Photogravure

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Note to the first edition

This book contains a detailed description of the various processes involved in converting a photograph into a photogravure, taking into account the use of materials available today. The first part of the book explains in detail the principle of photogravure, historical notes, materials needed, workshop equipment, as well as all the necessary steps for the production of a photogravure. In summary, in the chapters describing the respective procedures, there is a brief guide at the end with information on possible sources of error. The second part contains the description of different noble printing techniques such as carborundum, soot and pigment printing, which can be combined with photogravure. Furthermore, the reader receives detailed construction plans for necessary equipment as well as instructions for the production of materials used in photogravure.

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Contents

Appendix

Preface

Photogravure seems to be a rather labourious and complicated technique for beginners. However, it produces excellent results that cannot be achieved with any other printing technique. All steps described here are also carried out by me in this way. Much skill I have acquired myself over the years through experimentation and a lot of patience.

In Germany, only a few practice classical photogravure, but they do not pass on their knowledge. Anyone who already has a basic knowledge of photography or intaglio printing techniques will find this book provides detailed instructions that can be implemented without much effort and will quickly produce respectable results even for beginners. In summary, in the chapters describing the respective procedures, there is a brief guide at the end with information on possible sources of mistakes.

Gary Krüger, 2022

Introduction

Classic photogravure is a method of transferring a photograph with all levels between black and white by etching onto a copper plate and printing it on paper. The different tonal gradations result from tiny irregular craters in the plate, which differ in depth and extent. The printed image on the paper is not formed by dots of different sizes (screens) simulating a halftone image, but by variations in the amount of ink in the etched areas of the copper plate.

Photogravure has little to do with a photographic production process in which an exposure is necessary for each print. Only the method of making individual copies with a printing plate produced via a photo-mechanical way and a printing press belongs to the "photographic process" field. The printed image consists of gravure ink instead of metallic silver.

From the point of view of photographic reproduction, photogravure is a perfect method of reproducing different shades of gray and details in outstanding quality. The velvety, deep black, the different shades of gray and the finest nuances in the light areas of the image result in a presence that cannot be produced by any other reproduction method. Of course, to achieve such a result, a printing paper as well as printing ink of the highest quality are a prerequisite.

At the end of the 19th century, photographers discovered photogravure for themselves. Both the creative manipulation possibilities and the poor quality of the available material played a decisive role. After 1920, however, interest in photogravure waned. Higher quality photographic paper that excelled in durability was now available. Gravure screen printing, which was slowly becoming established, was much cheaper to produce than a handmade copper plate printed by hand press. Attempts to automate the photogravure process also remained more or less unsuccessful. In 1970, the noble printing technique "photogravure" experienced a renaissance.

For artists and photographers, photogravure appeared to be a creative medium where the focus was not only on an exact reproduction of a photograph, but rather on the numerous possibilities to influence the process of creating a photogravure.

From a technical point of view, photogravure is an aquatint, but it can be wonderfully combined with other conventional methods of intaglio printing (drypoint, mezzotint, reservage, brush etching, etc.). Simpler processes in the production of templates are also possible today. Instead of an aquatint, the printing plate can be made with the help of a gravure screen, i.e. the film is screened into dots of different sizes, but these can be seen very clearly in the printed image. I am of the opinion that a screen is no substitute for a copper plate prepared with very fine, evenly melted asphalt dust. For this reason, I will introduce you to traditional photogravure in the following.

Historical Notes

I am the Enemy, 2006, 28 x 28 cm, Photogravure

The history of the photogravure reaches back up to the photographic experiments of Nicéphore Niépce (1765-1833). In 1816 he tried to project a picture by a camera obscura so that it could be brought in a printable form. This first quite primitive photomechanical process is called Niépce Gravure Heliographique. After Niépce´s death Louis Jacques Mandé Daguerre (1787-1851) developed another photographic process. In 1839 he announced his invention called daguerreotype, which was immediately tested in order to make the daguerreotype plate printable as photomechanical intaglio plates.

In 1839 and 1840 it became known by Mungo Ponton and Becquerel that dichromat gets photosensitive in connection with different animal glues. In 1852 Henry Fox-Talbot found that gelatine becomes insoluble when mixed with potassium dichromate and exposed to light. He patented his technique "Photoglyphic Engraving" in 1852 and 1858 which was later to become known as photogravure. Talbot sprayed the sensitised gelatine directly onto the plate and etched after exposure with platinum chloride, later with much cheaper ferric chloride. In the process, he discovered that the start and speed of the etching process could be controlled with different acid concentrations.

After a kind of pigment printing process was developed in 1860, in which the exposed pigment paper was transferred to a printing paper and developed, Karel Klíc from Vienna combined both processes in 1870 and exhibited his first "heliogravures" in 1879. It was not the quality that was surprising, because the French company "Goupil" was already producing far better photogravures at that time. It was astonishing that Karl Klíc only needed three days to produce the plates, whereas Goupil needed a whole three weeks.

Goupil used a completely different process: The printing plate was made by electrolysis using a variation of the Woodbury method. Karl Klíc kept his technical knowledge secret, only selling some details to companies specialising in photographic or photomechanical processes under strict preconditions.

Between 1884 and 1886, important details about the actual technique became known, which meant that photogravure received greater attention. However, only the possibility of reproducing photos was of interest, with photographers making less use of the technique.

Another interesting representative of photography was Eadweard Muybridge (*9 April 1830 in Kingston upon Thames; † 8 May 1904), who caused a sensation at the time with his motion studies such as Animal in Motion and Human Movements. The process used is called the dry gelatine process - developed for the production of photographic negative material. Instead of potassium bromide, the gelatine could be made sensitive to UV light by chromatisation, as it is still used today in photogravure. Many modernist artists such as Marcel Duchamp or Francis Bacon referred to the work of Eadweard Muybridge.

Clear Ship, 2003, 40 x 30 cm, Photogravure

In 1889, the English photographer Peter Henry Emerson declared photogravure to an independent art form in his book "Naturalistic Photography". As a result, many photographers learned this technique and were now able to better control their results. Others saw photogravure as a mere reproduction technique.

Between 1903 and 1917, Alfred Stieglitz published numerous photogravures in his magazine "Camera Work", a mixture of original artistic works and reproductions.

In 1895, Karl Klíc had made a new invention that revolutionised the technique of photogravure: instead of an asphalt coating, a gravure screen was now also exposed and the copper plate was replaced by printing cylinders. After printing, the paper was cut from the roll and pressed once more onto a blank plate to create the plate edge typical of photogravure. This made it impossible to distinguish a sheet produced in this way from a classical photogravure.

In 1904, this process gave rise to rotogravure (exposure with a screen film and subsequent rotary printing), a forerunner of today's offset printing.

From 1920 onwards, the technique of classical photogravure, which had become too expensive, gradually disappeared. What remained were art printers, art photographers and artists who continued to see photogravure as an independent artistic medium.

Today's users of photogravure are much more versatile than their predecessors. Many photographers see this technique as an extension of their artistic work, whereas other artists who produce a photograph more as a template for a photogravure focus on the outstanding quality and character of a photogravure as a special means of expression.

You think it was me?, 2007, 39 x 54 cm, Photogravure

The different processes in the field of fine printing techniques are permanently changing. Modern techniques (solar plates, intagliotype) seem to be replacing old reproduction techniques such as photogravure, although the quality of the prints has not necessarily improved.

Principle of Photogravure

Photogravure, based on gelatine, is only one of many methods of reproduction. Gelatine itself is not light-sensitive, a chemical substance is needed for this: Potassium dichromate K2Cr2O7. A gelatine layer impregnated with potassium dichromate becomes insoluble in water after exposure to daylight (UV rays) at normal temperatures. This process plays an essential role in photogravure.

A sheet of pigment paper, consisting of a backing paper coated with pigments of coloured gelatine, is dipped into a potassium dichromate solution and then dried. Together with a halftone film, the exposure takes place, during which the gelatine layer lying under the halftone film is tanned according to the strength of the penetrating UV light. Most of the light penetrates through the lightest parts of the halftone film and tans the gelatine most strongly there, while virtually no light penetrates through the darkest parts, which means that the gelatine remains water-soluble in these areas.

2. Copper Plate

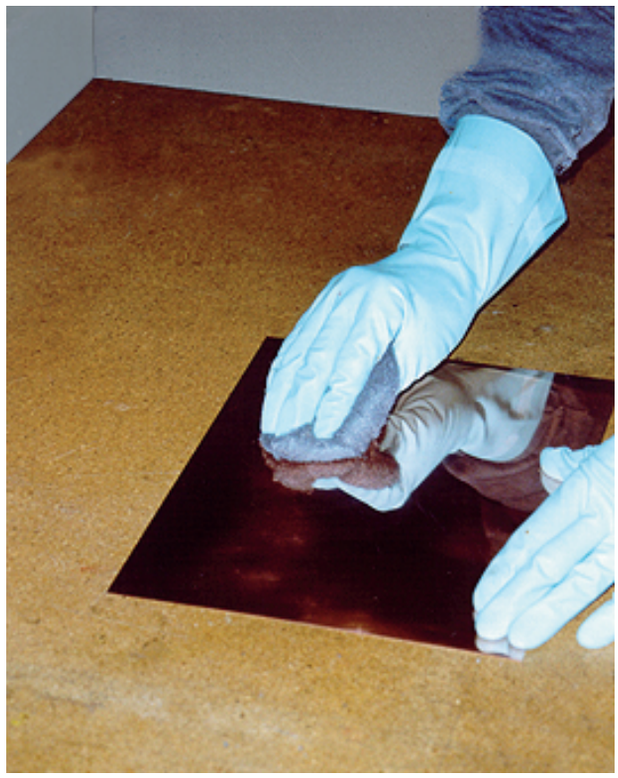
The following materials are required:

- Copper plates in a thickness of 0.8 - 1 mm
- Sodium hydroxide
- Vinegar and salt
- Finest steel wool
- Wet sandpaper 2500
- methylated spirit
- Polishing pastes from coarse to fine
- Acid-proof gloves

There are 2 types of copper available in the trade: hammered and rolled. The harder hammered copper would be advantageous, but this is very difficult to obtain. I have had the best experiences with rolled copper plates from the artist's supply store. However, pay attention to the surface. At least one side of the plate should be scratch-free and covered with a protective film. The darker the copper, the harder the plate, which is desirable for higher print runs. I prefer a maximum run of 10 prints, sometimes one print is enough. More prints don't make sense because simply the print quality decreases rapidly. For high print runs there are other printing processes! One way to achieve a higher print run is to steel the plate. However, this has the decisive disadvantage that the finest details in the plate are "covered" and will be lost in the later print. If you want to harden a plate, choose the nickel plating method. The layer is somewhat finer and allows more details to appear in the printed image than the steeling.

Supplier of copper plate: www.polymetaal.nl

The plates from polymetaal.nl are always of the best quality and, if ordered in large quantities, cheaper than from artists' supplies dealers. For heliogravures of 20 x 30 cm, a plate thickness of 0.8 mm is sufficient. For plate sizes above this, a thickness of 1 mm is necessary.



Method 1

First remove any protective films that may be present. Rub the plate with the finest steel wool until no more rolling marks, impurities or scratches are visible. You can polish out heavy scratches with a polishing steel and a little linseed oil. Then sand with wet sandpaper (grit 2500, available in car accessory shops). As a final treatment, you can use polishing pastes to achieve a mirror-smooth surface.

From now on you must definitely wear rubber gloves!

The copper plate is cleaned or degreased on both sides with 2% sodium hydroxide solution (20g sodium hydroxide in 1l water) and a soft cotton cloth. When preparing the lye, always make sure to add only a little sodium hydroxide to the water (never the other way round!). This is to avoid splashes and excessive heating. Sodium hydroxide is highly corrosive and must be stored in an absolutely dry place due to its strongly hygroscopic properties. There is no grease left on the plate when the lye forms a surface and does not bead. Then rinse the plate well with water.

Now rub the copper plate well on both sides in the same way with a salt-vinegar solution (100ml vinegar cleaner and 100 g salt and 800 ml water) or dip it briefly in a tray filled with this solution. The solution can be used further. The copper is slightly etched and any oxidation residue is removed. Normal vinegar instead of vinegar cleaner can also be used.

The plate is rinsed well, dried with paper towels and rubbed with an alcohol solution (50% isopropanol or conventional methylated spirit and 50% water) to remove any last grease residues. After final drying, the asphalt dust coating can now be applied. Before starting the asphalt coating, check the back of the plate once again. There should be no more water residues there. To be sure that the plate is absolutely dry, I place it on 2 wooden slats and let it rest for 5 minutes.

18. Homemade Dust Box, Pro

The following are instructions for building a professional dust box, such as is also available commercially. The advantage of this box is that the dust is whirled up by an external crank. Furthermore, the size of the box makes it possible to dust plates up to 50 x 60 cm. If you use larger plates, you will have to adjust the given dimensions according to your needs.

List of Materials

You will need: Tools such as cordless screwdriver, jigsaw, sandpaper, various spanners, stapler and knife. When it comes to the material, it looks a bit more complicated, of course. If I have forgotten something in the list, it will definitely appear in the following instructions.

Plywood panels, 20 mm thick

4 pieces 64 x 80 cm
3 pieces 70 x 80 cm
1 piece 60 x 70 cm
2 pieces 64 x 74 cm
1 piece 19 x 69 cm
1 piece 24 x 74 cm

Sealing tape, 20 mm, 5 mm thick

7 m

Slats, 48 x 24 mm

8 pieces each 6 cm
2 pieces each 60 cm
2 pieces each 70 cm
4 pieces each 50 cm

Wooden Blocks, 4 x 8 cm

4 pieces each 10 cm

Round Bar, d 28 mm

1 piece 13 cm (crank handle)

Pavatex Plate, 5 mm thick

4 pieces each 56.5 x 28 cm
1 piece 60 x 110 cm

Steel plate, 6 mm

2 pieces each 6 x 10 cm
1 piece 4 x 22 cm

Small parts

10 nuts M10 with washers,
Threaded rod 10mm, 100 cm
4 tension locks small, 2 simple furniture hinges, 1 metal handle
approx. 80 spax screws, 4 x 40 mm
approx. 20 Spax screws, 3 x 16 mm
approx. 8 spax screws, 4 x 20 mm
Metal glue, wood glue, Pattex

The Outer Panels

First mark the cut plywood panels. All measurements refer to the panel thickness of 20 mm. If you use thinner or thicker boards, you will have to adjust all measurements.

Top section, width x height

6: Back panel 70 x 80 cm
7: Side right 64 x 80 cm
9: Side left 64 x 80 cm
8: Front panel 70 x 60 cm
10: Lid 74 x 64 cm

Bottom section, width x height

2: Rear panel 70 x 80 cm
3: Side right 64 x 80 cm
5: Side left 64 x 80 cm
4: front panel 70 x 80 cm
1: Base 74 x 64 cm