuersim r. abdominis musculum, hoc in parte ad pectoris usq; sedem connexum. Porro r linea insignitur, que carnem re Elii musculi partem finit, queq; ultimi ipsius insertionis in homine est portio, ut in quartata tabula ad characteres rem n est cernere. Intercedente igitur ab r ad s pertinente, se ostendit recti abdominis musculi tendens seu t. membrana, excarnis ue musculi pars. t autem indicat carneam musculi sedem, prima costa, & secunda thora cui inseritam, estq; latius ille tendo & carnea hec pars, quem Galenus quintum thorace mouentium enumerat, in hominibus haudquaquam, ut in caudatis simis & canibus, conspicuus. Nos autem hic illum, Galenum intelligendi gratia, delineauimus, quod alioquin hac pectore se de, sequentium duarum tabularum per floribus erat absq; his musculis responsura. Postremo, u,u,u notantur inscriptiones, seu nervea delineamenta, transuersim recto musculo impressa, quibus oblique ascendens musculi nervea exilitas pertinacissime connotatur.

*x* Linea hec portiunculam notat musculi abdominis oblique ascendens, qua ī transuerso abdominis musculo inibi adeo uadile committitur, ut inter diffecandum, nisi reliquo eiusmodi signo, à transuerso liberari nequeat.

*y* Transuersus abdominis musculus.

*z* Oblique ascendens abdominis musculus, ab abdomine hic reflexus.

β Uasorum

OFFICINÆ TYPOGRA-  
PHICÆ DELINEATIO.



EN THYMI sculptoris opus, quo prodidit una  
Singula chalcographi munera rite gregis.  
Et correctorum curas, operasq; regentum,  
Quasq; gerit lector, compositoq; vices.  
Ut vulgus fileam, tu qui legis ista, libello  
Fac iteratâ animi sedulitate satis.  
Sic meritæ cumulans hinc fertilitatis honores,  
Ceu pictura oculos, intima mentis ages.

PICTURE OF A PRINTING OFFICE



This cut, the work of Thymius' accurate hand  
Shows all at once how printing shops are manned:  
The masters' duties, the correctors' chores,  
The work of readers and compositors.  
To this small book then you'll apply your mind  
Good reader, if you're not the vulgar kind,  
So that a picture in your mind may rise  
To match this picture that's before your eyes.

with a religious order was a source of disturbance, bringing "a multitude of worries about money and property" into space previously reserved for meditation and good works.<sup>19</sup>

As self-serving publicists, early printers issued book lists, circulars, and broadsides. They put their firm's name, emblem, and shop address on the front page of their books. Indeed, their use of title pages entailed a significant reversal of scribal procedures; they put themselves first. Scribal colophons had come last. They also extended their new promotional techniques to the authors and artists whose work they published, thus contributing to new forms of personal celebrity. Reckon masters and instrument makers along with professors and preachers also profited from book advertisements that spread their fame beyond shops and lecture halls. Studies concerned with the rise of a lay intelligentsia, with the new dignity assigned to artisan crafts, or with the heightened visibility achieved by the "capitalist spirit" might well devote more attention to these early practitioners of the advertising arts.

Their control of a new publicity apparatus, moreover, placed early printers in an exceptional position with regard to other enterprises. They not only sought ever larger markets for their own products, but they also contributed to, and profited from, the expansion of other commercial enterprises. What effects did the appearance of new advertising techniques have on sixteenth-century commerce and industry? Possibly some answers to this question are known. Probably others can still be found. Many other aspects of job printing and the changes it entailed clearly need further study. The printed calendars and indulgences that were first issued from the Mainz workshops of Gutenberg and Fust, for example, warrant at least as much

<sup>19</sup> Wytze Hellinga, "Thomas A. Kempis – The First Printed Editions," *Quaerendo* IV (1974): 4–5.

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Fig. 4 (opposite). A master printer in his shop. The Latin verse and woodblock first appeared in Jerome Hornschuch, *Orthotypographia* (Leipzig: M. Lantzenberger, 1608). The English translation comes from a facsimile edition, edited and translated by Philip Gaskell and Patricia Bradford (Cambridge University Library, 1972, p. xvi). Reproduced by kind permission of the Cambridge University Library.

attention as the more celebrated Bibles. Indeed, the mass production of indulgences illustrates rather neatly the sort of change that often goes overlooked, so that its consequences are more difficult to reckon with than perhaps they need be.

In contrast to the changes that have just been noted, those that were associated with the consumption of new printed products are more intangible, indirect, and difficult to handle. A large margin for uncertainty must be left when dealing with such changes.

On the difficult problem of estimating literacy rates before and after printing, the comments of Carlo Cipolla seem cogent:

It is not easy to draw a general conclusion from the scattered evidence that I have quoted and from the similarly scattered evidence that I have not quoted . . . I could go on to conclude that at the end of the sixteenth century "there were more literate people than we generally believe" . . . I could equally conclude that "there were less literate people than we generally believe" for in all truth one never knows what it is that "we generally believe" . . . one could venture to say that at the end of the sixteenth century the rate of illiteracy for the adult population in Western Europe was below 50 percent in the towns of the relatively more advanced areas and above 50 percent in all rural areas as well as in the towns of the backward areas. This is a frightfully vague statement . . . but the available evidence does not permit more precision.<sup>20</sup>

In view of the fragmentary evidence that is available and the prolonged fluctuations that were entailed, it would seem prudent to bypass vexed problems associated with the spread of literacy until other issues have been explored with more care. That there are other issues worth exploring – apart from the expansion of the reading public or the "spread" of new ideas – is in itself a point that needs underlining (and that will be repeatedly underscored in this book). When considering the *initial* transformations wrought by print, at all events, changes undergone by groups who were already literate ought

<sup>20</sup> Carlo M. Cipolla, *Literacy and Development in the West* (London, 1969), 60.

to receive priority over the undeniably fascinating problem of how rapidly such groups were enlarged.

Once attention has been focused on the already literate sectors, it becomes clear that their social composition calls for further thought. Did printing at first serve prelates and patricians as a "divine art," or should one think of it rather as the "poor man's friend"? It was described in both ways by contemporaries and probably served in both ways as well. When one recalls scribal functions performed by Roman slaves or later by monks, lay brothers, clerks, and notaries, one may conclude that literacy had never been congruent with elite social status. One may also guess that it was more compatible with sedentary occupations than with the riding and hunting favored by many squires and lords. In this light, it may be misguided to envisage the new presses as making available to low-born men products previously used only by the high born. That many rural areas remained untouched until after the coming of the railway age seems likely. Given the large peasant population in early modern Europe and the persistence of local dialects which imposed an additional language barrier between spoken and written words, it is probable that only a very small portion of the entire population was affected by the initial shift. Nevertheless, within this relatively small and largely urban population, a fairly wide social spectrum may have been involved. In fifteenth-century England, for example, mercers and scriveners engaged in a manuscript book trade were already catering to the needs of lowly bakers and merchants as well as to those of lawyers, aldermen, or knights. The proliferation of literate merchants in fourteenth-century Italian cities is no less notable than the presence of an illiterate army commander in late sixteenth-century France.

It would be a mistake, however, to assume that a distaste for reading was especially characteristic of the nobility, although it seems plausible that a distaste for Latin pedantry was shared by lay aristocrat and commoner alike. It also remains uncertain whether one ought to describe the early reading public as being "middle class." Certainly extreme caution is needed when matching genres of books with groups of readers. All too often it is taken for granted that "low-brow" or "vulgar" works reflect "lower-class" tastes, despite contrary

evidence offered by authorship and library catalogues. Before the advent of mass literacy, the most "popular" works were those which appealed to diverse groups of readers and not just to the plebes.

Divisions between Latin- and vernacular-reading publics are also much more difficult to correlate with social status than many accounts suggest. It is true that the sixteenth-century physician who used Latin was regarded as superior to the surgeon who did not, but it is also true that neither man was likely to belong to the highest estates of the realm. Insofar as the vernacular-translation movement was aimed at readers who were unlearned in Latin, it was often designed to appeal to pages as well as to apprentices; to landed gentry, cavaliers, and courtiers as well as to shopkeepers and clerks. In the Netherlands, a translation from Latin into French often pointed away from the urban laity, who knew only Lower Rhenish dialects, and toward relatively exclusive courtly circles. At the same time, a translation into "Dutch" might be aimed at preachers who needed to cite scriptural passages in sermons rather than at the laity (which is too often assumed to be the only target for "vernacular" devotional works). Tutors trying to educate young princes, instructors in court or church schools, and chaplains translating from Latin in response to royal requests had pioneered in "popularizing" techniques even before the printer set to work.

But the most vigorous impetus given to popularization before printing came from the felt need of preachers to keep their congregations awake and also to hold the attention of diverse outdoor crowds. Unlike the preacher, the printer could only guess at the nature of the audience to which his work appealed. Accordingly, one must be especially careful when taking the titles of early printed books as trustworthy guides to readership. A case in point is the frequent description of the fifteenth-century picture Bible, which was issued in both manuscript and then blockbook form, as the "poor man's" Bible. The description may well be anachronistic, based on abbreviating the full Latin title given to such books. The *Biblia pauperum praedicatorum* was aimed not at poor men but at poor preachers who had a mere smattering of Latin and found scriptural exposition easier when given picture books as guides. Sophisticated analysts have suggested the need to discriminate between actual readership as

determined by library catalogues, subscription lists, and other data (with due allowance made, of course, for the fact that many book buyers are more eager to display than to read their purchases) and the more hypothetical targets envisaged by authors and publishers. All too often, titles and prefaces are taken as evidence of the actual readership although they are nothing of the kind.

Information on the spread of reading and writing . . . must be supplemented by analysis of contents; this in turn provides circumstantial evidence on the composition of the reading public: a cookbook . . . reprinted eight or more times in the XVth century was obviously read by people concerned with the preparation of food, the *Doctrinal des Filles* . . . a booklet on the behavior of young women, primarily by "filles" and "mesdames."<sup>21</sup>

Such "circumstantial evidence," however, is highly suspect. Without passing judgment on the audience for early cookbooks (its character seems far from obvious to me), booklets pertaining to the behavior of young ladies were probably also of interest to male tutors or confessors or guardians. The circulation of printed etiquette books had wide-ranging psychological ramifications; their capacity to heighten the anxiety of parents should not go ignored. Furthermore, such works were probably also read by authors, translators, and publishers of other etiquette books. That authors and publishers were wide-ranging readers needs to be perpetually kept in mind. Even those sixteenth-century poets who shunned printers and circulated their verse in manuscript form<sup>22</sup> took advantage of their own access to printed materials. It has been suggested that books describing double-entry bookkeeping were read less by merchants than by the writers of accountancy books and teachers of accountancy. One wonders whether there were not more playwrights and poets than shepherds who studied so-called *Shepherd's Almanacks*. Given the corruption of data transmitted over the centuries, given

<sup>21</sup> Hirsch, *Printing, Selling*, 7.

<sup>22</sup> J. W. Saunders, "From Manuscript to Print: A Note on the Circulation of Poetic Manuscripts in the Sixteenth Century," *Proceedings of the Leeds Philosophical and Literary Society* VI (May 1951): 507–28.

the false remedies and impossible recipes contained in medical treatises, one hopes that they were studied more by poets than by physicians. Given the exotic ingredients described, one may assume that few apothecaries actually tried to concoct all the recipes contained in early printed pharmacopeia, although they may have felt impelled to stock their shelves with bizarre items just in case the new publicity might bring such items into demand. The purposes, whether intended or actual, served by some early printed handbooks offer puzzles that permit no easy solution. What was the point of publishing vernacular manuals outlining procedures that were already familiar to all skilled practitioners of certain crafts? It is worth remembering, in any event, that the gap between shoproom practice and classroom theory was just becoming visible during the first century of printing and that many so-called practical handbooks and manuals contained impractical, even injurious, advice.

While conjectures about social and psychological transformations can be postponed, certain points should be noted here. One must distinguish, as Altick suggests, between literacy and habitual book reading. By no means all who mastered the written word have, down to the present, become members of a book-reading public.<sup>23</sup> Learning *to read* is different, moreover, from learning *by reading*. Reliance on apprenticeship training, oral communication, and special mnemonic devices had gone together with mastering letters in the age of scribes. After the advent of printing, however, the transmission of written information became much more efficient. It was not only the craftsman outside universities who profited from the new opportunities to teach himself. Of equal importance was the chance extended to bright undergraduates to reach beyond their teachers' grasp. Gifted students no longer needed to sit at the feet of a given master in order to learn a language or academic skill. Instead, they could swiftly achieve mastery on their own, even by sneaking books past their tutors -- as did the young would-be astronomer, Tycho Brahe. "Why should old men be preferred to their juniors now that it is possible for

<sup>23</sup> Richard Altick, *The English Common Reader: A Social History of the Mass Reading Public 1800-1900* (Chicago, 1963), 31.

the young by diligent study to acquire the same knowledge?" asked the author of a fifteenth-century outline of history.<sup>24</sup>

As learning by reading took on new importance, the role played by mnemonic aids was diminished. Rhyme and cadence were no longer required to preserve certain formulas and recipes. The nature of the collective memory was transformed.

In Victor Hugo's *Notre Dame de Paris* a scholar, deep in meditation in his study... gazes at the first printed book which has come to disturb his collection of manuscripts. Then... he gazes at the vast cathedral, silhouetted against the starry sky... "Ceci tuera cela," he says. The printed book will destroy the building. The parable which Hugo develops out of the comparison of the building, crowded with images, with the arrival in his library of a printed book might be applied to the effect on the invisible cathedrals of memory of the past of the spread of printing. The printed book will make such huge built-up memories, crowded with images, unnecessary. It will do away with habits of immemorial antiquity whereby a "thing" is immediately invested with an image and stored in the places of memory.<sup>25</sup>

To the familiar romantic theme of the Gothic cathedral as an "encyclopedia in stone," Frances Yates has added a fascinating sequel by her study of the long-lost arts of memory. Not only did printing eliminate many functions previously performed by stone figures over portals and stained glass in windows, but it also affected less-tangible images by eliminating the need for placing figures and objects in imaginary niches located in memory theaters. By making it possible to dispense with the use of images for mnemonic purposes, printing reinforced iconoclastic tendencies already present among many Christians. Successive editions of Calvin's *Institutes* elaborated on the need to observe the Second Commandment. The favorite text of the defenders of images was the dictum of Gregory the Great that

<sup>24</sup> Jacopo Filippo Foresti, "Supplementum Chronicarum" (Venice, 1483), cited by Martin Lowry, *The World of Aldus Manutius*, 31.

<sup>25</sup> Frances Yates, *The Art of Memory* (London, 1966), 131.

statues served as "the books of the illiterate."<sup>26</sup> Although Calvin's scornful dismissal of this dictum made no mention of printing, the new medium did underlie the Calvinist assumption that the illiterate should not be given graven images but should be taught to read. In this light it may seem plausible to suggest that printing fostered a movement "from image culture to word culture," a movement which was more compatible with Protestant bibliolatry and pamphleteering than with the baroque statues and paintings sponsored by the post-Tridentine Catholic church.

Yet the cultural metamorphosis produced by printing was really much more complicated than any single formula can possibly express. For one thing, engraved images became more, rather than less, abundant after the establishment of print shops throughout Western Europe. For another thing, Protestant propaganda exploited printed image no less than printed word – as numerous caricatures and cartoons may suggest. Even religious imagery was defended by some Protestants, and on the very grounds of its compatibility with print culture. Luther himself commented on the inconsistency of iconoclasts who tore pictures off walls while handling the illustrations in Bibles reverently. Pictures "do no more harm on walls than in books," he commented and then, somewhat sarcastically, stopped short of pursuing this line of thought: "I must cease lest I give occasion to the image breakers never to read the Bible or to burn it."<sup>27</sup>

If we accept the idea of a movement from image to word, furthermore, we will be somewhat at a loss to account for the work of Northern artists, such as Dürer or Cranach or Holbein, who were affiliated with Protestantism and yet owed much to print. As Dürer's career may suggest, the new arts of printing and engraving, far from reducing the importance of images, increased opportunities for image makers and helped to launch art history down its present path. Even

<sup>26</sup> Myron P. Gilmore, "Italian Reactions to Erasmian Humanism," *Itinerarium Italicum*, ed. H. Oberman (Leiden, 1975), 87–8.

<sup>27</sup> Martin Luther, "Against the Heavenly Prophets in the Matter of Images and Sacraments" (1525), *Luther's Works XL*, ed. C. Bergendorff and H. T. Lehmann (Philadelphia, 1958), 99–100.

## A R S M E M O R I A E.

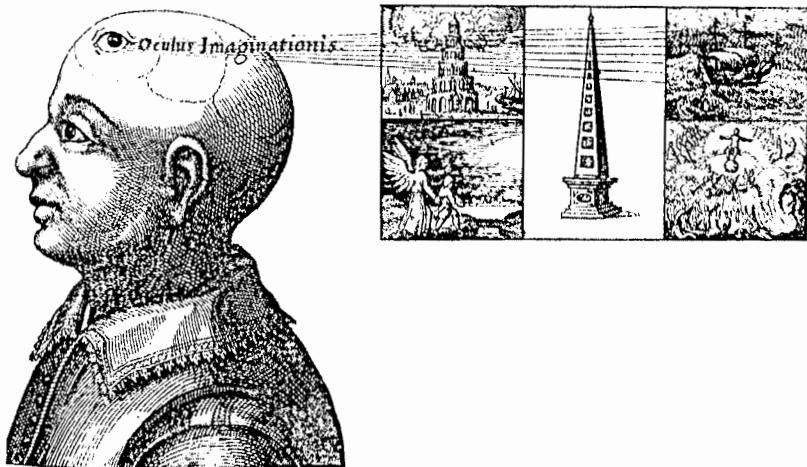


Fig. 5. Seeing with a “third eye” in the seventeenth century. After their original functions were outmoded, ancient memory arts acquired an occult significance and received a new lease on life in printed form. From Robert Fludd, *Utriusque cosmi maioris...* (Oppenheim: Johan-Theodor de Bry, typis Hieronymi Galleri, 1621, II, 47). Reproduced by kind permission of the Folger Shakespeare Library.

the imaginary figures and memory theaters described by Frances Yates did not vanish when their mnemonic functions were outmoded, but received a “strange new lease on life.” They provided the content for magnificent emblem books and for elaborate baroque illustrations to Rosicrucian and occult works in the seventeenth century. They also helped to inspire an entirely new genre of printed literature – the didactic picture book for children. Leipzig boys in Leibniz’s day “were brought up on Comenius’ picture book and Luther’s Catechism.”<sup>28</sup> In this form, the ancient memory images reentered the imagination of Protestant children, ultimately supplying Jung and his followers with evidence that suggested the hypothesis of a collective unconscious. Surely the new vogue for image-packed emblem books was no

<sup>28</sup> Yates, *Art of Memory*, 134, 377.

less a product of sixteenth-century print culture than was the imageless "Ramist" textbook.

Furthermore, in certain fields of learning, such as architecture, geometry, or geography, and many of the life sciences as well, print culture was not merely incompatible with the formula offered above; it actually increased the functions performed by images while reducing those performed by words. Many fundamental texts of Ptolemy, Vitruvius, Galen, and other ancients had lost their illustrations in the course of being copied for centuries and regained them only after script was replaced by print. To think in terms of a movement going from image to word points technical literature in the wrong direction. It was not the "printed word" but the "printed image" which acted as a "savior for Western science" in George Sarton's view. Within the Commonwealth of Learning it became increasingly fashionable to adopt the ancient Chinese maxim that a single picture was more valuable than many words.<sup>29</sup> In early Tudor England, Thomas Elyot expressed a preference for "figures and charts" over "hearing the rules of a science"<sup>30</sup> which seems worth further thought. Although images were indispensable for prodding memory, a heavy reliance on verbal instruction had also been characteristic of communications in the age of scribes. To be sure, academic lectures were sometimes supplemented by drawing pictures on walls; verbal instructions to apprentices were accompanied by demonstrations; the use of blocks and boards, fingers and knuckles were common in teaching reckoning; and gestures usually went with the recitation of key mnemonics. Nevertheless, when seeking rapid duplication of a given set of instructions, words simply had to take precedence over other forms of communication. How else save by using words could one dictate a text to assembled scribes? After the advent of printing, visual aids multiplied; signs and symbols were codified; different kinds of iconographic and nonphonetic communication were rapidly developed. The fact that printed picture books were newly designed

<sup>29</sup> Sarton, *Appreciation of Ancient and Medieval Science*, 91, 95.

<sup>30</sup> See citation from the "Boke Called the Gouvernour" (1531) in Foster Watson, *The Beginning of the Teaching of Modern Subjects in England* (London, 1909), 136.

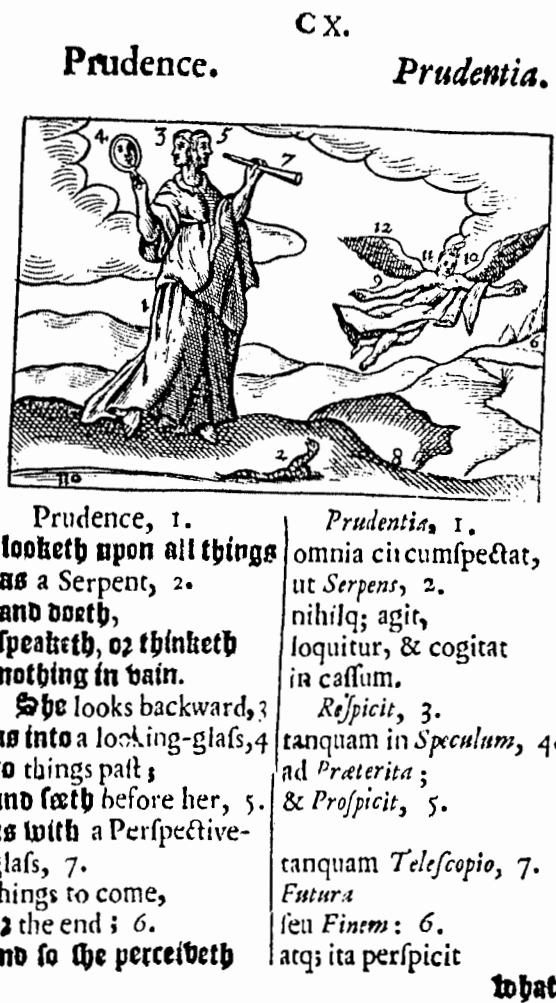


Fig. 6. An ancient mnemonic image transposed for didactic purposes into an illustration for the first children's picture book. The figure of Prudence from Johann Amos Comenius, *Orbis sensualium pictus* (1658); translated into English by Charles Hoole (London, 1685). Reproduced by kind permission of the Folger Shakespeare Library.

by educational reformers for the purpose of instructing children and that drawing was considered an increasingly useful accomplishment by pedagogues also points to the need to think beyond the simple formula "image to word."

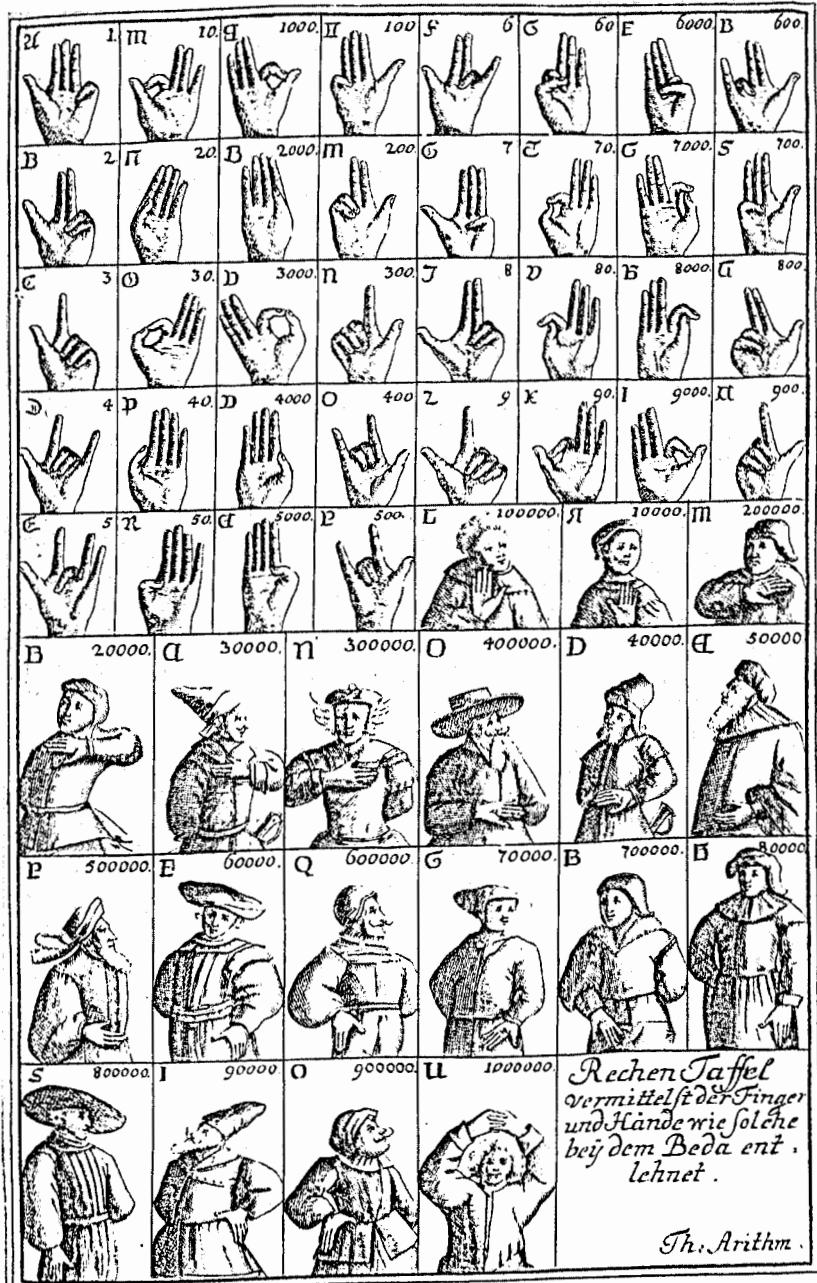


Fig. 7. Although the use of fingers and gestures for reckoning was superseded by the use of printed arithmetic books, charts, and tables, these ancient arts were codified and given a long lease on life in printed form. This engraving from Jacob Leupold, *Theatrum arithmeticæ-geometricum . . .* (Leipzig: C. Zunkel, 1727), is reproduced by kind permission of the Department of Special Collections, Stanford University Libraries.

As these comments may suggest, efforts to summarize changes wrought by printing in any one statement or neat formula are likely to lead us astray. Even while acknowledging that there was an increased reliance on rule books and less on rules of thumb or that learning by reading gained at the expense of hearing or doing, one must also consider how printing encouraged new objections to bookish knowledge based on “slavish” copying and how it enabled many observers to check freshly recorded data against received rules. Similarly, one must be cautious about assuming that the spoken word was gradually silenced as printed words multiplied or that the faculty of hearing was increasingly neglected in favor of that of sight. Surely the history of Western music after Gutenberg argues against the latter suggestion. As for the many questions raised by the assertion that print silenced the spoken word, a few are noted elsewhere in this book; all must be passed over here.

The purpose of this preliminary discussion has been simply to demonstrate that the shift from script to print entailed a large ensemble of changes, each of which needs more investigation and all of which are too complicated to be encapsulated in any single formula. But to say that there is no simple way of summarizing the complex ensemble is not the same thing as saying that nothing had changed. To the contrary!

## SOME FEATURES OF PRINT CULTURE

Granted that some sort of communications revolution did occur during the late fifteenth century, how did this affect other historical developments? Most conventional surveys stop short after a few remarks about the wider dissemination of humanist tomes or Protestant tracts. Several helpful suggestions – about the effects of standardization on scholarship and science, for example – are offered in works devoted to the era of the Renaissance or to the history of science. By and large, the effects of the new process are vaguely implied rather than explicitly defined and are also drastically minimized. One example may illustrate this point. During the first centuries of printing, old texts were duplicated more rapidly than new ones. On this basis most authorities conclude that “printing did not speed up the adoption of new theories.”<sup>1</sup> But where did these new theories come from? Must we invoke some spirit of the times? Or is it possible that an increase in the output of old texts contributed to the formulation of new theories? Maybe other features that distinguished the new mode of book production from the old one also contributed to such theories. We need to take stock of these features before we can relate the advent of printing to other historical developments.

Without attempting to draw up a complete inventory, I have singled out some of the features which appear in the special literature on early printing and held them in mind while passing in review selected historical developments. Conjectures based on this approach may be sampled here under headings that indicate my main lines of inquiry.

<sup>1</sup> Febvre and Martin, *Coming of the Book*, 420–1.

### A CLOSER LOOK AT WIDE DISSEMINATION: INCREASED OUTPUT AND ALTERED INTAKE

Most references to wide dissemination are too fleeting to make clear the specific effects of an increased supply of texts directed at different markets. Just as the "spread" of literacy tends to take priority over changes experienced by already literate sectors, so too the "spread" of Lutheran views or the failure of Copernican theories to "spread" as rapidly as Ptolemaic ones seems to outweigh all other issues. Too often the printer is assigned the sole function of serving as a press agent. His effectiveness is judged by circulation figures alone. Even while more copies of one given text were being "spread, dispersed, or scattered" by the issue of a printed edition, different texts, which had been previously dispersed and scattered, were also being brought closer together for individual readers. In some regions, printers produced more scholarly texts than they could sell and flooded local markets. In all regions, a given purchaser could buy more books at lower cost and bring them into his study or library. In this way, the printer who duplicated a seemingly antiquated backlist was still providing the clerk with a richer, more varied literary diet than had been provided by the scribe. "A serious student could now endeavor to cover a larger body of material by private reading than a student or even a mature scholar needed to master or could hope to master before printing made books cheap and plentiful."<sup>2</sup> To consult different books it was no longer so essential to be a wandering scholar. Successive generations of sedentary scholars were less apt to be engrossed by a single text and expend their energies in elaborating on it. The era of the glossator and commentator came to an end, and a new "era of intense cross referencing between one book and another"<sup>3</sup> began.

That something rather like a knowledge explosion was experienced in the sixteenth century has often been suggested, in

<sup>2</sup> Craig Thompson, ed., *The Colloquies of Erasmus* (Chicago, 1965), 458.

<sup>3</sup> Denys Hay, "Literature: The Printed Book," *The New Cambridge Modern History*, vol. 2, *The Reformation 1520-1559*, ed. G. R. Elton (Cambridge, 1958), 366.

connection with the Northern Renaissance if not with the advent of printing. Few studies of the literature of the era fail to cite relevant passages from Marlowe or Rabelais indicating how it felt to become intoxicated by reading and how bookish knowledge was regarded as if it were a magic elixir conferring new powers with every swallow. Yet when dealing with any major intellectual change in the sixteenth century, the ferment engendered by access to more books is likely to be ignored. In a recent perceptive account of the sense of intellectual crisis reflected in Montaigne's writing, for example, we are told about the shattering impact of the Reformation and wars of religion and "the extension of mental horizons" produced by geographical discoveries and humanist recoveries.<sup>4</sup> It would be foolish to assert that the most newsworthy events of the age made no impression on so sensitive an observer as Montaigne. But it also seems misguided to overlook the event that impinged most directly on his favorite observation post. That he could see more books by spending a few months in his tower study than earlier scholars had seen after a lifetime of travel also needs to be taken into account. In explaining why Montaigne perceived greater "conflict and diversity" in the works he consulted than had medieval commentators in an earlier age, something should be said about the increased number of texts he had at hand.

More abundantly stocked bookshelves obviously increased opportunities to consult and compare different texts. Merely by making more scrambled data available, by increasing the output of Aristotelian, Alexandrian, and Arabic texts, printers encouraged efforts to unscramble these data. Some medieval coastal maps had long been more accurate than many ancient ones, but few eyes had seen either. Much as maps from different regions and epochs were brought into contact in the course of preparing editions of atlases, so too were technical texts brought together in certain physicians' and astronomers' libraries. Contradictions became more visible, divergent traditions more difficult to reconcile. The transmission

<sup>4</sup> P. M. Rattansi, "The Social Interpretation of Science in the Seventeenth Century," *Science and Society 1600-1900*, ed. Peter Mathias (Cambridge, 1972), 7.

of received opinion could not proceed smoothly once Arabists were set against Galenists or Aristotelians against Ptolemaists. Not only was confidence in old theories weakened, but an enriched reading matter also encouraged the development of new intellectual combinations and permutations. Combinatory intellectual activity, as Arthur Koestler has suggested, inspires many creative acts. Once old texts came together within the same study, diverse systems of ideas and special disciplines could be combined. Increased output directed at relatively stable markets, in short, created conditions that favored new combinations of old ideas at first and then, later, the creation of entirely new systems of thought.

It should be noted that cross-cultural interchange was experienced first of all by the new occupational groups responsible for the output of printed editions. Even before a given reference work had come off the press, fruitful encounters between typefounders, correctors, translators, copy editors, illustrators or print dealers, indexers, and others engaged in editorial work had already occurred. Early printers themselves were the very first to read the products that came off their own presses. They also kept an anxious eye on their competitors' output. The effects of access to more books (and, indeed, of all the varied features associated with typography) were thus first and most forcefully experienced within printers' workshops, by the new book producers themselves. Whereas other libraries were nourished by the output of master printers such as the Estiennes or Christopher Plantin, the valuable collections they themselves built up contained many by-products of their own daily shopwork.

That a remarkable amount of innovative work in both scholarly and scientific fields was done outside academic centers in the early modern era is often noted. The new attraction exerted by printers' workshops upon men of learning and letters may help to explain this development. The same point holds good for discussion of the new interchanges between artists and scholars or practitioners and theorists which proved so fruitful in early modern science. Printing encouraged forms of combinatory activity which were social as well as intellectual. It changed relationships between men of learning as well as between systems of ideas.

Cross-cultural interchange stimulated mental activities in contradictory ways. The first century of printing was marked above all by intellectual ferment and by a "somewhat wide-angled, unfocused, scholarship."<sup>5</sup> Certain confusing cross currents may be explained by noting that new links between disciplines were being forged before old ones had been severed. In the age of scribes, for instance, magical arts were closely associated with mechanical crafts and mathematical wizardry. When "technology went to press," so too did a vast backlog of occult lore, and few readers could discriminate between the two. Historians who are still puzzled by the high prestige enjoyed by alchemy, astrology, "magia and cabala," and other occult arts within the Commonwealth of Learning during early modern times might find it helpful to consider how records derived from ancient Near Eastern cultures had been transmitted in the age of scribes. Some of these records had dwindled into tantalizing fragments pertaining to systems of reckoning, medicine, agriculture, mythic cults, and so forth. Others had evaporated into unfathomable glyphs. Certain cosmic cycles and life cycles are experienced by all men, and so common elements could be detected in the fragments and glyphs. It seemed plausible to assume that all came from one source and to take seriously hints in some patristic works about an Ur text set down by the inventor of writing, which contained all the secrets of Creation as told to Adam before the Fall. It also seemed plausible that the teachings contained in this Ur text, after being carefully preserved by ancient sages and seers, had become corrupted and confused in the course of barbarian invasions. A large collection of writings containing ancient lore was received from Macedonia by Cosimo de Medici, translated from Greek by Ficino in 1463, and printed in fifteen editions before 1500. It took the form of dialogues with the Egyptian god Thoth, whose Greek name was Hermes Trismegistus. The writings retrieved in the fifteenth century seemed to come from the same corpus of texts as other fragmentary dialogues known to earlier scholars and also attributed to Hermes Trismegistus. The hermetic corpus ran

<sup>5</sup> E. Harris Harbison, *The Christian Scholar in the Age of the Reformation* (New York, 1956), 54.

through many editions until 1614, when a treatise by Isaac Casaubon showed it had been compiled in the post-Christian era. On this basis we are told that Renaissance scholars made a "radical error in dating." No doubt they had. A neo-Platonic, post-Christian compilation had been mistaken for a work which preceded and influenced Plato. Yet to assign definite dates to scribal compilations, which were probably derived from earlier sources, may be an error as well.<sup>6</sup>

The transformation of occult and esoteric scribal lore after the advent of printing also needs more study. Some arcane writings (in Greek, Hebrew, or Syriac, for example) became less mysterious. Others became more so. Thus hieroglyphs were set in type more than three centuries before their decipherment. These sacred carved letters were loaded with significant meaning by readers who could not read them. They were also used simply as ornamental motifs by architects and engravers. Given baroque decoration on one hand and complicated interpretations by scholars, Rosicrucians, or Freemasons on the other, the duplication of Egyptian picture writing throughout the Age of Reason presents modern scholars with puzzles that can never be solved. So we must not think only about new forms of enlightenment when considering the effects of printing on scholarship. New forms of mystification were encouraged as well.

In this light it seems necessary to qualify the assertion that the first half-century of printing gave "a great impetus to wide dissemination of accurate knowledge of the sources of Western thought, both classical and Christian."<sup>7</sup> The duplication of the hermetic writings, the sibylline prophecies, the hieroglyphics of "Horapollo," and many other seemingly authoritative, actually fraudulent esoteric writings worked in the opposite direction, spreading inaccurate knowledge even while paving the way for later purification of Christian sources. Here, as elsewhere, we need to distinguish between initial and delayed effects. An enrichment of scholarly libraries came rapidly; the sorting out of their contents took more time. Compared

<sup>6</sup> Frances Yates, *Giordano Bruno and the Hermetic Tradition* (London, 1964), passim.

<sup>7</sup> Myron P. Gilmore, *The World of Humanism 1453-1517* (New York, 1952), 190.

*Specimen Lectionis Idealū, in primo latere Obelisci exhibitum.*

Hemphta Numen supre-  
influit virtutem

in fidere Mundi ani-

vnde vitalis motus in  
omniumque rerum abun-  
ex vberate Cra-  
quadam sympathia

duplici in sibi sub

Vigilantissimus  
facrorum canarium  
in qua vita rerum

Ophionius  
ad cuius fa-

vitamque pro-  
Sacra hæc ei  
cuius beneficio cælestè  
diuini Osiridis

affistentia ab om-

Præterea in sacri-  
finem eiusdem

Eparisterium Naturæ  
id est Naturæ efflu-

Quo allectus Poly-  
varietatem

Typhonis technæ

Vnde vita rerum  
ad quod plurimum

pentacula, siue

rationes, quibus

sunt enim vijæ

acquirendorum potentes

mum & Archetypon  
& munera sua

mā, id est solare Nume sibi subditu

Mundo Hylzo, siue Elementari ,  
dætia, & specierū varietas prouenit.  
teris Osiriaci, in quem mira  
tractus continuò influit

dita dōminio potens .

Chenosiris  
custos, id est Naturæ humidæ  
omnium consistit.

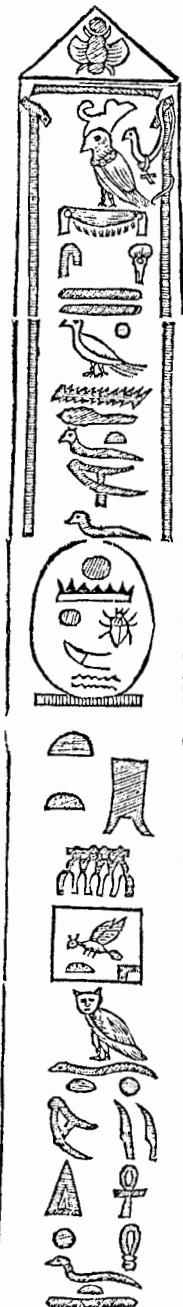
Agathodæmon  
uorem obtinendum

pagandam  
Tabula consecranda est ;  
Heptapyrgon id est arx planetarum  
Agathodæmonis humidi

nibus aduersis conseruatur .

ficijs & ceremonijs in hunc  
statua circumsetenda est ;  
siue fons Hecatinus, siue vetigineus  
uum inter sacrificia aperiendum.

morphus Dæmon , vberem  
(do)  
rerū cōcedet in quadripartito Mū-  
vitæ insidiatrices , elidentur  
innoxia conseruabitur  
quoq;conducēt hæc, quæ sequuntur  
periammata , ob mysticas  
constructa sunt.  
bonorum omnium  
illecebræ .



with the large output of unscholarly vernacular materials, the number of trilingual dictionaries and Greek or even Latin editions seems so small that one wonders whether the term "wide dissemination" ought to be applied to the latter case at all.

Dissemination, as defined in the dictionary, seems especially appropriate to the duplication of primers, ABC books, catechisms, calendars, and devotional literature. Increased output of such materials, however, was not necessarily conducive either to the advancement of scholarship or to cross-cultural exchange. Catechisms, religious tracts, and Bibles would fill some bookshelves to the exclusion of all other reading matter. The new wide-angled, unfocused scholarship went together with a new single-minded, narrowly focused piety. At the same time, practical guidebooks and manuals also became more abundant, making it easier to lay plans for getting ahead in this world – possibly diverting attention from uncertain futures in the next one. Sixteenth-century map publishers thus began to exclude "Paradise" from this world as being of too uncertain a location. Eventually Cardinal Baronius would be cited by Galileo as distinguishing between "how to go to heaven" – a problem for the Holy Spirit – and "how the heavens go" – a matter of practical demonstration and mathematical reasoning.<sup>8</sup> It would be a mistake to press this last point too far, however, for many of the so-called practical guides contained nonsensical and mystifying material, making them highly impractical. Moreover, until Newton's *Principia*, the output of conflicting theories and astronomical tables offered very uncertain guidance on "how the heavens go." Manuals on devotional exercises and

<sup>8</sup> Galileo Galilei, "Letter to the Grand Duchess Christina" (1615), printed in *Discoveries and Opinions of Galileo*, tr. and ed. Stillman Drake (New York, 1957), 186.

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Fig. 8 (opposite). The duplication of Egyptian picture writing contributed more to mystification than to enlightenment. Hieroglyphs, set in type long before being deciphered, were assigned divergent meanings by learned men such as the Jesuit whose work appears. From Athanasius Kircher, *Obelisci aegyptiaci...* (Rome: Ex typographia Varesij, 1666, p. 78). Reproduced by kind permission of the Folger Shakespeare Library.

guidebooks on spiritual questions provided clear-cut advice. Readers who were helped by access to road maps, phrase books, conversion tables, and other aids were also likely to place confidence in guides to the soul's journey after death. Tracts expounding the Book of Revelation entailed a heavy reliance on mathematical reasoning. The fixing of precise dates for the Creation or for the Second Coming occupied the very same talents that developed new astronomical tables and map-projection techniques.

It is doubtful, at all events, whether "the effect of the new invention on scholarship"<sup>9</sup> was more significant than its effect on vernacular Bible reading at the beginning of the sixteenth century. What does need emphasis is that many dissimilar effects, all of great consequence, came relatively simultaneously. If this could be spelled out more clearly, seemingly contradictory developments might be confronted with more equanimity. The intensification of both religiosity and secularism could be better understood. Some debates about periodization also could be bypassed. Printing made more visible long-lived and much used texts which are usually passed over and sometimes (mistakenly) deemed obsolete when new trends are being traced. Many medieval world pictures were duplicated more rapidly during the first century of printing than they had been during the so-called Middle Ages. They did not merely survive among conservative Elizabethans "who were loth to upset the old order."<sup>10</sup> They became more available to poets and playwrights of the sixteenth century than they had been to minstrels and mummers of the thirteenth century. Given the use of new media, such as woodcuts and metal engravings, to depict medieval cosmologies, we cannot think simply of mere survival but must consider a more complex process whereby long-lived schemes were presented in new visual forms.

In view of such considerations, I cannot agree with Sarton's comment: "It is hardly necessary to indicate what the art of printing meant for the diffusion of culture but one should not lay too much

<sup>9</sup> Gilmore, *World of Humanism*, 189.

<sup>10</sup> E. M. W. Tillyard, *The Elizabethan World Picture* (New York, 1942), 8.

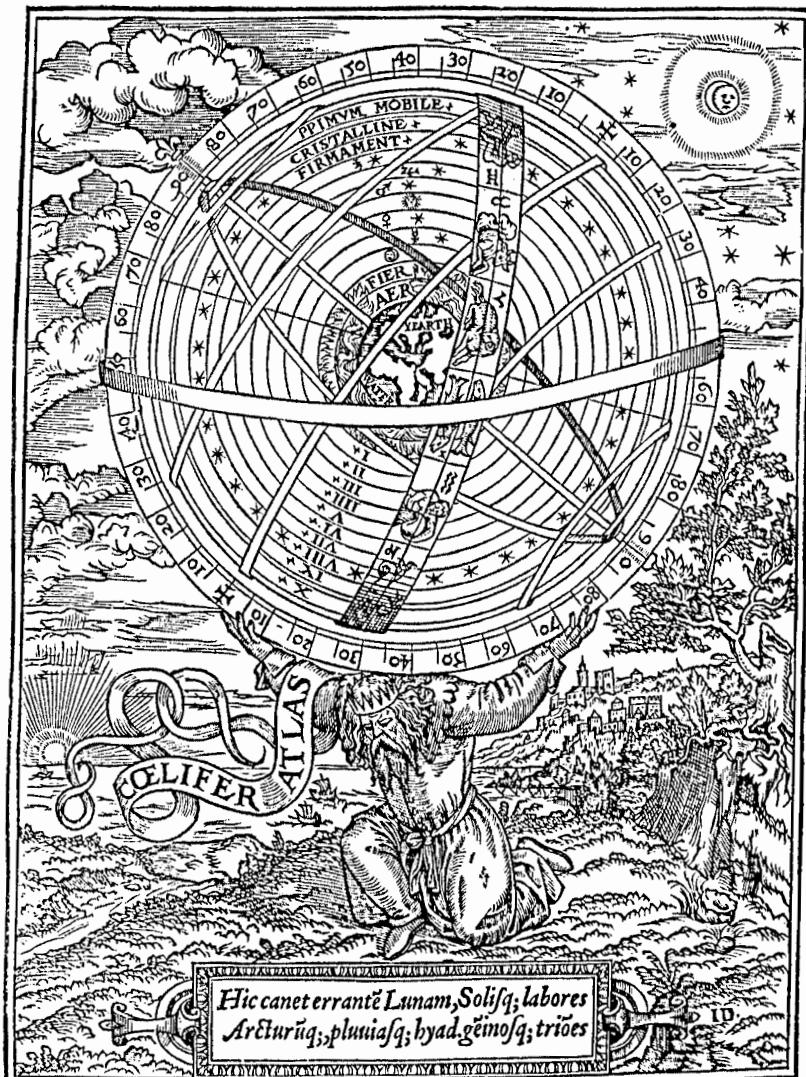


Fig. 9. Medieval world pictures became more available in the sixteenth century than they had been in the Middle Ages, thanks to the use of blocks and plates which presented long-lived schemes in new visual form. A medieval king representing Atlas is holding an Aristotelian cosmos in this engraving taken from William Cunningham, *The Cosmographical Glasse* (London: John Day, 1559, folio 50). Reproduced by kind permission of the Folger Shakespeare Library.

stress on diffusion and should speak more of standardization."<sup>11</sup> How printing changed patterns of cultural diffusion deserves much more study than it has yet received. Moreover, individual access to diverse texts is a different matter from bringing many minds to bear on a single text. The former issue is apt to be neglected by too exclusive an emphasis on "standardization."

#### CONSIDERING SOME EFFECTS PRODUCED BY STANDARDIZATION

Although it has to be considered in conjunction with many other issues, standardization certainly does deserve closer study. One must be careful not to skew historical perspectives by ignoring the vast difference between early printing methods and those of more recent times. But it is equally important not to go too far in the other direction and overestimate the capacity of scribal procedures to achieve the same results as did the early presses. Certainly early printing methods made it impossible to issue the kinds of "standard" editions with which modern scholars are familiar. Press variants multiplied rapidly and countless errata had to be issued. The fact remains that Erasmus or Bellarmine could issue errata; Jerome or Alcuin could not. The very act of publishing errata demonstrated a new capacity to locate textual errors with precision and to transmit this information simultaneously to scattered readers. It thus illustrates rather neatly some of the effects of standardization. However late medieval copyists were supervised – and controls were much more lax than many accounts suggest – scribes were incapable of committing the sort of "standardized" error that was produced by a compositor who dropped the word "not" from the Seventh Commandment and thus created the "wicked" Bible of 1631. If a single compositor's error could be circulated in a great many copies, so too could a single scholar's emendation.

<sup>11</sup> George Sarton, "The Quest for Truth: Scientific Progress during the Renaissance," *The Renaissance: Six Essays* (New York, 1962), 66.

- \* Deut. 5:12 q \* Honour thy father and thy mother, that  
 16. mat. thy dayes may bee long vpon the land which the  
 25.4. LORD thy God giueth thee.
- Lephe 6.2. 13 \* Thou shalt not kill.  
 \* Matth. 14 Thou shalt commit adultery.  
 5.21. 15 Thou shalt not steale.  
 16 Thou shalt not bear false witness against  
 \* Rom. thy neighbour.  
 7.7. 17 \* Thou shalt not couet thy neighbours house,  
 25.18. thou shalt not couet thy neighbours wife, nor his  
 man-servant, nor his maid-servant, nor his ox, nor  
 his ass, nor anything that is thy neighbours.
- \* Hebr. 18 q And \* all the people saw the thunders  
 25.18. and the lightnings, and the noyse of the trumpets,  
 and the mountaine shookeing, and when the people  
 saw it, they remooved and stood a farr off.

Fig. 10. An enlarged passage from the so-called "wicked" Bible, printed by R. Barker in 1631, showing the commandment "thou shalt commit adultery." Reproduced by kind permission of the Rare Books Division, New York Public Library.

The need to qualify the thesis of standardization is perhaps less urgent than the need to pursue its ramifications. Sarton's remark, "Printing made it possible for the first time to publish hundreds of copies that were alike and yet might be scattered everywhere,"<sup>12</sup> is too important to get lost in quibbling over the fact that early printed copies were not all precisely alike. They were sufficiently uniform for scholars in different regions to correspond with each other about the same citation and for the same emendations and errors to be spotted by many eyes.

In suggesting that the implications of standardization may be underestimated, I am thinking not only about textual emendations and errors, but also about calendars, dictionaries, ephemerides, and other reference guides; about maps, charts, diagrams, and other visual aids. The capacity to produce uniform spatiotemporal images is often assigned to the invention of writing without adequate allowance being made for the difficulty of multiplying identical images by hand.

<sup>12</sup> Ibid., 66.

The same point applies to systems of notation, whether musical or mathematical. Indeed, it is likely that exact repeatability transformed the disciplines of the *quadrivium* rather more than those of the *trivium*.

Too many important variations were played on the theme of standardization for all of them to be listed here. This theme entered into every operation associated with typography, from the replica casting of precisely measured pieces of type to the making of wood-cuts that were exactly the right dimension for meeting the surface of the types.<sup>13</sup> It also involved the "subliminal" impact upon scattered readers of repeated encounters with identical type styles, printers' devices, and title page ornamentation. Calligraphy itself was affected. Sixteenth-century specimen books stripped diverse scribal "hands" of personal idiosyncrasies. They did for handwriting what style books did for typography itself; what pattern books did for dressmaking, furniture, architectural motifs, or ground plans. Writing manuals, like pattern sheets and model books, were not unknown in the age of scribes. But like the manuscript grammar books and primers used by different teachers in different regions, they were variegated rather than uniform.

It seems likely that the very concept of a "style" underwent transformation when the work of hand and "stylus" was replaced by more standardized impressions made by pieces of type. Distinctions between bookhand and typeface are such that by placing a given manuscript against a printed text one can see much more clearly the idiosyncratic features of the individual hand of the scribe.<sup>14</sup> When set against a printed replica, a given sketch or drawing offers an even more dramatic contrast. It appears much fresher and more "original" than when it is set against a hand-drawn copy. Thus distinctions between the fresh and original as against the repeatable and copied were likely to have become sharper after the advent of printing. The

<sup>13</sup> Steinberg, *Five Hundred Years*, 25; E. P. Goldschmidt, *The Printed Book of the Renaissance: Three Lectures on Type, Illustration, Ornament* (Cambridge, 1950), 38.

<sup>14</sup> Böhler, *The Fifteenth-Century Book*, 37.

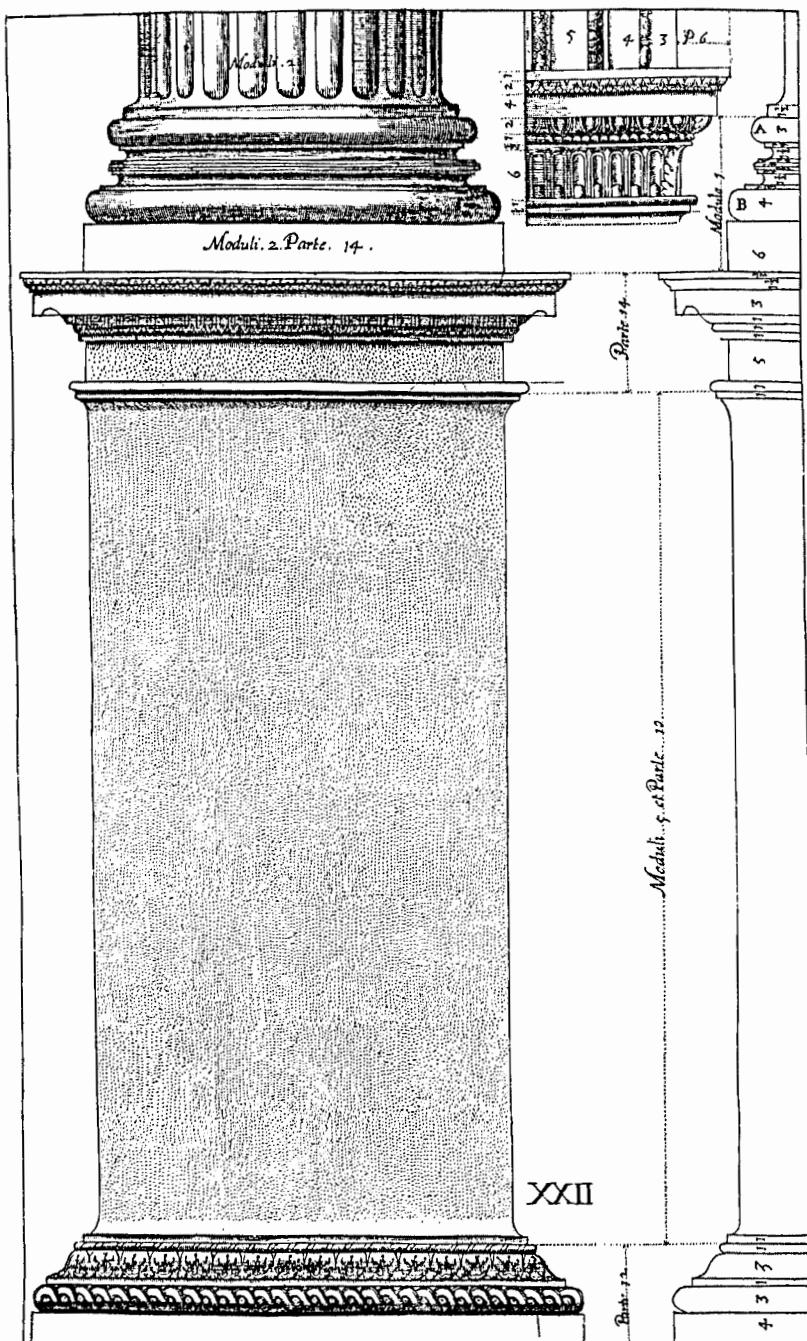
process of standardization also brought out more clearly all deviations from classical canons reflected in diverse buildings, statues, paintings, and *objets d'art*. "Gothic" initially meant not yet classic; "barocco," deviation from the classic norm. Ultimately the entire course of Western art history would be traced in terms of fixed classical canons and various deviations therefrom: "That procession of styles and periods known to every beginner – Classic, Romanesque, Gothic, Renaissance, Mannerist, Baroque, Rococo, Neo-Classical, Romantic – represent only a series of masks for two categories, the classical and the nonclassical."<sup>15</sup>

With the disappearance of variegated bookhands, styles of lettering became more sharply polarized into two distinct groups of type fonts: "Gothic" and "Roman." A similar polarization affected architectural designs. A heightened consciousness of the three orders set down by Vitruvius accompanied the output of architectural prints and engravings along with new treatises and old texts. Heightened awareness of distant regional boundaries was also encouraged by the output of more uniform maps containing more uniform boundaries and place names. Similar developments affected local customs, laws, languages, and costumes. A given book of dress patterns published in Seville in the 1520s made "Spanish" fashions visible throughout the far-flung Habsburg Empire. New guidance was provided to tailors and dressmakers, and at the same time, the diversity of local attire became all the more striking to the inhabitants of Brussels or Lima.

A fuller recognition of diversity was indeed a concomitant of standardization. Sixteenth-century publications not only spread identical fashions but also encouraged the collection of diverse ones. Books illustrating diverse costumes, worn throughout the world, were studied by artists and engravers and duplicated in so many contexts that stereotypes of regional dress styles were developed. They acquired a paper life for all eternity and may be recognized even now on dolls, in operas, or at costume balls.

<sup>15</sup> E. H. Gombrich, *Norm and Form: Studies in the Art of the Renaissance* (London, 1966), 83–4.

ORDINE CORINTHIA



DE SCRITTORE DEL

XXII.

**S**e il piedestallo di quest' ordine Corinio fosse la terza parte della colonna farebbe moduli sei e duei terzi<sup>a</sup>, ma si puo comportare di moduli sette per più sicurezza, conforme moto, e conveniente a simil ordine, & anco perche il netto del piedestallo senza la cimase e bassamento riccia di duoi quadri, come si puo vedere per li suoi numeri il resto cioè la base, è la cim sa, & il bassamento, per essere notato minutamente, e anco la imposta dell' arco, non accade altra scrittura.

A Torro overo bastone superiore, B Torro overo bastone inferiore.

**T**adien het Pedestal van dese Corinthische Orden is het derde deel van de kolomne / soo sal het houden ses Modulos ende  $\frac{2}{3}$  / maar men mach het wel maken van 7 Modulos, om te meer stijficheyt / die dese Orden ster ghevoeghlyck is ende wel past: Doch mede op dat het pedestal / sonder het Cimatum ende basement / even op twee vierkantenvirkome / gelijken men sien mach aen de getallen. De rest / te weten het basis 't cimatum ende basement / de wijs so op 't nauke zijn aengeteekent / als mede d'imposta oft opstellingh van de bogen / soo en hoeven wop dace niet meer van te schryven.

A De Tors of stock van boven/ B De Tors of stock van beneden.

**S**lle Piedestal de ceste ordonance Corinthienne est le tiers de la colomne, il tiendra six modules &  $\frac{2}{3}$ , mais on le pourra bien faire de sept Modules pour plus grande solidité, fort conforme & convenable a ceste ordonnance : & aussi, ainsi que le Piedestal, sans la cimace & basement, revienne a deux quarrez, comme l'on pourra voir par les nombres. Le reste, c'est a savoir la base, la cimace & le basement, puis qu'ils sont notez par menu, comme aussi l'imposition de l'arc, il n'est ja besoing d'en escrire d'avantage.

A Le Tore ou baston d'en haut, B Le Tore ou baston d'embas.

**G**esch. **M**it dasd Pedestal von dieser Corinthischen orden das dritthell ist von die Colomne/ so sol es halten 6 Modulen vnd  $\frac{2}{3}$ / aber man mag es vol machen von 7 Modulen wegen mehrer strecte/ welche diesen orden gar siglich ist/ vnd auch/ auß dass es Pedestall ohn das Cimatum/ und basement/ gerad auß zwei vierkanten auf kompe/ gleich man an die galb sehn mag. Der rest nemlich das Cimatum und Basement / die weil sie außwo genauwste sein angezeichnyn/ wie auch die imposta oder anstellung von denen bogen/ so ist nüch nötz davon mehr zu schreiben.  
A Der Tonus oder stock von oben/ B Der Tonus oder stock von unten.

**I**f the Pedestal of this Corinthian Order bee the third part of the Columne, it shall containe six modulos en and two thirds, but you may make it of 7 modulus, for the greater solidity, which isverry conformable and besiting this Order: as also, that the Pedestal, without the Cimact and basement commeth out even in 2 sourcesquares even as you may see by the Numbers. The rest, to witt the base, the Cimact and basement the while they are noted least, as also the Imposi<sup>c</sup>t or setting up of the Bow or Arch, so that wee neede not write more thereof.

A The Torus or picce on high, B The Torus or picce belou,

Fig. 11 (opposite and above). A heightened consciousness of the ancient architectural orders described by Vitruvius accompanied the output of prints and printed texts. Detailed rules for the Corinthian Order (above) are set forth in Italian, Dutch, French, German, and English, accompanying the engraving on the opposite page. From Giacomo Barozzio Vignola, *Regola de cinque ordini d' architettura* (Amsterdam: Jan. Janz., 1642, pp. 54-5). Reproduced by kind permission of the Folger Shakespeare Library.



Fig. 12. Books for dressmakers and tailors published in sixteenth-century Seville made "Spanish" fashions visible through the far-flung Habsburg Empire. The pattern shown above comes from Diego de Freyle, *Geometria y traca para el oficio de los sastres* (Seville: Fernando Diaz, 1588, folio 17 verso). Reproduced by kind permission of the Folger Shakespeare Library.

Concepts pertaining to uniformity and to diversity – to the typical and to the unique – are interdependent. They represent two sides of the same coin. In this regard one might consider the emergence of a new sense of individualism as a by-product of the new forms of standardization. The more standardized the type, indeed, the more compelling the sense of an idiosyncratic personal self. It was just this sense that was captured in the *Essays* of Montaigne. As a volatile creature, concerned with trivial events, the author of the *Essays* contrasted in almost every way with the ideal types conveyed by other books. The latter presented princes, courtiers, councillors, merchants, schoolmasters, husbandmen, and the like in terms which made readers ever more aware, not merely of their shortcomings in their assigned roles, but also of the existence of a solitary singular self, characterized by all the peculiar traits that were unshared by others – traits which had no redeeming social or exemplary functions and hence were deemed to be of no literary worth. By presenting himself, in all modesty, as an atypical individual and by portraying with loving care every one of his peculiarities, Montaigne brought this private self out of hiding, so to speak. He displayed it for public inspection in a deliberate way for the first time.

Traditional rhetorical conventions had allowed for the difference in tone between addressing a large assemblage in a public arena, where strong lungs and broad strokes were required, and pleading a case in a courtroom, which called for careful attention to detail



Fig. 13. Diversity accompanied standardization. Books illustrating diverse costumes were also issued in the sixteenth century. This picture of an "indo-africano" comes from Cesare Vecellio, *Degli habit antichi et moderni di diverse parti del mondo* (Venice: Damian Zenaro, 1590, pp. 495-6). Reproduced by kind permission of the Folger Shakespeare Library.

and a more soft-spoken, closely argued, intimate approach. But no precedent existed for addressing a large crowd of people who were not gathered together in one place but were scattered in separate dwellings and who, as solitary individuals with divergent interests, were more receptive to intimate interchanges than to broad-gauged rhetorical effects. The informal essay which was devised by Montaigne was a most ingenious method of coping with this new situation. He thus established a new basis for achieving intimate contact with unknown readers who might admire portraits of worthy men from a distance but felt more at home when presented with an admittedly unworthy self. Above all, he provided a welcome assurance that the isolating sense of singularity which was felt by the solitary reader had been experienced by another human being and was, indeed, capable of being widely shared.

Even while an author such as Montaigne was developing a new informal and idiosyncratic genre of literature and laying bare all the quirks and peculiarities that define the individual "me, myself" as against the type, other genres of literature were defining ideal types and delineating appropriate roles for priest and merchant, nobleman and lady, well-bred boy and girl.

Here as elsewhere the "exactly repeatable pictorial statement" helped to reinforce the effects of issuing standard editions. Repeated encounters with identical images of couples representing three social groups – noble, burgher, peasant – wearing distinctive costumes and set against distinctive regional landscapes probably encouraged a sharpened sense of social divisions as well as regional ones. At the same time the circulation of royal portraits and engravings of royal entries made it possible for a reigning dynast to impress a personal presence in a new way upon the consciousness of all subjects. The difference between the older repeatable image which was stamped on coins and the newer by-product of print is suggested by one of the more celebrated episodes of the French Revolution. The individual features of emperors and kings were not sufficiently detailed when stamped on coins for their faces to be recognized when they traveled incognito. But a portrait engraved on paper money enabled an alert Frenchman to recognize and halt Louis XVI at Varennes.

It should be noted that a new alertness to both the individual and the typical was likely to come first to those who were responsible for compiling and editing the new costume manuals, style books, commemorations of royal entries, and regional guides. Just as the act of publishing errata sharpened attention to error within the printer's workshop, so too did the preparation of copy pertaining to architectural motifs, regional boundaries, place names, details of dress, and local customs. It seems likely that a new awareness of place and period and more concern about assigning the proper trappings to each were fostered by the very act of putting together illustrated guidebooks and costume manuals. To be sure, the use – in the Nuremberg Chronicle, for example – of the same woodcut to designate several different cities (such as Mainz and Bologna and Lyons) or of the same portrait head to designate different historic personages may seem to argue against such a thesis. Early printers often frugally used a few prints for many diverse purposes. An Ulm edition of 1483 "has one cut which is used thirty-seven times and altogether nineteen blocks do duty for one hundred and thirty-four illustrations."<sup>16</sup> Yet the 1480s also saw an artist-engraver commissioned to produce fresh renderings of cities and plants encountered on a pilgrimage to the Holy Land. Erhard Reuwich's illustrations of cities for Breydenbach's *Peregrinatio in Terram Sanctam* (1486) and of plants for Schoefffer's vernacular herbal *Gart der Gesundheit* (1485) did point the way to an increasingly precise and detailed recording of observations in visual form. The careless reuse of a few blocks for many purposes also needs to be distinguished from the deliberate reuse of a "typical" town or portrait head to serve as pointers or guide marks helping readers find their way about a text. Whatever the purpose served by the cuts of towns and heads in a work such as the Nuremberg Chronicle, previous remarks about individuation and standardization also seem cogent. The more standardized the image of typical town, head, or plant, the more clearly the idiosyncratic features of separate towns, heads, or plants could be perceived by observant draftsmen. Painters and carvers had been rendering natural forms on manuscript margins, church vestments, or stone fonts during previous centuries. But their

<sup>16</sup> David Bland, *A History of Book Illustration*, 2nd ed. (Berkeley, 1969), 106.

talents were used for new ends by technical publication programs initiated by master printers and learned editors from the days of Peter Schoeffer on.

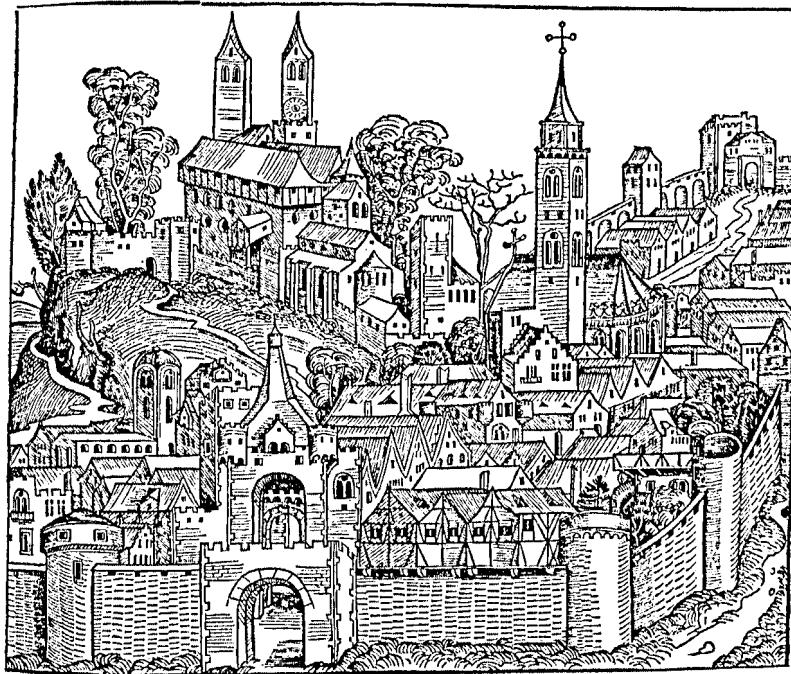
Here as elsewhere, we need to recall that early printers were responsible not only for publishing innovative reference guides but also for compiling some of them. To those of us who think in terms of later divisions of labor, the repertoire of roles undertaken by early printers seems so large as to be almost inconceivable. A master printer himself might serve not only as publisher and bookseller, but also as indexer-abridger-translator-lexicographer-chronicler. Many printers, to be sure, simply replicated whatever was handed them in a slapdash way. But there were those who took pride in their craft and who hired learned assistants. Such masters were in the unusual position of being able to profit from passing on to others systems they devised for themselves. They not only practiced self-help but preached it as well. In the later Middle Ages, practical manuals had been written to guide inquisitors, confessors, priests, and pilgrims – and lay merchants as well. Although large *summae* now attract scholarly attention, medieval scribes also turned out compact *summulae*, comprehensive guidebooks designed to offer practical advice on diverse matters – ranging from composing a sermon to dying in one's bed.<sup>17</sup> Here, as in many other ways, the printer seems to have taken over where the clerical scribe left off. But in so doing, he greatly amplified and augmented older themes. There is simply no equivalent in scribal culture for the “avalanche” of “how-to” books which poured off the new presses, explaining by “easy steps” just how to master diverse skills, ranging from playing a musical instrument to keeping accounts.

<sup>17</sup> Edward M. Peters, “Editing Inquisitors’ Manuals in the 16th Century . . . ,” *The Library Chronicle* (University of Pennsylvania) XL (Winter 1974): 95–107.

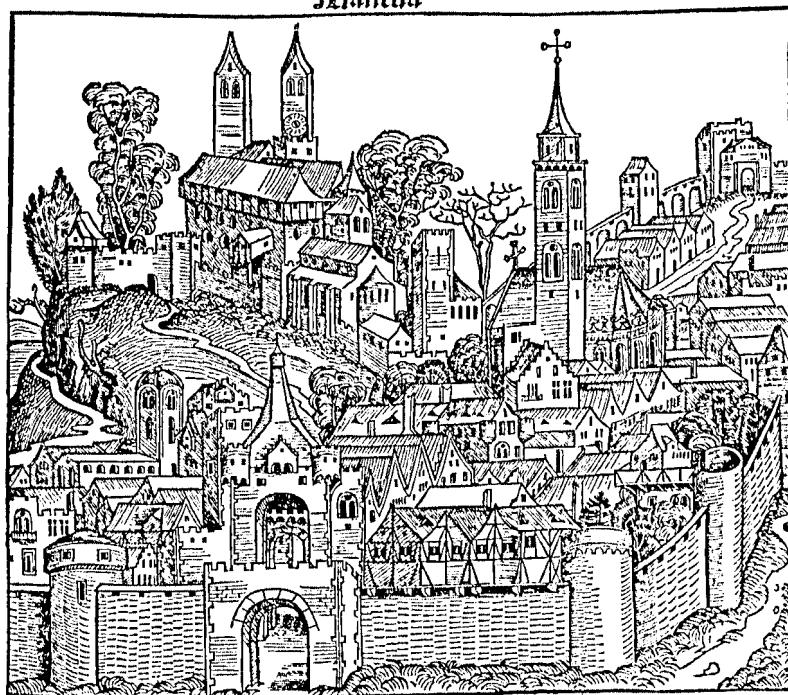
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Fig. 14 (opposite). The use of one block to illustrate several towns is shown on the opposite page by the way Verona (above) and Mantua (below) are presented in the Nuremberg Chronicle. From Hartmann Schedel, *Liber chronicorum* (Nuremberg: Anton Koberger, 12 July 1493, folios 68 and 84). Reproduced by kind permission of the Folger Shakespeare Library.

Verona



Bantua



*Baldus iuris doctor**Lauretius vallensis*

Fig. 15. Identical portrait heads of Baldus and Lorenzo Valla also decorate the Nuremberg Chronicle. The reuse of a given woodcut may have been aimed at pointing the reader to a given topic (such as a town or personage) rather than at conveying a particular profile. From Hartmann Schedel, *Liber chronicorum* (Nuremberg: Anton Koberger, 12 July 1493, folios 236 and 246). Reproduced by kind permission of the Folger Shakespeare Library.

*Bernardus copostella  
nus doctor**Io. gerson cancellarius parisiensis*

Fig. 16. Identical portrait heads of Compostella and Jean Gerson also from the Nuremberg Chronicle. From Hartmann Schedel, *Liber chronicorum* (Nuremberg: Anton Koberger, 12 July 1493, folios 213 and 240). Reproduced by kind permission of the Folger Shakespeare Library.

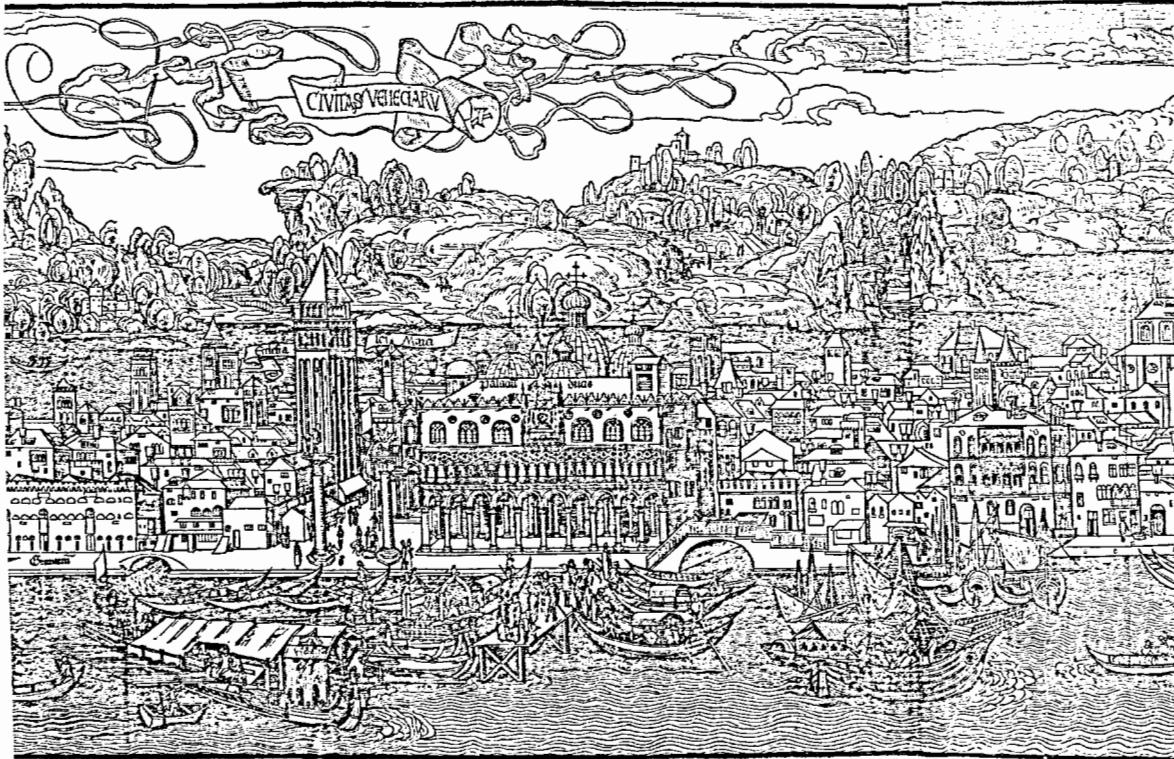


Fig. 17. Shortly before the Nuremberg Chronicle was published, Erhard Reuwich, an artist-engraver, had produced fresh renderings of cities and plants encountered on a trip to the Holy Land. His picture of Venice contains recognizable architectural features (along with a conventional out-of-place landscape in the background). From Erhard Reuwich's illustration of Venice in Bernhard von Breydenbach, *Peregrinatio in Terram Sanctam* (Mainz: Erhard Reuwich [types of Peter Schoeffer], 1486). Reproduced by kind permission of the Department of Special Collections, Stanford University Libraries.

Many early capitalist industries required efficient planning, methodical attention to detail, and rational calculation. The decisions made by early printers, however, directly affected both tool making and symbol making. Their products reshaped powers to manipulate objects, to perceive and think about varied phenomena. Scholars concerned with "modernization" or "rationalization" might profitably think more about the new kind of brainwork fostered by the silent scanning of maps, tables, charts, diagrams, dictionaries, and grammars. They also need to look more closely at the routines pursued by those who compiled and produced such reference guides. These routines were conducive to a new *esprit de système*. In his preface to his pioneering atlas which contained supplementary texts and indexes, Abraham Ortelius likened his *Theatrum* to a "well furnished shoppe" which was so arranged that readers could easily find whatever instruments they might want to obtain.<sup>18</sup> "It's much easier to find things when they are each disposed in place and not scattered haphazardly," remarked another sixteenth-century publisher.<sup>19</sup> He was justifying the way he had reorganized a text he had edited. He might equally well have been complaining to a clerk who had mislaid some account papers pertaining to the large commercial enterprise he ran.

#### SOME EFFECTS PRODUCED BY REORGANIZING TEXTS AND REFERENCE GUIDES: RATIONALIZING, CODIFYING, AND CATALOGUING DATA

Editorial decisions made by early printers with regard to layout and presentation probably helped to reorganize the thinking of readers. McLuhan's suggestion that scanning lines of print affected

<sup>18</sup> Abraham Ortelius, "Message to the Reader," *Theatre of the Whole World* (London, 1606), facsimile ed. (Antwerp, 1968).

<sup>19</sup> Cited by Natalie Z. Davis, "Publisher Guillaume Rouillé, Businessman and Humanist," *Editing Sixteenth Century Texts*, ed. R. J. Schoeck (Toronto, 1966), 100.

thought processes is at first glance somewhat mystifying. But further reflection suggests that the thoughts of readers are guided by the way the contents of books are arranged and presented. Basic changes in book format might well lead to changes in thought patterns.

For example, printed reference works encouraged a repeated recourse to alphabetical order. Ever since the sixteenth century, memorizing a fixed sequence of discrete letters represented by meaningless symbols and sounds has been the gateway to book learning for all children in the West. This was so little the case before printing that a Genoese compiler of a thirteenth-century encyclopedia could write that “‘amo’ comes before ‘bibo’ because ‘a’ is the first letter of the former and ‘b’ is the first letter of the latter and ‘a’ comes before ‘b’ . . . by the grace of God working in me, I have devised this order.”<sup>20</sup>

Other ways of ordering data were no less likely to be used in scribal reference works. As for scribal library catalogues, the full use of alphabet systems by the fabled custodians of the Alexandrian Library had vanished with the institution itself. “When it comes to cataloguing, a poem is a far cry from a card index,” note Reynolds and Wilson, in connection with some verses attributed to Alcuin describing the eighth-century library at York.<sup>21</sup> The rhymed book list was incomplete because metrical exigencies required the exclusion of various works. Medieval library catalogues, to be sure, were not usually in verse, but they were, nevertheless, far from being ordered along the lines of modern card indexes – or, for that matter, along any kind of uniform lines. They reflected the multiform character of scribal culture and were, for the most part, idiosyncratically arranged, designed to help a given custodian find his way to the books which reposed in cupboards or chests or were chained on desks in a special chamber.

<sup>20</sup> Cited in Lloyd W. Daly, *Contributions to a History of Alphabetization in Antiquity and the Middle Ages* (Brussels, 1967), 91.

<sup>21</sup> L. D. Reynolds and N. G. Wilson, *Scribes and Scholars* (Oxford, 1968), 76.

The increasing use of full alphabetical order, both for book catalogues and for indexes, has been attributed to the introduction of paper, which made it less costly to prepare the necessary card files. Doubtless, cheaper writing materials made indexing and cataloguing less costly, but they did little to overcome a natural resistance to repeatedly copying out long lists by hand. There were occasional efforts to make one index valid for several copies, but they were invariably thwarted by scribal errors of diverse kinds. For the most part, the owner of a medieval compendium, preparing an index for his own use, felt no obligation to employ anybody else's system but rather followed whatever method he chose. Similarly, a custodian keeping track of a library collection had no incentive to arrange his records in accordance with those of other librarians — and no incentive, either, to make the arrangement of volumes follow any clear order at all. (On the basis of encounters with some living guardians of rare books, one suspects that the more unfathomable the arrangement of a given inventory the better some medieval custodians were pleased.) After the advent of printing, however, shelf lists were supplemented by sales catalogues aimed at readers outside library walls, while any index compiled for one text could be duplicated hundreds of times. Thus the competitive commercial character of the printed book trade when coupled with typographical standardization made more systematic cataloguing and indexing seem not only feasible but highly desirable as well. To tap markets and attract potential purchasers while keeping competitors at bay called for booksellers' lists that presented titles in a clear and coherent arrangement and for editions that could be described as "well indexed" as well as "new and improved."

Peter Schoeffer's prospectus, which claimed that his firm offered "more complete and better arranged" indexes as well as "more readable" texts than those of his competitors, should not be taken at face value. The early printer, like the modern press agent, often promised more than he could deliver. Nevertheless, the pressure of competition did spur efforts to look for ways of improving familiar products and worked against the inherent resistance to change which had hitherto characterized the copying of valued texts. A rationalization

of format helped to systematize scholarship in diverse fields. Robert Estienne's five Paris book catalogues issued between 1542 and 1547 reflect a rapid advance along many fronts. Divided along trilingual lines, with each section arranged in a uniform progression, beginning with alphabets in Hebrew, Greek, and Latin, and going on to grammars, dictionaries, and texts, these catalogues have justly been described as "a miracle of lucid arrangement."<sup>22</sup> The same skills were used by Estienne for his pioneering work in lexicography and his succession of biblical editions.<sup>23</sup> Much as Estienne's successive improved editions of the Bible produced in sixteenth-century Paris might be compared with the one so-called edition turned out by scribes in thirteenth-century Paris, so, too, his many contributions to lexicography might be compared with that single unique bilingual lexicon produced by thirteenth-century schoolmen under the direction of Robert Grosseteste.

Such comparisons are useful, not only because they show what the new power of the press could achieve, but also because they suggest that attempts at lexicography had been made before print. Efforts at codifying and systematizing which predated the new presses had long been made by preachers and teachers who had compiled concordances for the use of other churchmen or arranged scriptural passages, sermon topics, and commentaries for themselves. A poem is not only "a far cry from a card index"; it is also fairly distant from many scholastic treatises on medical and legal as well as theological subjects. Such treatises were surrounded by glosses and bristled with abbreviations and marginal notations. Some contained diagrams which showed the branches of learning, schematized abstract concepts, or connected human organs with heavenly bodies. Others were furnished with small tabs made of parchment or paper to permit easy reference. One must be wary, in other words, of overstating the novelties introduced by printing or of overlooking how

<sup>22</sup> Graham Pollard and Albert Ehrman, *The Distribution of Books by Catalogue from the Invention of Printing to A.D. 1800* (Cambridge, 1965), 53.

<sup>23</sup> DeWitt T. Starnes, *Robert Estienne's Influence on Lexicography* (Austin, TX, 1963), 86–7.

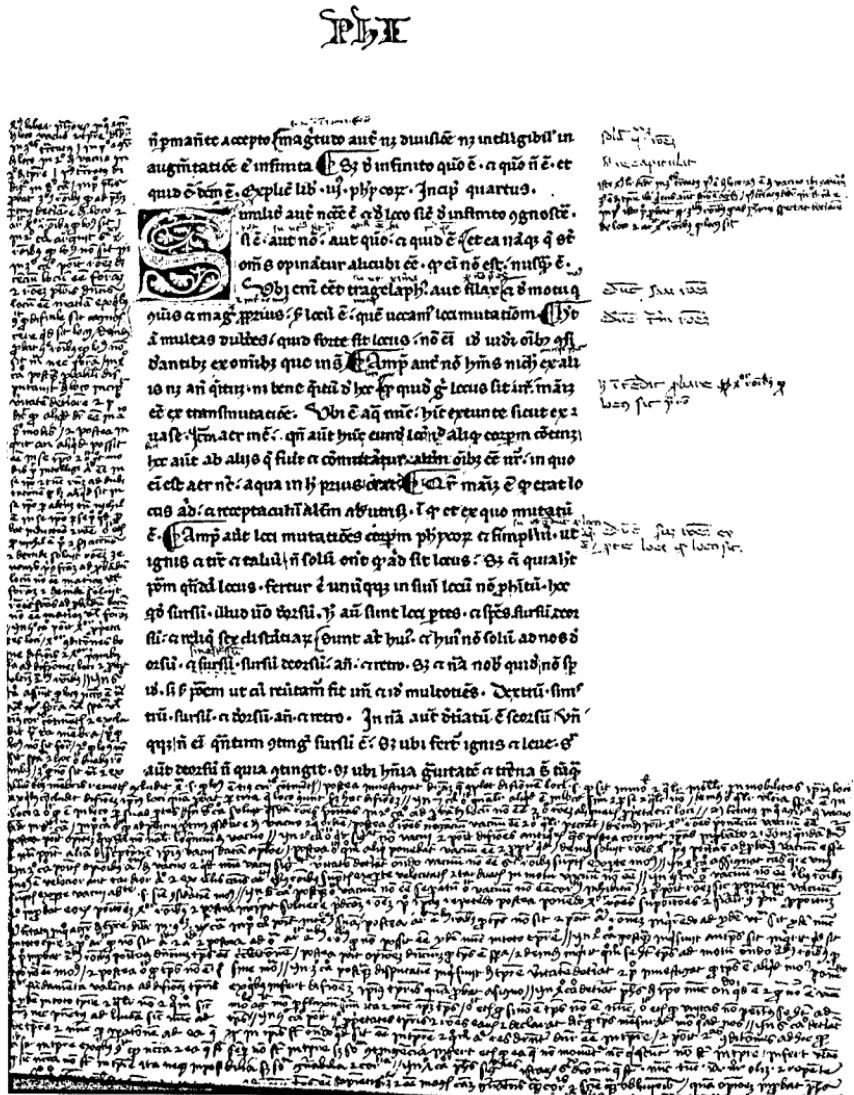


Fig. 18. This example of a medieval treatise, surrounded by a gloss and bristling with abbreviations, is taken from a manuscript copy on vellum of Aristotle, *Physica* (ca. 1300, leaf 22 recto). Reproduced by kind permission of the Folger Shakespeare Library.

previous developments helped to channel the uses to which the new tool was put. Such devices as diagrams and brackets, along with the habit of cross referencing between one passage and another, were not uncommon among medieval compilers and commentators, even though such practices took idiosyncratic and variegated forms. Just as the uniform use of alphabetic order for all reference words did not result from the invention of printing alone but required an alphabetic written language as a base, so, too, much of the cataloguing, cross referencing, and indexing that marked sixteenth-century scholarship should be regarded not only as by-products of typographic culture but also as reflecting new opportunities among clergymen and clerks to realize old goals:

At his most characteristic, medieval man . . . was an organizer, a codifier, a builder of systems. He wanted a place for everything and everything in the right place. Distinction, definition, tabulation were his delight . . . There was nothing medieval people did better or liked better than sorting out and tidying up. Of all our modern inventions, I suspect that they would most have admired the card index.<sup>24</sup>

As this citation from C. S. Lewis suggests, one need not think only of "well furnished shops" when considering the urge to rationalize Western institutions. A desire to have "everything in its right place" was shared by the medieval schoolman and the early capitalist alike. The printing shop performed a significant, albeit neglected, function by bringing together intellectual and commercial activities which reinforced each other and thus created an especially powerful, almost irresistible drive.

On the other hand, one must guard against the temptation to make too much of occasional medieval anticipations of trends that could not be really launched until after printing. The schoolmen might have admired our card index, but their sense of order was not based upon its use. A unique bilingual lexicon cannot do the same

<sup>24</sup> C. S. Lewis. *The Discarded Image: An Introduction to Medieval and Renaissance Literature* (Cambridge, 1974), 10.

work as hundreds of trilingual reference guides. There is simply no counterpart in medieval houses of study or monastic libraries for the printed polyglot Bibles of the sixteenth and seventeenth centuries or for the reference apparatus which accompanied them.

Between 1500 and 1800 more than seventy lexicons devoted solely to Hebrew would be issued. In the second half of the sixteenth century, Christopher Plantin set out to produce a slightly revised edition of the Complutensian Polyglot Bible of 1517–1522. He ended by publishing a monumental new work containing five volumes of text and three of reference materials which included grammars and dictionaries for the Greek, Hebrew, Aramaic, and Syriac languages. Further expansion came with the Paris polyglot edition of 1645, and the climax came in mid-seventeenth-century England. The London “polyglotte” of 1657 was announced by a prospectus which boasted of its superiority to all prior editions (in terms which were later echoed by Bishop Sprat in his praise of the Royal Society). Its contents suggest how much territory had been conquered after two centuries of printing. It presented texts in “Hebrew, Samaritan, Septuagint Greek, Chaldee, Syriac, Arabic, Ethiopian, Persian and Vulgate Latin,” thus adding to the stock of type fonts used by Western scholars for oriental studies. Its elaborate appendixes showed how Bible printing spurred the modern knowledge industry. They comprised

a vast apparatus including a table of ancient chronology prepared by Louis Cappel, descriptions and maps of the Holy Land and of Jerusalem; plans of the temple; treatises on Hebrew coins, on weights and measures, on the origin of language and of the alphabet, on the Hebrew idiom; an historical account of the chief editions and principal versions of the Scriptures; a table of variant readings, with an essay on the integrity and authority of the original texts and other matter.<sup>25</sup>

<sup>25</sup> Preserved Smith, *A History of Modern Culture*, vol. 1, *The Great Renewal*, rev. ed. (New York, 1930), retitled *Origins of Modern Culture 1543–1687* (New York, 1962), 251.

The output of tables, catalogues, gazetteers, and other reference works satisfied practical as well as religious impulses. Whereas Robert Estienne's work on lexicography came as a fallout from his biblical editions, one of Christopher Plantin's lexicographic contributions came simply from his position as an immigrant businessman. After settling in Antwerp and establishing ties with Leiden, Plantin decided to learn Dutch. Never one for wasted effort, he "placed in piles and in alphabetical order" each word that he learned. Thus was launched a collaborative venture which resulted in the *Thesaurus theutonicae linguae* of 1573 – the "first Dutch dictionary worth its name."<sup>26</sup>

Placing words (and letters) in piles according to alphabetical order was indeed a ubiquitous routine in the printer's workshop. The preparation of each index was in itself an exercise in textual analysis – one which was applied to many works that had never been indexed before. Indexing and other procedures entailed in copyediting pointed scholarly activities in a somewhat different direction than had the preparation of orations, dialogues, and other occasional commemorative pieces which had preoccupied earlier humanists. Objections posed by the latter to the barbarous language and bookhands used by the schoolmen were supplemented by new objections to the barbarous arrangement of medieval compendia with their great mass of elaborate digressions and seemingly unrelated details. The earliest printed editions were faithful replicas of these "barbarous" scribal compendia, to be sure; but the very act of duplication was a necessary preliminary to later rearrangement. A disorder previously concealed by oral presentation and piecemeal copying became more visible to copy editors and indexers and more offensive to publishers who valued systematic routines. Classical criteria of unity, internal consistency, and harmony were extended beyond orations, poems, and paintings to encompass the rearrangement of

<sup>26</sup> Leon Vöet, *The Golden Compasses: A History and Evaluation of the Printing and Publishing Activities of the Officina Plantiniana at Antwerp* (Amsterdam, 1969), I:132.

large compilations and of entire fields of study which were not within the early humanist domain.

Clarity and logic of organization, the disposition of matter on the printed page became . . . a preoccupation of editors, almost an end in itself. It is a phenomenon familiar to a student of encyclopedic books of the late sixteenth century, relating to the increased fascination with the technical possibilities of typesetting and the great influence exerted by the methodology of Peter Ramus . . . The Ramist doctrine that every subject could be treated topically, that the best kind of exposition was that which proceeded by analysis was enthusiastically adopted by publishers and editors.<sup>27</sup>

As Neal Gilbert suggests, the term “methodus,” which had been banned as barbarous by early humanists, came into its own a full century before Descartes – appearing “with almost unbelievable frequency in the titles of sixteenth-century treatises.”<sup>28</sup> The Ramist doctrine probably owed much of its popularity to the fact that printing made of textbook writing a new and profitable genre. The mere preparation of differently graded textbooks for teaching varied disciplines encouraged a reassessment of inherited procedures and a rearrangement of approaches to diverse fields. But the new emphasis placed on system and method was not exclusively pedagogical or confined to textbook writing. It was also applied to texts that the early humanists held in disdain; that is, to texts used for graduate studies by the faculties of theology, law, and medicine.

The medieval teacher of the *Corpus Juris* was “not concerned to show how each component was related to the logic of the whole,”<sup>29</sup> partly because very few teachers on law faculties had a chance to see the *Corpus Juris* as a whole. The accidental separation of portions of the manuscript of the *Digest* had given rise to two separate “ordinary”

<sup>27</sup> Gerald Strauss, “A Sixteenth-Century Encyclopedia: Sebastian Münster’s Cosmography and its Edition,” *From the Renaissance to the Counter-Reformation*, ed. C. H. Carter (New York, 1965), 152.

<sup>28</sup> Neal Gilbert, *Renaissance Concepts of Method* (New York, 1960), 66.

<sup>29</sup> Julian Franklin, *Jean Bodin and the Sixteenth Century Revolution in the Methodology of Law and History* (New York, 1963), 27–8.

and “extraordinary” lecture series even before successive layers of commentary were deposited by the glossators and post-glossators.<sup>30</sup> The subdivision of portions into “puncta” to be read aloud within time limits set by academic calendars also led to fragmentation and to throwing sequences into further disarray. To gain access to the most important manuscript source for the *Digest* required a pilgrimage to Pisa, where the Florentine Codex was closely guarded and could be examined, if at all, only for a short time.<sup>31</sup> For a full century after the advent of printing, this problem of access continued to plague those who tried to clean “the Augean stables of law” by cutting through the thicket of commentaries and reconstructing the corpus in its ancient form. The legal scholars were barred (quite literally in the case of Budé, who saw the manuscript only through a grate) by the guardians of the precious Codex who allowed visitors only fleeting glimpses of the relic.<sup>32</sup> Its publication in 1553 was thus an event of some significance – one which enabled a new generation, led by Jacques Cujas, to complete what earlier scholars, such as Budé, Alciato, and Amerbach, had begun. Cujas’s corrections ranged from “the simplest textual errors” to “anachronistic substitutions.” He also undertook “the job of indexing the citations.” By the end of the century the whole compilation had been made available in an emended and indexed form.<sup>33</sup> Stripped of the encrustation of glosses, the ancient compilation was rendered ever more stylistically coherent and internally consistent. By the same token, it came to seem less and less relevant to contemporary jurisprudence. Very much as was the case with Ciceronian Latin, when complete restoration had been successfully applied to the letter of the ancient code, its living spirit vanished for good.

A body of living law was also affected by copyediting, indexing, and emendation. Even while ancient compilations such as the

<sup>30</sup> H. Rashdall, *The Universities of Europe in the Middle Ages*, ed. F. M. Powicke and A. B. Emden (Oxford, 1936), I:205.

<sup>31</sup> Ibid., 255.

<sup>32</sup> Donald R. Kelley, *Foundations of Modern Historical Scholarship* (New York, 1970), 67, 113.

<sup>33</sup> Ibid., 114.

*Corpus Juris* seemed less relevant to current practice, a sharper cutting edge was given to some statutes and *ordonnances* which were in effect. In Tudor England, royal proclamations, once printed, were no longer merely fixed to walls and doors and other public places, but were also collected into a convenient octavo volume and furnished with a table of contents for easy reference. Beginning with Caxton's little-known contemporary, W. de Machlinia, in the 1480s, English law printing attracted an increasing number of enterprising Londoners such as Pynson, Redman, Berthelet, and Thomas More's versatile brother-in-law, John Rastell:

Keenly aware of one another's output, each made efforts to keep their own wares up to date and attractive to the legal public. It was probably to counter the complete abridgement of the Statutes... published by Redman in 1528, that Pynson reissued his 1521 edition... with a new title page and four folios of "newe addicions"... Rastell could not let these actions go unchallenged and replied with his *Magnum Abbreviamentum* listing the statutes down to 1523 abridged in... Latin, Anglo-French and English.<sup>34</sup>

Publications of abridgments and lists of statutes issued by John Rastell and his son offer a good illustration of how a rationalized book format might affect vital organs of the body politic. The systematic arrangement of titles, the tables which followed strict alphabetical order, the indexes and cross references to accurately numbered paragraphs all show how new tools available to printers helped to bring more order and method into a significant body of public law.<sup>35</sup> Until the end of the fifteenth century, it was not always easy to decide just "what a statute really was," and confusion had long been compounded concerning diverse "great" charters. In "Englishing and printing" the *Great Boke of Statutes 1530-1533*, John Rastell took care to provide an introductory "Tabula": a forty-six-page "chronological register by chapters of the statutes 1327 to 1523." He was not merely providing a table of contents; he was also

<sup>34</sup> H. S. Bennett, *English Books and Readers 1475-1557* (Cambridge, 1952), 77.

<sup>35</sup> John Cowley, "The Abridgement of Statutes," *The Library*, 4th ser. XII (September 1931): 128.

offering a systematic review of parliamentary history – the first many readers had ever seen.<sup>36</sup>

This sort of spectacular innovation, while deserving close study, should not divert attention from much less conspicuous, more ubiquitous changes. Increasing familiarity with regularly numbered pages, punctuation marks, section breaks, running heads, indexes, and so forth helped to reorder the thought of *all* readers, whatever their profession or craft. The use of arabic numbers for pagination suggests how the most inconspicuous innovation could have weighty consequences – in this case, a more accurate indexing, annotation, and cross referencing resulted. Most studies of printing have, quite rightly, singled out the regular provision of title pages as the most significant new feature associated with the printed book format. How the title page contributed to the cataloguing of books and the bibliographer's craft scarcely needs to be spelled out. How it contributed to new habits of placing and dating, in general, does, I think, call for further thought.

#### THE NEW PROCESS OF DATA COLLECTION: FROM THE CORRUPTED COPY TO THE IMPROVED EDITION

When turning out successive editions of a given reference work or set of maps, printers did not only compete with rivals and improve on their predecessors. They were also able to improve on themselves. The succession of Latin Bibles turned out by Robert Estienne and the succession of atlases turned out by Ortelius suggest how the immeasurable drift of scribal culture had been not merely arrested but actually reversed.

In making this point, one is likely to run up against objections posed by scholars who have good reason to be sceptical about all claims made on behalf of early printers. Prefaces and blurbs which repeatedly boast of improvement are belied by actual evidence of uncritical copying and – even worse – of ignorant emendation.

<sup>36</sup> H. J. Graham, "Our Tong Maternall Marvellously Amendyd and Augmentyd": The First Englishing and Printing of the Medieval Statutes at Large, 1530–1533," *U. C. L. A. Law Bulletin* XIII (November 1965): 58–98.

Comparisons of scribal reference works with early printed versions often show that an age-old process of corruption was aggravated and accelerated after print. In the field of Bible illustration, for example, inferior-quality blocks used repeatedly led to unintelligible lettering; misinterpretations of blurred captions by ignorant craftsmen produced mystifying juxtapositions; all errors were compounded by pirated editions issued over the course of decades.<sup>37</sup>

Early printed botany books underwent much the same kind of degradations as did early printed Bibles. A sequence of printed herbals beginning in the 1480s and going to 1526 reveals a "steady increase in the amount of distortion," with the final product – an English herbal of 1526 – providing a "remarkably sad example of what happens to visual information as it passed from copyist to copyist."<sup>38</sup> But in the very course of accelerating a process of corruption, which had gone on in a much slower and more irregular fashion under the aegis of scribes, the new medium made this process more visible to learned men and offered a way of overcoming it for the first time. In the hands of ignorant printers driving to make quick profits, data tended to get garbled at an ever more rapid pace. But under the guidance of technically proficient masters, the new technology also provided a way of transcending the limits which scribal procedures had imposed upon technically proficient masters in the past. Under proper supervision, fresh observations could at long last be duplicated without being blurred or blotted out over the course of time.

Some sixteenth-century editors and publishers simply duplicated old compendia. But others created vast networks of correspondents and solicited criticism of each edition, sometimes publicly promising to mention the names of readers who sent in new information or who spotted the errors which would be weeded out:

By the simple expedient of being honest with his readers and inviting criticism and suggestions, Ortelius made his *Theatrum* a sort of cooperative enterprise on an international basis. He received

<sup>37</sup> James Strachan, *Early Bible Illustrations: A Short Study* (Cambridge, 1957), *passim*.

<sup>38</sup> Ivins, *Prints and Visual Communications*, 40.

helpful suggestions from far and wide and cartographers stumbled over themselves to send him their latest maps of regions not covered in the *Theatrum*.

The *Theatrum* was... speedily reprinted several times... Suggestions for corrections and revisions kept Ortelius and his engravers busy altering plates for new editions... Within three years he had acquired so many new maps that he issued a supplement of 17 maps which were afterwards incorporated in the *Theatrum*. When Ortelius died in 1598 at least 28 editions of the atlas had been published in Latin, Dutch, German, French and Spanish... The last edition was published by the House of Plantin in 1612.<sup>39</sup>

Not every edition, to be sure, eliminated all the errors that were spotted; good intentions stated in prefaces failed to be honored in actual manufacture. Even so, the requests of publishers often encouraged readers to launch their own research projects and field trips, which resulted in additional publication programs. Thus a knowledge explosion was set off. The fallout from Ortelius's editions, for example, encompassed treatises on topography and local history ranging from Muscovy to Wales.

The solicitor or recipient of new data was not always a printer or publisher. Often it was the author or editor of a given series of editions who heard from readers about errors or additions to be incorporated in a later edition. As Mattioli's commentaries on Dioscorides, first published in 1554, ran through one edition after another, they were periodically revised and corrected on the basis of specimens and information received from correspondents. Exotic plants were thus introduced to Europeans (so that the horse chestnut, lilac, and tulip came from Turkey into botanical gardens in Europe via Mattioli's edition of 1581). The proliferation of foreign reports pertaining to fruits and seeds also led to more complete and precise descriptions of domestic plants.

By the middle of the sixteenth century, botanists were vying with each other to obtain novelties from India, from the New

<sup>39</sup> Lloyd A. Brown, *The Story of Maps* (Boston, 1959), 163-4.

World, from frozen countries, marshes, and deserts — from anywhere and everywhere. The plants and animals of distant exotic countries were either radically new or sufficiently different from those already known to cause perplexities and to invite further investigation . . . There emerged a new kind of scientist, the traveling naturalist . . . The greedy adventurers of early days were now replaced by men in search of knowledge . . .

The discoveries made in foreign lands excited the naturalists who were obliged to stay at home, such as physicians, professors and keepers of botanical gardens and greenhouses, and forced them to describe more accurately and completely the faunas and floras of their own countries . . . So much new knowledge was amassed that it tended to create confusion and there was an increasing need for new surveys.<sup>40</sup>

The new surveys led, in turn, to further interchanges, which set off new investigations and the accumulation of more data, making necessary more refined classification, and so on — *ad infinitum*. The sequence of improved editions and ever-expanding reference works was a sequence without limits — unlike the great library collections amassed by Alexandrian rulers and Renaissance princes. The destruction of the Alexandrian Library in the distant past and the destruction of the great collection amassed by Matthias Corvinus in the recent past were noted by Conrad Gesner in the dedication of the first edition of his massive bibliography, the *Bibliotheca universalis* (1545), which listed some ten thousand titles of Latin, Greek, and Hebrew works.<sup>41</sup> The natural sciences and the library sciences which Gesner helped to found were capable of unlimited expansion. They entailed an open-ended, indefinitely continuous process. The term “feedback” is ugly and much overused, yet it does help to define the difference between data collection before and after the communications shift. After printing, large-scale data collection did become

<sup>40</sup> George Sarton, *Six Wings: Men of Science in the Renaissance* (Bloomington, IN, 1957), 137.

<sup>41</sup> Hans Fischer, “Conrad Gesner (1516–1565) as Bibliographer and Encyclopedist,” *The Library*, 5th ser. XXI (December 1966): 271.

subject to new forms of feedback which had not been possible in the age of scribes.

Here as elsewhere, there are advantages to delineating the new features of print culture instead of merely noting in passing that, of course, printing was a prerequisite for early modern scholarship and science, before going on to cover other things. If the effects of printing received more attention one might be less inclined to attribute unusual moral virtues to sixteenth-century scholars or to set "greedy adventurers" against disinterested naturalists. If authors, editors, and publishers adopted "the simple expedient of being honest" by citing contributors, it was not because they were unusually noble but because this simple expedient had become more satisfying to mixed motives after printing than had been the case before. When Ortelius listed contributors to his atlas, he was pointing toward the "modern idea of scientific cooperation." But that is no reason to draw invidious comparisons between "honest" and cooperative craftsmen who sought to benefit others and vain, devious, self-serving schoolmen or literati who worked only for themselves.<sup>42</sup> No occupational group had a monopoly on a given virtue or vice. Socially useful techniques could be publicized after the sixteenth century, not because cooperative artisans became influential but because of the advent of print. Indeed, artisan-authors were no less "greedy," no less attracted by the lure of new intellectual property rights, than were literati and schoolmen.

It is noteworthy that high-minded passages justifying the writing of books by "humble" craftsmen often went together with appeals to the reader to visit the author's workshop where "marvelous things can be seen" and with the inclusion of addresses where instruments were on sale. When an artisan-author told his readers they could get his address from his publisher and come for a free demonstration to his shop, he was probably hoping to attract potential purchasers of his wares. The important point is that selfishness and altruism could be served at the same time.

<sup>42</sup> Edgar Zilsel, "The Genesis of the Concept of Scientific Progress," *Journal of the History of Ideas* VI (1945): 344-5.

This point is just as applicable to the "brain children" of professors as to those of instrument makers – if, indeed, the two figures can be kept apart. A certain ambivalence concerning new forms of publicity characterized academicians no less than artisans at first. Both groups contained authors who expressed their desire to disclose information for disinterested virtuous motives even while seeking fame and engaging in priority disputes. Similarly, a collaborative approach to data collection and honest acknowledgment of sources and contributions were by no means confined to the natural sciences. Bibliography no less than zoology became collaborative and subject to incremental change. Indeed, the so-called father of these two disciplines was the same man.

Insofar as the change from a sequence of corrupted copies to a sequence of improved editions encompassed all scholarly and scientific fields, it might be expected to have a fairly widespread effect upon the entire Commonwealth of Learning. It needs to be taken into consideration, I think, when dealing with massive intellectual movements such as the growing orchestration of themes associated with limitless progress and the muting of older "decay-of-nature" themes. "The Power which Printing gives us of continually improving and correcting our Works in successive Editions," wrote David Hume to his publisher, "appears to me the chief advantage of that art."<sup>43</sup> What was true of a single author's work applied with even greater force to large collaborative reference works. A series of new and augmented editions made the future seem to hold more promise of enlightenment than the past.

"Until half a century after Copernicus's death," Thomas Kuhn wrote, "no potentially revolutionary changes occurred in the data available to astronomers."<sup>44</sup> Yet Copernicus's life (1473–1543) spanned the very decades when a great many changes, now barely visible to modern eyes, were transforming "the data available" to all

<sup>43</sup> Cited in J. A. Cochrane, *Dr. Johnson's Printer: The Life of William Strahan* (London, 1964), p. 19, n.2.

<sup>44</sup> Thomas S. Kuhn, *The Copernican Revolution: Planetary Astronomy in the Development of Western Thought* (Cambridge, MA, 1957), 131.

book readers. A closer study of these changes could help to explain why systems of charting the planets, mapping the earth, synchronizing chronologies, codifying laws, and compiling bibliographies were all revolutionized before the end of the sixteenth century. In each instance, one notes, Hellenistic achievements were first reduplicated and then, in a remarkably short time, surpassed. In each instance, the new schemes, once published, remained available for correction, development, and refinement. Successive generations could build on the work left by sixteenth-century polymaths instead of trying to retrieve scattered fragments of it. The varied intellectual "revolutions" of early modern times owed much to the features that have already been outlined. But the great tomes, charts, and maps that are now seen as "milestones" might have proved insubstantial had not the preservative powers of print also been called into play. Typographical fixity is a basic prerequisite for the rapid advancement of learning. It helps to explain much else that seems to distinguish the history of the past five centuries from that of all prior eras – as I hope the following remarks will suggest.

#### CONSIDERING THE PRESERVATIVE POWERS OF PRINT: FIXITY AND CUMULATIVE CHANGE

Of all the new features introduced by the duplicative powers of print, preservation is possibly the most important. To appreciate its importance, we need to recall the conditions that prevailed before texts could be set in type. No manuscript, however useful as a reference guide, could be preserved for long without undergoing corruption by copyists, and even this sort of "preservation" rested precariously on the shifting demands of local elites and a fluctuating incidence of trained scribal labor. Insofar as records were seen and used, they were vulnerable to wear and tear. Stored documents were vulnerable to moisture and vermin, theft and fire. However they might be collected or guarded within some great message center, their ultimate dispersal and loss were inevitable. To be transmitted by writing from one generation to the next, information had to be conveyed by drifting texts and vanishing manuscripts.

This aspect of scribal culture is not often appreciated by modern scholars. It is completely concealed by recent anthropological studies which focus on the contrasts between oral and written records exhibited during the last few hundred years. Thus anthropologists are likely to assign to handwriting the capacity to produce "permanently recorded versions of the past."<sup>45</sup> Yet a single manuscript record, even on parchment, was fairly impermanent unless it was stored away and not used. More than one record required copying, which led to textual drift. Durable records called for durable materials. Stone inscriptions endured; papyrus records crumbled. These tangible differences gave rise to the rule: "Much is preserved when little is written; little is preserved when much is written."<sup>46</sup> After the advent of printing, however, the durability of writing material became less significant; preservation could be achieved by using abundant supplies of paper rather than scarce and costly skin. Quantity counted for more than quality. Even while time-tested rules were being duplicated, they were being made obsolete. One is reminded of the way modern scholars smile at the notion of an abbot instructing his monks to copy printed books so that texts would not perish. Yet modern scholars are just as prone as fifteenth-century monks to be deceived by appearances, and appearances have become increasingly deceptive.

By and large, printing required the use of paper — a less durable material than parchment or vellum to begin with, and one that has become ever more perishable as the centuries have passed and rag content has diminished. Whereas the scraping and reuse of skin does not obliterate letters completely, the scraping or reconversion of discarded printed matter leaves no palimpsests behind. When written messages are duplicated in such great abundance that they can be consigned to trash bins or converted into pulp, they are not apt to prompt thoughts about prolonged preservation. Manuscripts guarded in treasure rooms, wills locked in vaults, diplomas framed behind

<sup>45</sup> Jack Goody and Ian Watt, "The Consequences of Literacy," *Comparative Studies in Society and History* V (1963): 345.

<sup>46</sup> Harold Innis, *Empire and Communications* (Oxford, 1950), 10.

glass do appear to be less perishable than road maps, kitchen calendars, or daily newspapers. Moreover, we are repeatedly reminded of the remarkable survival value of ancient documents which have been buried under lava or stored in jars for thousands of years. A process of retrieval that was launched after printing has led to the uncovering of so many long-lost records that we are likely to underestimate the perishability of manuscripts which were not buried but were used. The development of new techniques for restoration and duplication, which bring lost writings to light, also encourages absentmindedness about losses which were incurred before the new techniques were employed.

Earlier scholars were less absentminded. Thomas Jefferson, for one, was keenly aware of the preservative powers of print. He wrote to George Wythe:

Very early in the course of my researches into the laws of Virginia, I observed that many of them were already lost, and many more on the point of being lost, as existing only in single copies in the hands of careful or curious individuals, on whose deaths they would probably be used for waste paper. I set myself therefore to work to collect all which were then existing... in searching after these remains, I spared neither time, trouble, nor expense... But... the question is What means will be the most effectual for preserving these remains from future loss? All the care I can take of them, will not preserve them from the worm, from the natural decay of the paper, from the accident of fire, or those of removal when it is necessary for any public purpose... Our experience has proved to us that a single copy, or a few, deposited in MS in the public offices cannot be relied on for any great length of time. The ravages of fire and of ferocious enemies have had but too much part in producing the very loss we now deplore. How many of the precious works of antiquity were lost while they existed only in manuscript? Has there ever been one lost since the art of printing has rendered it practicable to multiply and disperse copies? This leads us then to the only means of preserving those remains

of our laws now under consideration, that is, a multiplication of printed copies.<sup>47</sup>

This revealing letter is described by Julian Boyd as leading directly to the publication of Hening's *Statutes of Virginia*. According to Boyd, it reflects the same views Jefferson expressed much earlier "to the author of Hazard's *Historical Collections*: 'the lost cannot be recovered; but let us save what remains: not by vaults and locks which fence them from the public eye and use, in consigning them to the waste of time but by such a multiplication of copies, as shall place them beyond the reach of accident.'"<sup>48</sup>

It seems in character for Jefferson to stress the democratizing aspect of the preservative powers of print which secured precious documents not by putting them under lock and key but by removing them from chests and vaults and duplicating them for all to see. The notion that valuable data could be preserved best by being made public, rather than by being kept secret, ran counter to tradition, led to clashes with new censors, and was central both to early modern science and to Enlightenment thought. In deplored the loss of the "precious works of antiquity" while "they existed only in manuscript" Jefferson also sounded an older humanist theme which linked the rebirth of ancient learning to the new art of printing. Problems associated with this linkage will be discussed in the next chapter. Here let me merely note that a classical revival, which was already under way when the first printers moved into Italy, persisted despite Ottoman advances in Eastern Europe, the French invasions of Italy, the despoiling of English monasteries, and all the horrors of the religious wars. Once Greek type fonts had been cut, neither the disruption of civil order in Italy, the conquest of Greek lands by Islam, nor even the translation into Latin of all major Greek texts saw knowledge of Greek wither again in the West. But the implications of typographical fixity are scarcely exhausted by thinking about

<sup>47</sup> Julian Boyd, "These Precious Moments of... Our History," *The American Archivist* XXII, 2 (1959): 175-6.

<sup>48</sup> *Ibid.*, 175-6.

the permanent retrieval of Greek letters. Nor are they exhausted by reckoning the number of other ancient languages that have been retrieved and secured after being lost – not just to Western Europe but to the entire world – for thousands of years. They involve the whole modern “knowledge industry” itself, with its ever-expanding bibliographies, its relentless pressure on bookshelf space and library facilities.

They also involve issues that are less academic and more geopolitical. The linguistic map of Europe was “fixed” by the same process and at the same time as Greek letters were. The importance of the fixing of literary vernaculars is often stressed. The strategic role played by printing is, however, often overlooked. How strategic it was is suggested by the following paraphrased summary of Steinberg’s account:

Printing “preserved and codified, sometimes even created” certain vernaculars. Its absence during the sixteenth century among small linguistic groups “demonstrably led” to the disappearance or exclusion of their vernaculars from the realm of literature. Its presence among similar groups in the same century ensured the possibility of intermittent revivals or continued expansion. Having fortified language walls between one group and another, printers homogenized what was within them, breaking down minor differences, standardizing idioms for millions of writers and readers, assigning a new peripheral role to provincial dialects. The preservation of a given literary language often depended on whether or not a few vernacular primers, catechisms or Bibles happened to get printed (under foreign as well as domestic auspices) in the sixteenth century. When this was the case, the subsequent expansion of a separate “national” literary culture ensued. When this did not happen, a prerequisite for budding “national” consciousness disappeared; a spoken provincial dialect was left instead.<sup>49</sup>

Studies of dynastic consolidation and of nationalism might well devote more space to the advent of printing. Typography arrested

<sup>49</sup> Steinberg, *Five Hundred Years*, 120–6.

linguistic drift, enriched as well as standardized vernaculars, and paved the way for the more deliberate purification and codification of all major European languages. Randomly patterned sixteenth-century type casting largely determined the subsequent elaboration of national mythologies on the part of certain separate groups within multilingual dynastic states. The duplication of vernacular primers and translations contributed in other ways to nationalism. A "mother's tongue" learned "naturally" at home would be reinforced by inculcation of a homogenized print-made language mastered while still young, when learning to read. During the most impressionable years of childhood, the eye would see a more standardized version of what the ear had heard. Particularly after grammar schools gave primary instruction in reading by using vernacular instead of Latin readers, linguistic "roots" and rootedness in one's homeland would be entangled.

Printing contributed in other ways to the permanent fragmentation of Latin Christendom. Erastian policies long pursued by diverse rulers could, for example, be more fully implemented. The duplication of documents pertaining to ritual, liturgy, or canon law, handled under clerical auspices in the age of the scribe, was undertaken by enterprising laymen, subject to dynastic authority, in the age of the printer. Local firms, lying outside the pope's control, were granted lucrative privileges by Habsburg, Valois, and Tudor kings to serve the needs of national clergies. An Antwerp printer joined forces with a king of Spain to supply all Spanish priests with some 15,000 copies of a sixteenth-century breviary – its text having been slightly altered from the version authorized by post-Tridentine Rome. Philip II thus demonstrated royal control over the clergy of his realm, and Christopher Plantin thus evaded payments to the privileged Italian printer who had won a lucrative monopoly on the newly authorized Roman version.<sup>50</sup> The other varied ways in which printers, by pursuing their own interests, contributed to loosening or severing links

<sup>50</sup> Robert M. Kingdon, "Patronage, Piety and Printing in Sixteenth-Century Europe," *A Festschrift for Frederick Artz*, ed. D. Pinkney and T. Ropp (Durham, NC, 1964), 32–3.

with Rome, to nationalist sentiment, and to dynastic consolidation cannot be explored here. But they surely call for further study.

Many other consequences of typographical fixity also need to be explored. As Chapter 6 suggests, sixteenth-century religious divisions within Latin Christendom proved to be peculiarly permanent. When a heresy was condemned or a schismatic king excommunicated, such actions left a more indelible imprint than had been the case in earlier centuries. Similarly, as edicts became more visible, they also became more irrevocable. *Magna Carta*, for example, was ostensibly "published" (that is, proclaimed) twice a year in every shire. By 1237 there was already confusion as to which "charter" was involved.<sup>51</sup> In 1533, however, Englishmen glancing over the "Tabula" of the *Great Boke* could see how often it had been repeatedly confirmed in successive royal statutes.<sup>52</sup> In France also the "mechanism by which the will of the sovereign" was incorporated into the "published" body of law by "registration" was probably altered by typographical fixity.<sup>53</sup> It was no longer possible to take for granted that one was following "immemorial custom" when granting an immunity or signing a decree. Much as M. Jourdain learned that he was speaking prose, monarchs learned from political theorists that they were "making" laws. But members of parliaments and assemblies also learned from jurists and printers about ancient rights wrongfully usurped. Struggles over the right to establish precedents became more intense as each precedent became more permanent and hence more difficult to break.

Fixity also made possible more explicit recognition of individual innovation and encouraged the staking of claims to inventions, discoveries, and creations. It is no accident, I think, that printing is the first "invention" which became entangled in a priority struggle and rival national claims. Arguments over Gutenberg versus Coster or

<sup>51</sup> J. C. Holt, *Magna Carta* (Cambridge, 1965), 288–90.

<sup>52</sup> Graham, "Our Tong Maternall," 93.

<sup>53</sup> Franklin Ford, *Robe and Sword: The Regrouping of the French Aristocracy after Louis XIV* (Cambridge, 1953), 80.

Jenson set the pattern for later "Columbus Day" type disputes. One might compare the anonymity of the inventor of spectacles with later disputes over Galileo's right to claim priority in the case of the telescope. How much credit should be assigned to map publishers and printers for the naming of the New World itself? The way names were fixed to human organs and to the craters of the moon is also indicative of the way individual immortality could be achieved by means of print.

By 1500, legal fictions were already being devised to accommodate the patenting of inventions and assignment of literary properties. Once the rights of an inventor could be legally fixed and the problem of preserving unwritten recipes intact was no longer posed, profits could be achieved by open publicity provided new restraints were not imposed. Individual initiative was released from reliance on guild protection, but at the same time new powers were lodged in the hands of a bureaucratic officialdom. Competition over the right to publish a given text also introduced controversy over new issues involving monopoly and piracy. Printing forced legal definition of what belonged in the public domain. A literary "common" became subject to "enclosure movements," and possessive individualism began to characterize the attitude of writers to their work. The "terms plagiarism and copyright did not exist for the minstrel. It was only after printing that they began to hold significance for the author."<sup>54</sup>

Personal celebrity is related to printed publicity at present. The same point may be applied to the past – in a manner that is especially relevant to debates over the difference between medieval and Renaissance individualism. Cheaper writing materials encouraged the separate recording of private lives and correspondence. Not paper mills but printing presses, however, made it possible to preserve personal ephemera intact. The "drive for fame" itself may have been affected by print-made immortality. The urge to scribble was manifested in Juvenal's day as it was in Petrarch's. The wish to see

<sup>54</sup> Michael B. Kline, "Rabelais and the Age of Printing," *Etudes Rabelaisennes* IV; *Travaux d'Humanisme et Renaissance* LX (Geneva, 1963): 54.

one's work in print (fixed forever with one's name in card files and anthologies) is different from the desire to pen lines that could never be fixed in a permanent form, might be lost forever, altered by copying, or – if truly memorable – be carried by oral transmission and assigned ultimately to "anon." Until it became possible to distinguish between composing a poem and reciting one, or writing a book and copying one; until books could be classified by something other than incipits; the modern game of books and authors could not be played.

The thirteenth-century Franciscan, Saint Bonaventura, said that there were four ways of making books:

A man might write the works of others, adding and changing nothing, in which case he is simply called a "scribe" (*scriptor*). Another writes the work of others with additions which are not his own; and he is called a "compiler" (*compilator*). Another writes both others' work and his own, but with others' work in principal place, adding his own for purposes of explanation; and he is called a "commentator" (*commentator*) . . . Another writes both his own work and others' but with his own work in principal place adding others' for purposes of confirmation; and such a man should be called an "author" (*auctor*).<sup>55</sup>

This passage is remarkable, not only for its omission of completely original composition from the otherwise symmetrical scheme, but also for the unitary conception of writing which it implies. A writer is a man who "makes books" with a pen just as a cobbler is a man who makes shoes on a last.

Many problems about assigning proper credit to scribal "authors" may result from misguided efforts to apply print-made concepts where they do not pertain. The so-called forged book of Hermes is only one of many illustrations of this point. Who wrote Socrates' lines, Aristotle's works, Sappho's poems, any portion of the Scriptures? "God was not the author" of the written text of Scripture, writes a reviewer of a recent book, *Biblical Inspiration*. "But who was?

<sup>55</sup> John Burrow, "The Medieval Compendium," *Times Literary Supplement* (21 May 1976): 615.

That is the new and radical question which has since been raised by scholarship, disclosing to us centuries of development and complex multiplicity of authorship in the biblical documents as we now read them. Isaiah did not ‘write’ *Isaiah*.<sup>56</sup>

The new forms of authorship and literary property rights undermined older concepts of collective authority in a manner that encompassed not only biblical composition but also texts relating to philosophy, science, and law. Veneration for the wisdom of the ages was probably modified as ancient sages were retrospectively cast in the role of individual authors – prone to human error and possibly plagiarists as well. Treatment of battles of books between “ancients and moderns” might profit from more discussion of such issues. Since early printers were primarily responsible for forcing definition of literary property rights, for shaping new concepts of authorship, for exploiting bestsellers and trying to tap new markets, their role in this celebrated quarrel should not be overlooked. By the early sixteenth century, for example, staffs of translators were employed to turn out vernacular versions of the more popular works by ancient Romans and contemporary Latin-writing humanists. The tremendous impetus given by printers to the vernacular-translation movements in diverse countries needs to be taken into account when discussing debates between Latinists and the advocates of new vulgar tongues.

It is also worth considering that different meanings may have been assigned terms such as ancient and modern, discovery and recovery, invention and imitation before important departures from precedent could be permanently recorded. “Throughout the patristic and medieval periods, the quest for truth is thought of as the *recovery* of what is embedded in tradition . . . rather than the *discovery* of what is new.”<sup>57</sup> Most scholars concur with this view. It must have been difficult to distinguish discovering something new from recovering it in the age of scribes. To “find a new art” was easily confused with

<sup>56</sup> “The Author and His Ghosts,” *Times Literary Supplement* (22 September 1972): 1121.

<sup>57</sup> Harbison, *Christian Scholar*, 5.

retrieving a lost one, for superior techniques and systems of knowledge were frequently discovered by being recovered. Probably Moses, Zoroaster, or Thoth had not "invented" all the arts that were to be found. But many were retrieved from ancient giants whose works reentered the West by circuitous routes bearing few traces of their origins, even while testifying to remarkable technical expertise. Some pagan seers were believed to have been granted foreknowledge of the Incarnation. Possibly they had also been granted a special secret key to all knowledge by the same divine dispensation. Veneration for the wisdom of the ancients was not incompatible with the advancement of learning, nor was imitation incompatible with inspiration. Efforts to think and do as the ancients did might well reflect the hope of experiencing a sudden illumination or of coming closer to the original source of a pure, clear, and certain knowledge that a long Gothic night had obscured.

When unprecedented innovations did occur, moreover, there was no sure way of recognizing them before the advent of printing. Who could ascertain precisely what was known – either to prior generations within a given region or to contemporary inhabitants of far-off lands? "Steady advance," Sarton says, "implies exact determination of every previous step." In his view, printing made this determination "incomparably easier."<sup>58</sup> He may have understated the case. Exact determination must have been impossible before printing. Progressive refinement of certain arts and skills could and did occur. But no sophisticated technique could be securely established, permanently recorded, and stored for subsequent retrieval. Before trying to account for an "idea" of progress, we might look more closely at the new dynamic process entailed in a continuous accumulation of fixed records. Permanence introduced a new form of progressive change. The preservation of the old, in brief, was a prerequisite for a tradition of the new.

The advancement of learning had taken the form of a search for lost wisdom in the age of scribes. This search was rapidly propelled after printing. Ancient maps, charts, and texts once arranged and

<sup>58</sup> Sarton, "The Quest for Truth," 66.

dated, however, turned out to be dated in more ways than one. Map publishers turned out genuinely new and improved editions of atlases and star maps which showed that modern navigators and star gazers knew more things about the heavens and earth than did ancient sages. "The simple sailors of today," wrote Jacques Cartier in his *Brief Narration of 1545*, "have learned the opposite of the philosophers by true experience."<sup>59</sup> New, improved editions of ancient texts also began to accumulate, uncovering more schools of ancient philosophy than had been dreamed of before. Scattered attacks on one authority by those who favored another provided ammunition for a wholesale assault on all received opinion.

Incompatible portions of inherited traditions could be sloughed off, partly because the task of preservation had become less urgent. Copying, memorizing, and transmitting absorbed fewer energies. Useful reference books were no longer blotted out or blurred with the passage of time. Cadence and rhyme, images and symbols ceased to fulfill their traditional function of preserving the collective memory. Once technical information could be conveyed directly by unambiguous numbers, diagrams, and maps, the esthetic experience became increasingly autonomous. Although books on the memory arts multiplied after printing, the need to rely on these arts decreased. Scribal systems, elaborated in print, ultimately petrified and are only now being reassembled, like fossil remains, by modern research. The special formulas that had preserved recipes and techniques among closed circles of initiates also disappeared. Residues of mnemonic devices were transmuted into mysterious images, rites, and incantations.

Nevertheless, scribal veneration for ancient learning lingered on long after the conditions that had fostered it had gone. Among Rosicrucians and Freemasons, for example, the belief persisted that the "new philosophy" was in fact very old. Descartes and Newton had merely retrieved the same magical key to nature's secrets that had once been known to ancient pyramid builders but was later withheld from the laity or deliberately obscured by a deceitful priesthood. In

<sup>59</sup> Cited by Hiram Haydn, *The Counter Renaissance* (New York, 1950), 208.

fact, the Index came only after printing, and the preservation of pagan learning owed much to monks and friars. Some enlightened freethinkers, however, assigned Counter-Reformation institutions to the Gothic Dark Ages and turned Zoroaster into a Copernican. Similarly, once imitation was detached from inspiration, copying from composing, the classical revival became increasingly arid and academic. The search for primary sources, which had once meant drinking from pure wellsprings, came to be associated with dry-as-dust pedantry. But the reputation of ancient seers, bards, and prophets was not, by the same token, diminished. Claims to have inherited their magic mantle were put forth by new romanticists who reoriented the meaning of the term "original," sought inspiration by dabbling in the occult, and tried to resurrect scribal arts in the age of print. Even the "decay-of-nature" theme, once intimately associated with the erosion and corruption of scribal writings, would be reworked and reoriented by gloomy modern prophets who envisaged a "run-away technology" and felt regress, not progress, characterized their age.

### AMPLIFICATION AND REINFORCEMENT: THE PERSISTENCE OF STEREOTYPES AND OF SOCIOLINGUISTIC DIVISIONS

Many other themes embedded in scribal writings, detached from the living cultures that had shaped them, were propelled as "typologies" on printed pages. Over the course of time, archetypes were converted into stereotypes, the language of giants, as Merton puts it, into the clichés of dwarfs. Both "stereotype" and "cliché" are terms deriving from typographical processes developed three and a half centuries after Gutenberg. They point, however, to certain other features of typographical culture in general that deserve closer consideration. During the past five centuries, broadcasting new messages has also entailed amplifying and reinforcing old ones. I am referring to effects produced by an ever more frequent repetition of identical chapters and verses, anecdotes and aphorisms, drawn from very limited scribal sources. Quite apart from the constant republication of classical, biblical, or early vernacular works, there has been an

unwitting collaboration between countless authors of new books or articles. For five hundred years, authors have jointly transmitted certain old messages with augmented frequency even while separately reporting on new events or spinning out new ideas. Thus if they happen to contain only one passing reference to the heroic stand at Thermopylae, a hundred reports on different military campaigns will impress Herodotus's description on the mind of the reader who scans such reports with a hundredfold impact. Every dissimilar report of other campaigns will be received only once. As printed materials proliferate, this effect becomes more pronounced. The more wide ranging the reader at present, the more frequent will be the encounter with the identical version and the deeper the impression it will leave. Since writers are particularly prone to wide-ranging reading, a multiplying "feedback" effect results. When it comes to coining familiar quotations, describing familiar episodes, originating symbols or stereotypes, the ancients (that is, those who went to press first) will generally outstrip the moderns. How many times has Tacitus's description of freedom-loving Teutons been repeated since a single manuscript of *Germania* was discovered in a fifteenth-century monastery? And in how many varying contexts – Anglo-Saxon, Frankish, as well as German – has this particular description appeared?

The frequency with which all messages were transmitted was primarily channeled by the fixing of literary linguistic frontiers. A particular kind of reinforcement was involved in relearning mother tongues when learning to read. It went together with the progressive amplification of diversely oriented national "memories." Not all the same portions of an inherited Latin culture were translated into different vernaculars at the same time. More important, entirely dissimilar dynastic, municipal, and ecclesiastical chronicles, along with other local lore, both oral and scribal, were also set in type and more permanently fixed. The meshing of provincial medieval *res gestae* with diverse classical and scriptural sources had, by the early seventeenth century, embedded distinctively different stereotypes within each separate vernacular literature. At the same time, to be sure, a more cosmopolitan *Respublica Litterarum* was also expanding.

Messages in Latin (and, later, in French) were broadcast across linguistic frontiers to an international audience. An even more effective means of transcending language barriers was being developed by contributors to technical literature. Mathematical and pictorial statements conveyed identical messages to virtuosi and scientific correspondents in all lands without need for translation. Although Latin learned journals, a lively French-language press, and scientific transactions did reach a sizable portion of the reading public by the eighteenth century, the diverse cosmopolitan literary cultures did not have the powers of amplification that the separate vernaculars had. Messages received in foreign languages from abroad only intermittently and occasionally reinforced the shared references that were learned in familiar tongues at home.

On the other hand, the fixing of religious frontiers that cut across linguistic ones in the sixteenth century had a powerful effect on the frequency with which certain messages were transmitted. Passages drawn from vernacular translations of the Bible, for example, would be much more thinly and weakly distributed throughout the literary cultures of Catholic regions than of Protestant ones. The abandonment of church Latin in Protestant regions made it possible to mesh ecclesiastical and dynastic traditions more closely within Protestant realms than in Catholic ones – a point worth noting when considering how church–state conflicts were resolved in different lands. Finally, the unevenly phased social penetration of literacy, the somewhat more random patterning of book-reading habits, the uneven distribution of costly new books and cheap reprints of old ones among different social sectors also affected the frequency with which diverse messages were received within each linguistic group.