Chapter 11

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DEFINING THE INITIAL SHIFT

Some features of print culture

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 the reasons 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 post-classical 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 out what happened in a particular Mainz workshop in the 1450s. When pursuing other inquiries, it seems almost prudent to by-pass 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.[1] To pass by all that, when dealing with other problems, would seem to be incautious. For this reason, among others, I am skipping 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.[2] Instead, I 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.

By the advent of printing then, I 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.[3] 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 production, about a book revolution, or a media revolution, or perhaps, most simply and explicitly, about a shift from script to print. Will Durant refers to a 'typographical revolution'. Partly because it can be neatly coupled with the already well entrenched commercial revolution and also because it points to a major dimension of history which needs more attention, I believe 'communications revolution' best suits my purposes in this book. Whatever label is used, it should be understood to cover a large cluster of relatively simultaneous, closely 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.[4]

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.[5] 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 Vespasiano da Bisticci to produce 200 books for Cosimo de Medici's Badia library have been rendered virtually worthless by recent intensive research.[6]

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 one'.[7] Given this kind of comparison, it seems misguided to suggest that 'the multiplication of identical copies' was merely 'intensified' by the press.[8] Doubtless, hand-copying could be quite efficient for the purpose of duplicating a royal edict or papal bull.[9] 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.

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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 'intensify' previous trends. It reversed them, producing a new situation which released time for observation and research.

The previous introduction of paper, it should be noted, did not have anything like a 'similar' effect, any more than did 'the organization of a regular trade in manuscript books'.[10] 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 since the same number of man-hours was still required to turn out a given text, the increase in book production was sluggish and copies continued to be made at an irregular rate. Shops run by stationers or *cartolai* multiplied in response to an increasing demand for tablets, notebooks, prepared sheets and other supplies.[11] In addition to selling writing materials and school books as well as book-binding materials and services, some merchants also 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, although they usually specialized in one or another branch of their trade. The preparation and selling of book materials and binding were probably their commonest occupations. Some *cartolai* were also illuminators or employed illuminators in their shops . . . Scribes who mostly had other occupations (they were often notaries or priests) seem usually to have worked at home or in their shops, on commission . . . Many of the *cartolai* especially 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 . . .[12]

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.[13] 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.[14] His posthumous fame – achieved only in the nineteenth century after the publication of his memoirs and their 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. Thus the catalogue to the beautiful Morgan Library 1973 Exhibition on 'The Art of the Printed Book' asserts that the Medici [*sic*] 'considered newly printed books a degradation and would not allow them in their libraries'.[15] The same error was

amplified by an article in *The New York Times*: 'The Medici and other Florentine Princes [*sic*] considered printing a degradation and barred it from their sacred manuscript libraries'.[16] Similar distortions, all emanating from Burckhardt's use of Vespasiano's *Lives*, have been multiplied and amplified in so many varying contexts that scholarly disclaimers cannot catch up with them.[17]

The need to make Renaissance bibliophiles and patrons into snobbish enemies of machine-made objects seems oddly compelling. Why else is the story so often told with no real hard evidence to support it and expanded to Florence with no supporting evidence at all? 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.[18] 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 right down to 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'.[19]

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 book-trade, the Confrérie des Libraires, Relieurs, Enlumineurs, Ecrivains et Parcheminiers . . . founded in 1401 . . . Alarmed at the appearance of an outsider with such 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.[20]

The story may be just as unfounded as the legend that linked the figure of Johann Fust with that of Dr Faustus.[21] The adverse reaction it depicts should not be taken as typical; many early references were at worst ambivalent.[22] 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 found employment in print shops.[23] 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.[24] Other members of the *confrérie* could not foresee that most 'book-binders, rubricators, illuminators, and calligraphers would be kept busier than ever after early printers set up shop.[25] 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 Gutenberg's Bible.[26] It should

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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.

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.[27]

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.[28] 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, noted above, 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 the new features that began to appear before the fifteenth century had come to an end.

Concern with surface appearance necessarily governed the handwork 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.[29] 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.[30] 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.[31] 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'.[32] Title pages became increasingly common, facilitating the production of book lists and catalogues, while acting as advertisements in themselves.[33] 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.[34] Although Ivins' special emphasis on 'the exactly repeatable pictorial statement' has found favor

among historians of cartography,[35] 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 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.[36]

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. In his work the use of movable type is oddly described as 'little more than a way to do with a smaller number of proof readings'. A reference by Pliny the Younger to one thousand copies of a book being made in the second century A.D. is cited repeatedly as evidence that the duplicative powers of print were relatively feeble.[37] The incapacity of any two scribes (let alone one thousand) to produce identical copies while taking dictation is overlooked. 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'[38] Ivins' 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.[39] 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 illuminator along with that of the scribe.[40] When considering how technical literature was affected by the shift from script to print, it seems reasonable to adopt George Sarton's strategy of envisaging a 'double invention; typography for the text, engraving for the images'.[41] The fact that letters, numbers and pictures were *all* alike 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.

Intellectual historians may find the new interplay between 'literate, figurative and numerate' forms of expression of particular interest.[42] Social historians also need to be alerted to the new interplay between diverse occupational groups which occurred within the new workshops that were set up by early printers. The preparation of copy and illustrative material for printed editions led to a rearrangement of all book-making arts and routines. Not only did new skills, such as typefounding and presswork, involve veritable occupational mutations;[43] but the production of

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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.[44] 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 astronomers and engravers, physicians and painters together, 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 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.[45] As the key figure around whom all arrangements revolved, the master printer himself bridged many worlds.[46] 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.[47] 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' household in Venice, which contained some thirty members, has recently been described as an 'almost incredible mixture of the sweat shop, the boarding house and the research institute'.[48] A most interesting study might be devoted to a comparison of the talents mobilized by early printers with those previously employed by stationers or manuscript bookdealers. Of equal interest would be a comparison of the occupational culture of Peter Schoeffer, printer, with that of Peter Schoeffer, scribe. The two seem to work in contrasting milieux, subject to different pressures and aiming at different goals. 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.[49]

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 which led the printer to turn peddler and to launch what soon became an annual book fair at Frankfurt. '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 so much as potential bibliophiles, nor even as potential censors, but rather 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.[50]

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. All need to be brought out more clearly when considering fifteenth-century trends. The movement of centers of book production from university towns, princely courts, patrician villas and monasteries to commercial centers; the organization of new trade networks and fairs; the new competition over lucrative privileges and monopolies; the new restraints imposed by official censors have been covered in special accounts.[51] But the implications of such changes need to be underlined so that they may be related to other concurrent developments. 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 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. When one considers that such an event occurred in several places in the late fifteenth century, it seems to warrant more attention in studies of changes affecting late medieval religious life.[52]

We also need to hear more about the job-printing that accompanied book-printing. It lent itself to commercial advertising, official propaganda, seditious agitations and bureaucratic red tape as no scribal procedure ever had.[53] The very term 'avertissement' underwent an intriguing change. In the Low Countries, books copied during holy days in medieval scriptoria were regarded as specially consecrated. A note placed in the colophon designating holy-day work served as a warning (or 'avertissement') against sale.[54] Of course such a warning can be interpreted as indicating the commercialization of the manuscript book-trade. Books were being copied not just for the love of God but for sale, on all save holy days. But a different, more muted commercial theme was sounded by this kind of 'avertissement' than would be the case after presses were established.

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 the celebration of lay culture-heroes and to their achievement of personal celebrity and eponymous fame. Reckon masters and instrument makers along with professors and preachers also profited from book advertisements that spread their fame beyond shops and lecture halls.[55] Studies concerned with the rise of a lay intelligentsia, with the new dignity assigned to artisan crafts or with the heightened visibility

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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 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 sketched above, 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. Many of them also have to be left for later discussion because they involved prolonged, unevenly phased transformations which occurred over the course of several centuries. This seems especially true of those changes which are most commonly associated with the impact of printing: changes, that is, which hinge on the spread of literacy and which entail a variety of popularizing trends.

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 is it 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.⁵⁶

Statements about literacy rates during the fourteenth and early fifteenth centuries are likely to be just as vague – perhaps even more so. In the absence of hard data, plausible arguments may be developed to support sharply divergent opinions and there is no way of settling the inevitable conflict between revolutionary and evolutionary models of change. Thus one may envisage a relatively swift 'educational revolution' in the sixteenth century, in which case, the effects produced by printing will loom large; or, one may instead describe a 'long revolution' which unfolds so slowly that these effects are completely flattened out.⁵⁷

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

Once attention has been focused on 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 élite social status.[58] One may also guess that it was more compatible with sedentary occupations than with the riding and hunting favored by many squires and lords.[59] 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.[60] 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.[61]

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.[62] 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 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 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.[63] 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

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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 not aimed 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.[64] Sophisticated analysts have suggested the need to discriminate between 'audiences' – that is, actual readership as determined by library catalogues, subscription lists and other objective data – and 'publics', the more hypothetical targets envisaged by authors and publishers, those to whom they address their works.[65] Given the tendency to cite titles or prefaces as evidence of actual readership, this distinction is worth keeping in mind.

> To arrive at valid conclusions . . . we must proceed with care and caution. Information
> on the spread of reading and writing . . . is limited and must be supplemented by
> analysis of the subject contents of the total production (in itself not an easy task);
> 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 'files' and 'mesdames.'

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 did not necessarily attract feminine readers and were probably also of interest to male tutors, or confessors, or guardians. As a later chapter suggests, 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 court poets who shunned printers and circulated their verse in manuscript form[67] 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 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.[68] 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?[69] It is worth remembering, at all events, 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 postponing conjectures about social and psychological transformations, 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.[70] 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 the young by diligent study to acquire the same knowledge'? asked the author of a fifteenth-century outline of history.[71]

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.[72]

To the familiar romantic theme of the Gothic cathedral as an 'encyclopedia in stone', Frances Yates has added a fascinating sequel. 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 theatres. The way was paved for a more thorough-going iconoclasm than any Christian church had ever known. 'The "Ramist man" must smash the images both within and without, must substitute for the old idolatrous art, the new image-less way of remembering through abstract dialectical order'.[73]

This line of argument dovetails neatly with Walter Ong's earlier studies of Ramism and print culture – perhaps too neatly in the judgment of some medieval scholars who see evidence in medieval manuscripts of those diagrammatic features which Ong reserves for the printed page.[74] But even if all parts of the argument are not deemed equally acceptable, the basic point still seems valid. Printing made it possible to dispense with the use of images for mnemonic purposes and thus 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 statues served as 'the books of the illiterate'.[75] 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.[76] For one thing, the graven image became more, rather than less, ubiquitous after the establishment of print shops throughout Western Europe. For another thing, Protestant propaganda exploited printed image no less than printed word – as

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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. 'If graving were taken away we could have not printing', wrote Stephen Gardiner, putting the case for images against Nicholas Ridley in 1547. 'And therefore they that press so much the words of *Non facies tibi sculptile* . . . they condemn printed books, the original whereof is graving to make *matrices literarum*'.[77] A close study of two versions of sixteenth-century Dutch Bibles, one Protestant, the other Catholic, suggests that there was indeed a tendency for Protestants to deemphasize pictures and stress words; yet at the same time, they did engage in illustrating Bibles – a movement which Lutherans, at least, encouraged.[78] 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'.[79]

If we accept the idea of a movement from image to word, furthermore, we will be somewhat at 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 the opportunities for image makers and helped to launch art history down its present path. Even the imaginary figures and memory theatres 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' day 'were brought up on Comenius' picture book and Luther's Catechism'.[80] In this form, the ancient memory images re-entered 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 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.[81] In early Tudor England, Thomas Elyot expressed a preference for 'figures and charts' over 'hearing the rules of a science'[82] 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

non-phonetic communication were rapidly developed. The fact that printed picture books were newly designed 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.

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 chapter; all must be passed over here.

The purpose of this preliminary section 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!

Granted that some sort of communications revolution did occur during the late fifteenth century, how did this affect other historical developments? Since the consequences of printing have not been thoroughly explored, guidance is hard to come by. 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 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 we are told that 'printing did not speed up the adoption of new theories'.[83] 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.

Notes

1   For estimate of numbers of printing offices and places of printing, see Lenhart, *Pre-Reformation Printed Books*, p. 7. For graphic presentation, see maps in Febvre and Martin, *L'Apparition*, p. 273, covering the two intervals: 1471 to 1480 and 1481 to 1500, and discussion in Hirsch's 1974 edition of *Printing, Selling*, p. x, concerning the updating of R. Teichl's more detailed rendering, 'Der Wiegendruck im Kartenbild'. Uhlendorf's 1932 article, 'The invention and spread of printing', has not been superseded as a brief suggestive treatment of possible socioeconomic factors contributing to the rapid spread of printing, and the clustering of early presses in certain centers. When one considers the massive literature devoted to shifts in trade routes during the early-modern era, it is remarkable how little work has been done on shifts in communications centers.

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2   Stillwell, *The Beginning of the World of Books* offers useful guidance. See especially appendix A, pp. 75–87. Stillwell selects 1470 as a take-off point for the rapid spread of the new art (p. x).

3   That the age of incunabula should be extended to encompass the life-spans of the founders of early firms and hence to embrace the first few decades of the sixteenth century is persuasively argued by Steinberg, *Five Hundred Years*, pp. 15–17.

4   Clapham, 'Printing', p. 37. It is not clear whether Clapham takes 'all the scribes of Europe' to include those of Byzantium or not. If not, the statement becomes much more plausible.

5   The problematic and often composite nature of the medieval 'book' and the absence of any uniform conventions among medieval cataloguers who recorded them is discussed with many pertinent examples by E. P. Goldschmidt, *Medieval Texts*, pp. 95–101.

6   On the classic version derived from Vespasiano's *Lives*, see Burckhardt, *The Civilization of the Renaissance* I, part 3, chap. 3, p. 201. Doubts expressed by Ullman, *The Origin*, p. 132, have been thoroughly documented from surviving Fiesole accounts and mss. by de la Mare, 'Vespasiano', pp. 74–76 and appendix. (Her forthcoming study on 'Vespasiano and the Library of the Badia at Fiesole' to be published by the Warburg Institute will supply additional data.) She shows that Vespasiano obtained the books that filled the library by diverse methods, including the purchase of second-hand copies and reliance on other *cartolai*, and that the work took more than two years, encompassing an interval from 1461 until at least 1466–7. For recent use of the now discredited figures to estimate 'average' scribal output, see Burke, *Culture and Society*, p. 59.

7   De la Mare, 'Vespasiano', p. 207. The remarkable success of this 'uncommonly large edition' which was 'sold out in six years' when another printing took place is noted by Reynolds and Wilson, *Scribes and Scholars*, p. 130. According to Kristeller, 'Contribution of Religious Orders', p. 99, the Ripoli Press was 'one of the chief early presses in Florence'. In addition to the first edition of Ficino's Plato, which appeared in 1484, a 'Donatus' of 1476 and a *Book of Revelations* of 1478 are also noteworthy. The nuns of the Convent of San Jacopo di Ripoli, who ran the press, were 'the first women actually to print', according to Gies, 'Some Early Ladies', p. 1421. For basic work, see Nesi, *Il Diario della Stamperia di Ripoli*.

8   Harrington, 'The Production and Distribution', p. 3. This seems especially true when considering the fifty years before Gutenberg, when the system of the 'pecia' which had helped to speed duplication of large academic texts was no longer employed.

9   From conversation with Joseph Strayer, I learned that fourteenth-century French royal edicts were rapidly multiplied and distributed by a kind of 'chain letter' technique. At court, ten scribes were put to work producing ten copies each, some of which were carried by couriers to numerous provincial centers where the same procedure was repeated so that thousands of copies were quickly produced. See also evidence on Burgundian propaganda offered by Willard, 'The Manuscripts of Jean Petit'.

10 The 'enormous number' of manuscript copies of the Latin classics produced after the advent of paper is stressed by Kristeller, *Renaissance Thought*, pp. 14–15, who writes as a scholar concerned about the neglect of later Latin works and as an assiduous energetic investigator of Renaissance manuscript book lists. The compiler of *Iter Italicum* and *Latin Manuscript Books before 1600* is bound to be impressed by the remarkable output of copyists before print. Nevertheless, one must also make allowance for the fact that handmade copies, however 'enormous their number may seem, were still in very short supply compared to the number issued after printing. Paper was incapable of reducing the man-hours required for copying and hence could not achieve effects 'similar' to those produced by the press.

11 For a close-up view of the shop of an ordinary Florentine *cartolaio* who was engaged in binding books and selling writing materials rather than in procuring or producing bopks (although he kept some texts on hand for sale), see de la Mare, 'The Shop of a Florentine "cartolaio" in 1426'.

12 De la Mare, 'Bartolomeo Scala's Dealings', 240.

13 De la Mare, 'Vespasiano', pp. 95–7; 226.

14   See de la Mare, 'Vespasiano', pp. 108–9 for laudatory verses.

15   *Art of the Printed Book 1455–1955*, introduction by Joseph Blumenthal, p. 9. The same assertion was made on the label attached to entry no. 55 in this exhibition.

16   Shenker, 'Books as an Art Form Through Five Centuries', *The New York Times* (10 Sept., 1973), 2nd sect., p. 1.

17   See Burckhardt, *The Civilization of the Renaissance in Italy* I, p. 204 where Duke Federigo's shame is attributed to the idea of owning a printed book and Cardinal Bessarion's envoys when seeing a printed book in the house of Constantine Lascaris 'laughed at the discovery made among the barbarians in some German city'. Burckhardt's use of Vespasiano is discussed by Wieruszowski, 'Burckhardt and Vespasiano'.

18   Bühler, *Fifteenth Century Book*, p. 62; de la Mare, 'Vespasiano', p. 112; Moranti, *L'Arte Tipografia in Urbino*, p. 9.

19   De la Mare, 'Bartolomeo Scala's Dealings', p. 241.

20   Goldschmidt, *Gothic and Renaissance Bookbindings* I, 43–4.

21   By 1910, when the article for the eleventh edition of the Britannica was written, Phillips's, 'Faust', *Encyclopedia Britannica* X, 210, n. 1, could assert that 'the opinion, long maintained' of Faust and Fust being identical was 'now universally rejected'. Evidence showing that Fust was in Paris selling books in 1466 when he was killed by the plague suggests that the outcome of his first business trip did not discourage him from making a later one.

22   The ambivalence of scholars who cursed the errors made by careless printers much as earlier authors had cursed careless scribes is brought out by Bühler, *Fifteenth Century Book*, pp. 50–1, and by Hirsch, *Printing, Selling*, p. 48, n. 20. Early tributes to the 'divine' art are conveniently collected by Stillwell, *The Beginning of the World of Books*, appendix A: 2, pp. 88 ff. They often echo tributes to the labors of scribes – a topos that goes back at least to Cassiodorus and which was publicized by early printings of both Gerson's and Trithemius' *De Laude Scriptorum*

23   Gianandrea de' Bussi, a minor cleric, one-time private secretary to Nicholas of Cues and later Bishop of Aleria, helped to edit texts for Sweynheim and Pannartz (after they established the first press in Rome). In his dedicatory letter to Pope Paul II which appeared in the 1469 Roman edition of Saint Jerome's *Epistles* de' Bussi attributes the phrase 'divine art' ('Haec sancta ars') to Cusanus. Needless to say, early printers saw to it that the phrase received maximum exposure. A thoughtful essay on less well-publicized reactions – particularly some unpublished diatribes against early printing by a Dominican friar who had served as a copyist and reacted unfavorably to the Venetian press in the late fifteenth century – is contained in an article by Martin Lowry, 'Intellectuals and the Press in fifteenth century Venice' to appear in a forthcoming issue of the *Bulletin of the John Rylands University Library*.

24   De la Mare, 'Vespasiano', p. 113. On prices, see also Hirsch, *Printing, Selling*, pp. 68–73; Febvre and Martin, *L'Apparition*, chap. 4; Pettas, 'The Cost of Printing a Florentine Incunable'.

25   Of course, hindsight is required to show that technological unemployment was not severe, and fears, whether ultimately justified or not, may well have been aroused. On the new jobs created by printing, see Bühler, *Fifteenth Century Book*, pp. 25–7; Hirsch, *Printing, Selling*, pp. 48–9. In Florence the number of stationers' shops rose from twelve to thirty during the first half-century after the advent of the press. De la Mare, 'Vespasiano', p. 44.

26   See amusing speculations on sales of veal by Bühler, *Fifteenth Century Book*, p. 41.

27   Lehmann-Haupt, *Peter Schoeffer*, pp. 37–8.

28   Bühler, *Fifteenth Century Book*, p. 16. A detailed description of particular cases found in the Beinecke Library at Yale is offered by Lutz, 'Manuscripts Copied from Printed Books'.

29   Some Yale mss. marked up by early printers to be used as copy are noted by Lutz, 'Manuscripts Copied', p. 262, who also offers evidence of the irritation of a thirteenth-century scribe at a correction made by a bookdealer which destroyed the surface symmetry of two pages of a copy of a commentary by Thomas Aquinas.

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30   For a pertinent example, see the account of the procedure used by Aldus Manutius' chief editor, Marcus Musurus, when preparing the printer's copy for the 1498 edition of Aristophanes' works. Reynolds and Wilson, *Scribes and Scholars*, pp. 132–3.

31   Lehmann-Haupt, *Peter Schoeffer*, pp. 53–4 contains relevant data.

32   Steinberg, *Five Hundred Years*, p. 28.

33   Steinberg, *Five Hundred Years*, p. 145. Along with many other authorities, both Steinberg (pp. 145 ff.) and Hirsch, *Printing, Selling*, p. 25 overstate the novelty of the title page when describing it as a purely post-print phenomenon. The Folger Library has a copy of Lorenzo Valla's *De Elegantiis Linguae Latinae* – Phillipps Ms 2966 (Folger 'v.a. 102') which is identified by A. M. de la Mare as being by the hand of a Veronese scribe: Cristoforo Schioppo. The name of the book's author, 'Lauretii Vallae', and part of the title are clearly placed on a single page as if engraved on a stone tablet. That this is by no means the only ms. 'title page' of its kind is attested to by Dr de la Mare. But the basic points made by Steinberg in his section on the title page are not really invalidated by his overlooking quattrocento humanist manuscripts and taking Northern ms. styles for his norm. Title pages did not become common and information contained in colophons did not get shifted until after print.

34   Ivins, *Prints and Visual Communication*. Some specific examples discussed by Ivins are treated in later discussion of scientific data collection and early field trips.

35   See e.g., Bagrow, *History of Cartography*, p. 89; Skelton, *Maps*, p. 12; Robinson, 'Map making', *Five Centuries of Map Printing*, p. 1. The illustrations (in this last mentioned work) of relevant tools and techniques are unusually clear and helpful.

36   Thus the second edition of Vesalius' *De Fabrica* profited from the sharpening of indistinct letters and lines by a Basel woodcarver using a fine knife. Woodblocks impressed only on moist paper and made of birchwood treated with hot linseed oil can remain unspoiled even after running off 3,000 to 4,000 copies, according to Willy Wiegand (who printed an edition of Vesalius' *Icones anatomicae* from old woodblocks in 1935). See Herrlinger, *History of Medical Illustration*, p. 113.

37   Ivins, *Prints and Visual Communication*, pp. 2, 11, 163.

38   Ivins, *Prints and Visual Communication*, p. 27.

39   See fascinating section on 'indication lines' in Herrlinger, *History of Medical Illustration*, pp. 54–60. I owe thanks to Karen Reeds for bringing this to my attention.

40   Questions pertaining to the relationship between block-printing and book-printing and to whether the block book preceded the invention and use of movable type have given rise to a massive controversial literature that cannot be examined here. To sample recent arguments see Musper, 'Xylographic Books', pp. 345–7 (esp. bibliography p. 347) and Lehmann-Haupt, *Gutenberg and the Master of the Playing Cards*. A close-up view of the overlap between hand illumination and early Mainz printing is offered by Vaassen, *Die Werkstatt der Mainzer Riesenbibel in Würzburg und Ihr Umkreis*. See review article by Labarre, 'Un Atelier Mayençais d'Enluminure vers 1450–1500'. For stimulating speculation relating changes in shop structure to new handbooks for illuminators, see Bober's review of *The Göttingen Model Book*.

41   Sarton, *Appreciation of Ancient and Medieval Science During the Renaissance 1450–1600*, p. xi.

42   I borrow these terms from Derek da Solla Price's article, 'Geometrical and Scientific Talismans'.

43   How the diverse skills of the punchcutter, matrix-maker and mold-maker got lumped under the heading of 'typefounder' is discussed by Harry Caster, *A View of Early Typography*, p. 92.

44   The widely varying social and occupational origins of early printers, extracted from biographical dictionaries such as those compiled by E. Voullième and Joseph Benzing for German-speaking regions, are indicated by Hirsch, *Printing, Selling*, pp. 18–23. A 'flocking of priests into printing' is noted on p. 22 and the numbers of priests and bishops involved in proof-reading, on p. 47. How a former monk and abbot abandoned his monastery to work full-time as an editor for Peter Schoeffer's early firm is noted by Lehmann-Haupt, *Peter Schoeffer*, p. 83, n. 6. A recent finely

detailed study of the Paris book-trade in the mid-sixteenth century confirms the impression of diverse backgrounds among those entering the trade: Parent, *Les Métiers du Livre*, pp. 175 ff. Parent also notes that publication of devotional literature was often supervised by a priest who was sent by a bishop to receive room and board from the printer (p. 122).

45   References to pertinent studies are given by Hirsch, *Printing, Selling*, p. 51. Bühler, *The University and the Press in 15th Century Bologna*, pp. 15–16 gives an example of a contract drawn up in 1470 to build and run a press for academic purposes. The complex arrangements that went into the printing for academic purposes of a massive commentary on Avicenna's *Canon* (comprising over a thousand double column large folio-sized pages of text) are described by Mardersteig, *Remarkable Story*.

46   He was such a protean figure that no one label such as 'printer' adequately designates his many-faceted role.

47   Mardersteig's *Remarkable Story* shows the printer, Petrus Maufer, coping with strikes and many other complications before triumphantly concluding the actual printing which began in May 1477 when the first reams of paper were delivered. From then until December 1, 1477 when the last sheet came off the press, 'not a working day was wasted'. Four hand presses had been in operation from daybreak to night-time without interruption, and 6,800,000 separate pieces of type had been procured and used. For general description of the complex working routines observed in most print shops during the first centuries after Gutenberg, McKenzie's article, 'Printers of the Mind', is unexcelled. A useful glimpse of Plantin's operational plan is given by Lotte and Wytze Hellinga, 'Regulations'. That routines were somewhat more orderly than either McKenzie or the Hellingas imply is suggested by K. I. D. Maslen and John Gerritsen, correspondence in *The Library* (June, 1975).

48   Martin Lowry, *The World of Aldus Manutius* (Oxford: Blackwell, 1979).

49   In sustaining a gradual evolutionary approach to the impact of printing, authorities on the history of the book naturally emphasize the stationer as the true precursor of the printer. Yet use of the term *scriptor* for *impressor* by printers showed that they considered themselves the successors not of stationers but of copyists. (See Hirsch, *Printing, Selling*, p. 19, n. 21.) It seems fair to say that early printers took over functions performed *both* by copyists *and* by stationers (or 'publishers') while diverging from both in significant ways.

50   See Lehmann-Haupt, *Peter Schoeffer, passim*.

51   Much of this is covered in detail by Febvre and Martin, *L'Apparition*, chap. 6, and is also well documented by Pollard and Ehrman, *The Distribution of Books*. Hirsch, *Printing, Selling*, pp. 63–4 points out how Schirokauer's (1951) study drastically underestimates the size of markets tapped by early printers.

52   Wytze Hellinga, 'Thomas A Kempis', 4–5.

53   Although Steinberg, *Five Hundred Years* (p. 22) stresses this aspect of Gutenberg's invention as the most far-reaching, it receives little attention from Febvre and Martin, *L'Apparition* because of their focus on 'the book'. 'Jobbing printing' was also, with one exception, omitted from the exhibition on 'Printing and the Mind of Man' assembled at the British Museum and at Earl's Court, July 16–27, 1963. See British Museum Catalogue (London, 1963) p. 8. Official printing for ecclesiastical and secular governments is discussed by Hirsch, *Printing, Selling*, pp. 52–3. It furnished an important part of Peter Schoeffer's output, according to Lehmann-Haupt, *Peter Schoeffer*, pp. 78–9.

54   See item 7, Catalogue of Exhibition held in the Royal Library of Brussels (Sept.–Oct. 1973): *Le Cinquième Centenaire de L'Imprimerie dans les Anciens Pays-Bas* (Brussels, 1973), pp. 11–12 and footnote reference to B. Kruitwagen, 'Her Schrijven op Feestdagen in de Middeleuwen'. One might compare this medieval approach to holy-day book making with the indignation of a member of the Royal Society at printing delays caused by 'the holy days sticking in the workman's hands', cited by Hill, book review, *English Historical Review* (1973).

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55 Printed announcements of university lectures containing blurbs for pertinent books on sale are described by Hirsch, *Printing, Selling*, p. 51 and Parent, *Les Métiers*, p. 142.

56 Cipolla, *Literacy*, p. 60.

57 See Cipolla, *Literacy*, p. 52 where he discusses whether Lawrence Stone's concept of an 'educational revolution' in England is relevant to continental trends. In his article on 'Literacy and Education', p. 78, Stone underlines the importance of cheap paper and movable type whereas Williams, *The Long Revolution*, pp. 132–3 discusses the interval encompassed by Stone's 'educational revolution' without mentioning printing at all. On pp. 156–7, Williams mentions printing but traces the growth of the reading public back to the eighth century and beyond to Rome. When this approach is coupled with emphasis on the advent of a mass reading public after the steam press, the fifteenth-century typographical revolution is bound to recede. Williams does bring out the importance of printing as against writing in his brief study of *Communications*, p. 22. The topic is especially likely to be underplayed in connection with the history of education. See e.g. Talbott, 'The History of Education', where a survey of the literature shows printing to be omitted from among factors which 'triggered educational expansion' in early-modern England (p. 136).

58 The very term 'poor man's book' ('Liber Pauperum') goes back at least as far as the twelfth century in England where a Lombard master arranged a compilation of the Code and Digest for poor law clerks. Cf. Haskins, *The Renaissance of the Twelfth Century*, p. 211.

59 Thus in Richard Pace's celebrated anecdote about the early Tudor squire, who questioned the need to teach his sons how to read, hunting and hawking are opposed to armchair study.

60 Jacob, *The Fifteenth Century*, pp. 663–667. See also Adamson, 'The Extent of Literacy in England', 163–93; Bennett, *English Books and Readers 1475–1557*, p. 20; Parkes, 'The Literacy of the Laity'. Thrupp, *The Merchant Class*, p. 157 provides a useful table as well as relevant data.

61 See Renouard, *Etudes d'Histoire Médiévale*, I, pp. 419–26; Jeannin, *Merchants of the Sixteenth Century*, pp. 80–6; Sapori, *The Italian Merchant, passim*. Bec, *Les Marchands Ecrivains, passim*, has data on the numerous merchants who kept diaries as well as accounts.

62 Useful warnings on this point are offered by Natalie Z. Davis, 'Printing and the People'.

63 A thirteenth-century Dominican manual: *De Arte Predicandi* issued on 'how to sew a sermon together quickly' and how to appeal to special interest groups such as 'rich women in towns' or 'crowds at fairs' or 'young girls' is described by Murray, 'Religion among the Poor'.

64 James Strachan, *Early Bible Illustrations*, p. 7 raises the question of whether the abbreviated title *Biblia Pauperum* is appropriate or not.

65 This distinction, suggested by T. J. Clark in his study of Courbet is discussed in connection with problems posed by sixteenth-century 'popular' culture by Natalie Davis, 'Printing and the People'. It seems futile to try to restrict usage of terms already employed interchangeably in a large literature. I prefer the phrase: 'assumed public' (which is used by Davis elsewhere in the same article) since it is less likely to be misinterpreted.

66 Hirsch, *Printing, Selling*, p. 7.

67 Saunders, 'From Manuscript to Print', pp. 507–28.

68 On accountancy books, almanacs, pharmacopeia and other 'practical' guide-books see Natalie Davis, 'Printing and the People'.

69 In his *Speculum* review of *The Göttingen Model Book*, Harry Bober suggests that the detailed instructions for illumination contained therein (which included sixteen separate steps for painting one acanthus leaf) must have been aimed at a new group of untrained craftsmen mobilized by printers since scribal illuminators had no need of such a manual – any more than 'an experienced chef needs the numbered instructions on soup cans'. Even if this argument holds good for book-making, it still leaves open questions raised by other craft manuals in trades where there was no dramatic change in shop structure nor influx of neophytes. The purposes served by the early publication of vernacular booklets by the two German master masons: Matthias Roriczer

and Hans Schmuttermayer, for example, remain somewhat baffling, as I have learned from two articles by Shelby, 'The Education of Medieval English Master Masons', 1–26; 'The Geometrical Knowledge', 395–421, and correspondence with their author.

70   Altick, *The English Common Reader*, p. 31.

71   Jacobo Filippo Foresti, *Supplementum Chronicarum* (Venice, 1483) cited by Martin Lowry in his biography of Aldus.

72   Yates, *Art of Memory*, p. 131.

73   Yates, *Art of Memory*, p. 271.

74   In slide lectures given at Catholic University during the 1974 Medieval Academy Summer Institute program on 'The Archeology of the Book', Professor Richard H. Rouse of U.C.L.A. demonstrated graphically the frequent use of diagrams, brackets, cross-references, marginal guides and other devices in scribal compilations (especially in concordances and guides to patristic works) produced by medieval teachers and preachers.

75   Myron Gilmore, 'Italian Reactions to Erasmian Humanism', pp. 87–8.

76   Although Stone, 'Literacy and Education', p. 76 cites my preliminary 'Conjectures' as suggesting that the printed book caused Europe to move 'decisively from image culture to word culture' I am not convinced that this formulation is valid and regret any inadvertent implication that such a movement occurred. That Protestant bibliolatry and iconoclasm were more compatible with early print culture than Tridentine Catholicism was suggested in my article but that is a different matter than suggesting that European culture moved from image to word. For objections to the latter formulation, see paragraphs following this note in text above.

77   *The Letters of Stephen Gardiner*, pp. 258–9. I owe this reference and the one from Luther below to Margaret Aston, who is completing a major study of iconoclasm in Tudor England.

78   Hindman, 'The Transition from Manuscripts'. See esp. p. 205.

79   'Against the Heavenly Prophets in the Matter of Images and Sacraments', (1525), *Luther's Works*, XL 99–100. On Lutheran Bible illustration, see Ph. Schmidt, *Die Illustration der Lutherbibel 1522–1700*.

80   Yates, *Art of Memory*, pp. 134; 377. The magnificent Baroque engravings that made visible the elaborate memory systems developed in the sixteenth and seventeenth centuries may be sampled by examining almost any work by Robert Fludd. How much Comenius' *Orbis Pictus* (1658) owed to Campanella's *City of the Sun* and Rosicrucian manifestoes is noted by Yates, p. 377.

81   Sarton, *Appreciation*, pp. 91; 95. As is noted, the notion that the ancient Egyptians had compressed valuable data in each hieroglyph was believed by would-be decipherers of hieroglyphs until the nineteenth-century discovery of the Rosetta Stone.

82   See citation from the *Boke Called the Gouvernour* (1531) in Watson, *The Beginning of the Teaching of Modern Subjects in England*, p. 136.

83   Febvre and Martin, *L'Apparition*, pp. 420–1.

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