The origins of typography

TYPOGRAPHY is the balance and interplay of letter forms on the page, a verbal and visual equation that helps the reader understand the form and absorb the substance of the page content.

A specimen sheet of typefaces and languages by William Caslon I from the 1728.
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The first use of symbols to portray abstract thought might have been the pictograms or pictographs painted on caves and cliffs. The figures represent concepts, objects, activities, places or events. Cuneiform alphabets and hieroglyphs are based on pictographs. Pictograms, pictures that resemble what they signify, evolved into ideograms, pictures that represent ideas.

A San, or Bushman, pictograph found in the Tsodilo Hills of Botswana. Some of the paintings have been dated as 24,000 years old, making this one of the oldest such sites yet discovered.
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An ideogram or ideograph is a graphical symbol that represents an idea, rather than a group of letters arranged according to the phonemes of a spoken language, as is done in alphabetic languages. Ideas, such as the concept of a time period, can be expressed symbolically, as in the lunar month ideogram above.
Hieroglyphics means ‘sacred carvings.’ Until 1822, hieroglyphics were thought to be pictographic. In the era of the Old Kingdom, the Middle Kingdom and the New Kingdom, about 700 hieroglyphs were in use. By the Greco-Roman period, they numbered more than 5,000.
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Found in 1790 in Egypt, the Rosetta Stone contains three inscriptions of a single text, a decree of the priests of Memphis in honor of Ptolemy V. (196 BC). French scholar Jean Francois Champollion (1790-1832) in translating the Rosetta Stone realized the phonetic value of hieroglyphs; they have more than symbolic meaning and served as a ‘spoken language.’

The Rosetta Stone resides in the British Museum
Text on the Rosetta Stone appears in hieroglyphs, Demotic and Greek, allowing Egyptologists in 1822 to decode hieroglyphics. Hieroglyphs include three kinds of glyphs:

- Phonetic glyphs. Single-consonant characters like an alphabet.
- Logographs. Characters representing morphemes, the basic sounds of the language.
- Determinatives. Ideograms that narrowed the meaning of a logographic or phonetic word.
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Chinese writing is made up of logograms, with each character corresponding to a spoken syllable, usually with a basic meaning. Logograms also are used in Japanese and Korean writing. A complete writing system in Chinese characters was developed 3500 years ago, making it perhaps the oldest surviving writing system. Chinese characters are derived directly from individual pictograms or combinations of pictograms and phonetic signs.

“Strength,” brush calligraphy by Lixin Wang
The large characters mean strength. The small character on the right says, “Strong enough to lift a mountain, and the power is unparalleled in the world.”
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More than 5,000 years ago, the Sumerians of southern Iraq invented cuneiforms, one of the world’s earliest systems of writing, because they needed a means of accounting. The system used signs, originally pictograms, to represent numbers, things, words and the sounds of words. A picture of a person’s head could be used to mean “head” or could stand for the sound of the word for head, or “sag” in Sumerian. By using signs to represent syllables, the system could be used to express concepts, immaterial things that existed only as thoughts such as valor, honor, freedom and evil.
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By the 8th and 7th centuries B.C., the Phoenicians had colonies around the Mediterranean and extensive trade networks, extending as far as the Atlantic coast of Africa and the Black Sea. According to Biblical accounts, their artisans and artists were unparalleled, and they sponsored, together with King Solomon, ambitious naval undertakings. The Phoenician alphabet, considered the first ‘Western’ alphabet, was based on the principle that one sign represents one spoken sound. It gave rise to Aramaic, Greek and Berber alphabets. These are purely symbolic codes used in combination to represent spoken sounds.
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To move from pictures to letters is to go from the specific to the universal. Letters that are not tied to a specific thing can express abstract ideas, things that do not exist in the material world, such as honesty, love, hate or courage.
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The Romans used their alphabet to express ideas, to record information for posterity, and for literature. **Roman letters, derived from stone carvings, are upright, with serifs and variation of thick and thin strokes.** Roman typefaces we use today, such as Times Roman, follow this style but with lowercase letters added.

ABOVE: The base of Trajan’s column, Rome, inscribed about 113 A.D. BELOW: A detail of the lettering. Note the use of serifs.
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Serifs originally were chisel strokes used to finish the bottoms of letters. Roman lettering represents a ‘modern’ form, but printing didn’t come along for another 2,000 years.

The modern titling font Trajan, designed by Carol Twombly, was based on the lettering on Trajan’s Column in Rome. Twombly also designed Lithos, another font based on ancient writing styles.
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During medieval times, language was kept alive by religious scribes, who copied sacred texts by hand. Their work influenced letter shapes. As Erik Spiekermann notes, much of our typography today derives from handwriting.

RIGHT: The Carolingian script of the 8th Century looks much like modern roman typeface, as this illustration from the Epistolary of Giovanni da Gaibana of 1259 illustrates. LEFT: An example of “black monumental textus precissus” from the Luttrell Psalter of 1340.
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We attach meaning to type, to the shape of the letters. Textura, or black letter, has been connected with Nazi Germany, but it also appears in trademarks of many newspapers.
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First created in Latin around 700 A.D., the Lindisfarne Gospels were translated into Old English some 250 years later.

Uncial, a more open style practiced by scribes, is the precursor to lower-case letters. To keep quills sharp and strokes uniform required skill and sensitivity.
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Luca Pacioli, from *Divina Proportione*, Venice:, 1509
Pacioli, a Franciscan monk, is mentioned several times in the notebooks of Leonardo da Vinci. His *Summa di Arithmetica, Geometria, Proportioni e Proportionalità* appeared in 1494. He published this work in 1509. In an appendix to the book, each of the capital roman letters is broken down into its component parts, showing its underlying proportions.

As letter forms became more symbolic and less like pictures, the size, form and shape of each letter became important. Lettering began to be seen as an art form.
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Designers are interested in type that is reproducible. Modern typography begins with the invention of movable type and the printing press.

LEFT: Block print, Hanshu, history of western Han. Fujian Province, China, 1304-1334. ABOVE: Ceramic moveable type, Ch’ing-li period (1041-1048).
Gutenberg’s contribution: A way of mass producing individual pieces of type in metal that could be used over and over again. A punch (top right) was carved by hand, then driven into softer metal to form a matrice (bottom right) that was used in a mold to form type slugs (top left).
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Gutenberg’s legacy is ‘hot-metal’ type setting, a way of mass producing moveable type cast in metal. The character forms, strongly influenced type design for centuries. Gutenberg’s font had more than 300 characters to imitate textura style of the scribes.
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Germany

Gutenberg’s masterpiece was his 42-line Bible. It had 1,286 pages in all. Today, 48 survive out of perhaps 180 that Gutenberg printed circa 1456. This example is from one of two complete Bibles that reside in the British Library. You can view high-resolution images at the library’s Web site.
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**Italy**

Aldus Manutius founded Aldine Press in Venice with the goal of preserving classic Greek texts. His artisans advanced typeface design beyond imitating hand-drawn characters by using Roman letter forms. He is credited with developing italics, with the name derived from *italianate*.

*Florilegium diversorum epigrammatum in septem libros*, printed by the Aldine Press in Venice 1525. The Aldus trademark, or colophon, the dolphin and anchor, was printed in the back of the book before the advent of the title page.
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Britain
William Caxton printed first books in English, using the textura style type similar to Gutenberg’s. By 1509, English printers were using Roman type, influenced by the French.

Early printers used a composing stick (A) to build lines of type into galleys (B) that were locked into the press bed (C).
The printer worked at the typecase, containing all the letters, numbers and “sorts.” The flatbed press with the hand screw, derived from a wine press, served printers for hundreds of years.
Today hand set type is used for special jobs that require a refined, classic look.
As presses became mechanized, the typesetting function had to adapt to mass production. The Linotype machine allowed type to be composed on a keyboard. When a line was complete, the operator would cast this onto a slug. One by one, the lines of type formed a galley.
High-speed presses use cylinders and rollers. The stereotype system produced cylindrical plates. The Linotype slugs were set in a galley, then a papier maché mold was produced (left). It was used to make rounded plates that could be bolted on the press (right).
Gutenberg's raised type is called relief printing (A). Other process of printing include intaglio or gravure (B) and planographic such as offset lithography (C).
Phototypesetting introduced the era of “cold type.” Strips of photo paper containing the text were pasted into “mechanicals” to be made into plates.
Cold-type mechanicals are transferred to the printing plate through a photographic process. Most commercial printing today is done on offset presses, a lithographic process that uses lightweight aluminum plates.
Offset printing allows better reproduction of photographs, and it is a superior process for color because the press has a lighter touch on the paper and can use a finer halftone screen.
A word about halftones: A press using white paper and black ink cannot print shades of gray, so photos must be converted to halftones to reproduce correctly and look natural. A halftone is made by converting the photo to a series of dots. The bigger the dots, the darker that part of the photo will appear.
Computers first used bitmapped text (right) to create characters on a screen. The letters were composed of individual square picture elements, or pixels. But when bitmap type is enlarged, it gets jagged. Postscript type describes characters in a font by vectors, data points that form an outline. These can be enlarged without jagged edges. To be printed, the Postscript type is turned back into a bitmap by a raster image processor (RIP).
Type Technology

CoJo 256
CoJo 256

When type is rasterized, the smooth type is converted to square picture elements, or pixels. High-quality typesetting machines rasterize at 2,400 pixels per inch, so the square pixels are not visible. But for low-resolution applications, such as Web pages on a computer screen, the computer uses anti-aliasing to give the type a smooth look.
Digital printing uses technology similar to the laser printer to produce pages directly from a computer file.