

American Printing: The Search for Self-Sufficiency

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WHEN printing was invented in Europe, about the middle of the fifteenth century, its first patrons were the church, the state, and the school.¹ When it reached North America some two centuries later, the same triumvirate provided the initial support. In the summer of 1638, the Reverend Josse Glover, a dissenting minister, sailed on the *John of London* for New England, accompanied by his wife and children and a number of servants. Among these were Stephen Day, a Cambridge locksmith, with his wife and sons. Their baggage included a quan-

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¹ The literature on the history of printing in America is vast, although uneven in quality and scope; the colonial period has been extensively studied, while post-1825 has had comparatively little attention. It would be inappropriate to attempt a full-scale bibliography on the subject for a brief lecture, yet I must acknowledge my indebtedness to a few sources on which I have relied heavily. First, most properly, is Isaiah Thomas. One can but marvel at how much he discovered, and saved, about the early history of printing in this country. Next is Lawrence Wroth, whose work on colonial printing may have been corrected in minor details, but which is still basic, essential, and stimulating. The two editions of *The Book in America*, edited by Hellmut Lehmann-Haupt (they are not identical in content), are as yet the best general surveys on the subject. Rollo G. Silver's books and articles are original, thorough, and interesting—not, alas, a common combination. Among general American historians, Daniel J. Boorstin has seen printing in a much larger context than most, and has written about it with wit and skill. A less obvious source, but one that I found highly useful for its technical information, is the catalogue—the small inexpensive guidebook not the later coffee-table version which omitted the descriptions of machines and processes—of the International Printing Exhibition, *Printing and the Mind of Man*, held in London in 1963.

ity of iron tools—presumably a printing press and type, imprecisely identified, probably to avoid government interference with the establishment of a printing office in the new colony. Mr. Glover died during the voyage and his widow settled the family and its retainers in Cambridge, Massachusetts, home of the recently founded Harvard College. She bought a sizable and comfortable house for her own use (Glover had been the son of a well-to-do merchant) and installed the Days in a more modest dwelling nearby. This became the site of the first North American printing shop.

We know, from a letter written by Edward Browne on September 7, 1638, that the press was given high priority by the new settlers. He wrote that 'wee have a Cambridge heere, a college erecting, a library, and I suppose that there will be a presse by winter.' A letter written on December 10 by Hugh Peters, a Salem pastor, reported that 'we have a printing house.'

The new press had, in addition to Glover's stock, a quantity of type given to Harvard by 'some gentlemen of Amsterdam.' The reasons for their gift are unclear: it may have been because they were Puritan sympathizers, or perhaps the Dutch government wished to encourage the printing of banned English-language texts outside Holland, to lessen the criticism of English authorities.

Stephen Day had been trained as a locksmith, which meant that, like Gutenberg, he had skill in metalworking. He probably had not been a printer in England. His younger son Matthew, who succeeded him as foreman of the shop in 1647, had probably had some previous printing experience. The father, however, is recognized as the first American printer.²

No copies of the first two publications of the new press have survived. The first was a broadside form, *The Freeman's Oath*,

² A good, brief summary of the printing of the Bay Psalm Book is contained in the volume of text accompanying Zoltan Haraszti's facsimile edition *The Enigma of the Bay Psalm Book* (Chicago, 1956).

issued in 1638; the other was a nautical almanac for 1639. By 1640 the shop was capable of a substantial book, *The Psalms in Metre*—more commonly known as the *Bay Psalm Book*—a three-hundred-page octavo of which 1,700 copies were printed. The composition and press work were crude, as one might expect, but it is a respectable piece of work and, considering the handicaps under which it was produced and the newness of the shop, a remarkable one. It is also, significantly, a religious work, as were many of the first imprints of the theocratic press.

Luckily for the historian of printing, printers have been a litigious lot. Much of our data on Gutenberg comes from court records. This is also true of the Glover-Day press. Mrs. Glover married Henry Dunster, president of Harvard, in 1641. Dunster ran the press for her and continued its management after her death two years later, moving it to the new President's House in 1645 or 1646. When he retired from Harvard in 1654 he attempted to sell it to the college. The Glover heirs sued and won their case.

The *Bay Psalm Book* was not the only remarkable volume issued by a seventeenth-century American press. Another, perhaps even more impressive publication, was the Eliot Indian Bible. This bible was printed by Samuel Green under the auspices of the Corporation for Printing the Bible, at a press sent for the purpose to Cambridge in 1659. The first edition of the New Testament appeared in 1663; the whole work was completed two years later, in an edition of 1,000 copies. It was a remarkable effort because of its size, its complexity, and the limited resources of the printing shop. One of the problems was that of composing and proofreading a work in a language completely unknown to European printers. One solution was the training of the first Native American printer, known as James the Printer and then as James Printer, who had attended the Indian school at Cambridge, where he learned to read and write English. In 1659 he was apprenticed to Samuel Green. He joined King Phillip's War, the Indian rebellion against the

whites, but returned to his craft after its failure; he helped print the second edition of the Bible in 1680. His name appears as coprinter of a 1709 edition of the Psalter in the Indian and English languages, printed at Boston.³

About a quarter of the printers listed in Isaiah Thomas's *History of Printing in America* were born and trained abroad, mainly in England. Most of the American printers were colonial-born, and trained in the traditional method, by apprenticeship. There was, according to Lawrence Wroth, a chronic shortage of journeymen printers; this was one of the reasons for the great mobility of printers during the colonial period.⁴ Apprenticeship varied in length, from a few years to as many as fifteen. By the late eighteenth century, four or five years became the standard apprenticeship period. Hours were long, living conditions might be poor, and there were many dissatisfied apprentices. Running away from an unsatisfactory master was not uncommon.

The printer in the colonies depended on presses made abroad, in England for the most part, although a few in Pennsylvania were German imports. While local carpenters or joiners were capable of producing the required wooden frame, and of making repairs, the more complicated iron work was beyond local craftsmen.⁵ Thomas reports that Christopher Sower of Germantown made his own presses by 1750, but Sower was an unusually skilled mechanic. The earliest known press commissioned in the colonies was built by Isaac Doolittle, a watch- and clockmaker of New Haven, in 1769, for William Goddard of Philadelphia. By 1789 presses had been built in New Haven, Philadelphia, Hartford, Charleston, and Fayetteville, North Carolina. They were all of the common wooden press variety

³ Isaiah Thomas, *The History of Printing in America*, ed. Marcus A. McCorison (New York, 1975), pp. 90–98.

⁴ Lawrence C. Wroth, *The Colonial Printer* (New York, 1931).

⁵ Chapter 4 of Wroth's work, 'The Colonial Printing Press,' gives a concise summary of colonial press manufacture. Rollo G. Silver's *The American Printer, 1787-1825* (Charlottesville, 1967) provides basic data on the following decades.

used in England and on the Continent, occasionally improved by local ingenuity, and not superseded by the iron handpress until the next century.

Type was also imported throughout the seventeenth and eighteenth centuries, although there were efforts to produce it in the colonies late in the eighteenth century.⁶ Punch cutting of type required great skill. Type metal was not available (antimony, necessary to give the metal hardness, was not discovered in North America until the 1850s). There was also a preference for the elegant foreign faces. Abel Buell, of Killingworth, Connecticut, began experimenting with punch cutting and typecasting in 1768, but he was not successful, despite support from the Connecticut legislature. There was some type cast in the colonies from imported matrices. Christopher Sower is known to have made crude matrices, using old type as punches, and other printers doubtless did the same. There were powerful motives for seeking locally made type: the non-importation movement of the 1760s in response to increasing English taxation, the cost of English type and the difficulty of paying for it (indeed, the balance-of-payments problem is not by any means a new one), delays in securing supplies, and the costs of freight and insurance. When supplies were cut off during the Revolution, the demand for American-made type increased considerably. Several typefounders were attracted, with their tools, to this promising market. Among them were John Baine, who had been a founder in Edinburgh, and his namesake grandson, both experienced and capable workmen. They arrived in Philadelphia, after stopping in New York, in 1787, and within a few years were well established. In 1790, when Thomas Dobson of Philadelphia began publication of his *Encyclopaedia*, based on the third edition of the *Britannica*, he used Baine's type—a good, stout letter based on Scottish

⁶ Wroth, *Colonial Printer*, chapter 5, 'Type and Type Founding in the Colonial Period'; Rollo G. Silver, *Typefounding in America, 1787–1825* (Charlottesville, 1965); Lawrence C. Wroth, *Abel Buell of Connecticut* (Middletown, Conn., 1958).

models. Adam Mappa, a Dutch founder, arrived in New York in 1789, equipped with machinery estimated to have been worth £3,500. Mappa could not make a go of it, and advertised his business for sale in 1794. His tools were eventually bought by Binny & Ronaldson, the first commercially successful American typefounders, of whom more later.

After the Revolution, printers turned again to imports. There was still considerable prestige attached to foreign design. On the title page of his 1785 type specimen, Isaiah Thomas proudly announced that his type came mainly from 'that great Artist, William Caslon, Esq., of London.' Thomas's career may not have been typical. He was more energetic, more successful, and a better businessman than most printers, but his career provides considerable insight into the practice of his day, especially since his papers are available and usable at the American Antiquarian Society. One reason for his importation of English type was his highly successful Bible printing. He did not have enough type to keep so large a book standing, so he decided to have type cast for it and set in England, then sent to America already made up. This required far more capital than most printers possessed, as well as good credit and a willingness to take risk. Thomas commissioned Fry & Company of London to undertake the job in 1790. The project took seven years to complete, during which time Thomas and Fry both grew heartily tired of it. Their lengthy correspondence is filled with mutual recrimination.⁷ Even so, it proved a highly profitable venture for Thomas. He reprinted it year after year, changing only the date on the title page.

Only the larger printers dealt directly with foreign founders. Smaller men bought through agents, either abroad or in this country. They found it slow and expensive, and were quite ready to turn to a domestic source of supply as soon as a satisfactory one was available, which finally occurred early in the nineteenth century.

⁷ This correspondence is held at the American Antiquarian Society.

Ink was another problem, albeit a less important one. While the ingredients, varnish and lampblack, were easily available, combining them and boiling them down to the proper consistency was a malodorous and risky business. Thomas states that until the Revolution cut off supplies, most printing ink was imported from England, although he cites a few printers who made their own. Importation continued after the war, apparently because the native ink makers could not supply all that was needed. Ebenezer T. Andrews reported to his partner, Isaiah Thomas, in a letter written at Boston in 1791, that 'we imported only six kegs of ink—one already sold. Could sell them all, as nobody else has any. Can you find the name of the best ink maker in London?'⁸ After 1800 the number of ink-makers increased, and printers were able to buy as much locally as they needed.

Paper was the most difficult supply problem, after type, for the American printer—perhaps even more difficult, since type can be reused, even when broken and worn. As the demand for printing grew, and as the number of printers increased, so did the need for paper. Papermaking is a comparatively simple craft, as is evidenced by the number of amateurs who have turned to it in recent years. All that is required is clean, pure water; a sufficient supply of clean white rags; an apparatus for beating these with water into a pulp; and wire moulds on which to form the sheets. There was ample pure water available, but a chronic shortage of rags and of skilled workmen. The development of printing has been, in many ways, a continuum, in which the solution of one problem has created others to be solved in turn. The development of the printing process could not have occurred without the introduction of paper into Europe; there could never have been enough vellum to permit the larger, cheaper editions made possible by printing. Newer, better, faster presses, new methods of making and composing type, new and larger markets for printed matter, all led to the

⁸ The *Isaiah Thomas Papers*, American Antiquarian Society.

development of new methods and materials, particularly in papermaking.

Papermaking in the colonies began in Pennsylvania in 1690, when William Bradford, Samuel Carpenter, and William Rittenhouse built a mill near Germantown. The mill made both printing and writing paper. Pennsylvania remained a center for papermaking throughout the colonial period. In 1787 it boasted about half the American mills, and by the end of the century was making about 7,000 reams a year.

Throughout the colonial period paper was scarce and expensive. There was great resentment when the Stamp Act and the Townshend Acts included paper among the imports to be taxed. It was considered so essential, especially for newspapers, that the cheaper grades were excepted from some of the Revolutionary nonimportation resolutions of 1769. American printers did as much as possible to encourage the establishment of new mills. During the Revolution, papermakers were exempted from military service. In 1810, Isaiah Thomas records 195 mills in operation, of which 60 were in Pennsylvania. Next was Massachusetts, with 40, Connecticut, with 17, and New York, with 12. The remainder were widely scattered.⁹

With political independence, the new nation began a parallel quest for economic independence. 'Buy American' is no new slogan. American ingenuity was applied to almost every facet of printing: type design and manufacture; composition; presses and press work; the distribution of the printed product—and, for that matter, to its writing. Printing spread rapidly in the United States, traveling with the pioneers as they established new communities, and often helping to create those settlements. The emigrant guides, and especially the newspapers, played important roles in the westward expansion of the frontier. The newspapers were, as Daniel J. Boorstin has pointed

⁹ Wroth, *Colonial Printer*; Silver, *American Printer*; Dard Hunter's various works are still useful; David C. Smith, *History of Papermaking in the United States* (New York, 1970), is the most authoritative and comprehensive book on the subject.

out, a 'booster press,' eager to attract new settlers who would become readers.¹⁰ It took little capital to start a paper; cheap, portable presses—whose manufacture was encouraged by the needs of the newspaper—could be bought for as little as \$150. Type and paper, too, became plentiful and cheaper during the course of the nineteenth century.

The printing press used in colonial America differed little from that of Gutenberg, whether made in the Old World or copied in the New.¹¹ It changed rapidly and constantly during the nineteenth century, much of that change the result of American innovation. The first commercially successful American press maker was Adam Ramage, a Scot who settled in Philadelphia during the 1790s. He began to manufacture presses there about 1800, together with a wide variety of other equipment. Ramage quickly made a name for himself. His presses were well made, of good materials and excellent finish, and could be easily repaired. They were comparatively light in weight, and consequently cheaper to ship. Ramage continued to build presses until his death, in 1850. It is estimated that he built some 1,250 presses, which were used all over the country. They are recorded as having been the first used in New Mexico in 1843; in California soon thereafter; in Utah in 1849; in Washington in 1852; and possibly in Colorado in 1859.

Another American press maker in the early nineteenth century was George Clymer (1754–1834), who achieved great success abroad. The son of a Pennsylvania farmer, he early showed mechanical ability and was trained as a carpenter and cabinet maker. His Columbian press, the first to substitute a lever for the screw, was introduced in Philadelphia about 1813 and soon reached New York. Highly ornamented, with an American eagle counterweight and a great deal of other deco-

¹⁰ Daniel J. Boorstin, *The Americans: The National Experience* (New York, 1965), p. 124 ff.

¹¹ See especially Silver, *American Printer* and the British Museum exhibition catalogue *Printing and the Mind of Man* (London, 1963).

ration, it sold well in England and on the continent despite its chauvinistic trim; later models substituted an urn for the eagle. Clymer began experimenting about 1800. By 1812 he had arrived at the basic principles involved in the Columbian, which combined a number of already known ideas. The most important of these was derived from Thomas Newcomen's 1712 English invention of the beam pumping machine, which utilized an overhead beam, known as the great lever, to transmit the motion of a piston to a pump.

Between 1812 and 1814, Clymer worked on his press, trying to adapt it to newspaper use, the greatest market. By 1814 he was advertising its availability in Philadelphia, and selling it in that area. It was too heavy to appeal to printers traveling west, who continued to favor Ramage's press. In 1817, Clymer, aged sixty-three, decided to try his luck in England. He settled in London, where he patented his press, and began to manufacture it there the next year. It had many distinct advantages: it could be adapted to print anything from small cards to large sheets, it required less physical exertion to pull, and it was well made. Its major drawback was its slowness as compared to its chief English rival, the Albion (whose name was apparently a counter to the Columbian), invented by R. W. Cope about 1822. Both presses, as well as others of the same type, were used commercially well into the twentieth century, and are still in high favor among private press printers.

John I. Wells, a Hartford inkmaker, was responsible for another advance in American pressmaking when he applied to printing presses the simple mechanism of a lever and toggle joint that he had used in his linseed oil factory. He first built a wood and iron press, which could not withstand the pressure of his mechanism, and switched to an all-iron frame in 1819. Despite the efficiency of his press, he was not able to market it successfully—Hartford may have been too far from the main printing centers for him to meet the competition of New York

manufacturers, who saw the advantage of his principle and quickly helped themselves to it.

The most famous American hand press was Samuel Rust's Washington press. Rust, a former grocer and printer, patented an iron press with a toggle joint in 1821. Rust and Turney, his partner, manufactured and sold the Washington extensively until Rust's retirement in 1834, when the firm was bought by John Colby, an agent of Robert Hoe, who did not reveal the identity of his principal. Hoe continued to offer the press for almost a century.

The most successful American press manufacturer, Robert Hoe, began business in partnership with his brothers-in-law, Peter and Matthew Smith.¹² A farmer's son, Hoe emigrated to New York from Leicestershire in 1803. After working briefly as a seedsman and as a bridge builder he joined forces in 1805 with the Smiths, who were already making presses. In 1822, Peter Smith, an excellent mechanic, patented an acorn-shaped iron press, which had a toggle joint and was operated by a bar. When Matthew Smith died in 1820, Hoe became the senior partner, and, when Peter retired, about 1822, Hoe assumed complete control. That year, Smith, Hoe & Company became R. Hoe & Co. Hoe's son and grandsons succeeded him in the business, which became the largest press manufacturer in the United States, perhaps in the world, through the century.

Printers in the United States were quick to learn of the introduction of the power press in England, where Koenig and Bauer's power-driven press, using ink rollers instead of ink balls, was patented in 1810. That press was driven by steam power, utilized the conventional flat bed principle, and was a failure. In 1812 Koenig built a cylinder press. Two of these were bought by the *Times*, installed in secret, and used for the first time for the paper dated November 29. Output was 1,100

¹² Frank E. Comparato, *Chronicles of Genius and Folly: R. Hoe & Company and the Printing Press as a Service to Democracy* (Culver City, Calif., 1979).

impressions an hour. In 1821 Daniel Treadwell of Boston designed a power press so profitable that he earned \$70,000 from it in seven years. Treadwell, a silversmith, was a gifted merchant, with an inventive mind. He had earlier invented a screw-making machine and a nail-making machine. His first press, operated by a foot-treadle, was large and cumbersome. Impressed, perhaps, by Clymer's success, he went to England in 1819, and had a press built by Napier, which he patented the next year. While he received high praise from English printers, he found no customers, and returned to Boston. In London he saw steam-driven newspaper cylinder presses, which inspired him to try to design one.

Treadwell could not find tools or skilled artisans to make either a cylinder press or a suitable steam engine, so he settled for a one horse-power engine. That is a literal description; the power was supplied by a horse, led in a circle by a boy. When it became apparent that the job was too much for a single horse—the machine was very heavy—a second horse was added as a relay. Treadwell did not manufacture presses, but licensed their construction. It is estimated that some fifty were built by 1830, many of them double units built back-to-back and powered by a common shaft. As soon as adequate steam power became available the horses were eliminated. When Treadwell retired—he eventually became a professor at Harvard—Hoe & Company manufactured his presses for a while, but discontinued them in favor of cheaper, more efficient machines.

Among other presses incorporated into the Hoe business was that of Seth and Isaac Adams, journeymen cabinetmakers who had worked on Treadwell's machines. Isaac was a highly inventive craftsman, Seth a shrewd businessman. By 1827 Isaac had developed a bed-and-platen press, which he and his brother jointly produced. They refined their machine several times and in 1836 organized a company to market it. Their presses were well made and durable and printed a 30- by 40-inch sheet rapidly and handsomely. Their machining was so

precise that it could not be easily or cheaply counterfeited. The Adams press was especially suited to fine bookwork, and was bought by such quality-conscious printers as John Wilson, Henry Houghton, and the Harpers. In 1901 T. L. DeVinne wrote that 'for more than fifty years it was the machine preferred for fine book printing.' In 1859 Robert Hoe & Company, who had been accused of infringing on Adams's patents, bought the Adams plant and its patents and continued to manufacture the press. It is estimated that over 1,000 presses, in fifty-seven sizes, were sold in the United States and that many were also exported.

In 1832 Hoe sent Sereno Newton, who later became a partner, to investigate what was going on in England. Newton returned to report what he had seen there, especially in the Napier shops. Hoe developed a line of cylinder presses, which were well made, since the company had excellent machine and tool shops. The business had many profitable sidelines, among them saw making, and manufactured models and machines for a wide variety of industries besides printing. Stephen Tucker, in his '*History of R. Hoe and Co.*', tells a great deal about this. Tucker, who became an apprentice in 1834 and ultimately was made a partner, mentions that most of the early tools, consisting of a few lathes, drills, and woodworking tools, were made on the premises. The forge fires were blown by hand bellows, and all the carting was done by a single man with 'a big, black vicious animal called Major, who had earlier provided the motive power for the mill.' Among the tools made for outside customers were a pinmaking machine, a coining press, a brick-making machine, a cotton gin, and howitzers and guns for the government—which kept the plant running during the Civil War, when materials were hard to get—and even a pill-making machine. Among its failures were a music printing press and a perpetual motion machine.

In 1846 Richard Hoe developed the 'Lightning Press,' patented the next year, in which the type was locked up in curved

chases fastened to a large cylinder; two smaller cylinders carried the paper and rolled it against the type. Robert Hoe made a trip to Europe in 1848 and succeeded in selling a four-cylinder press to a Paris newspaper. Tucker was sent over to erect it. While abroad he visited numerous shops, and came back with a number of ideas incorporated into Hoe presses. The *Times* (London) ordered two in 1857. The *Times* order stipulated that its presses must be built in Great Britain; Hoe manufactured them in Manchester, from American drawings. Later, Hoe leased a factory in London to manufacture presses and to service machines imported from the United States. The report of the jury at the London 1862 exhibition commented that Hoe presses had proven superior to those made in Britain, and that as a consequence no fewer than thirty-six had been imported during the preceding six years. At the 1876 Philadelphia Centennial Exhibition other presses were shown and praised, but the accolade was given to Hoe: 'The workmanship is of the highest quality . . . It is to this press, with its important improvements upon others which have preceded it, that America largely owes its reputation for producing the best printing-presses in the world.'

American typefounding, like press making, achieved its independence during the early nineteenth century. The establishment of Binny & Ronaldson in Philadelphia, in late 1796, marks the first successful American type foundry—the first to become a viable commercial enterprise able to survive the lives of its originators. James Ronaldson and Archibald Binny were both natives of Edinburgh; Binny, who had learned type founding there, emigrated for political reasons about 1795, bringing with him his tools.¹³ Ronaldson, whose previous trade had been baking, reached this country at about the same time. He apparently provided the capital for the new venture, Binny the skill. Their success came slowly, but in a few years

¹³ Philadelphia Museum of Art, *Philadelphia: Three Centuries of American Art* (Philadelphia, 1976), pp. 297–89.

they had more orders than they could handle; they had more than thirty men and boys in their plant, and were making money. It was not an easy business. Printers were slow payers; raw materials, especially antimony, were in short supply; parents considered the industry unhealthy and arduous, and were reluctant to subject their sons to the long apprenticeship required. By 1809, Binny & Ronaldson issued their first specimen, a pamphlet showing the 102 metal ornaments they could supply, many of them engraved by Dr. Alexander Anderson, an American.

Archibald Binny developed several significant improvements in type moulds and their use. His improved type mould, patented in 1811, featured a quick release which cut molding time by about one-third. He also patented a new method for smoothing and rubbing type. Binny retired from the firm in 1815 to settle on a farm in Maryland. Ronaldson was succeeded by a younger brother who had been a jeweler in Edinburgh. The company continued under various names until 1892 when its descendant firm, MacKeller, Smiths & Jordan, became part of the newly formed American Type Founders Company (ATF).

Philadelphia, the political, intellectual, and financial center of the country at the end of the eighteenth century, was also the center of the printing trades. It lost that distinction to New York during the next few decades. A prime factor was the New York Foundry of David and George Bruce.¹⁴

The Bruces, who started as printers and stereotypers, issued specimen sheets seriatim, as they added types to their repertory, the first of which appeared in 1815. These were bound up into a book in that same year. As their stock increased, the Bruces issued larger volumes. Their 1820 book claimed leadership in the field, a statement that considerably irritated Ronaldson back in Philadelphia. In 1816 the Bruces had sold their printing shop to concentrate on their new interests; David

¹⁴ Silver, *Typefounding in America*.

managed the stereotyping side, George the foundry. After David's retirement in 1822, George gave up stereotyping to concentrate on typefounding, at which he excelled. In 1822 he made the first American attempt to establish and standardize correct proportions between the various sizes of type. He cut his own punches and fitted the matrices from them. He was still cutting punches in his seventy-eighth year. The Bruce firm, like Binny & Ronaldson, was absorbed by ATF in 1892.

Typefounding was largely a regional business. Boston, New York, and Philadelphia all had successful foundries, as did many smaller cities. As printers followed the frontiers, so did the founders, following their customers all the way to California. While smaller towns could not support a foundry, regional trading centers could and did—it was faster and cheaper for a printer in Kentucky to buy from Cincinnati rather than New York, for a midwesterner to order from Chicago or Saint Louis, for a Californian to get his type from San Francisco.

As a loyal Chicagoan, I shall use the firm of Marder, Luse & Company, also known as the Chicago Type Foundry, as a model.¹⁵ It began as an agency of Charles T. White & Company, of New York, in 1855. Eight years later the parent firm decided to sell the branch to John Marder, its bookkeeper, whose wife's family advanced the money. Marder's father-in-law, David Scofield, became a partner. In 1869, A. P. Luse, who had been Marder's employer in Iowa, entered the firm, at which time the name was changed; it remained Marder, Luse & Co. until it, too, joined the American Type Founders Company.

The new enterprise prospered. By 1869 it had seventy employees, with a weekly payroll of \$800 and a business of over \$250,000 a year. The 1871 Chicago fire wiped the business out completely, destroying the building, machinery, type, moulds, matrices—even the whole stock of a new specimen

¹⁵ James Eckman, 'The Chicago Typefounding of Marder, Luse & Company, 1868-1892,' *Printing and Graphic Arts* 7 (1959):69-83.

book not yet distributed. Within a year, the company was back in business, in a new building financed from insurance and the sale of Marder's house, and with new steam casting machines for text types (larger sizes still required hand-casting). Mechanical typecasting had been developed in 1838 by David Bruce, Jr., whose machines had been built by a locksmith, L. Brandt. Marder and Luse's types were sized according to the new American point system, based on a fractional part of the inch. By 1876 the firm's whole type repertory had been adapted to this system. By 1885 eight other American foundries had adopted it, and the next year the American Type Founders Association, of which John Marder was vice-president, accepted it as a standard system.

I have mentioned the American Type Founders Company frequently. It is time to discuss its foundation and the reasons for it. The company was incorporated in February 1892 in an attempt to increase profits by decreasing competition, despite the passage of antitrust legislation in 1890. Competition had become so severe that many foundries had been forced into bankruptcy, as were the optimists who took them over. In addition, many technological forces were emerging that spelled even greater trouble. In 1886 the first Linotype machine was installed in a newspaper office, and the newspapers provided by far the greatest market for type. The next year the Monotype machine was invented. John Marder of the Chicago Type Foundry and Arthur Brower of the Union Type Foundry, another Chicago firm, were instrumental in organizing ATF, which brought together twenty-three plants scattered across the country, among them MacKellar, Smiths & Jordan of Philadelphia, the largest in the United States. A number of successful foundries held out, but proved unable to remain independent. By 1919 most had entered the combine. This corporation not only reduced competition, it also made possible the investment of the large amount of capital required to install the new machine tools that were rapidly appearing, many of them

developed by ATF engineers. ATF's first catalogue, issued in 1895, listed eighteen branches; by 1910 type was being cast only in Boston, Jersey City, Cincinnati, Chicago, and San Francisco. Eventually all manufacturing was concentrated in the Jersey City plant, whose construction began in 1903. Like its forerunners, ATF sold not only type but printing machinery and supplies of all kinds.

Some idea of the typefounding industry in the United States can be gained from a series of letters written by Thomas W. Smith of the British firm of H. W. Caslon & Company during an American trip in 1897 and sent to his home office.¹⁶ On May 4, 1897, Smith reported that he 'went over to Bruce & Sons old foundry in New York. An old fashioned place that has not progressed for many years. We have nothing to learn from them.' He was considerably more impressed by Damen and Peet of Brooklyn, who supplied leads to all the leading American foundries. Their casting and finishing machines were so superior that he agreed to buy one for \$600. He also met Lynn B. Benton, who in 1885 invented the punch-cutting machine, which he considered too crude for use by a typefounder, although good enough for Linotype use.

Smith moved on to Philadelphia, where he visited MacKeller, Smiths & Jordan, whose foundry he thought far superior to anything he had seen in New York, but still no better than those at home. In one letter, Smith noted: 'I have come to the conclusion that the Americans do not beat us in type production; their appliances are very good; their engineering perfect; their methods admirable; but though our shops do not look as grand as theirs and our appliances for attaining a good and profitable result are of a more simple kind—we get there just the same.'

Smith was treated kindly and courteously wherever he went. In Chicago, at Barnhart Brothers & Spindler, he was even

¹⁶ These letters are located in the Newberry Library.

shown 'a new matrix and punch engineering machine which was kept in a secret room' and allowed to take copious notes on whatever he saw. A breaking-off machine, patented in America but not in England, was described in great detail, so that it could be copied at home. Here, as elsewhere, Smith was told of the tremendous inroads made by the Linotype machine, especially in newspaper plants. From St. Louis he wrote: 'I think we need never refuse, now, to show any American over our foundry, for the simple reason that they are quite as advanced as we are, perhaps more so.' In Detroit he saw and bought a simple conveyor belt contrivance on which 'a case of eggs could be safely delivered . . . or a case weighing a ton with equal safety and ease.' Detroit's preeminence in conveyor belts soon proved useful in the automobile industry.

During the nineteenth century, typefounding was increasingly mechanized, largely as a result of American invention and technology.¹⁷ The first significant American invention was David Bruce, Jr.'s type casting machine in 1838. Such automatic casters required the provision of enormous numbers of molds, which in turn necessitated the creation of punches and matrices. Lloyd B. Benton was responsible for many of the machines that made possible the enormous increase in their production. A partner in a foundry in Milwaukee, Benton in 1884 produced a punch-cutting machine based on a pantograph that traced around a pattern in relief. His foundry, which had no punch-cutting machine, received an order requiring 2,000 punches. Although he had neither mechanical nor technical training, Benton did have considerable ingenuity, which he applied to the problem. Letters were drawn to a large scale—twelve inches high—and were then pantographically traced

¹⁷ David Bruce, Jr., *The History of Typefounding in the United States* (New York, 1925), with an introduction by Douglas McMurtrie, gives considerable information on the Bruce family's many contributions to American printing history. In addition, *Printing and the Mind of Man* provides excellent descriptions and often illustrations of the many new machines and processes developed during the Industrial Revolution, many of them American.

onto a wax-covered metal plate from which electrotypes could be made. Using this method, the same model could serve for type ranging from two point to seventy-two point. The resulting engraved patterns served to guide power-driven routers and cutters, which cut the letter face on punches in the sizes and quantities required to strike matrices. Benton's firm was acquired by ATF. When it was closed two years later, Benton became director of manufacturing for the whole ATF empire. He worked closely with printers and type designers, among them T. L. DeVinne, in the development of new faces. Among his other inventions—he is credited with more than twenty patents—was the adaptation of his machine to the direct engraving of matrices, making the punch cutter obsolete except for typographic purists.

While there was a constant speeding-up of press time during the nineteenth century as a result of a number of technological advances—the development of cylinder presses and the application of power, and of type casting, and the invention of automatic casting machines—there was little increase in the speed of composition until the end of the century. This was certainly not for lack of effort. The first patent was issued to Dr. William Church, of Vermont, in 1822, for a machine combining an improved press, a casting machine, and a composing machine. There is no record that the composing machine was ever built, but Church's design included features included in later inventions. Type was stored in inclined channels, and released singly through operation of a keyboard. It fell into a horizontal race from which it was assembled by rocking arms into a continuous line. Justification was performed by hand and power was provided by a clockwork mechanism. Church's patent was registered in England, perhaps because there was a larger market there than in the United States. A number of English engineers attempted composing machines, generally following Church's principles. None, whether in England or in the United States,

were successful. Most, like the Paige machine in which Mark Twain invested heavily, were commercial disasters.

Ottmar Mergenthaler, a German immigrant who was naturalized in 1878, invented the Linotype composing machine about 1884. He brought together several existing devices to produce it: the keyboard; a magazine to store the matrices from which type is cast; the mould, the metal—an alloy that remained molten in a heated pot but cooled and hardened rapidly when released from the mould and the matrices, whose mass production was made possible by Benton's inventions. Type was not cast individually, but into line-length slugs, which were rapidly produced and easy to make up into columns. The metal was melted and reused, which meant that fresh type, free of broken letters, was available for each use. This eliminated the distribution of type after printing, a time-consuming and messy job, and it freed the large sums of capital locked into huge stocks of type. The types were suitable for newspaper or book work. The major disadvantage was aesthetic; the limitations of the machine, and the necessity for the compact storage of the matrices, precluded the production of kerned characters, in which a type abuts and hangs over its neighbor. Such kerned types allow for more pleasing page color.

The Linotype machine was rapidly introduced into newspaper plants, which benefited from its speed of composition and easy makeup; it was soon adopted by book and jobbing printers for the same reasons. The first book set on the Linotype was *The Tribune Book of Open-Air Sports*, published by the New York Tribune Association in 1887. While the first Linotype faces were extremely ugly—as were many foundry faces of the same period—the Mergenthaler firm soon took steps to improve their design, employing such artists as Frederic Goudy, W. A. Dwiggins, and Rudolph Ruzicka, among others. Aided by an able publicity department and aggressive advertising, as well as by excellent manufacturing and service facil-

ties, the company dominated both newspaper and book printing in the United States during the first half of the twentieth century. It did equally well abroad, setting up a worldwide distributing and manufacturing network.

The other important composing instrument, the Monotype machine, was also invented by an American, Tolbert Lanston of Washington. Developed between 1885 and 1897, it consisted of two related machines, a keyboard and a caster, and composed single letters in justified lines. In this system of composition, the keyboard perforates a continuous roll of paper tape which, when inserted into the caster, activates the setting mechanism. The matrices are arranged in a grid secured in a steel case over the mould in the caster. The holes in the perforated tape direct compressed air to a series of stops, which direct the position of the case over the mould and the selection of the desired character. In addition, the Monotype could produce kerned letters, and offered a greater choice of width for individual characters, which meant that it could more closely approximate traditional type faces. For this reason, and because more even spacing could be achieved by manual adjustment, Monotype composing gained favor among printers of fine books. When D. B. Updike finally succumbed and installed composing machines, in 1938, he chose the Monotype, mainly because of the excellent type faces chosen for it by Stanley Morison of the English Monotype Company.

What was being printed by all these presses, and who was reading the printed products? The early New England settlers, highly religious and with a deep belief in the need for reading the Bible, stressed the foundation of schools in their settlements. The General Court of Massachusetts, in 1647, decreed that every township with fifty or more households must appoint a schoolmaster. This meant, of course, that there must be an ample supply of school books available. The *New England Primer*, the most successful of them, sold over three

million copies in a century and a half.¹⁸ Law books were also essential, although not in such huge quantities. These three categories, religion, law, and education, provided the staples of colonial printing, along with newspapers and magazines. There was little demand for literature; those who wished belles lettres had to import it direct or buy it through a bookseller, who brought in what he thought would sell. This remained true throughout most of the colonial period. Henry Le Moine, in his *Present State of Printing and Bookselling in America* (1796), originally published in the *Gentleman's Magazine*, London, provides considerable useful information. He states that a few school books were printed in the northern states, while in New York, Baltimore, and Philadelphia, printers were producing small books and tracts, mainly translations from the French or reprints of English publications. A 1789 Philadelphia reprint of Blackstone's *Commentaries* is cited by Le Moine as an example of what went wrong: 'The book is very ill-done, and yet sells much higher than those imported.' Most booksellers relied on imports, which they obtained from New York, Philadelphia, or Boston. Expensive books did not sell, but reasonably priced ones had a ready market, for 'it is scarcely possible to conceive the number of readers which every little town abounds.' There were apparently regional differences in taste. In the South, where books were very expensive, Le Moine noted that 'novels and useful histories are the best articles to be considered . . . after Dictionaries.' Law books sold well everywhere, even at a high price. Books that were not useful moved more slowly. 'Scotch books, like their countrymen, are not much in repute in any part of North America.' English law books, mainly folios, did not do as well as Irish editions in smaller sizes, which were not only easier for lawyers and judges to take on their circuits, but were also apt to be cheaper. Few other foreign books were imported, except

¹⁸ Daniel J. Boorstin, *The Americans: The Colonial Experience* (New York, 1958), p. 300.

those in German, Le Moine stated, 'for they sell in places inhabited by the Dutch; but primarily books of devotion and school-books. They have very few books but of devotion, and some trivial school-articles. The men of learning are as scarce among them also. When a Dutchman is not at prayers he is either working or sleeping.' Mr. LeMoine cared no more for the Germans than for the Scotch. He goes on to note that while many well-educated persons spoke French, few read it; the majority preferred English. They 'dwell with pleasure on what they term their English ancestors, heartily curse French machinations and politics, and continue still to read and admire English books,' he declared.¹⁹

Theology remained in high favor into the nineteenth century.²⁰ The Bible and service books, as well as sermons, were printed and, one assumes, read in quantity, especially in New England. The sermon was an American institution, as Boorstin calls it. The church was the effective community center. There was little social life outside it, and there was ample time on Sunday to attend not one, but two services. And often there was a midweek lecture sermon as well. Grateful congregations could be expected to buy and re-read the words of their ministers, and preachers exchanged their works with one another. Indeed, the publication of preachers' sermons was an early form of vanity publishing. These were printed near their source of origin, since their market was the local community.

Literature fared less well, as Le Moine pointed out. Books were expensive, and only the well-to-do could afford the luxury of novels or poetry, except for such pious works as *The Pilgrim's Progress*, which was frequently printed in the colonies. There were occasional literary works printed: the second edition of Ann Bradstreet's *The Tenth Muse*, retitled *Several Poems*, was printed in 1678 from the London edition of 1650;

¹⁹ Henry Le Moine, *Present State of Printing and Bookselling in America* (1796; reprint, Chicago, 1929).

²⁰ Wroth, *Colonial Printer*, p. 215 ff.

Benjamin Tompson's *New England Crisis*, a book of poems on the Indian war, published by John Foster in Boston in 1676; and William H. Brown's anonymous *The Power of Sympathy* (1789), which is generally regarded as the first American novel. The cultivated reader, until Independence and for some time after, generally relied on imported books, either from a book agent or a local bookseller. The local printer, short of paper, type, and labor, preferred to print more profitable works which did not have to compete with cheaper Dublin or London sources.

A prime product of the American press in its early days was the newspaper, although the first one did not appear until 1690.²¹ Benjamin Harris's *Publick Occurrences both Foreign and Domestik* appeared in only one issue; it was suppressed by the Massachusetts governor and Council for having been issued without license. Fifteen years later *The Boston News-Letter*, printed by Benjamin Green and properly authorized, began publication. It continued under various names until 1776. Although a monopoly for fifteen years, it was not particularly profitable. Almost every issue is filled with complaints of lack of support. It relied heavily on news from London, with a few local stories, and marine reports from other American ports. By 1730 there were 7 newspapers being published regularly in four colonies. By 1801 there were over 200. Newspaper printers and publishers usually did job-printing, and often served as postmaster or as general storekeeper. As the pioneers moved west, the printers followed closely; by 1814 there were presses not only in the original colonies but in Kentucky, Ohio, Mississippi, Illinois, Indiana, and Michigan. In 1810, Isaiah Thomas estimated, there were 359 newspapers in the United States. By 1869 there were 5,411. In the mid-twentieth century, of some 7,200 daily newspapers published in the world, the United States possessed about one-quarter. In recent years, faced by

²¹ Ibid., p. 19.

new competition for readers and, above all, advertising, the numbers have continued to fall.

The magazine was considerably less successful. The first American periodical was a reprint of a London-based journal, *The Independent Whig*, issued in Philadelphia in twenty weekly numbers during 1724.²² The first monthly magazine, credited to Benjamin Franklin was *The General Magazine*, which began publication in 1740/41, and continued for six months. There were various other efforts, usually short-lived, during the century; 20 began between 1741 and 1776, one during the Revolution, and 79 between 1783 and 1800—a total of 100. Most were general literary miscellanies, with a few articles on religion, politics, the arts, or commerce. They relied heavily on English models; as Boorstin says, ‘they seem to have been composed primarily with the scissors rather than the pen.’²³

A major reason for the habit of freely borrowing from foreign sources was the lack of international copyright protection. It was easy and cheap to import copies of foreign works and to reproduce them, if the market was large enough. The first American encyclopaedia, published by Thomas Dobson in Philadelphia from 1790 until 1797, was lifted almost entirely from the third edition of the *Britannica*, with scattered revisions and a few added articles for home consumption. The popularity of writers like Scott—whose success irritated Mark Twain so much—and Dickens made their works highly profitable to American publishers, who found native writers somewhat risky at first. As late as 1840 the Careys were writing William Gilmore Simms: ‘We do not see much hope in the future for American light literature—as a matter of profit it might be abandoned. The channel seems to be glutted with periodical literature, particularly the mammoth weeklies—besides which we go into the market for \$1.50 a copy against

²² Ibid., p. 236.

²³ Boorstin, *Colonial Experience*, p. 328.

English reprints at 90¢.²⁴ While a few American writers, like Cooper, had sold well, most did not. Less serious work, with a distinctly native flavor and a lower price, did quite well. Davy Crockett's *Almanacs* and the various other books and pamphlets concerning him were best-sellers. Gradually, America built its own literature, and American publishers began to share their foreign colleagues' disgust about piracy—especially when their large investments in the creation and publication of scientific and technical works were vulnerable. Not until 1891 did the United States grant copyright protection to qualified non-resident foreign authors.

The greatest triumphs of American printing technology occurred in the present century—although this progress has begun to show signs of waning of late. I have neither the time nor the ability to sketch that story, which includes photocomposition, electronic composition, the replacement of letterpress by offset printing, satellite transmission, and many other remarkable technical innovations. The history of printing has been one of increasingly rapid change. The first three and a half centuries after Gutenberg's invention saw few changes. The next century saw a complete transformation, as part of the Industrial Revolution. And the present century has seen that speedup constantly accelerating. It would be presumptuous and foolish to try to forecast what the future will bring, and I shall not try—except to predict, appropriately enough in an institution forming a Program for the History of the Book in American Culture, that books in some form will probably survive.

²⁴ *The Carey Papers* are included in *The Edward Carey Gardner Collection, 1682–1939*, held in the Historical Society of Pennsylvania.

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