

The Typographic Plate Manufacture

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All of the stamps under consideration would have been printed using plates produced by one of three major typographic technologies: photographic typography, matrix typography, or independent typographic dies. All three frequently produced systematic irregularities, or as they are termed in the literature, *flaws*. Let's review those production techniques.

Photographic typography was used to fabricate printing plates by transferring an image from a glass negative to a metal plate coated with a photosensitive material. The process began by printing a large number of identical *auxiliary prints* (black prints twice the size of the subject stamp), enough to be pasted to stiff paper in an array (called a *paste-up*) that reflected the layout of the plate being manufactured. Since most (but not all) of the early Czechoslovak printing plates consisted of ten rows of ten stamps, one hundred clichés in all, the most common paste-up consisted of a ten-by-ten array. How the auxiliary prints themselves were made is a matter of conjecture; many believe zincography was used.

To support a postal clerk's accounting needs, a set of *tally numbers* was pasted below the bottom row of stamps. Each tally number recorded the value of the stamps in a special way. The left-most number indicated the value of all of the stamps printed in the column above it. The tally number to its right summed in the same way the value of the stamps printed in the column above it *plus* the stamps printed in all columns to its left. The rightmost tally number thus indicated the total value of every stamp printed on a pane (Fig. 1).

A clerk would then remove stamps as they were sold from columns on the right side on the pane. At the end of the day the clerk could add the value of the right-most tally number that still had a complete column of stamps above it to the number of stamps in any partial columns (were the clerk careful, that would mean just one such column) to account for the value of the stamps remaining on the pane.



Fig. 1: Mock-up of a Hradčany 1 Haler Paste-up.

Note the value of the rightmost tally number ($100 \times 1 \text{ haler} = 1 \text{ Kč}$).



Fig. 2. Negative Image.

Light areas on the negative permitted light to activate the plate's photosensitive coating. Dark areas kept light from reaching the plate.

Once the array was constructed, the printer photographed it using a camera with a 50% reduction lens, thus reducing the image of the double-stamp size auxiliary prints to the actual size of the stamps to be printed and producing a glass negative. The image on the negative was then transferred to a metal plate coated with a photosensitive material by pairing the two and exposing them to light. The transfer was such that the light shown through the clear areas on the negative activated the photosensitive coating on the plate while the dark areas on the negative did not (Fig. 2). After the exposure, the activated areas of the photosensitive coating were hardened and those areas not activated washed away. This left a durable copy of the image on the metal plate.

The plate was then placed in an etching bath. The areas not protected by the hardened coating were eaten away leaving the protected areas (called *lands*) undamaged. This process produced a relief version of the stamp where the higher lands would receive ink during the printing process while the lower etched away areas would not. In point of fact, typographic printing is classed as *relief printing*, just the opposite of more modern intaglio printing. Because of this characteristic use of a relief image, one may often see on the gummed side of a typographically produced stamp an embossed version of the vignette. (This is somewhat more obvious on used stamps when the gum has been removed.)

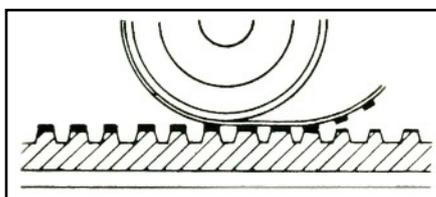


Fig. 3: A Relief (Typographic) Plate in Use.

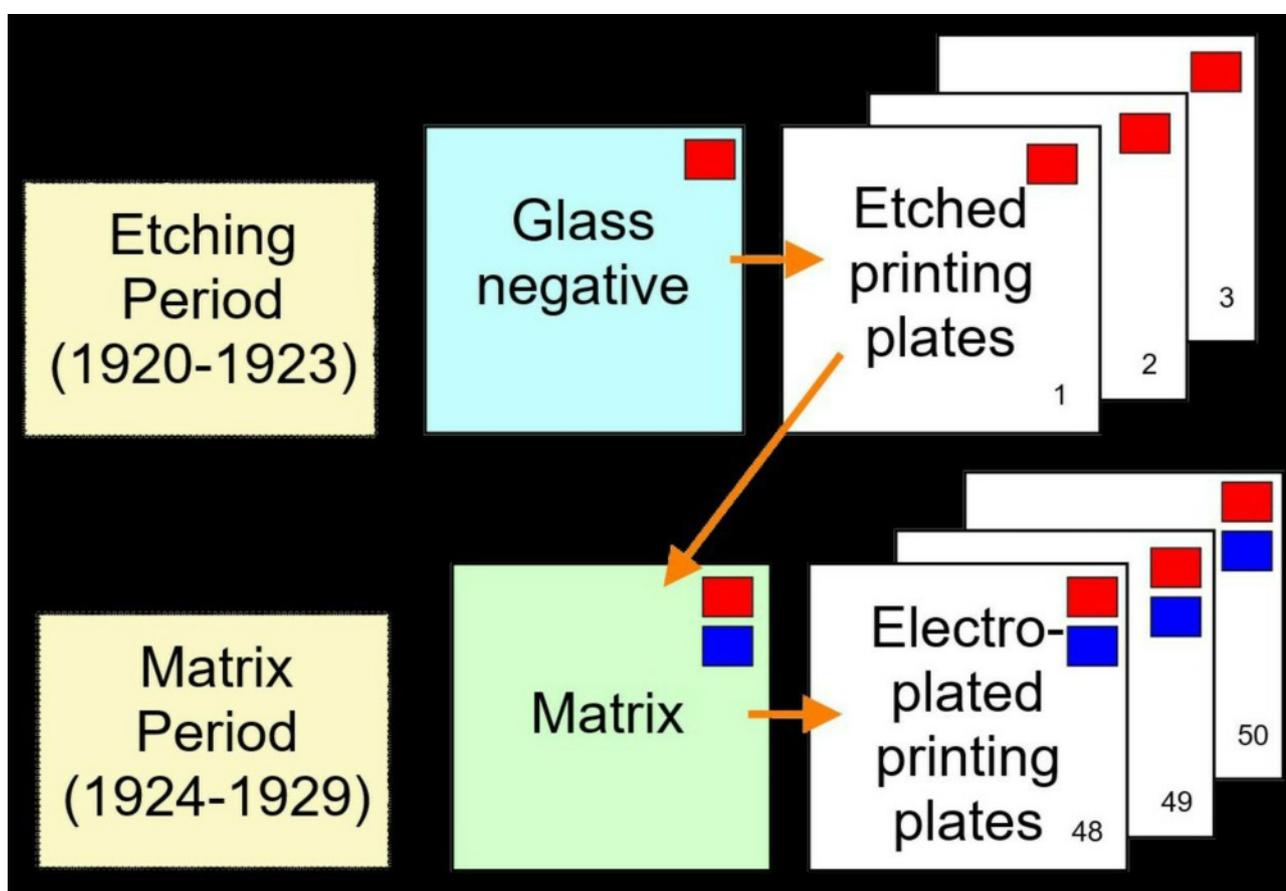
Ink is transferred from the higher lands to the paper.

Until 1923 photographic typography was the printer's most common technology (although experiments were carried out with alternative techniques) in use to manufacture Czechoslovak printing plates. The process required a great deal of time and was labour intensive. Thus the need for an improved technology.

Matrix typography replaced, for the most part, its photographic cousin in 1924. To create printing plates, a negative impression of an etched plate was constructed. That is, matrix typography took the product of photographic typography and in doing so eliminated all those labour intensive steps: once created, the matrix was used to produce all further plates.

How the negative impression was actually created remains a matter of conjecture. There are two possibilities. First, a metallic foil might have, under great pressure, been impressed into an etched plate. The foil would then have a negative version of the relief pattern found on the etched plate – the lands would be lower, the etched-out areas higher, exactly the reverse of the original plate. The other alternative, using an electroplated copy of the etched plate as a matrix would have resulted in the same sort of negative copy of the original plate. Experts suspect, based upon the technologies available to the printer but without any factual support, that the electroplated version was likely the method used to produce a negative matrix of the plate.

Whichever method produced the matrix, it was strengthened and put to use to produce plates. First the matrix received a thin coating of an oil. It was next subjected to an electroplating process. Once the matrix had an electroplated metallic film on its face, that film was removed, strengthened, and could be used as a new printing plate, an exact copy of the etched plate used to produce the matrix. One must always remember that the glass negative was the grandmother of the matrix and its offspring.



Schematic of the Relationship Between Photographic and Matrix Technology.

The red squares represent negative flaws, the blue squares flaws introduced during the creation of the matrix.

Note that the negative flaws from the glass negative persist into the matrix.

This was the result of using an etched plate created with the negative to produce the matrix

Although flaws persisted and indeed were created during the manufacture and use of a matrix, its output tended to be more stable than etched plates. The etching process first exposed the negative to injury as its image was transferred to the plate, then relied upon the photosensitive coating to accurately mimic that image, and finally endangered the plate itself as it was bathed in acid during the etching process. A matrix could be damaged during storage or cleaning, but the electroplating process itself did not endanger the plate in the way an acid bath did and was far less likely to inflict damage on the matrix.

The reduction of the chance of damage during manufacture drove further experiments into matrix-like production methods. These are dealt with in the next section.

The Czech Graphics Union must have felt that the reliance upon etched plates to produce a matrix was a chancy business. The firm experimented with alternative methods as early as the Hradčany issue and as late as the 1937 Newspaper issue. The most enduring characteristic of die-produced plates is that they lack tally numbers. This was because, unlike pasting printed numbers below the last row in a paste-up, each tally number would have had to been cast in metal and clamped or soldered to the dies.

Independent dies were first used to fabricate plates for the abstract version of the 30 haler Hradčany. A set of dies the size of a 30 haler stamp were manufactured from a woodcut using an electroplating process. The dies were clamped together into an array similar to a paste-up, but for obvious reason no tally numbers could be added below the last row. Because dies were switched out during the printing process, there is reason to believe that the dies themselves – clamped together – were placed on the press in the same way a printing plate might have been. Also, the dies are poorly aligned and spaced unevenly, more evidence that they were clamped in place.



Fig. 4: Single Die.
The dies were placed on the press.



Fig. 5: Strip of Five Dies Soldered Together.
Electroplated copy taken once twenty were assembled into a plate format.

In 1920, for the Agriculture and Science issue, the printer chose to first manufacture a set of five dies, solder them together side-by-side, and produce a matrix from that strip that was used to manufacture more strips of dies (Fig. 5). Two five-die strips were then soldered end to end to form a row. In a similar manner nine more rows were manufactured and soldered below the first. Thus, instead of the loose die arrangement likely with the 30 haler Hradčany, the dies formed a solid ten-by-ten array. This array was used as a matrix and plates were taken from it using the same electroplating technology described in the matrix typography section above. Later the printer built the matrix from blocks of ten dies created by soldering a strip of five dies below another strip of five – instead of soldering them end-to-end.

The printer experimented with other forms of typographic plate manufacture but most were discarded after a single use. For instance, the 125 haler denomination of the 1920 T G Masaryk issue used a most peculiar technique. First the printer fabricated by, we suspect, photographic typography a quarter-plate of twenty-five clichés (Fig. 6). This was then used as a matrix to produce eight more quarter-plate pieces. Two sets of four quarters were then soldered together (Fig. 7) to form two printing plates. The exact sequence of events is unknown but likely resembled the above description.



Fig. 6: T G Masaryk Quarter Plate.

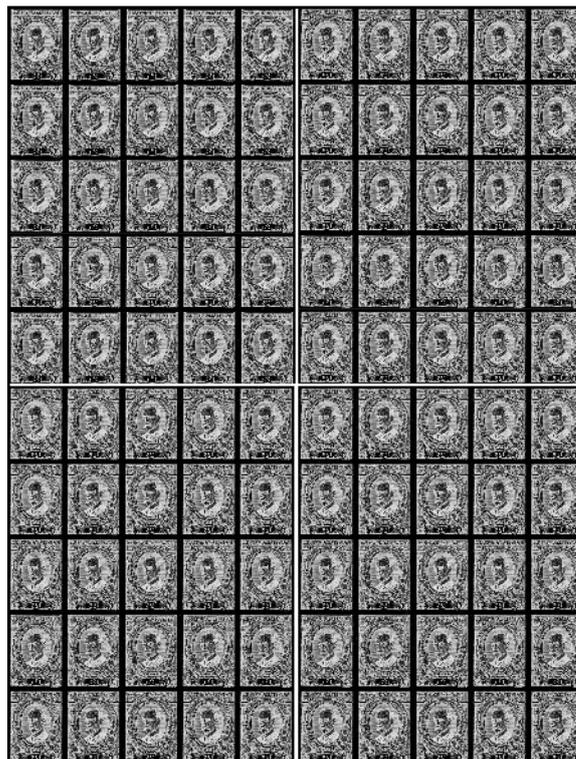


Fig. 7: T G Masaryk Assembled Plate.

A similar practice was used to manufacture the plates of the 1937 Postage Due issue. In fact, the souvenir sheets printed at the Bratislava National Stamp Exhibition were printed using one of the component sections of the full plates.