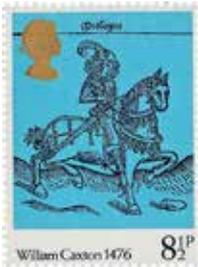


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Stamp Printing Processes

Glenn H. Morgan

For a publication relating to “the collection and study of all philatelic material that pertains to the topic of graphic communications,” it is perhaps surprising that more space has not been given in *Philately-Graphics* through the years to the printing processes that are used during stamp production.

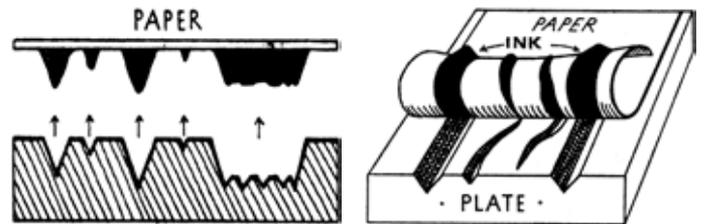
I therefore provide a brief description of the various methods likely to be encountered, which will hopefully be useful to those members who are less familiar with the terminology and means of differentiation. (Other principal names used for the same process are given in parentheses after the most philatelically accurate name for the printing method.)

Intaglio (recess, line-engraving, copperplate, steel engraving, photo engraving, etching or siderography)



Engraving with a burin. Above left, Monaco, 1996 [Sc2020]. Top right, Denmark, 1983 [Sc737]. Bottom right, France, 1966 [ScB400].

The stamp design is incised by the engraver with a burin (a sharp, pointed hand-held tool) into the printing plate to varying depths, widths and shapes below the surface, often with the aid of a microscope to assist with engraving the finer details.



Transferring ink from the incised plate, resulting in a raised image on the paper.

Ink is applied to the plate, the excess is wiped off with a cloth and the paper is pressed under great pressure against the plate, actually squeezing into the inked grooves, extracting the ink and transferring the design to the substrate.



Sheets of Penny Blacks were reprinted on a Victorian intaglio press at The Stamp Show 2000 in London.

An intaglio printed stamp has a distinct raised feel and has been the “process of choice” for the philatelist since its first use by the British firm of Perkins, Bacon & Petch on the Penny Black stamp design of 1840.

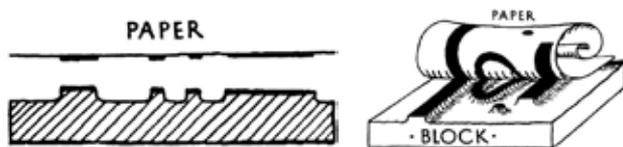
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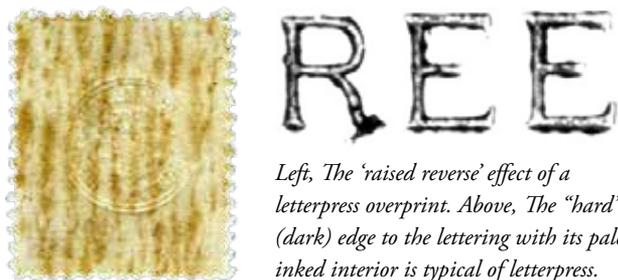
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Letterpress (relief-printing, surface-printing or typography)



Letterpress has the non-image area incised into the plate, with its printing area (the design) raised above the surface.

The stamp design was once transferred onto a metal plate using a greasy ink, with the rest of the plate being etched away, leaving just the raised design to print from (think of inked rubber stamps used in offices).



Left, The 'raised reverse' effect of a letterpress overprint. Above, The "hard" (dark) edge to the lettering with its paler inked interior is typical of letterpress.

These older letterpress stamps could invariably be best identified from the reverse side because the design often felt raised to the touch due to the use of the metal plates and the heavy pressure used.

The face of the stamp also tended to have a "hard" edge to the inked design, best explained in the accompanying image. These days, plastic plates are used for this printing process and so tend not to leave the raised surface on the reverse.

Letterpress is currently undergoing something of a renaissance with small print shops and hobbyists, but appears not to have been used to print postage stamps for many years. Towards the end of the "philatelic" life of letterpress, it only tended to be used for locally produced overprints and surcharges to an existing stamp.

[Photo]Gravure (gravure, rotary printing, rotogravure or Rotaglio)

An intaglio-based (i.e., below the surface) printing system typically running at very high speeds, it is best suited to producing large print runs owing to the expensive set-up costs and uses either plates or cylinders.

Rotogravure is a commercial process used when producing magazines (think Sunday newspaper color supplements), but it is a term only infrequently applied to the production of postage stamps. Rotogravure (a

merging of parts of the words "rotary" and "photogravure"), by definition always uses a revolving press and cylinders, while Rotaglio was a commercial brand.

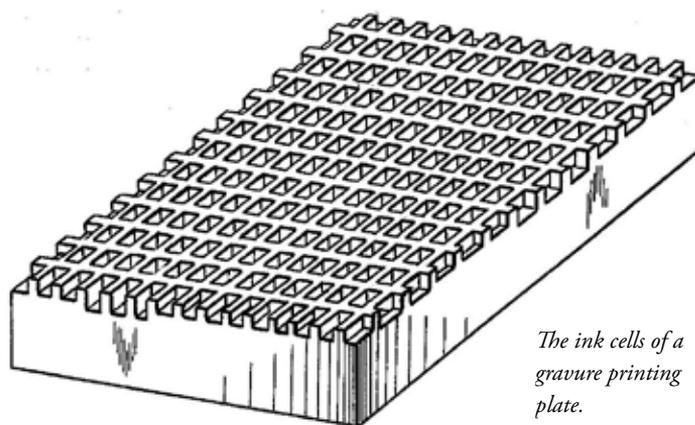


Left, Bavaria, 1914 [Sc114]. The first use of photogravure for a postage stamp. Right, United States, 1967 [Sc1335]. The first American photogravure stamp.

The photogravure process was first used for stamp production by German printer F A Bruckmann of Munich during 1914 on an issue for Bavaria that to this day is regarded as an excellent use of the method.

The Bavarian stamps were clearly seen as an important development, and it was not long before Mexico (1917), GB (Waterlow 1918 War Tax stamps, Harrison 1921 6d National Savings stamps), Czechoslovakia (1919), Bulgaria and Württemberg (1920) had each followed Bavaria's lead, with many more countries being late adopters in taking the photogravure route, such as USA (1967).

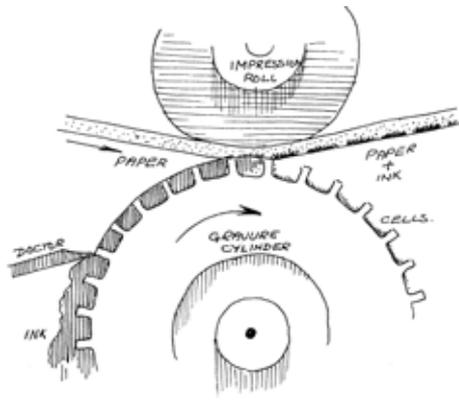
Until relatively recently, collectors would have only encountered stamps that employed a photographic process in manufacturing the cylinders (hence photogravure). Following the introduction of computer-engraved cylinders, photography is no longer a part of the cylinder manufacturing process, so "gravure" is the term for current production by this method.



The ink cells of a gravure printing plate.

Gravure printing uses fluid inks applied to the cylinder and held there in microscopic cells recessed into the plate/cylinder. Excess ink is removed with a

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A view of printing stamps by gravure, taken from a Harrison and Sons philatelic wall chart.



A Harrison & Sons dummy promotional stamp illustrates manually making amendments to a photogravure stamp cylinder.

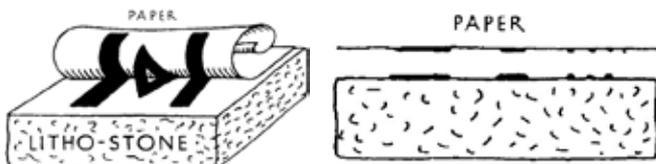
doctor blade (think of a scraper), and the required ink is transferred from the cells onto the substrate.

Gravure is now very much on the decline, with fewer countries than ever using this process, in part due to cost, but also owing to the much smaller print runs produced for a stamp issue. The Universal Postal Union has stated that 90% of stamps are currently produced by offset, so the remaining 10% of production is shared between all other print options, including gravure.

Lithography (*litho, planography or planographic printing*)

The original deployment of lithography for stamps was without an “offset” element, i.e. the paper came in direct contact with the lithographic stone that contained the inked imagery. It was based on the principle that grease and water repel each other.

The design was first drawn onto a calcareous stone (usually limestone) with a greasy ink that was then treated with a chemical solution (acid and gum arabic) that caused the artwork to be “fixed” to the stone. This was then moistened all over, with the highly porous stone retaining the water in the non-image areas only.



Lithography using a stone and direct inking.

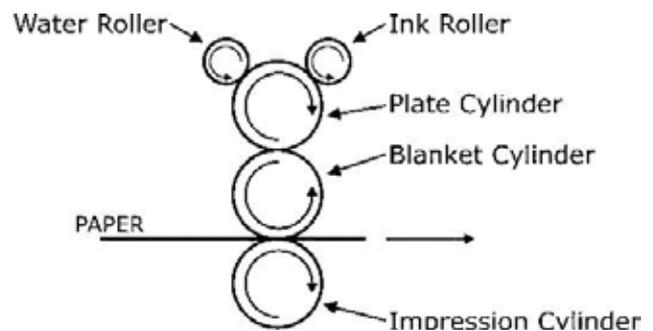


Austria, 1998 [Sc1749]. Inking the stone with a roller. Stamp marks the 200th anniversary of lithographic printing invented by Aloys Senefelder (1771-1834). Senefelder’s portrait appears on the litho stone.

Ink was applied to an inking roller that was rolled across the stone, only applying ink to the design area and leaving the non-design area un-inked. A sheet of paper was then pressed on to the inked stone resulting in a single printed image.

Offset Lithography (*photo-litho, offset-litho, offset*)

In broad respects similar to the original lithographic method, “offset lithography” (generally now just called “offset” in the print industry) transfers photographed artwork of the stamp image to a disposable polymer coated flexible printing plate that is usually made of zinc or aluminum and is then bent around a plate cylinder.



The offset process.

Rollers apply viscous ink and water to the oleophilic (grease-loving) plates and, as you have already read, since oil and water do not mix, the oil-based ink fails to adhere to the non-image areas.

The inked image is then offset to a flexible rubber blanket cylinder, which transfers the image to the paper



The blue ink on a white background is the inked offset plate in correct way reading. The blue ink on red area is the design offset on the rubber blanket in reverse way reading.

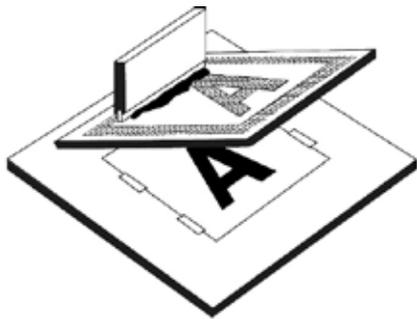
as it passes between it and an impression cylinder positioned beneath the paper.

The flexibility of this technique allows for the use of several ink colors to the point where it is rare to find a single-colored offset postage stamp, such is the current obsession with multi-colored, some say gaudy, modern stamps.

This is the most readily accessible form of commercial printing available worldwide today, with comparatively low set-up costs and suitability for runs up to around ten million stamps. It is increasingly difficult to differentiate between gravure and offset.

[Silk] Screen (*screen printing, silkscreen printing, screen process, serigraph printing or serigraphy*)

A printing process in which the ink is forced via a giant squeegee through a fine screen (once made of silk, hence its original name) onto the paper surface of the stamp below.



Manually making a screen print.

A protective coating on the screen allows color to pass through in some places (the image areas where the mesh remains visible), but not others (the non-image areas where the mesh has been concealed). When printing stamps, the printer simply employs a scaled-up version of the manual screening process often used today for personalizing t-shirts.



Hong Kong, 1999 [Sc834]. Stamp with a gold scratch-off screen-printed area. When removed, the scratch off area reveals a Chinese greeting.

The screen process is best suited when a heavy ink coverage is required and is a comparative newcomer in the field of stamp printing. A typical philatelic example would be the application of latex to conceal words

or images underneath, as later revealed by the customer when scratching off the latex with the edge of a coin.

Flexography (*flexo*)

Flexography utilizes flexible relief plates that can be fixed on to a printing cylinder. It is essentially an updated version of letterpress. That said, it is much more versatile than that, as it can be used for printing on virtually any type of substrate including plastics and metallic films, as well as on paper.

It is widely used on non-porous substrates required for food packaging, and, as with silk-screen, it is well suited for printing large areas of solid color. Flexo is used occasionally on modern stamps, but not to the extent that letterpress once was...at least not yet. Personally, I can see a future for this process, as it is increasingly becoming mainstream in the rest of the print industry.



Left, Australia, 2011 [ScB1-5]. A flexo-printed sheet for a Flood Relief appeal that features two each of five different stamps.



Above, Australia, 2011 [ScB2]. Single stamp from sheet at left.

These days it is increasingly difficult to differentiate flexo from offset, as the appearance of both is rapidly becoming identical to the layman as flexo's quality continues to improve.

Digital (*alternative terms have yet to be used*)

The "new kid on the block" is digital printing, and it will surely not be too long before this process has a far greater impact on the world of stamp production *cont. on next page.*

following Australia's ground-breaking fast-tracked printing of the Sydney 2000 Olympic Games stamp sheets.

This process scarily presents an opportunity to make each stamp printed quite literally unique, perhaps individually numbered, tariff coded or with hidden security features.



Finland, 2017. One of 60,000 different 'Finland 100 - Finland Faces' stamp booklets.

The idea of a truly unique stamp sounded somewhat far-fetched just a few years back, but then security printer Joh. Enschedé recently printed booklets of ten stamps for the Finnish Post Office in a run of 60,000 with every single stamp that came off the press being different, thanks to the use of variable data and sophisticated software. That's 600,000 totally different stamps issued in just one day—a current world record.

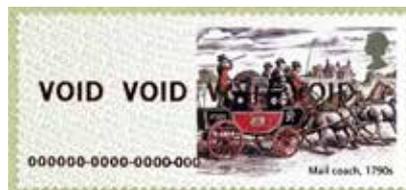
In the early days when digital printing was being considered for stamps, the quality of output, while respectable, was not anywhere near as good



An early USA digital dummy stamp souvenir from the Pacific '97 stamp show. Quality was good, but not great.

as that encountered by traditional printing methods. However, in just a short time period those discrepancies have all but gone, to the point where today an average collector is unlikely to detect the difference between a digital and an offset stamp.

Some digital stamps at present tend to have a highly glossy inked area and vibrant colors in comparison with their offset or gravure equivalents, which can now appear quite “flat” in appearance.



A British digitally printed “Post and Go” vending stamp with a VOID impression.

Digital printing has already been used by Britain's International Security Printers on Post and Go vending stamps for Royal Mail, Gibraltar, Guernsey, Jersey, Netherlands, Qatar and Spain, while New Zealand Post, Oriental Press and others have also started to use this process. You can expect to see the word ‘digital’ much more frequently in coming years in the ‘new issue’ pages of stamp magazines.

The following three entries are considered by some stamp collectors to be actual printing processes. They are not, but are, none the less, considered appropriate for inclusion here...

Embossing

A technique performed after printing that stamps either a raised (embossed) or a depressed (debossed) image into the surface of the paper, often using engraved metal dies and extreme pressure. This process can also be used in conjunction with metallic foils (by the additional use of heat) and can be applied to unprinted or printed areas of a stamp design.

Combination Printing

“Combination printing” is the term used for stamp production where more than one printing process is employed on the same postage stamp. It is not a process in its own right. The most commonly encountered example is where a single

colored background “wash”, or perhaps a mono-, bi- or multi-colored design is first applied by offset or, far less frequently today, gravure, with intaglio line-work applied on top to give a tactile feel to key elements of the complete design.

Also encountered are offset or gravure stamps with a [silk] screen application of latex that in part covers some of the design. This is later removed by the recipient to reveal a hidden message or image (think of a lottery scratch-card).

Thermography

Thermography is a finishing technique whereby slow-drying ink is applied to the paper and, while the ink is still wet, is lightly dusted with a resinous powder. The stamp sheet passes through a heat chamber where the powder melts and fuses with the ink to produce a raised surface, giving the pseudo-effect of intaglio printing. It is most frequently encountered by the public on invitations and business cards.

Conclusion

We have seen that there have been seven key printing processes used to print stamps since 1840. Some readers will no doubt be familiar with many other methods that have also been employed, such as the use of typewriters, stencils, embroidery, woodblocks, mimeographs, xerographic machines, laser printers—the list goes on and on. However, none of these methods for getting words and images onto a substrate were ever destined to become mainstream, so really did not warrant special mention above.

It is hoped that you will now have a better understanding of how an artwork gets put onto a substrate, and that you may perhaps see your stamps in a different light from now on.

Batik

Paul Horton



Jersey, 1992 [Sc600-603], Batiks created by Jersey art students at Hautlieu School.

Batik is described as an art of textile printing. The earliest batik patterns were monochrome. The design standing out against an indigo background is produced by a negative dyeing method being marked out in wax before the fabric is dipped so that the waxed portions do not take the dye and stand out in the original color of the fabric.

From the 18th century, multicolored fabrics were produced by methods of dyeing introduced through Indian Moslems—many of the patterns depending on ancient traditional designs.

Batik is a Malaysian name for producing these bold, exotic patterns. It was mentioned by Pliny and used in Tang China. Javanese batik—the best known today—was unrecorded until the early 16th century. It was introduced into Europe by Dutch traders about a century later. It was first used on expensive materials like velvet, and then later, batik patterns were printed on cotton. The technique was improved in the 17th century by the invention of the tjanting, a copper crucible with several spouts by which wax could be applied in continuous lines.

The social position of the owner was reflected by the beauty of the batik designs in the ceremonial and festive garments worn, and some of the ancient batiks are among the most superb examples of ornamental textile design known.

Reference:

Oxford Dictionary of Art, Oxford University Press, New York, 1988.

See also, ‘New Issues’ (Malaysia) page 10 of this issue of *P-G*.