



Mhen Gutenberg introduced moveable type, a whole lot of people got upset. Downright nasty. The scribes' union, the church, even the mayor—you see, his nephew specialized in illuminations, borders, and pinstriping. They called Gutenberg an eccentric, a lunatic, even a heretic. He was shunned by his contemporaries, but eventually, his dream came true. If it hadn't, you would not be reading this ad. In fact, you might not be reading at all.

Technology sponsored by perseverance and common sense prevails.

The Tradition of Foundry Type

Anecdote to Chapter Two



Johann Gutenberg—The father of printing

The inventor of moveable type in the Western world is generally considered to be Johann Gensfleisch zum Gutenberg, who was born in the city of Mainz, Germany in 1397. The wealth of the Gutenberg family freed Johann for a life of leisure and pleasure during which he developed an interest in technology—primarily seal making and goldsmithing. In 1438 Gutenberg started a business that produced religious mirrors in Strasbourg. By that time he was considered a master craftsman in metalworking.

There is evidence that by 1444 Gutenberg had returned to Mainz to set up a printing shop. As a goldsmith he had cut letters and symbols into precious metals and into wax to form molds to cast jewelry. It is unknown exactly how he conceived of casting letters for printing. However, the concept of "mirror" images was common knowledge.

Gutenberg's casting process involved first cutting a letter by hand in reverse on a piece of hard metal, then punching the letter shape into a soft copper mold to form a die called a matrix.

He next needed a suitable metal to cast in the matrix. He experimented with pewter hardened with large quantities of antimony, but the mixture shrank when it cooled and pulled away from the matrix. The letters formed were imperfect.

Gutenberg's experience with lead in mirror manufacturing encouraged him to try a combination of lead, tin, and antimony. His original formula (5 percent tin, 12 percent antimony, and 83 percent lead) is used nearly unchanged in casting today. Characters can be perfectly cast with this alloy because it expands when it cools and forms a duplicate of the matrix cavity. Using Gutenberg's system, two workers could cast and dress (trim away excess material) twenty-five pieces of type an hour.

Gutenberg's most notable work, a forty-two-line-a-page Bible, was begun in 1452 and completed by 1455. Each page contained around 2,800 characters. Two pages were printed at the same time, so 5,600 pieces of

type were needed to make each two-page printing. It was the practice for the next two pages to be composed during the press run of the current two, so at least 11,200 letters were needed to even begin printing. Working a normal workday (twelve hours), it took two craftsmen more than thirty-seven workdays just to prepare the initial type. At this rate, more than three years were needed to complete just two hundred copies of Gutenberg's Bible.

Much of the language of modern printing comes from the craft of foundry type composition developed by Gutenberg and his workers more than five hundred years ago. Terms such as "form," "leading," "uppercase," "lowercase," "type size," "impression," and "make-ready" originated with Gutenberg. All printers today owe the hundreds of early craftsmen who followed Gutenberg in the tradition of hand-set foundry type and gave us both a language and an art.