The press descending from the heavens.

THE PRINTING REVOLUTION IN EARLY MODERN EUROPE

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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." 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 below under headings that indicate my main lines of inquiry.

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." 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" began.

That something rather like a knowledge explosion was experienced in the sixteenth century has often been suggested, in 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. 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 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 on, 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." 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, magica arts were closely associated with mechanical crafts and mathematica wizardry. When "technology went to press," so too did a vast back log of occult lore, and few readers could discriminate between tl two. Historians who are still puzzled by the high prestige enjoyed l alchemy, astrology, "magia and cabala," and other occult arts witl the Commonwealth of Learning during early modern times mi find it helpful to consider how records derived from ancient N

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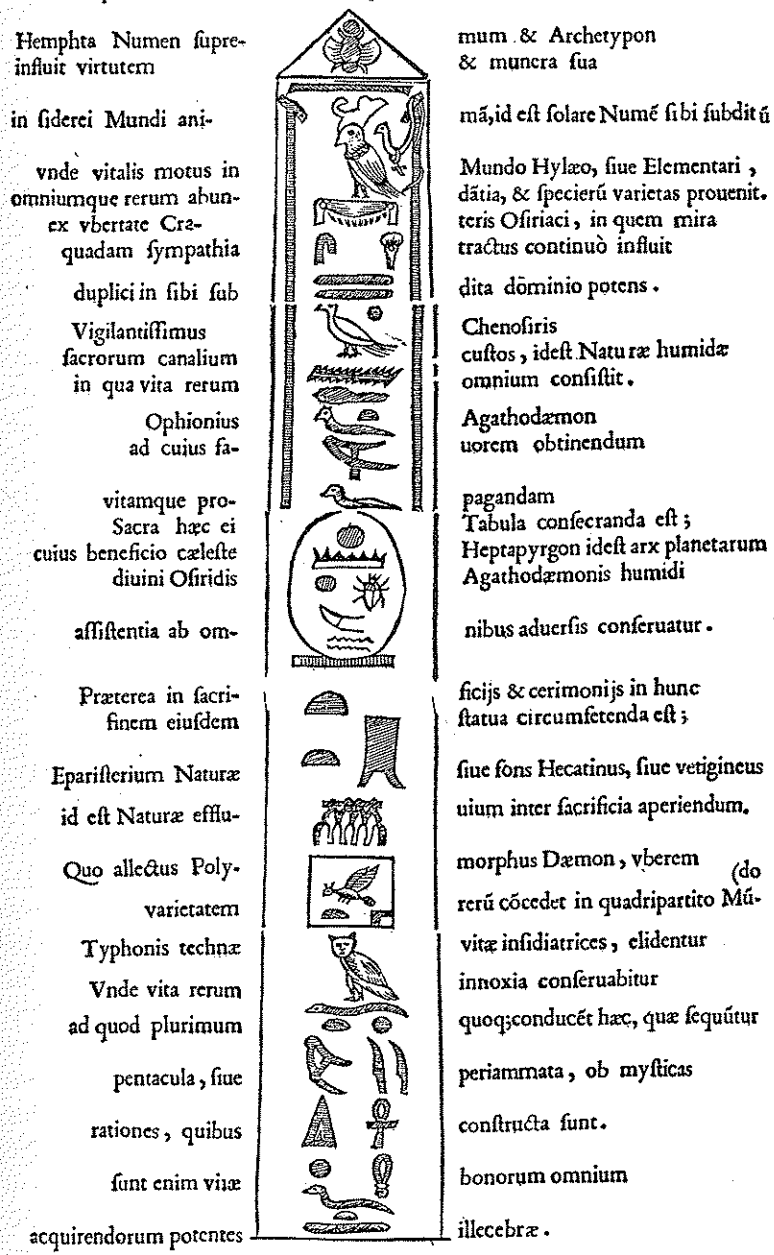
Eastern cultures had been transmitted in the age of scribes. Some of these records had dwindled into tantalizing fragments pertaining to systems of reckoning, medicine, agriculture, mythic cults, and so forth. Others had evaporated into unfathomable glyphs. Certain cosmic cycles and life cycles are experienced 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 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.

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

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.

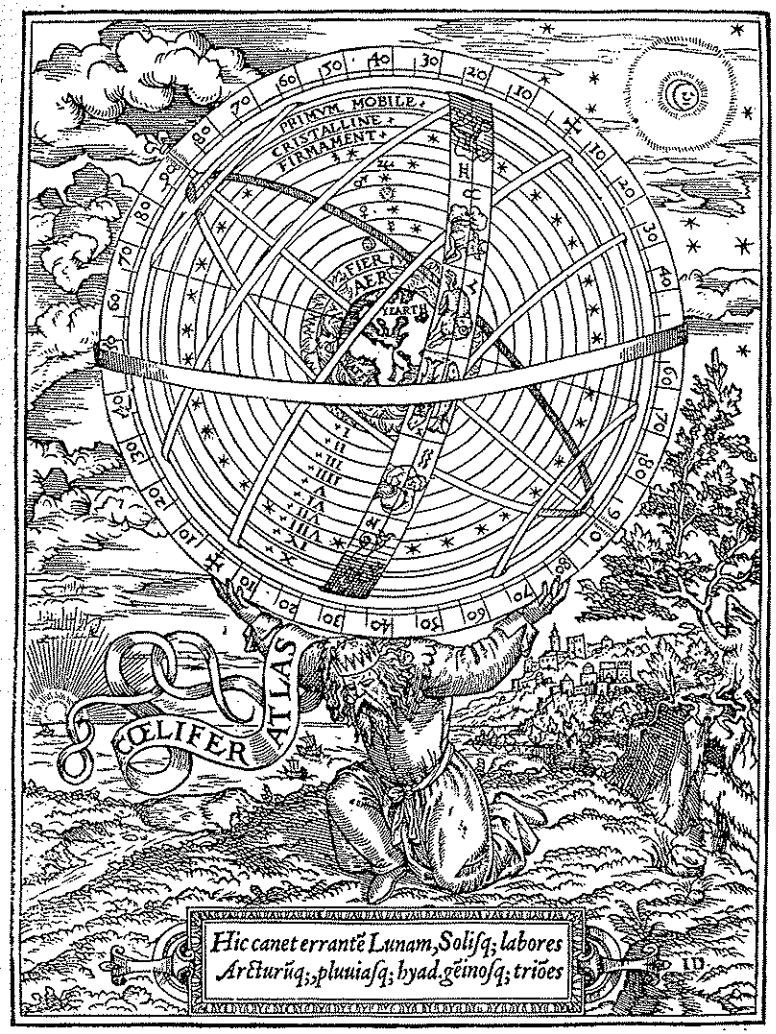
Specimen Lectionis Idealis, in primo latere Obelisci exhibitum.



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." 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 a purification of Christian sources later on. Here, as elsewhere, there is 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 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 distin-



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.

guishing 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. 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 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.

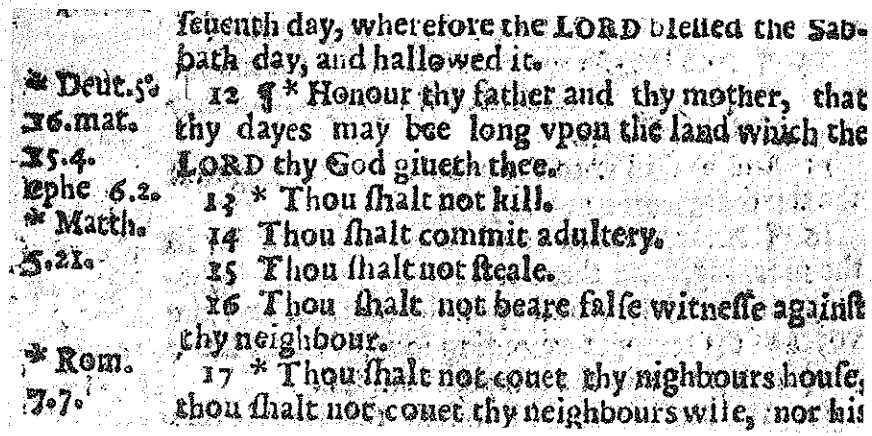
It is doubtful, at all events, whether "the effect of the new invention on scholarship" was more significant than its effect on vernacular Bible reading at the beginning of the sixteenth century. What does need emphasis is that many dissimilar effects, all of great consequence, came relatively simultaneously. 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." 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 stress on diffusion and should speak more of standardization." 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.

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," is


seuenth day, wherefore the LORD bleſſed the Sabbath day, and hallowed it.
* Deut.5.
16.mat.
15.4.
Iephe 6.2.
12 ¶ * Honour thy father and thy mother, that thy dayes may bee long vpon the land which the LORD thy God giueth thee.
13 * Thou ſhalt not kill.
* Matth.
5.21.
14 Thou ſhalt commit adultery.
15 Thou ſhalt not ſteale.
16 Thou ſhalt not beare falſe witneſſe againſt thy neighbour.
* Rom.
7.7.
17 * Thou ſhalt not couet thy nighbours houſe, thou ſhalt not couet thy neighbours wife, nor his

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.

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. 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 woodcuts that were exactly the right dimension for meeting the surface

of the types. 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. 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 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."

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

SE il piedestallo di quest' ordine Corintio fosse la terza parte della coloma, sarebbe moduli sei e duoi terzi, ma si puo comportare di moduli sette per piu sueltezza, conforme molto, e conveniente a simil ordine, & anco perche il netto del piedestallo senza la cimasa e bassamento riesca di duoi quadri, come si puo vedere per li suoi numeri il resto cioe la base, è la cimasa, & il bassamento, per essere notato minutamente, e anco la imposta dell' arco, non accade altra scrittura.

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

INdien het Pedestael van dese Corintische Orden is het derdepart van de colomne / soo sal het houden ses Modulos ende $\frac{2}{3}$ / maer men mach het wel maken van 7 Modulos, om te meer stijvicheyt / die dese Orden seer gheboeghlijck is ende wel past: Oock mede op dat het pedestael / sonder het Cimatium ende basement / even op twee vierkanten uptkomt / gelijck men sien mach aen de getallen. De reste / te weten het basis 't cimatium ende basement / de wijl sy op 't nauste zijn aengeteeckent / als mede d'imposta oft opstellingh van de boge / soo en hoeven wy daer niet meer van te schrijven.

A De Torus oft stock van boven / B De Torus oft stock van beneden.

SI le Piedestal de ceste ordonnance 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, afin que le Piedestal, sans la cimace & basement, revienne à 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'enhaut, B Le Tore ou baston d'embas.

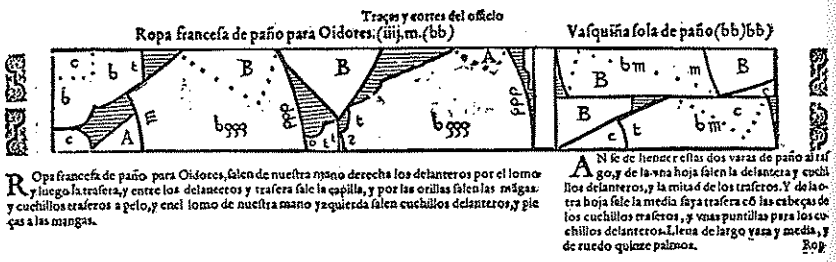
EIn jal daß Pedestal von diser Corintischen orden das dritteheil ist von die Colomne / so sol es halten 6 Moduln vnd $\frac{2}{3}$ / aber man mag es wol machen von 7 Moduln / wegen mehrer stercke / welche diesen orden gar fugsich ist / vnd auch / auff daß es Pedestalt / ohn das Cimatium / vnd basement / gerad auff zwey viereccken auß kompt / gleich man an die zalh sehen mag. De rest / nemblich das Cimatium vnd Basement / die weil sie auffs genawste sein angezeichnet / wie auch die imposta oder auffstellung von denen boge / so ist nicht nötig davon mehr zu schreiben.

A Der Torus oder stock von oben / B Der Torus oder stock von vnten.

IF 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 modulos, for the greater solidity, which is verry conformable and befitting this Order: as also, that the Pedestal, without the Cimaet and basement commeth out even in 2 fouresquares even as you may see by the Numbers. The rest, to witt the base, the Cimate and basement the while they are noted least, as also the Impost or setting up of the Bow or Arch, so that wee neede not write more thereof.

A The Torus or piece on high, B The Torus or piece belou.

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. 54–55). Reproduced by kind permission of the Folger Shakespeare Library.



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.

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 of 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.

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

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 habiti antichi et moderni di diverse parti del mondo* (Venice: Damian Zenaro, 1590, pp. 495–496). Reproduced by kind permission of the Folger Shakespeare Library.

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 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"

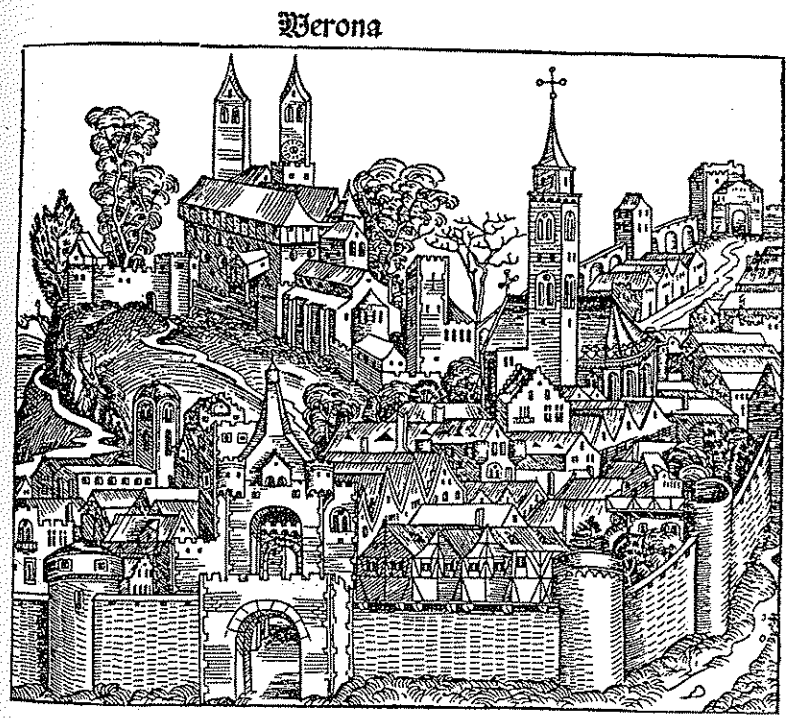
helped to reinforce the effects of issuing standard editions. Repeated encounters with identical images of couples representing three social groups – noble, burgher, peasant – wearing distinctive costumes and set against distinctive regional landscapes probably encouraged a sharpened sense of social 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.

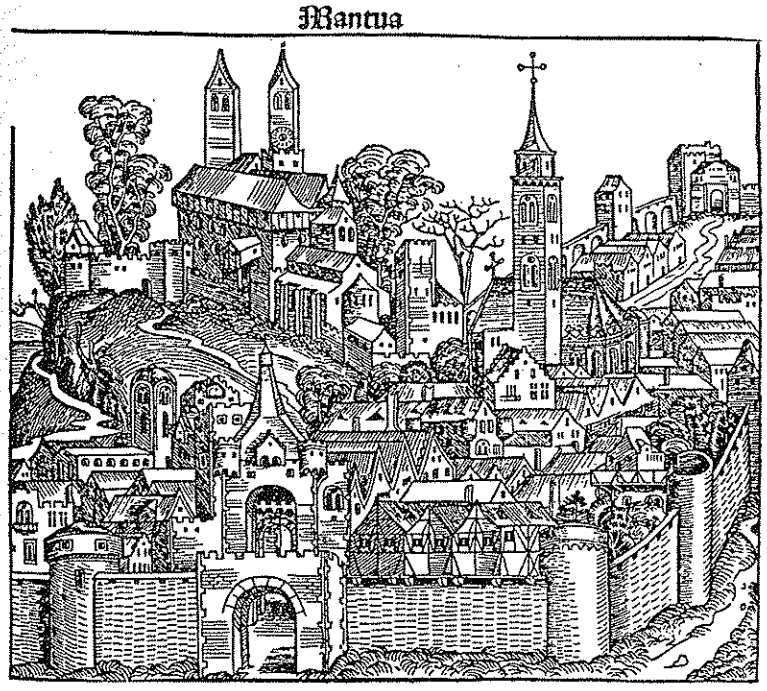
It should be noted that a new alertness to both the individual and the typical was likely to come first to those who were responsible for compiling and editing the new costume manuals, style books, commemorations of royal entries, and regional guides. Just as the act of publishing errata sharpened attention 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." 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 Schoeffer'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 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

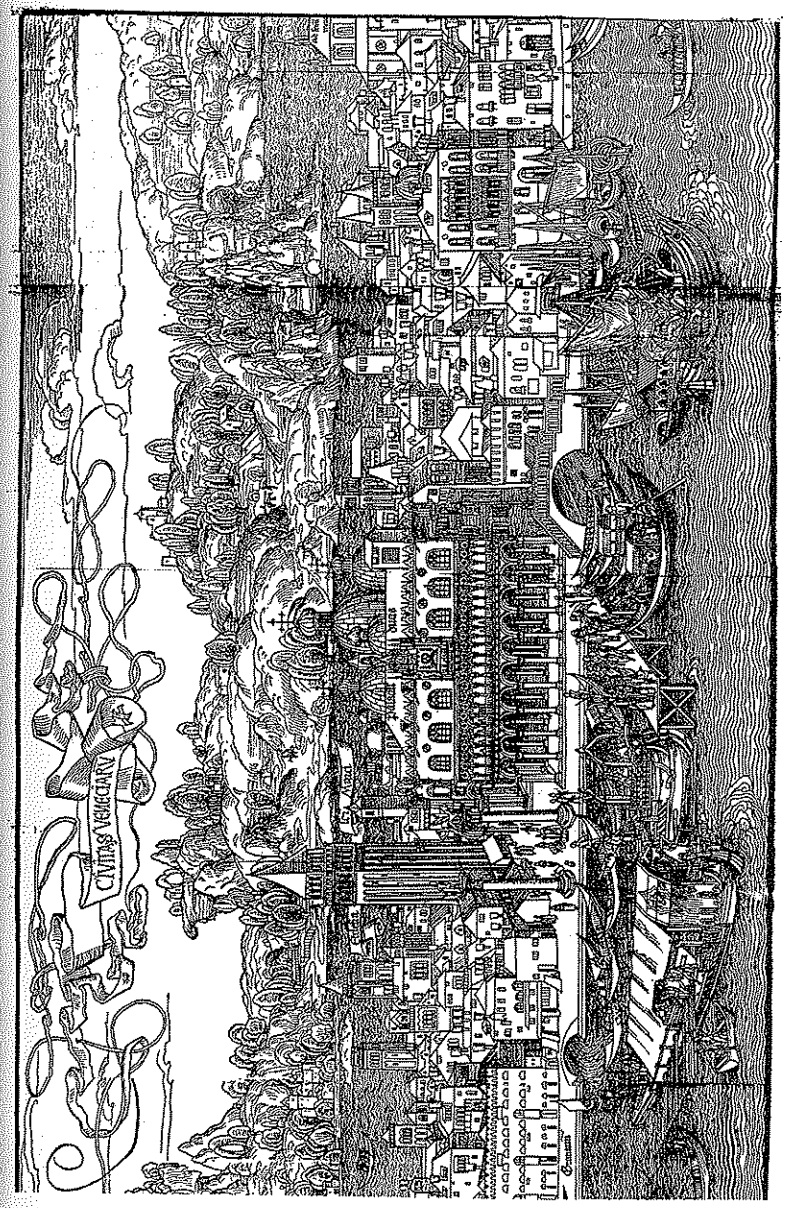
The use of one block to illustrate several towns is shown on the opposite page by the way Verona (above) and Mantua (below) are presented in the Nuremberg Chronicle. From Hartmann Schedel, *Liber chronicorum* (Nuremberg: Anton Koberger, 12 July 1493, folios 68 and 84). Reproduced by kind permission of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





Identical portrait heads (of Baldus and Lorenzo Valla above and of Compostella and Jean Gerson opposite page) 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, 246, 213, 240). Reproduced by kind permission of the Folger Shakespeare Library.

to offer practical advice on diverse matters – ranging from composing a sermon to dying in one's bed. 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



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.

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.

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. "It's much easier to find things when they are each disposed in place and not scattered haphazardly," remarked another sixteenth-century publisher. 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 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."

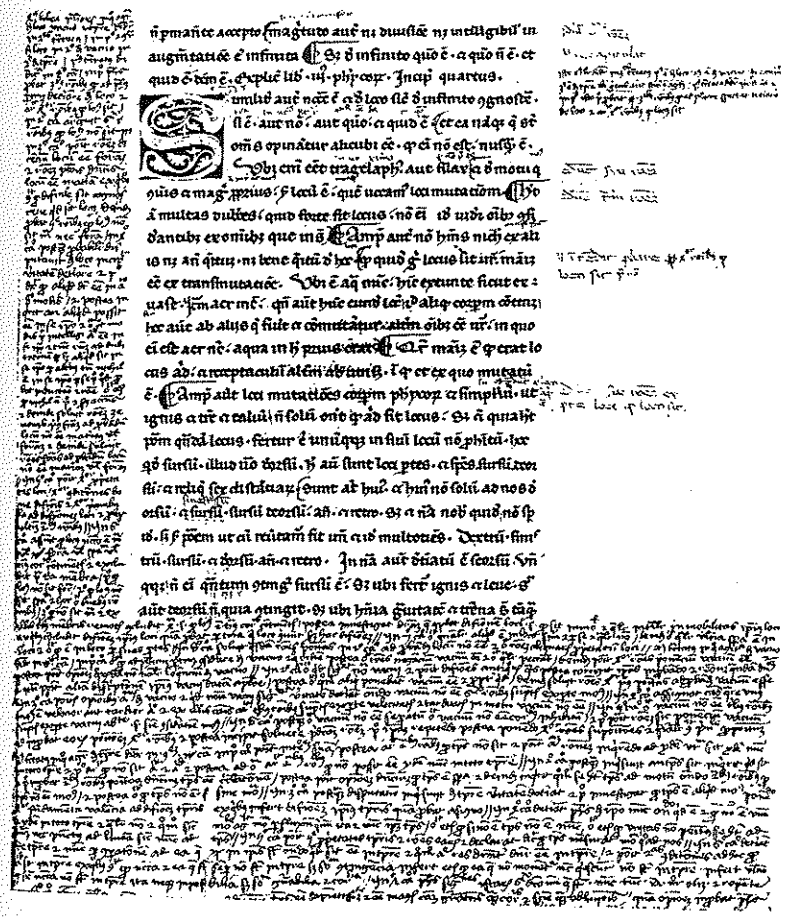
Other ways of ordering data were no less likely to be used in scribal reference works. As for scribal library catalogues, the full use of alphabet systems by the fabled custodians of the Alexandrian Library had vanished with the institution itself. "When it comes to cataloguing, a poem is a far cry from a card index," note Reynolds and Wilson, in connection with some verses attributed to Alcuin describing the eighth-century library at York. 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.

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." The same skills were used by Estienne for his pioneering work in lexicography and his succession of biblical editions. 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



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.

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 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.

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 work as hundreds of trilingual reference guides. There is simply no counterpart in medieval houses of studies 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.

The output of tables, catalogues, gazetteers, and other reference works satisfied practical as well as religious impulses. Whereas Rob-

ert 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."

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 which had never been indexed before. Indexing and other procedures entailed in copy editing 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 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.

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." 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," 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" and "extraordinary" lecture series even before successive layers of commentary were deposited by the glossators and postglossators. 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. 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. 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. 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 copy editing, indexing, and emendation. Even while ancient compilations such as the *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.

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. 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 offering a systematic review of parliamentary history – the first many readers had ever seen.

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 immemorial 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. 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.

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 down 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." 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 co-operative enterprise on an international basis. He received 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.

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 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.

The new surveys led, in turn, to further interchanges which set off new investigations, 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. 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 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 co-

operative craftsmen who sought to benefit others and vain, devious, self-serving schoolmen or literati who worked only for themselves. 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.

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." 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 writes, "no potentially revolutionary changes occurred in the data available to astronomers." 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 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." 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." 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 scrapping 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

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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 scrapping 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 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.

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.' "

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 deploring 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 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.

Studies of dynastic consolidation and of nationalism might well devote more space to the advent of printing. Typography arrested 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 first see a more standardized version of what the ear had first 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. The other varied ways in which printers, by pursuing their own interests, contributed to loosening or severing links 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. 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. 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. 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 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."

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 pre-

serve 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 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*).

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's 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? 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*."

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 *re*covery of what is embedded in tradition . . . rather than the *dis*covery of what is new." 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 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." 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 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." 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 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 re-

worked 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.