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THE TYPEFOUNDER'S ART.

A Bit of Its History, Ancient and Modern, and a Detailed Technical Description of the Methods and Machines Used in Casting Type.

BY SKOPEO, OF NO. SIX.

ONE by one, owing to modern investigations, the stories of our youth prove to have no basis. It is generally known that the story anent William Tell and the shooting of the apple from his boy's head was the concoction of the Munchausens and Mandevilles of the time, or of a later date. Now it is known that the immortal Gutenberg, Johann Gensfleisch of that name, who has been credited with the invention of printing, was not so much the inventor of printing as of the art of typography, or the formation of cast movable letters. Johannes Janssen, an erudite German, has written a work entitled the "History of the German People at the Close of the Middle Ages," a foot-note to the first chapter of which, based on Van der Linde's work on Gutenberg, puts an end to the many errors, legends and falsifications formerly accepted as regards the invention of printing.

Centuries before Gutenberg was thought of (and I have lately seen it stated somewhere—in the Sun, I think—that he was born on the wrong side of the blanket) the art of transferring figures, pictures and texts from one surface to another by means of pressure was in use. It was not a new idea that letters, and consequently whole pages, could be engraved and printed. The block-printing system of the Chinese dates as far back, at least, as the tenth century. The art of block printing, or xylography, was learned by the Europeans from the Mongolians, who mastered China in the thirteenth century, and soon afterward laid waste eastern Europe. The Germans practiced xylography prior to 1400, about which year that art was carried into Flanders. The first known date of a wood-cut is 1423. At that time the Germans did not print with wooden blocks only, for they also engraved designs on metal. With the printers the wood engravers and cutters organized a guild of their own.

The importance of Gutenberg's discovery did not lie in the invention of wooden type either, for in the days of the Romans movable types were in use. The importance consisted in the discovery of efficient means of casting metal types of uniform size. The letters were cut in the form of embossed dies or punches, and from these matrices or molds, from which the types were cast, were formed. In addition to the movability of the single types, thus enabling the combination of words, the production of types in any desired quantity was an indispensable adjunct to the printer's art in order to substitute for the expensive process of cutting each letter separately the cheapness and uniformity

obtainable by casting a number of types from a single mold.

The typefounders' advertisements in the JOURNAL lead to a few reflections on the wonderful growth of the typefounder's art.

"Les Arts et les Industries du Papier," published by Motteroz, a printer and book publisher in Paris, says that the first known typefounder was an individual whose name is perpetuated in a type name, our friend Jenson, who was sent to Mayence by King Louis XI of France for the purpose of learning the secrets of the growing art, and he produced the beautiful roman types which Garamond later took for models of his font and which were used by the Aldi, the Estiennes, the Vascosans, etc. A writer of two hundred and odd years ago, one Thevet, has preserved for us, in a notice on Gutenberg, the technic of this fabrication, which is reproduced from the work of Motteroz in its old French:

A former charactères d'impression, il est requis premièrement avoir poinçons d'acier amollis par le feu, sur lesquels engravent par contre-poinçons destrempés, ou burins acérés, le blanc estant au dedans des lettres achevans avec limes le corps d'icelles éminentes au bout, non à leur endroit, ains tournées. Après trempent ces poinçons pour les endurcir et polissent, puis en frappent de petits billons de fin cuivre passés par le feu, lesquels ainsi engravés monstrent les lettres à leur vray naturel, ce qu'on appelle frappe de matrice. Alors justifient ces matrices sur moules de fer, et au blanc d'iceluy font les fontes avec plomb, estain de glace, antimoine et autres matières mixtionnées, afin de les rendurcir et qu'elles durent plus longuement. Les lettres ainsi fondues sont mises dans une grande casse de bois pleine de petits cassis, lesquels sont distribués selon leur différence et bien d'autres dispositions que l'ordre alphabétique ne requiert coustumièrement.

Sanlecque, Le Bé, Ibarra, Caxton, Baskerville and Enschédé employed the same methods to obtain their famous characters. Many famous printers of those days were their own typefounders, for there was no other way to obtain type. It was only at the beginning of the nineteenth century that a slight improvement resulted from the adoption of the mold known in France as "the American," which enabled the workman to produce a third more in quantity than theretofore. This mold rendered the founder's work easier and quicker, without modifying sensibly the principle of the primitive mold. By its means the product was raised from four thousand letters to six thousand per day. One of the famous Didot family of printers in France invented, about 1806, the "moule polyamatype," which cast simultaneously a font of 140 letters. Some English founders bought his patent and decided immediately to destroy the new machine so that they might keep their old one. They were evidently not very progressive. The name "polyamatype" was applied to Didot's invention because it cast one hundred letters at once. His invention continued in use in France, however, in its inventor's establishment, where the renowned engraver Marcellin Legrand made use of it for his new characters. Léger Didot, to whom is due the endless paper machine, constructed in 1820 an automatic machine of great ingeniousness for that period.

In 1828 an American, William Johnson, patented a mechanical mold which had a certain amount of success in Europe, and at about that time a Paris workman named Petyt constructed a machine, operated by steam, which was said to produce 3,600 characters in copper, drawn and stamped while cold, but this very original invention did not become a commercial success, despite the prophecies of Didot. Brockhaus, of Leipzig, and Dressler, of Frankfort, showed at the exposition in London in 1851 two very curious mechanical molds. At this exposition Marcellin Legrand obtained a prize medal for a mold casting 140 letters at once. There were also shown at the Crystal Palace—not that at Sydenham, which is known to so many Americans who visit London as simply a pleasure resort, but the building in Hyde Park in which the exposition was held—numerous specimens of logotypes or combinations of syllables cast in one piece. The jury was not favorable to their adoption and declared that they con-

stituted, in place of progress, a return to a superannuated system which had long been abandoned. Later expositions gave space to exhibitions of the logotype under various names and with the same success. Now we have machines ceaselessly producing characters, and without any hand work, the principle of which is the same as the bullet mold, the hollow being filled with melted metal, after which the mold, which is in several pieces, is opened and the type drops out. A detailed technical description of the methods and machines used in casting type will be found further on.

The early founders had no standard common to all as regards height and thickness, the result differing widely in shape. The leaden matrices of the old founder Enschédé, mentioned above, are preserved at Haarlem, in Holland, and are said to be derived from copper punches. They are over four hundred years old, and the metal poured into them merely touched them at the end of each type, becoming cold as soon as it touched the leaden plate, the latter being left intact. The printer cut his own punches, fitted his matrices and did his own casting.

Typefounding in the United States began in Boston, Mass., in 1763, a Scot starting a place there and failing (extraordinary thing for a Scot!). Christopher Sauer, Ben Franklin Bache (Franklin's grandson), Baine, Barth, Benton, Mappa (a Dutchman), Binny & Ronaldson, D. & G. Bruce, Marder, Luse & Co., Barnhart Bros. & Spindler, MacKellar, Smiths & Jordan, Conners, Dickinson, and Farmer, Little & Co. are famous names in the business in the United States. Outside of the American Typefounders' Company there are equally as large houses in Chicago and New York and over half a dozen smaller foundries in other cities. This company dates from 1885, when the various firms began to fight one another, and discounts ranging from 30 to 50 per cent., and yet higher, were freely given. The strife ended in the incorporation in one concern of two large firms in Boston, two in Cincinnati, one in St. Louis, one in New York, one in Chicago and one in Philadelphia, with a dozen of the small fry, under the name of the American Typefounders' Company.

We now come to the technical side of the industry, which should prove of much interest to the large number of typos who subscribe to the JOURNAL. I find that the manufacture of type involves infinite detail and requires the greatest exactness on the part of highly skilled workmen, the best of management, close oversight and the finest tools and measuring instruments. A great outlay in appliances, matrices and stock is entailed by the wide range involved by the requirements of printers, the number of type bodies, the variety of styles and the countless ornaments, signs and accents, which are in everyday use in printerdom, but which in the total amount to very little as a merchantable commodity. If the typefounder could confine his output to job type and romans he could make money rapidly, but the profits on what are termed the "bread and butter" lines are swallowed up by the expenses incidental to supplying items that are occasionally used, such as Greek, Hebrew, music, signs and accents.

The first requisite in the business of making type is to secure a design. The drawing of the ordinary roman characters, whether in modern or old style, is governed by certain principles of construction deducted from the experience and experiments of centuries. We moderns have never been able to surpass the lettering which antedated the discovery of how to cast movable letters. The early printers (who always made their own type, as previously mentioned) found ready to their hand perfect models of lettering, which they copied with more or less success. We have refined these old-time designs and made letters of smaller size and of

greater mechanical accuracy and adaptability, but have always had to go back to the designs of the early printers for true art in lettering.

When the design is ready a punch (Fig. 1) is cut for each character in the font. The best punches are cut in soft steel, which is afterward hardened. The punch-cutter, who must have mechanical and artistic genius, works entirely with his hands. It should be remembered that a good punch is the foundation of good type, as the face, the form and the general effect of the type are dependent upon it. Many punches are cut in type metal and require as much skill, but they are easier to cut because of the comparative softness of the metal. The recent invention by L. B. Benton of a punch-cutting machine has simplified the work of punch-cutting. This punch-cutter is in use in both hemispheres and is considered to be one of the most marvelous mechanical inventions of the day, its product surpassing in accuracy the finest hand work, while it cuts many sizes from one pattern. It cuts in steel or softer metals, and overcomes what has heretofore been a serious difficulty in punch-cutting, because no matter how expert a punch-cutter may be he can never cut two of the same characters exactly alike. The Benton machine reproduces any number of the same characters without the slightest deviation. How important this achievement is may be judged by the fact that the linotype machine, which has worked such havoc in our ranks, was doomed to failure while it depended for matrices on punch-cutters who worked by hand. The matrices on the linotype are constantly giving out, and the punch-cutter could never make an accurate facsimile, the consequence being that the appearance of the face soon became irregular and as if full of wrong fonts.

Fig. 1.

When the Benton punch-cutter was secured by the Linotype Company the greatest obstacle to the success of its machine was successfully overcome. The career of Mr. Benton illustrates the possibilities of success for a workman with genius and that necessary adjunct to genius—perseverance. He was at first an all-round country printer, but on becoming part owner of a small type foundry in Milwaukee he set to work to master the details of this intricate business. His invention of self-spacing type led him to the more important one of the punch-cutting machine, as he found it impossible to hire enough punch-cutters to bring out self-spacing type in any reasonable time. Mr. Benton is manager of the construction department of the American Typefounders' Company and the patents upon his self-spacing type and punch-cutter are, I understand, owned and operated by that company, which, I may remark parenthetically, judging from the constant appearance of its advertisements in the JOURNAL, has solved the true idea of advertising—always keep your name before the public, in season and out of season.

But this is not to the point, so I will return to technical details. When the punch is pronounced perfect—a result which necessitates frequent recuttings—it is used to make a drive (Fig. 2). If of steel, the punch is driven into a solid piece of copper, an operation which entails great care and selection of perfect material. The chief difficulty in the process arises from frequent breakages of the expensive punch, which may be too highly tempered, or too soft, or a flaw may be developed in the steel from which it is made. About 12 per cent. of all steel punches break when first used. These breakages, of course, add to the cost of manufacturing type.

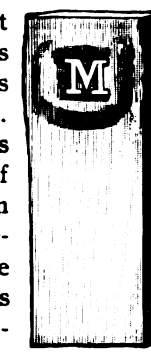

Fig. 2.

[*To be continued.*]