

## Techniques of printmaking.



### **BLOCK PRINTING**

#### WOOD CUT

Woodblock printing, known as xylography today, was the first method of printing applied to a paper medium. It became widely used throughout East Asia both as a method for printing on textiles and later, under the influence of Buddhism, on paper. As a method of printing on cloth, the earliest surviving examples from China date to about 220. Ukiyo-e is the best known type of Japanese woodblock art print. Most European uses of the technique on paper are covered by the term woodcut, except for the block-books produced mainly in the fifteenth century.



Book illustration of the  
*Hortus Sanitatis lapidary*



**Durer**, *Four Horsemen of the Apocalypse*  
c1496 Woodcut.

## Technique

Woodcut is a relief printing technique in printmaking. An artist carves an image into the surface of a block of wood—typically with gouges—leaving the printing parts level with the surface while removing the non-printing parts. Areas that the artist cuts away carry no ink, while characters or images at surface level carry the ink to produce the print. The block is cut along the wood grain (unlike wood engraving, where the block is cut in the end-grain). The surface is covered with ink by rolling over the surface with an ink-covered roller (brayer), leaving ink upon the flat surface but not in the non-printing areas.



Flat bed Printer.

For colour printing, multiple blocks are used, each for one colour, although overprinting two colours may produce further colours on the print. Multiple colours can be printed by keying the paper to a frame around the woodblocks.

There are three methods of printing to consider:

### Stamping

Used for many fabrics, and most early European woodcuts (1400–40).

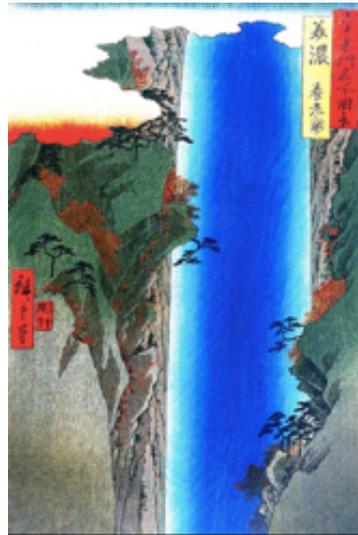
### Rubbing

The block is placed face side up on a table, with the paper or fabric on top. The back of the paper or fabric is rubbed with a "hard pad, a flat piece of wood, a burnisher, or a leather frotton".

### Printing in a press



**Hiroshige**, *Morning Mist*.



**Hiroshige**.

Mino province: *Yoro-taki* from the series *Views of Famous Places in the Sixty-odd Provinces*

**Utagawa Hiroshige** (1797 – 1858), was a Japanese ukiyo-e artist, considered the last great master of that tradition.

Hiroshige is best known for his landscapes, such as the series *The Fifty-three Stations of the Tōkaidō* and *The Sixty-nine Stations of the Kiso Kaidō*; and for his depictions of birds and flowers.



**Félix Vallotton**, *La Raison Probante* (The Cogent Reason), Woodcut from the series *Intimités*, (1898).



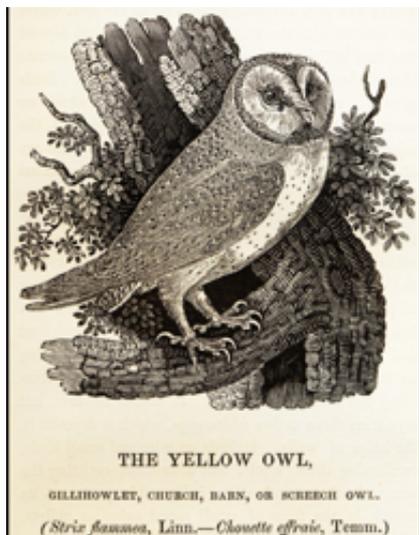
**Kirchner**, *Portrait of Otto Müller* 1915

**Ernst Kirchner** and **Otto Müller** were members of Die Brücke, the first wave of 20th century German Expressionism. The aims, in their often very crudely made woodcuts, was to achieve a sense of raw primitivism which references Medieval woodcuts (see example of the Book illustration of the *Hortus Sanitatis lapidary*) and appeals directly to the emotions.

#### WOOD ENGRAVING

Wood engraving is a printmaking and letterpress printing technique, in which an artist works an image or matrix of images into a block of wood. Functionally a variety of woodcut, it uses the end-grain of the block, which allows for finer detail, but also restricts the size. It uses relief printing, where the artist applies ink to the face of the block and prints using relatively

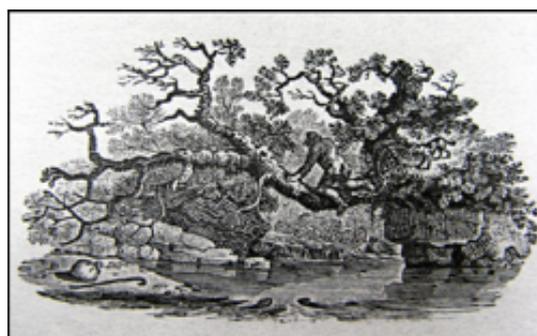
low pressure. By contrast, ordinary engraving, like etching, uses a metal plate for the matrix, and is printed by the intaglio method, where the ink fills the valleys, the removed areas. As a result, wood engravings deteriorate less quickly than copper-plate engravings, and have a distinctive white-on-black character.



**Bewick, Barn Owl 1797-1804.**



**Bewick, Wood Engraving. Block**



**Bewick, Wood Engraving**

**Thomas Bewick** (1723-1828) was an English engraver and natural history author. He is best known for his *A History of British Birds*, which is admired today mainly for its wood engravings, especially the small, sharply observed, and often humorous vignettes known as tail-pieces. The book was the forerunner of all modern field guides. He notably illustrated editions of *Aesop's Fables* throughout his life.



**Frank Leslie**, Illustrated Newspaper 1883.

This is a large wood engraving on an 1883 cover of **Frank Leslie's** Illustrated Newspaper. Such news engravings were composed of multiple component blocks, combined to form a single image, so as to divide the work among a number of engravers.



**Eric Gill**, *Eve* 1929 wood engraving.

#### LINOCUT

Linocut uses the same principal as wood block printing, that is cutting away the part that is to be left white, and printing off the raised surface. The print can be taken in a press, or by placing the paper face down on the 'block' and rubbing on the back in the traditional Japanese manner. Lino as a material for printmaking developed in the 20th century. It is most suitable for flat colour effects which do not require fine detailed drawing.



**James Dodds**, *Maldon Shipwrights*, linocut.  
This image would require two lino 'blocks'



**Picasso**, *Jacqueline* 1962 lino cut.

**Pablo Picasso** (1881-1973), in addition to his major contribution to revolutionising painting and sculpture in the 20th century, made original works in the art forms of ceramics and printmaking. This print of his second wife was made by the 'subtractive' method of cutting which requires only one lino 'block.' Firstly the area to be left white would be removed, the block would be inked in yellow and as many prints taken as required for the full edition. Next the yellow area would be removed and the reddish brown printed, and so on through the dark brown and black. Colour variations can be achieved by changing the colour between prints, and by exploiting the transparency of the colour. It has the disadvantage, over using

separate blocks for each colour, of being unrepeatable once the initial edition is completed.

## **PLATE**

### **ENGRAVING**

Engraving is the practice of incising a design onto a hard, usually flat surface by cutting grooves into it. The result may be a decorated object in itself, as when silver, gold, steel, or glass are engraved, or may provide an intaglio printing plate, of copper or another metal, for printing images on paper as prints or illustrations; these images are also called engravings.

Engraving was a historically important method of producing images on paper in artistic printmaking, in mapmaking, and also for commercial reproductions and illustrations for books and magazines. It has long been replaced by various photographic processes in its commercial applications and, partly because of the difficulty of learning the technique, is much less common in printmaking, where it has been largely replaced by etching and other techniques.

Traditional engraving, by burin or with the use of machines, continues to be practised by goldsmiths, glass engravers, gunsmiths and others, while modern industrial techniques such as photoengraving and laser engraving have many important applications. Engraved gems were an important art in the ancient world, revived at the Renaissance, although the term traditionally covers relief as well as intaglio carvings, and is essentially a branch of sculpture rather than engraving, as drills were the usual tools.



**Durer, *St. Jerome in his Study* 1514, engraving.**



Engraving tools.

### **ETCHING**

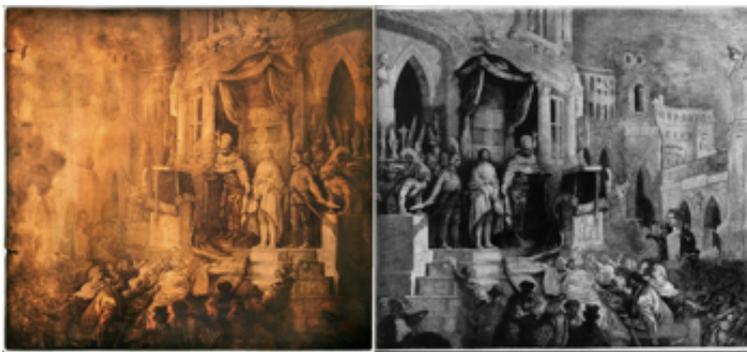
Etching is traditionally the process of using strong acid or mordant to cut into the unprotected parts of a metal surface to create a design in intaglio (incised) in the metal. In modern manufacturing, other chemicals may be used on other types of material. As a method of printmaking, it is, along with engraving, the most important technique for old master prints, and remains in wide use today.

In traditional pure etching, a metal (usually copper, zinc or steel) plate is covered with a waxy ground which is resistant to acid. The artist then scratches off the ground with a pointed etching needle where he or she wants a line to appear in the finished piece, so exposing the bare metal. The *échope*, a tool with a slanted oval section, is also used for "swelling" lines. The plate is then dipped in a bath of acid, technically called the mordant (French for "biting")

or etchant, or has acid washed over it. The acid "bites" into the metal (it dissolves part of the metal) where it is exposed, leaving behind lines sunk into the plate. The remaining ground is then cleaned off the plate. The plate is inked all over, and then the ink wiped off the surface, leaving only the ink in the etched lines.

The plate is then put through a high-pressure printing press together with a sheet of paper (often moistened to soften it). The paper picks up the ink from the etched lines, making a print. The process can be repeated many times; typically several hundred impressions (copies) could be printed before the plate shows much sign of wear. The work on the plate can also be added to by repeating the whole process; this creates an etching which exists in more than one state.

Etching has often been combined with other intaglio techniques such as engraving (e.g., **Rembrandt**) or aquatint (e.g., **Francisco Goya**).



**Jean-Pierre Norblin**, *Ecce Homo*, copper etching plate and print from the plate.



**Rembrandt.**

Self portrait and scene with cottages. These two examples are first state, that is drawn with a stylus into the ground and etched, with no aquatint or other techniques.



**Rembrandt**, *The Three Crosses* 1653.

This example shows further crosshatching to create the dense blacks, probably enhanced by leaving ink on the surface. The plate has been wiped clean in the centre to create the illusion of the light of heaven descending on the figures around the cross. In some parts traces of ink have been left on the surface to create shadow; most notably on the figure centre foreground, which by contrast thrusts the light area behind into the middle distance. The drawing of the figures right centre are left in a sketchy state, in contrast with the more 'complete,' detailed drawing of the figures on the left, and the foliage bottom right. This creates an effect of discovering the figures engulfed in bright, enveloping light.



**Goya**, *No one can help them* c1810.

The initial line drawing of the first state has been amplified by aquatint to achieve a sense of depth and atmosphere.

#### AQUATINT

Aquatint is an intaglio printmaking technique, a variant of etching.

Like etching, aquatint uses the application of a mordant to etch into the metal plate. Where the engraving technique uses a needle to make lines that print in black (or whatever colour ink is used), aquatint uses powdered rosin to create a tonal effect. The rosin is acid resistant and typically adhered to the plate by controlled heating. The tonal variation is controlled by the level of mordant exposure over large areas, and thus the image is shaped by large sections at a time.



Aquatint box.



Zinc plate with powdered resin.

An aquatint box is used to apply resin powder. The powder is at the bottom of the box, a crank or a bellows is used to blow the powder up into the air of the box. A window allows the engraver to see the density of flowing powder and to place his plate in the box using a drawer. When the powder covers the plate, it can be extracted from the box for the next operations.

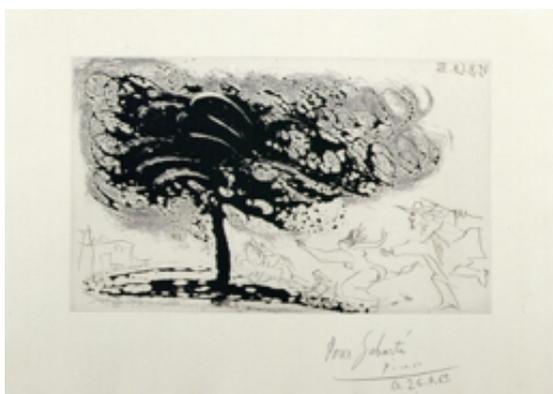
The plate is then heated; if the plate is covered with powder, the resin melts forming a fine and even coat; if it is in spirits, the spirits evaporate and the result is essentially the same. Now the plate is dipped in acid, producing an even and fine level of corrosion (the "bite") sufficient to hold ink. At this point, the plate is said to carry about a 50% halftone. This means that, were the plate printed with no further biting, the paper would display a gray color more or less directly in between white (no ink) and black (full ink).

At some point the artist will then etch an outline of any aspects of the drawing s/he wishes to establish with line; this provides the basis and guide for the later tone work. He or she may also have applied (at the very start, before any biting occurs) an acid-resistant "stop out" (also called an asphaltum or hard ground) if he or she intends to keep any areas totally white and free of ink, such as highlights.

The plate is immersed in the acid bath, progressively stopping out (protecting from acid) any areas that have achieved the designed tonality. These tones, combined with the limited line elements, give aquatints a distinctive, watery look. Also, aquatints, like mezzotints, provide ease in creating large areas of tone without laborious cross-hatching; but aquatint plates, it is noted, are generally more durable than mezzotint plates.



Sugar Lift,  
Unknown artist



**Picasso**, sugar lift with line etching.

### SUGAR LIFT

Sugar lift is a modern technique. Designs in a syrupy solution of sugar (or Camp Coffee) are painted onto the metal surface prior to it being coated in a liquid etching ground or 'stop out' varnish. When the plate is placed in hot water the sugar dissolves and lifts off leaving the image. The plate can then be etched.

Sugar lift solution can be made by dissolving a saturated solution of sugar in water and then adding a few drops of detergent and some Indian ink to colour it.

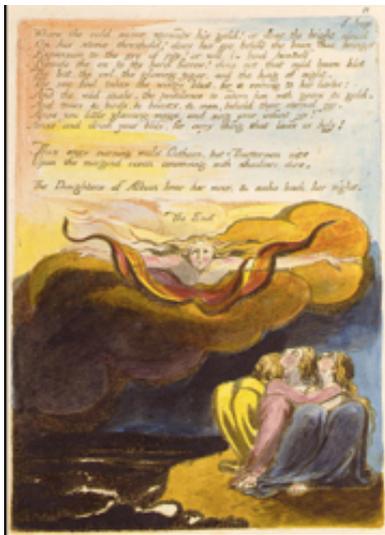
"Instead I go down to the supermarket and purchase a bottle of Chickery or liquid coffee essence. This works just as well in the process as it is coloured and has a high percentage of sugar in it."

## Process

Degrease the etching plate in the usual way. Start drawing your image onto the plate with the coffee lift. If the (coffee) sugar lift does not properly adhere to the plate, put the plate in acid for one second, then take it out and rinse and dry with a rag.

After applying the drawing, lightly warm or with a hairdryer blow air on the sugary coffee liquid until it is dry. It will still remain very sticky. Pour thinned solution of bitumen (stop out) onto the plate making sure to move the plate to give an even coat over all of it. After drying the bitumen immerse the plate into warm water. Wait for the sugar lift solution to lift off or gently brush with a soft brush which can be continually charged with soap to keep it smooth. Eventually the sugar solution will completely lift off.

The open areas of the plate can then be open bitten, aquatinted, or sprayed with paint and placed in acid for the desired tonality.



**Blake**, *Visions of the Daughters of Albion*

**William Blake** (1757-1827) was trained in traditional printmaking techniques. However, he developed an entirely personal method of printing for his books which involved a combination of relief etching for the lines and monotype for the colour. In effect he reversed the method of intaglio printing from a copper plate by 'stopping out' his liner design and lettering, then etching away the background in the acid bath. He then inked the raised surface to make a print, usually in sepia tones. Colour was added either by monotype or watercolour. This had the advantages of being quicker and allowing more variation in the colour (most of his books were printed in very small numbers and treated individually.) Also the paper remained flat, without the pressed in impression of the edges of the metal plate, typical of etchings, so that it could be printed on both sides.

## MEZZOTINT

Mezzotint is a printmaking process of the intaglio family, technically a drypoint method. It was the first tonal method to be used, enabling half-tones to be produced without using line- or dot-based techniques like hatching, cross-hatching or stipple. Mezzotint achieves tonality by roughening a metal plate with thousands of little dots made by a metal tool with small teeth, called a "rocker". In printing, the tiny pits in the plate hold the ink when the face of the plate is wiped clean. A high level of quality and richness in the print can be achieved.

Alternatively, it is possible to create the image directly by only roughening a blank plate selectively, where the darker parts of the image are to be. This is called working from "light to dark", or the "additive" method. The first mezzotints by Ludwig von Siegen were made in this way. Especially in this method, the mezzotint can be combined with other intaglio techniques, such as engraving, on areas of the plate not roughened, or even with the dark to light method.



**Peter Ilsted,**  
*Sunshine Falling on a Door*



Mezzotint, 17th century.

#### STEEL ENGRAVING

Steel engraving is a technique for printing illustrations based on steel instead of copper. It has been rarely used in artistic printmaking, although it was much used for reproductions in the 19th century.



Banknote



Steel engraving c1840.

#### DRYPOINT

Drypoint is a printmaking technique of the intaglio family, in which an image is incised into a plate (or "matrix") with a hard-pointed "needle" of sharp metal or diamond point. In principle the method is practically identical to engraving. The difference is in the use of tools, and that the raised ridge along the furrow is not scraped or filed away as in engraving. Traditionally the plate was copper, but now acetate, zinc, or plexiglas are also commonly used. Like etching, drypoint is easier for an artist trained in drawing to master than engraving, as the technique of using the needle is closer to using a pencil than the engraver's burin.



**Lesser Ury, *Woman in Cafe***  
Drypoint showing the typical rich blurred line of drypoint.



**Stanisław Masłowski, ca 1905,**  
*Portrait of Artist's Wife*, drypoint.

The lines produced by printing a drypoint are formed by the burr thrown up at the edge of the incised lines, in addition to the depressions formed in the surface of the plate. A larger burr, formed by a steep angle of the tool, will hold a lot of ink, producing a characteristically soft, dense line that differentiates drypoint from other intaglio methods such as etching or engraving which produce a smooth, hard-edged line. The size or characteristics of the burr usually depend not on how much pressure is applied, but on the angle of the needle. A perpendicular angle will leave little to no burr, while the smaller the angle gets to either side, the larger the burr pileup. The deepest drypoint lines leave enough burr on either side of them that they prevent the paper from pushing down into the centre of the stroke, creating a feathery black line with a fine, white centre. A lighter line may have no burr at all, creating a very fine line in the final print by holding very little ink. This technique is different from engraving, in which the incisions are made by removing metal to form depressions in the plate surface which hold ink, although the two methods can easily be combined, as Rembrandt often did. Because the pressure of printing quickly destroys the burr, drypoint is useful only for comparatively small editions; as few as ten or twenty impressions with burr can be made, and after the burr has gone, the comparatively shallow lines will wear out relatively quickly. Most impressions of **Rembrandt** prints on which drypoint was used show no burr, and often the drypoint lines are very weak, leaving the etched portions still strong. To counter this and allow for longer print runs, electroplating (called steel-facing by printmakers) can harden the surface of a plate and allow the same edition size as produced by etchings and engravings.



**Mary Cassatt**, *The Bath*, 1890-1 Drypoint combined with aquatint,

## **SURFACE**

### **MONOTYPE / MONOPRINT**

Monotyping is a type of printmaking made by drawing or painting on a smooth, non-absorbent surface. The surface, or matrix, was historically a copper etching plate, but in contemporary work it can vary from zinc or glass to acrylic glass. The image is then transferred onto a sheet of paper by pressing the two together, usually using a printing-press. Monotypes can also be created by inking an entire surface and then, using brushes or rags, removing ink to create a subtractive image, e.g. creating lights from a field of opaque colour. The inks used may be oil based or water based. With oil based inks, the paper may be dry, in which case the image has more contrast, or the paper may be damp, in which case the image has a 10 percent greater range of tones.



**Castiglione**, *The Creation of Adam* c1642. Monotype.

**Giovanni Castiglione** (1609-1664) is regarded as the originator of the Monotype.

A monoprint is a single impression of an image made from a reprintable block. Materials such as metal plates, litho stones or wood blocks are used for etching upon. Rather than printing multiple copies of a single image, only one impression may be produced, either by painting or making a collage on the block. Etching plates may also be inked in a way that is expressive and unique in the strict sense, in that the image cannot be reproduced exactly. Monoprints may also involve elements that change, where the artist reworks the image in

between impressions or after printing so that no two prints are absolutely identical. Monoprints may include collage, hand-painted additions, and a form of tracing by which thick ink is laid down on a table, paper is placed on top and is then drawn on, transferring the ink onto the paper. Monoprints can also be made by altering the type, color, and pressure of the ink used to create different prints. When you create a monoprint, it is possible to copy work from separate pieces of artwork onto one mono print.



**Degas**, *Three Ballet Dancers*. monoprint.



**Allen Jones**, *Spice Island 1986* mono print.

Monoprinting and monotyping are very similar. The difference between monoprinting and monotype printing is that monoprinting has a matrix that can be reused, but not to produce an identical result. With monotyping there are no permanent marks on the matrix, and at most two impressions (copies) can be obtained. Both involve the transfer of ink from a plate to the paper, canvas, or other surface that will ultimately hold the work of art. In the case of monotyping the plate is a featureless plate. It contains no features that will impart any definition to successive prints. The most common feature would be the etched or engraved line on a metal plate. In the absence of any permanent features on the surface of the plate, all articulation of imagery is dependent on one unique inking, resulting in one unique print. Monoprints, on the other hand, are the results of plates that have permanent features on them. Monoprints can be thought of as variations on a theme, with the theme resulting from some permanent features being found on the plate – lines, textures – that persist from print to print. Variations are confined to those resulting from how the plate is inked prior to each print. The variations are endless, but certain permanent features on the plate will tend to persist from one print to the next.

Monoprinting has been used by many artists, among them **Georg Baselitz**. Some old master prints, like etchings by **Rembrandt** with individual manipulation of ink as "surface tone", or hand-painted etchings by **Degas** (usually called monotypes) might be classifiable as monoprints, but they are rarely so described.

Monoprints are known as the most painterly method among the printmaking techniques; it is essentially a printed painting. The characteristic of this method is that no two prints are alike. The beauty of this medium is also in its spontaneity and its combination of printmaking, painting and drawing media.

## LITHOGRAPHY

Lithography (from Ancient Greek lithos, meaning 'stone', and graphein, meaning 'to write') is a method of printing originally based on the immiscibility of oil and water. The printing is from a stone (lithographic limestone) or a metal plate with a smooth surface. It was invented in 1796 by German author and actor **Alois Senefelder** as a cheap method of publishing theatrical works. Lithography can be used to print text or artwork onto paper or other suitable material.

Lithography originally used an image drawn with oil, fat, or wax onto the surface of a smooth, level lithographic limestone plate. The stone was treated with a mixture of acid and gum arabic, etching the portions of the stone that were not protected by the grease-based image. When the stone was subsequently moistened, these etched areas retained water; an oil-based ink could then be applied and would be repelled by the water, sticking only to the original drawing. The ink would finally be transferred to a blank paper sheet, producing a printed page. This traditional technique is still used in some fine art printmaking applications.



**Charles Marion Russell,**  
*The Custer Fight* (1903) lithograph.



Stone used for a lithograph  
with a view of Princeton University.

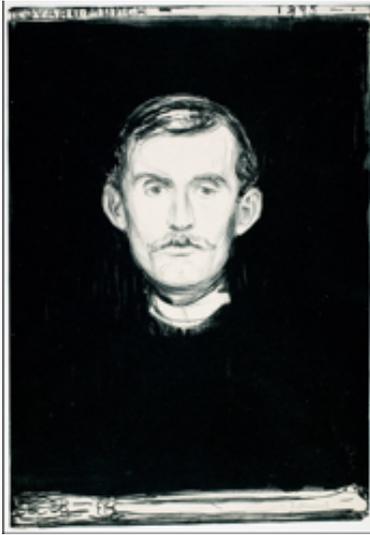


**Bellows,** *In the Park*, 1916 Lithograph



**Lautrec,** *Moulin Rouge, La Goulue* 1891.  
Lithographic poster

**Henri de Toulouse Lautrec** (1864-1901) developed lithograph as an art form and revolutionised the art of the theatrical poster. These two examples, made from the same stone, demonstrate his artistry in making variations of the print.



**Munch**  
*Self Portrait with Skeleton Arm*  
Lithograph

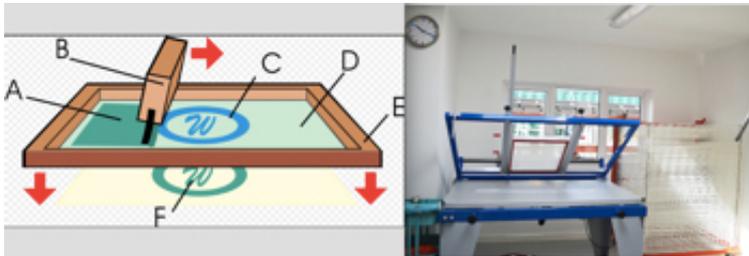


**Ernst Haeckel**  
*Sea anemones from Kunstformen der Natur*  
(*Artforms of Nature*), 1904. Lithograph.

**Ernst Haeckel** (1834 –1919) was a German biologist, naturalist, philosopher, physician, professor, marine biologist, and artist who discovered, described and named thousands of new species, mapped a genealogical tree relating all life forms, and coined many terms in biology, including anthropogeny, ecology, phylum, phylogeny, and Protista. Haeckel promoted and popularised Charles Darwin's work in Germany.

## **SCREEN**

### **SILK SCREEN PRINTING / SERIGRAPHY**



Screen printing is a stencil method of print making in which a design is imposed on a screen of polyester or other fine mesh, with blank areas coated with an impermeable substance. Ink is forced into the mesh openings by the fill blade or squeegee and by wetting the substrate, transferred onto the printing surface during the squeegee stroke. As the screen rebounds away from the substrate the ink remains on the substrate. It is also known as silk-screen, screen, serigraphy, and serigraph printing. One colour is printed at a time, so several screens can be used to produce a multicoloured image or design.



**Henry Moore**, *Wall Hanging* 1947.  
Screen print.



**Andy Warhol**, *Marilyn*, screen print.

**Andy Warhol** (1927-1987) used silk screen printing to make repetitions of his images of celebrities. Produced with his assistants in his studio, known as The Factory, they are an ironic comment on industrialised production. The silk screen stencils (one for each colour patch) would be made from a photograph, which is a mechanical reproduction. By changing the colours between prints, and slight off registering, he introduces elements of chance and accident, thereby using an industrial process to produce a 'hand made' product. Although denying that there was anything behind or 'beneath' the surface of his pictures - 'what you see is what you get' - no interpretation or 'story' to be discovered, nevertheless the unnatural and sometimes violent colouring, varying from one face to another, conveys a sense of differing moods and aspects of personality in conflict with one another.