Book History 1450-present (a brief overview)

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The invention of letterpress printing and beyond!

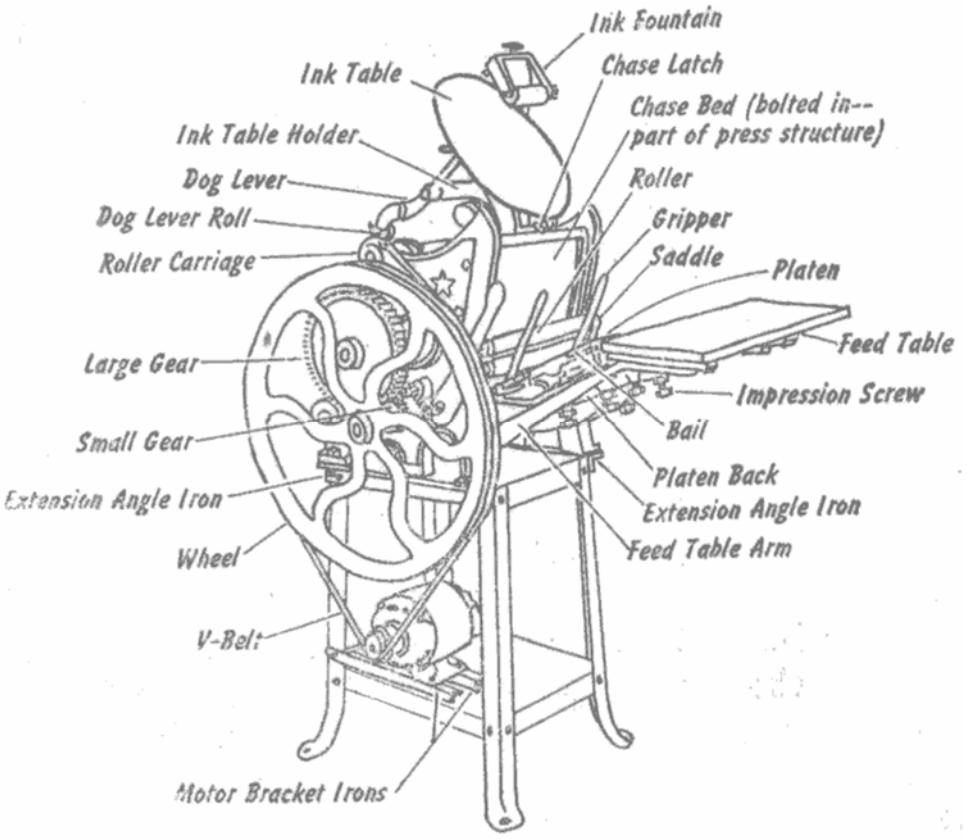


Image source: https://www.pinterest.com/pin/57491332721133974/

Relief/Letterpress printing

When we think of Gutenberg's printing press, we are thinking of relief/letterpress printing. While block printing had been around prior to 1450, Gutenberg's contribution to printing technology was to create cast type (out of metals with low melting points but that solidified quickly, like lead), and to create a press where whole pages of this type would be laid out at once in what is called the bed of the press. This meant print book production was incredibly efficient compared to manuscript book production, meaning that many more books could be made and many more ideas could be circulated in print to larger audiences.

First, a printer would cast the type inside a mould. You can see in this diagram the mould the type was poured into and what the resulting type would look like.

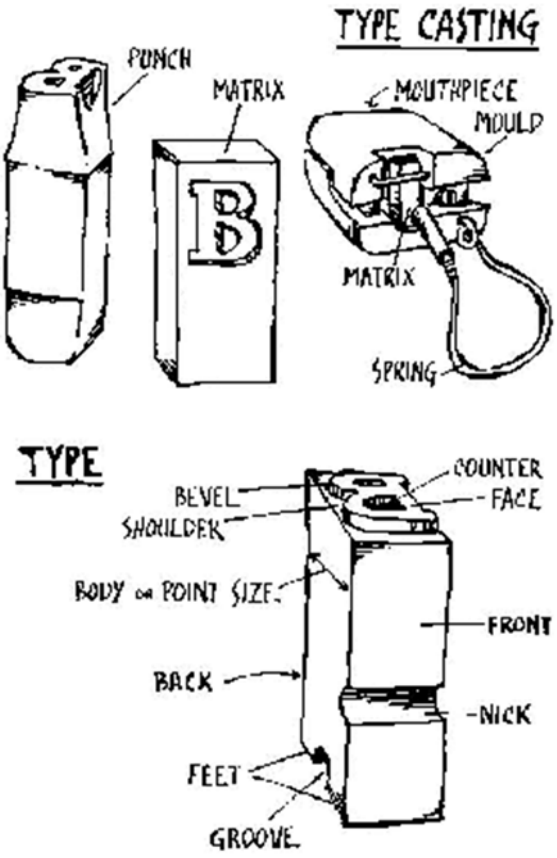


Image source: http://crab.rutgers.edu/~wfitz/oraltoprint.html

This type would be used to print pages, and could be reused many times. Once it was no longer needed it would be melted down to make new type. Letterpress/relief printing technology works by using type where the desired printing surfaces are raised from the rest of the surface:

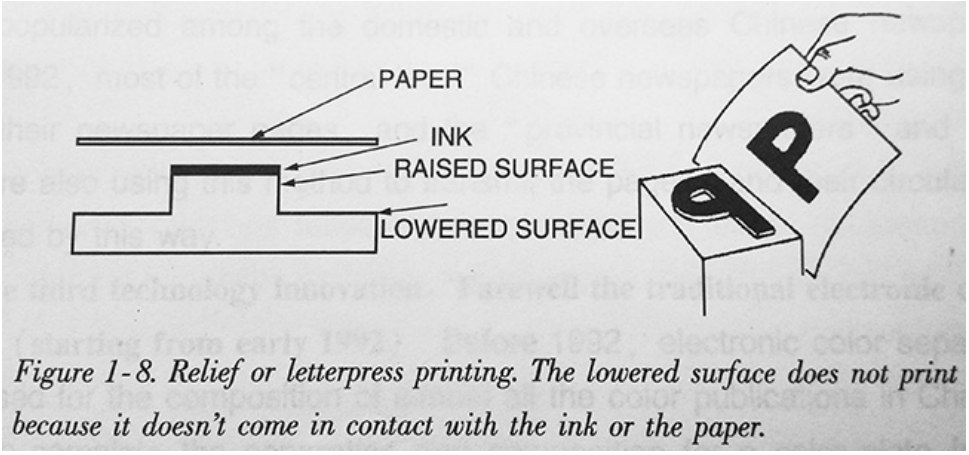


Figure 1-8. Relief or letterpress printing. The lowered surface does not print because it doesn't come in contact with the ink or the paper.

Image source: http://www.zxprinter.com/support/relief-or-letterpress-printing.html

After the type and any images (which were often cast or woodcut at this time) were situated in the press bed, the printer could start printing. A frisket (made out of a thin sheet of metal usually) would be put between the paper and the press bed to protect the page margins. Then the tympan (which holds the paper) would be folded over on to the press bed and pressure would be applied to ensure that all the words and images transferred properly. Here is one example of a press, although there are many different styles out there.

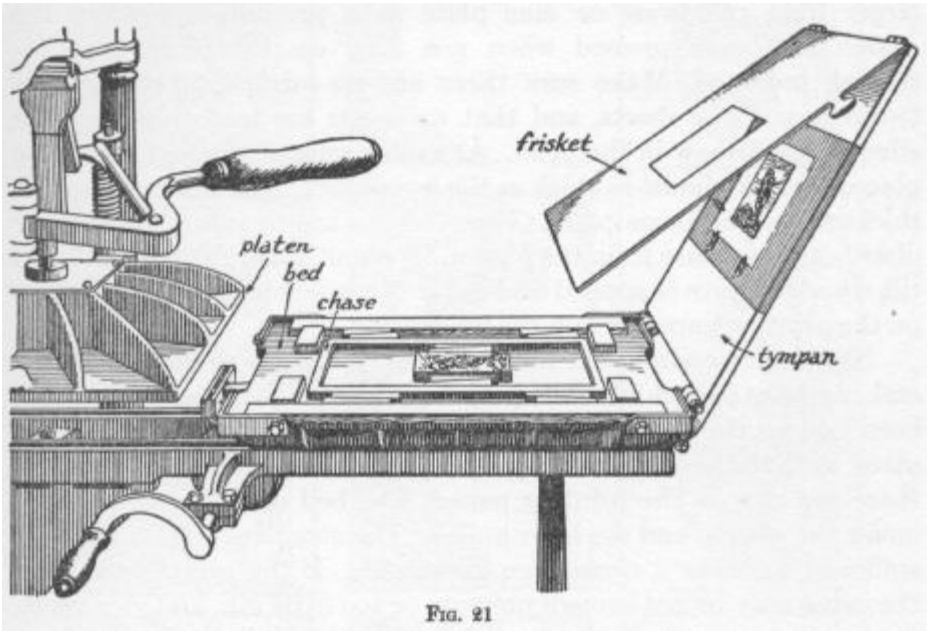
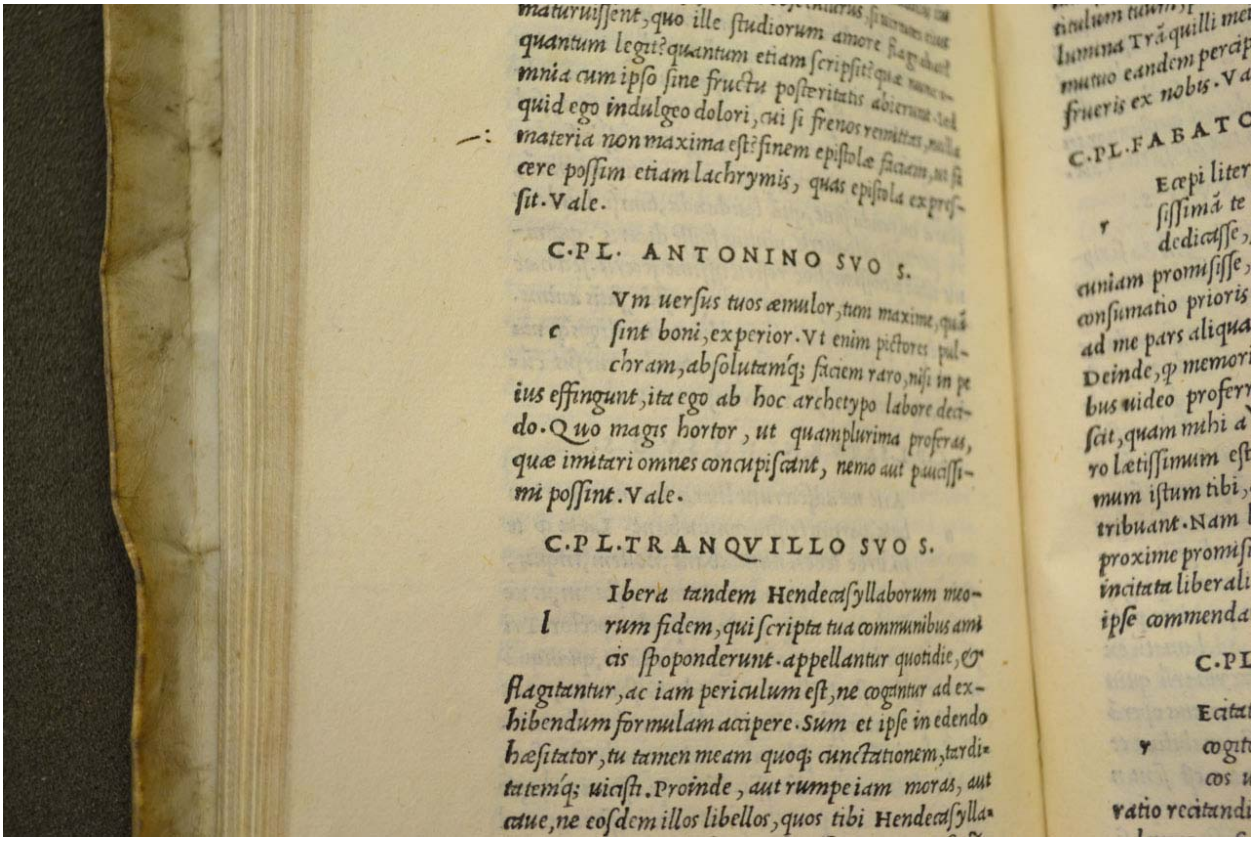


Image source: http://paisleydogpress.com/2014/02/letterpress-glossary-frisket/

After printing, the pages would be dried, organized into folded sections (called signatures) and then bound together into books. Often times, printers would sell loose signatures, and patrons could either pay the printer to bind them or take them somewhere else to be bound. This was in part because books were still expensive, and that way people could only buy the parts of the book they wanted.

Some people would pay to have their printed books decorated, for example by having fancy capital letters painted in to the book. Printers would put in guide letters (small capital letters surrounded by blank space) so that the letterer would know what was meant to go there. However, not all books were decorated, so many still have only the small guide letters.



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C. PL. ANTONINO SVO S.

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c ſint boni, experior. Vt enim pictores pul-
chram, abſolutamq; faciem raro, niſi in pe
ius effingunt, ita ego ab hoc archetypo labore deci-
do. Quo magis hortor, ut quamplurima proferas,
quæ imitari omnes concupiſcant, nemo aut pauciſſi-
mi poſſint. Vale.

C. PL. TRANQVILLO SVO S.

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l rum fidem, qui ſcripta tua communibus ami
cis ſpoponderunt. appellantur quotidie, &
flagitantur, ac iam periculum eſt, ne cogantur ad ex-
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Image source: http://library.samford.edu/about/sc/treasure/2014/pliny.html

Printing Innovations in the Industrial Revolution

Letters and layout

Like any technology, the technology of making books continued to evolve. During the early modern period, paper became ubiquitous as a book material, which was easier to produce than vellum and less expensive. Starting in the 1800s, new technological innovations in a number of fields revolutionized how we produce and consume goods, leading to what we now know of as the Industrial Revolution.

One of the new innovations was the typecasting machine, which appeared around 1840 and which became heavily used thereafter as it reduced some of the labor necessary to create type. The same kind of type mold we saw before would be placed in a machine and the molten metal would be forced into it. Depending on the brand, the machine would sometimes trim the excess material from the edges of the type.

Here is an explanation of the machine's process:
"Setting type by hand and then redistributing it into the job case remained a slow and costly process. By the middle of the nineteenth century, presses could produce twenty- five thousand copies per hour, but each letter in every word in every book, newspaper, and magazine had to be set by hand. Dozens of experimenters worked to perfect a machine to compose type, and the first patent for a composing machine was registered in 1825. By the time Ottmar Mergenthaler perfected his Linotype machine in 1886, about three hundred automatic typesetting machines had been invented that tried various methods. Mergenthaler's breakthrough involved the use of small brass matrixes with female impressions of the letterforms. Each time the operator pressed a key on a keyboard, a matrix for that character was released from a tube, it slid down a chute and was automatically lined up with the other characters in that line. Molten lead was poured into the line of matrixes to cast a line of type. This technology facilitated the explosion in the amount of printed material." (source: https://visualartsdepartment.wordpress.com/the-victorian-era/)

Many printers used linotype, which (like it sounds) is a piece of type cast as a whole line of text (e.g. a single word or sentence) rather than individual letters. These lines were often called 'slugs'. This made placing the type in the press more efficient and sped up the printing process. Like earlier type, linotype would be melted down and reused as needed.

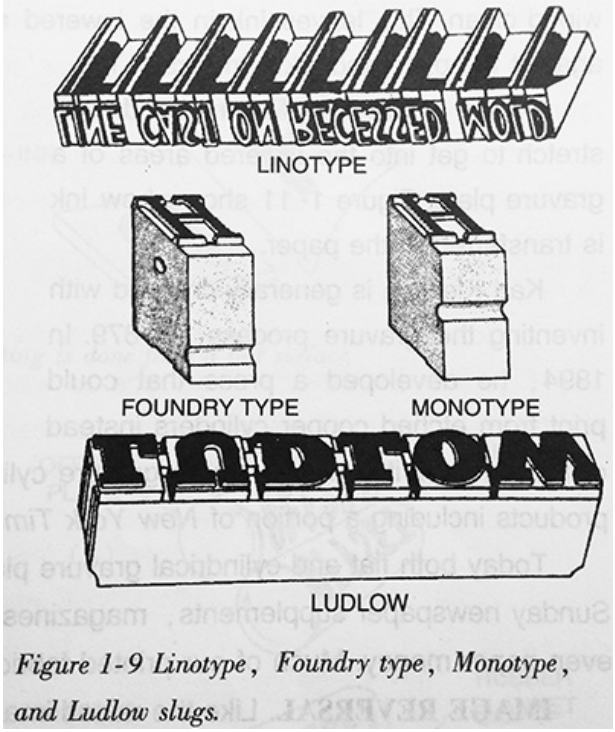


Figure 1-9 Linotype, Foundry type, Monotype, and Ludlow slugs.

Image source: http://www.zxprinter.com/support/relief-or-letterpress-printing.html

Linotype was very popular, but was not the only type available. Single letters were still being made, and there is considerable debate today about the history and best use of foundry type vs. monotype (for a sample of a spirited debate among printmakers, see: http://www.briarpress.org/33756). According to these debates, foundry type is made in a commercial type foundry from stronger metals, meaning that it lasts longer than monotype, which was meant for single runs before needing to be melted down (~10,000 printings). Many printers used commercial foundries rather than producing their own type because these were much more cost effective. While some printers refer to monotype as being made in-house, Monotype was also a brand of typecaster, and some (e.g. http://www.circuitousroot.com/artifice/letters/press/tools/type/foundry-vs-monotype/index.html) insist that claims of foundry type lasting 10x longer than monotype were marketing ploys rather than based in reality. While there is no clear answer (and no shortage of opinions) about the history and significance of different type-making practices, it is a great reminder of how exciting and sometimes convoluted the study of book technology can be.

Images

New ways of reproducing images were also born out of the Industrial Revolution, and many new picture printing technologies became commonplace. These include lithography, which was invented in the 1790s and uses a grease crayon on a wet stone as the printing base. When water is applied to the stone, it repels the ink, which sticks to the grease and produces the image. In the 1830s, chromolithography was patented, which was basically the same process but using multiple stones for different colors of ink.

For more on images, see: https://visualartsdepartment.wordpress.com/the-victorian-era/
and
http://www.lib.udel.edu/ud/spec/exhibits/color/index.htm

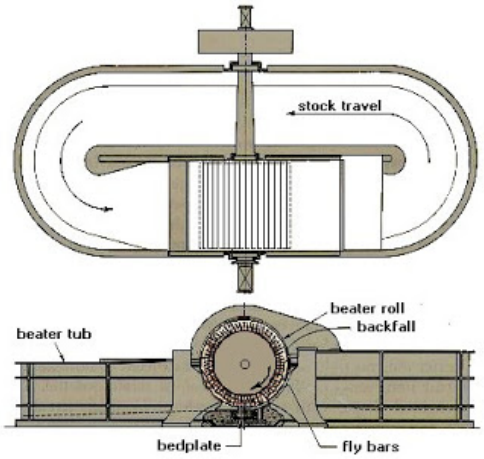
"The arrival of color printing had vast social and economic ramifications.
The ancient printing technique of movable type had, until then, restricted design to an inflexible grid: Anything that was to be printed had to adhere to a system whereby type was set in consecutive rows of parallel lines. Illustrations, maps and the like were hand drawn and engraved. Lithography set type and layout free.
From art reproductions to advertising graphics, color printing poured from the presses in the millions. But admirers of fine typography were appalled that the design was done on the artist's drawing board – without training in printing and type traditions, designers could invent any letterform that suited their fancy.
Punch and Harpers New Monthly Magazine opened the era of the magazine when they began publication in 1841 and 1850, respectively. Both used many woodcut or engraved illustrations and metal type. The rising tide of literacy, plunging production costs, and the growth of advertising revenues pushed the number of newspapers and magazines published in the US from 800 to 5,000 between 1830 and 1860." (source: https://visualartsdepartment.wordpress.com/the-victorian-era/).

As the Victorian era continued, photography also became popular, and halftone screen printing was used to reproduce photos in print (screens would be overlaid so that dots of color would end up on the paper, closer or farther apart depending on the depth of tone needed).

Steinway Hall on East 14th Street in Manhattan. The first halftone print of a photo used in a periodical in the United States. December 1873 (source: https://visualartsdepartment.wordpress.com/the-victorian-era/)

Papermaking

As we saw earlier, paper was made from rags until the start of the 19th century. This process initially was does entirely by hand, but new technologies began to assist in the papermaking process. The Hollander beater, for example, was invented in the late 17th century (in Holland), and consisted of an engine that would shred the rags more quickly than other methods.



Source: http://ricestrawpapermakinge.blogspot.com/2013/03/hollander-beater.html

The invention of the wove mould in the 1750s was also important to bookmaking. Laid paper moulds, where wires going one direction were more prominent, resulting in a paper with laid lines, had been the standard in printing for centuries. However, because of these laid lines, sometimes print could not be applied reliably due to the uneven surface. The invention of the wove mould resulted in a paper with an even surface that was more amenable to printing.

Laid paper mould (left) and wove mould (right). Source: http://bookbindersmuseum.org/a-brief-history-of-wove-paper/

Paper traditionally was made from linen rags, but as cotton was inexpensive and more common after the Revolutionary War, it became easier to find cotton rags than linen ones. Pure cotton pulp has short fibers and is hard to work with using a paper mould, but if mixed with linen works very well. This resulted in a drop in paper (and thus book) prices. Another thing that impacted book prices was the invention of the paper machine, which automated some of the shaking and straining activities formerly done by hand, and which drastically increased paper production rates and, as a result, the production rate for books.

However, the cost of rags increased, and while papermakers tried to find other materials to throw in (straw and wheat were both popular), they were not always able to do so successfully, and their profits began to diminish. This meant that papermakers had to find other materials to work with, and eventually turned to wood pulp as a means for papermaking. However, wood pulp has a higher lignin content than rags, and so the paper is not as longlasting, and begins to discolor and become brittle somewhat quickly. Wood pulp was introduced as a paper ingredient in the 1850s but not taken seriously until one inventor invented a double boiler process that removed some of the lignin in an alkaline solution.

The papermaking process continued to become more automated with the introduction of the tandem dryer (and dryer that would press the water from the paper, giving it a smoother surface than was possible with handmade paper) and with internal sizing (previously paper sizing had been put outside the paper, but now the addition of rosin soap to the paper pulp made it so smoother sized paper was possible). These many technological advances resulted in very cheap paper for the first time in history. However, literacy rates were also very low, and printers began to produce books like school primers and literacy guides to help more Americans learn to read (and to buy more of their products).

For more, see: http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1124&context=charleston

Modern Fine Press Books

Letterpress and other hand printing methods did not disappear with the Industrial Revolution. In fact, artists' books as well as printed material in general are experiencing a resurgence as many people seek a break from digital technologies and look back to print for the experience of reading and holding a book.

Book artists today draw on thousands of years of technology and combine it in many ways, for example by combining different printing styles or by adding manuscript elements to printed works (just as was done with early printing). Modern book artists also push the limits of what a 'book' is, by encouraging us to think about books as being able to take many forms (for example, making a book like the one below reminds us that books aren't just the codex-style books we are used to). As with any book form, these books often employ narrative and a progression of ideas that interplays with the form (for example by moving right to left, or from front to back). In a way, modern artists are returning to the roots of book art many thousands of years ago, using older forms (e.g. scrolls and tablets) alongside reimagined forms of all sorts. In so doing, they show us that the book is a constant in our cultural landscape, but one that can be revisited and reconstructed while paying homage to millennia of tradition.

Cult of Relics is a reliquary housing objects derived from the natural world. Drawing inspiration from religious artifacts of the same name that were prevalent during the Romanesque era in Europe, this one-of-a-kind work calls into question what we as humans choose to venerate and preserve by imbuing these transitory forms with the same significance generally reserved for objects of religious or spiritual importance. Each unique object was collected during a three month stay in Italy in early winter, 2015. Objects were then wrapped in handmade abaca to not only preserve their form from decay, but to mirror the texture and pallor of religious artifacts from the historic era.

Anne Covell, 2015.