LITHOGRAPHY.

instruction

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Realized under the scholarship program of the Minister of Culture and National Heritage – ***Culture in the network***



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Historical outline

The technique of printing from lithographic stone was invented in 1798. The German graphic artist Alojzy Senefelder, who in 1817 published a book on lithography entitled “A detailed manual of all lithographic stone printing methods”, which initiated the development of technology in Germany. Then, lithographic studios were established in Paris, Madrid and Warsaw (1818). The best lithographic stones were obtained from Bavarian quarries near Solenhofen.

In the graphic industry, offset zinc plates were introduced for utility printing, which made it possible to obtain more prints in a shorter time. In artistic lithography, limestone slate is still used today.

Lithography– a flat printing technique

Lithography is a flat printing technique that relies on a number of chemical processes that take place on the stone. Lithography is based on the mutual repulsion of oil and water. Parts of the stone are made to attract water (they become hydrophilic) and others are primed to repel it and absorb oils instead (they become oleophilic). In preparation for printing, the stone is covered with alternate layers of water and ink, which only adhere to specific areas of the surface. Greasy areas absorb the ink to create a drawing, which is then impressed on paper.

The drawing on the lithographic template is a positive, i.e. all its black areas will also come out black in print (as a mirror image), which makes printing much easier in comparison with other techniques. Thanks to the use of materials such as crayons and lithographic inks, working with stone is not very different from working paper – the images are simply drawn. This makes it possible to imitate any technique – a detailed pencil drawing, a rough charcoal sketch, or a delicate watercolor, etc. Drawing becomes faster, lighter, and less constrained.

Lithographic stone may be used multiple times, since the original drawing is easily scrubbed away. Lithography requires layers of limestone with a compact and uniform structure that can be split into plates. Due to the presence of silicic acid in the stone in a greater or lesser percentage, lithographic stones have various hardnesses and different colors.

In fact, the possibilities are endless and individual artists can use the basic principles of lithography to devise their own original methods.

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Lithographic stone

Lithographic stone is a lime shale in the form of a compact, layered stone, composed of calcium carbonate, silicon, alumine and iron oxide. The best and the oldest stones are extracted from Bavarian quarries, but stone was once also mined for lithographic purposes in America, England, France, Russia and Poland. Today, sources have been almost completely depleted and most of its supply comes from the German site of Solnhofen. Lithographic stone is available in four colours, from gray to warm yellow with a pinkish hue.

Readying the stone

To begin with, the stone must be prepared for drawing. It needs to be ground, smoothed and evened out to make sure its surface has an appropriate texture. This is usually done with another, slightly smaller stone, as well as with water and corundum.

Corundum

The stone can be polished with corundum or carborundum. The latter, also known as silicon carbide, is a synthetic compound obtained in electric furnaces at a temperature of 2000°C from a mixture of carbon and silica sand. Its hardness is comparable to that of diamond, which makes it suitable for use as an abrasive material. Pressed by the second stone, carborundum particles wear away a microscopic layer of the litho stone, removing the old image and giving a fine grain to the surface. Corundum used in lithography is usually graded on a grit scale ranging from 100 (the coarsest), through 150 / 180, all the way to 220 (the finest).

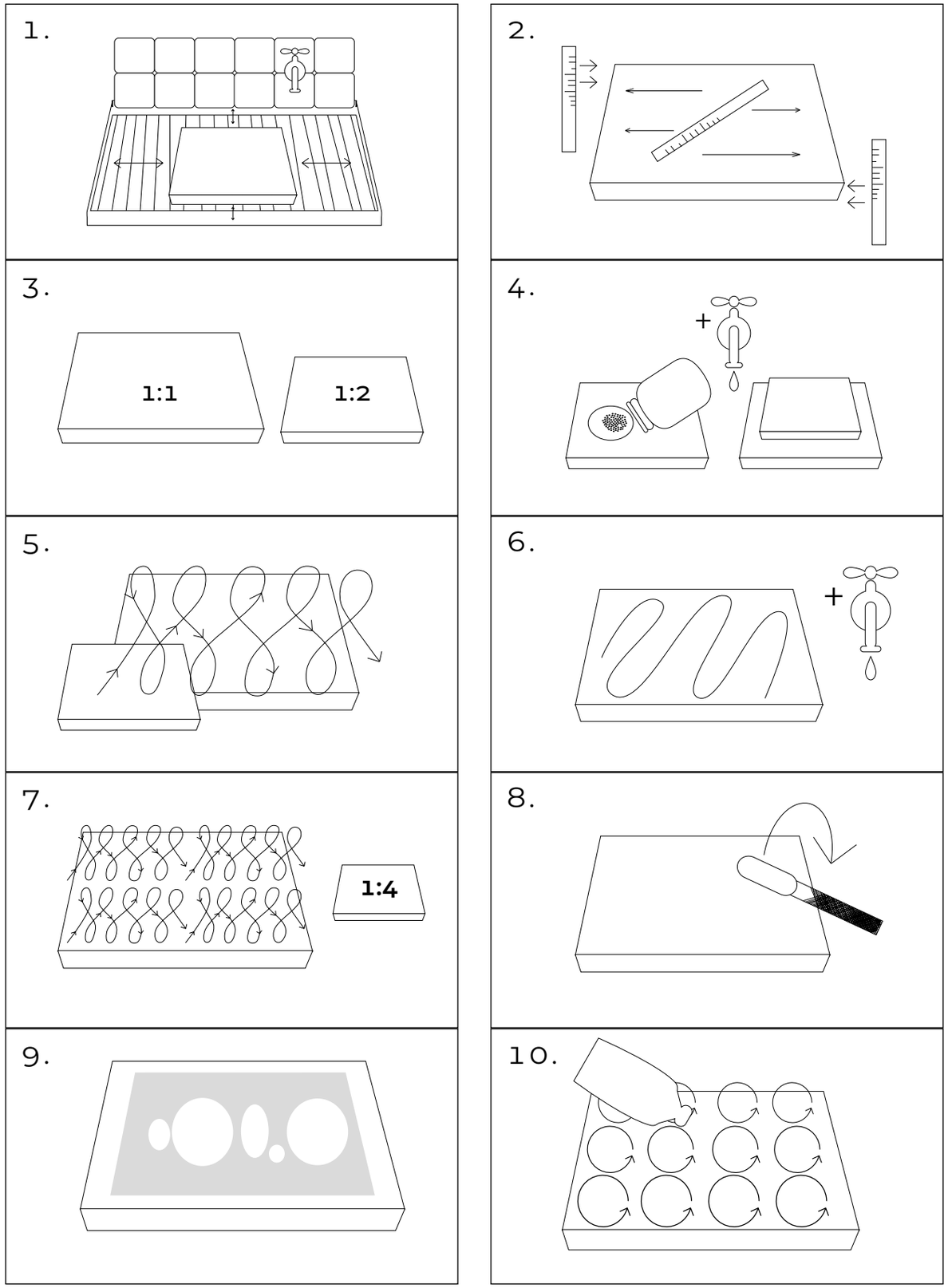
Levelling the stone

Printing with the lithographic press requires that the stone should be perfectly even, with no dips and bumps, to make sure that an even pressure will be exerted across the entire surface. Before you grind a stone that has never been used before, or one that seems rugged, first carry out a simple test. To do so, you will need strips of thin paper and a large metal ruler, whose length should be greater that the diagonal of the stone in question. Place the ruler on the diagonal; if you are able to slide the strip of paper underneath in different spots, the surface is even. The result should be the same no matter where the ruler is placed.

Grinding

Put the stone to be ground on the grinder; make sure that plenty of water is available. You will need another, smaller stone. If you opt for the former, keep in mind that the grinding stone loses the image faster than the polished surface. Grinding a medium-sized stone takes an average of about 30 minutes.

1. GRINDING THE STONE



1. Make room on the grinder; ensure easy access to the stone and ample water.

2. Check if the surface of the stone is even - if the stone has any dimples or irregularities. If so, try to get rid of them throughout the stone grinding process.

3. Prepare the second, smaller grinding stone.

4. Sprinkle the stone with a small amount of biggest carborundum, wet it with water, and place the smaller stone on it.

5. Grind evenly with circular movements, until you are no longer able to slide one stone against the other. To avoid creating a dimple in the stone, remember to put the grinding stone over the edge. **Repeat this step until the drawing disappears completely.**

6. Put the smaller stone away and **wipe both with water**, so that there are no sand particles left on it. Also remember to rinse your hands.

7. Put corundum of less thickness onto the stone. Add a little water. Grind with a much smaller stone until the stone stops sliding over the surface. Repeat the step depending on the desired final effect (the more you polish the stone, the smoother the surface will be).

8. Use a metal file to polish off the sharp edges of the stone so that they have a rounded shape.

9. The stone is ready for drawing. Previus stone grease may be slightly visible on the surface, however, it will not take on the grease. This is called *stone memory* – which can be used when planning printing from multiple matrices.

10. If you do not start drawing on the stone right away, you will need to sensitize it with alum: put the alum on the stone and rub the surface of the stone with circular movements until it turns white. Then you wash the stone with water.

TOOLS:

1. 3 stones

2. carborundum 100, 150, 220

3. ruler

4. metal file

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Sensitize the stone

Before drawing, the stone should be sensitized with alum so that it absorbs fat better.

The stone gumming process

The metaarabine contained in the rubber fills the pores of the stone and creates a thin, water-insoluble, fat-free layer. A thin layer of rubber is applied over the entire surface of the stone. The stone gumming process is used so that the stone remembers the changes made to the matrix. The gum dissolves in water - wash the gum with water, wiping the stone with a sponge. Rubber does not protect the stone against acid, but it protects against other external factors. Tip: never leave a stone free, even if you want to return to work the next day.

The turpentine and tincture process

The drawing should be washed out with turpentine through the so-called *dry film*, i.e. on the gummed stone. The rubber protects our drawing from excessive greasing with turpentine - rubber is soluble in water, and turpentine has a small amount of water in it, which means it will dissolve the rubber and the process of washing the drawing with thermpentine will be slower, with more control. Tincture chokes the drawing - it makes it stronger and more saturated. Apply the tincture to the stone with a rag, carefully wiping the entire surface of the stone. Wipe the tincture dry with a rag.

Applying ink to the stone

Before each ink transfer, the stone should be wiped with water using a sponge. The dry spots left will absorb the transfer ink immediately. Leather rollers are used for transfer ink; we use rubber rollers for offset ink. Be careful not to blacken the drawing when adding paint to the stone.

Etching

During etching, calcium carbonate breaks down in acids, turns into the salt of the used acid, water and carbonic anhydride, which takes the form of small bubbles. During etching, the calcium salt covers the stone with a very thin layer that is insoluble and porous. This layer holds water and repels greasy printing inks. Etching should take several seconds, depending on the strength of the acid. Etching should be performed several times - the greater the number of etching, the more stable the stone will be and will print more smoothly (it will not blacken). Before each stone etching, transfer ink should be applied.

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Lithography is characterized by a rich array of drawing techniques, including crayon, ink wash, Syrian asphalt and drypoint, to name a few. These depend on the materials used to draw on the litho stone, such as lithographic crayons, solid or liquid lithographic ink, Syrian asphalt dissolved in turpentine, and offset printing ink diluted with turpentine or petroleum. Drawing implements may include all kinds of scrapers, polishing stones and cubes or needles.

Lithographic crayon

Lithographic crayon is the simplest drawing implement. It pose no difficulty for printmaking, which can proceed immediately after the drawing has been finished and produced a positive print. When magnified, the trace of crayon on the stone consists of waxy particles lodged in a grainy surface similar to that of sandpaper. In order to achieve an intense black, it is better to add gentle criss-crossing lines one by one rather than exert a lot of pressure. Otherwise, tiny particles of greasy matter may stick to the crayon and leave thick patches in some places, leaving other untouched. Using lithographic crayons is similar to working with greasy pastel paints.

Wash drawing

To make a wash drawing, you will need some lithographic ink and water. Solid lithographic ink, which comes in cubes, first needs to be ground in a porcelain bowl and then diluted with several drops of distilled water. Grind it with your finger to ensure it spreads uniformly and then dilute according to need. Lithographic ink can also be combined with crayons, but it should be kept in mind that the former is likely to smudge and blacken the image when superposed on the former. If lithographic ink is repeatedly added to the same spot, the drawing will also turn more oily, even if the lithographic ink itself does not seem very intense. To be able to properly control the production of a wash, the drawing needs to be regularly wiped dry with a piece of cloth, because wet stone will affect the intensity of colour. The lithographic ink must be diluted with distilled water.

Syrian asphalt washing – *(ossa sepia, manière noire – Mezzotint on stone)*

The technique involves drawing on a more coarse-grained litho stone, using Syrian asphalt dissolved in turpentine. You can also use turpentine mixed with a bit of petroleum.

Colour lithography

Colour lithography requires that we use a separate stone for each colour in the drawing. An experienced lithographer is able to use the three basic colours to elaborate a rich palette by predicting their derivatives. Each colour should be drawn

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on a separate stone, unless the elements are spaced enough not to overlap during printing. However, each colour is usually printed separately, at intervals of several days, so that the prints have ample time to dry. It is important to plan out the sequence of colours in advance, since the inks are transparent and their superposition results in derivative colours, which plays an important role in colour mixing.

Inverted drawing

Another technique is known as *inverted drawing*, which consists of white lines or blots on a black background. Two methods can be used to achieve this effect: one involves the use of acidic materials, the other consists in drawing on a previously etched stone surface. After the drawing has been finished, the stone is etched and greased with lithographic ink. The lithographic ink is then wiped off and ink is applied, resulting in a white image on a dark background.

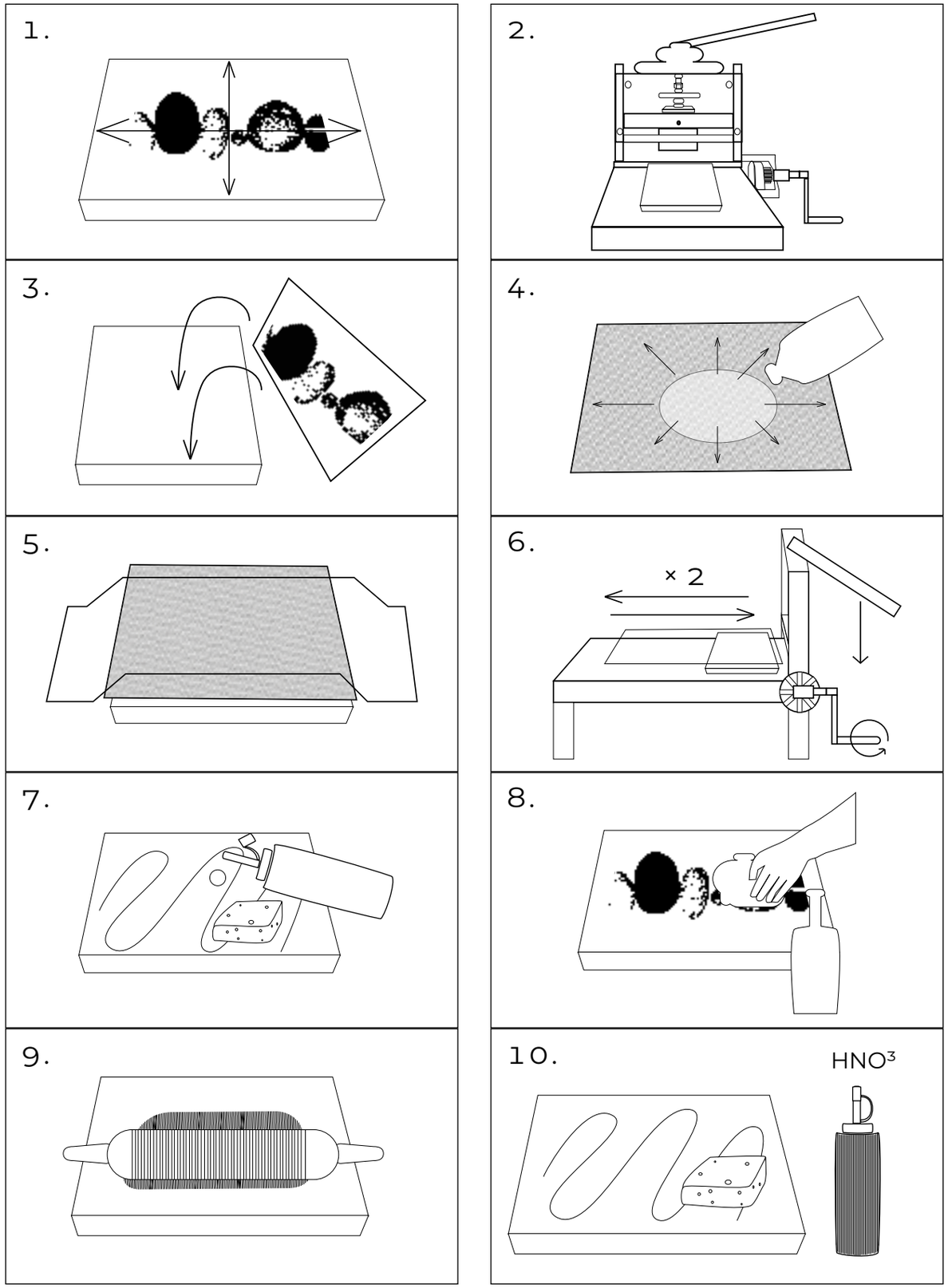
Xerox

Lithography also makes it possible to transfer a xerox image to stone. After grinding, the stone is very sensitive to even trace amounts of oily materials, which can be used as carriers for ink. By using aggressive nitro solvents or acetone, you can thus easily transfer a toner image (xerox) to stone. The xerox image needs to be prepared saved as a greyscale image.

Margins

Before drawing, the edges of the stone should be impregnated against oil. Once the format of the image has been decided (it needs to be smaller than the stone), they can be washed with a solution of gum arabic to prevent the absorption of oily substances. In this manner, you will be able to support your arm against them while drawing.

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1. Convert the graphic into a greyscale. Print it out with a xerox machine. Make sure the print is adjusted to the size of the stone. The graphic will be transferred as a mirror image.

2. Place the stone on the lithographic press and prepare the press for printing * *see chapter PREPARING THE PRINTING PRESS*.

3. Place the xerox print face down on the stone.

4. Soak the tissue paper evenly with nitro solvent. Always use thick gloves for nitro.

5. Put the tissue paper on the stone, you can cover it with foil (the fumes only act on the stone).

6. Make the print. Remember that nitro solvent dries very quickly.

7. Apply gum arabic to the stone; let it dry.

8. Additionally you can grease the graphics with a dry rag, rub the tincture or turpentine essence onto the stone.

9. With a leather roller, apply transfer ink until the drawing is properly saturated. Be careful not to blacken the grease. When applying the printing ink, remember to wet the stone.

10. Etch the stone and gum it. If you want to draw something – you should sensitize the stone with alum.

TOOLS:

1. black litho ink

2. bowl of water and sponge

3. xerox print

4. nitro solvent

5. tissue paper / cardboard

6. foil

7. polished stone

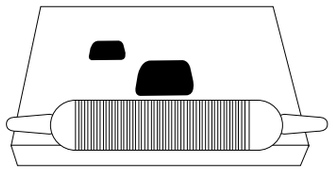
8. thick gloves

9. gum arabic

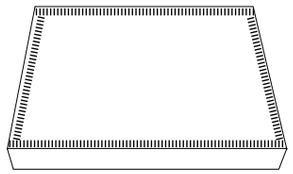
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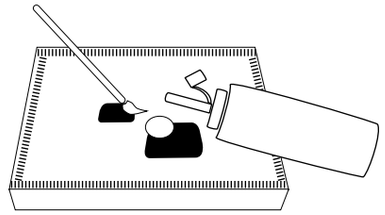
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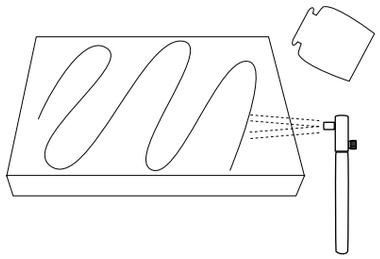
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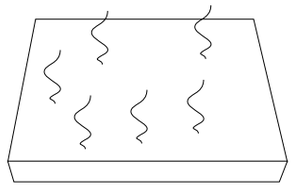
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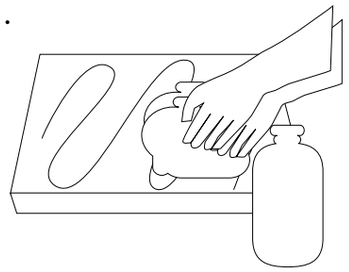
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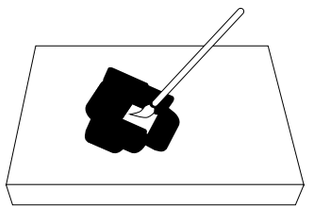
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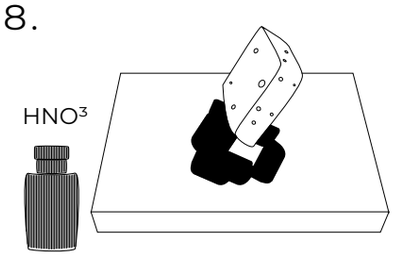
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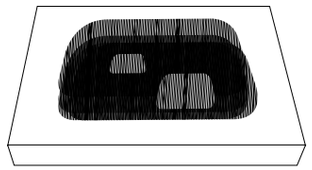
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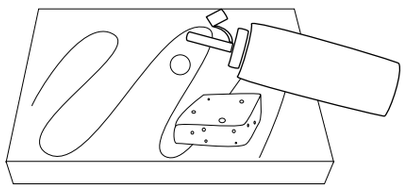
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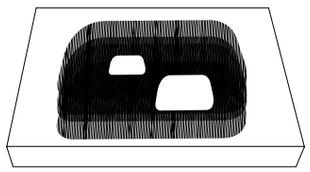
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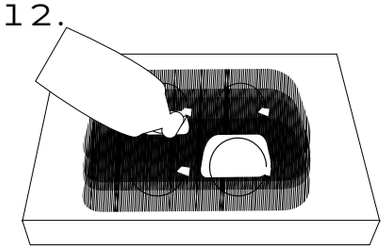
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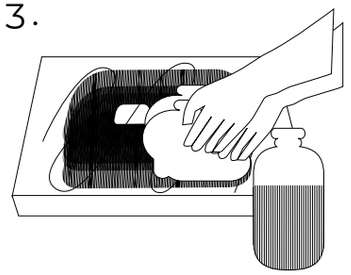
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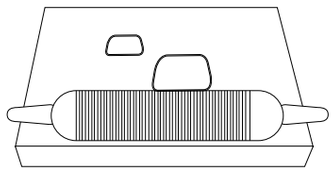
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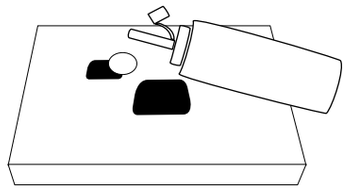
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15.



1. Apply the black transfer ink to the surface of the drawing. Remember to wet the stone before.

2. Secure the margins with paper tape or gum arabic.

3. With Arabic gum, paint over the larger parts that are not meant to be black.

4. Apply the spirit varnish on the stone. It is good to use an areograph for this.

5. Wait for it to dry.

6. Clean the stone with turpentine. Use cloth.

7. Use a strong acid to etch the places where the image was. Use a brush.

8. Remove the acid with a sponge to prevent it from etching the varnish.

9. After a while a **negative image** should emerge.

10. Apply gum arabic to the stone.

11. The matrix is ready for the printing process.

THE ENTIRE PROCESS CAN BE REVERSED BACK TO THE POSITIVE DRAWING.

12. To reverse the process, sensitize white areas (non-printing areas) with alum.

13. Remove the spirit varnish with denatured alcohol.

14. Apply paint on the stone until the inverted drawing appears.

15. Apply gum arabic on the stone. The process is complete.

TOOLS:

1. black litho ink
2. bowl of water and sponge
3. tape
4. fan
5. spirit varnish
6. gauze / cloth
7. turpentine
8. weak and strong acid
9. gum arabic
10. acid

11

A key stage in the lithographic process involves preparing a template. The first etching is particularly important. Its purpose is to separate drawn areas from empty spaces so that they will repel or absorb the printing ink. During etching, fatty acids contained in the material substance of the drawing are released; subsequently, these penetrate the porous surface of the stone and bind with it permanently. When this happens, the material substance becomes redundant. Areas which have absorbed fatty acids will serve as a printing base that will absorb ink and recreate the image. Empty spaces and margins, on the other hand, are ready to soak up moisture and repel oil.

Etching the stone

Etching involves separating the printing and the non-printing parts of the template. When an oily substance comes into contact with the stone, an immediate chemical reaction is produced between the alkaline limestone and the fatty acids in the drawing, and the product is calcium oleomanganate that accumulates just below the surface.

Once the drawing is made, as well as after etching, the stone should be put aside for a while to allow the chemical reaction to take place; this will make the template more stable. These pauses should be taken into account when planning the total time needed to make a print.

In the context of lithography, the phrase *etching the stone* is apt to be misunderstood, since it does not mean eating away at the structure of the material as is the case in letterpress printing or creating grooves typical of intaglio techniques. Rather, the term refers to the process of making the undrawn areas of the stone resistant to oil, so that they will not be able to absorb ink.

Chemical reaction

The process requires a solution of gum arabic and a small quantity of nitric acid. When acidized and applied to the stone, gum arabic will immediately create a thin layer of calcium nitrate on its surface. The reaction proceeds as follows:

$$CaCO_3 + 2HNO_3 \rightarrow Ca(NO_3)_2 + H_2CO_3\uparrow$$

Calcium carbonate + nitric acid → calcium nitrate + carbonic acid (volatile)

Nitric acid reacts with calcium carbonate to produce a layer of gum arabic with calcium. The layer will lay out the light-coloured parts of the composition by repelling oily ink.

Fatty acids are released as a consequence of several chemical reactions; they penetrate into the structure of the stone and create oily areas just below the surface, thus helping to separate the printing and the non-printing parts of the template.

Acid

Nitric acid (HNO^3) is the most frequent acid used in lithography. Higly corrosive and oxidizing, its concentrated form is usually employed in very small quantities, ranging from several to several dozen drops per 30 ml of gum arabic. At these proportions, the solution is completely safe for the skin.
The stone is usually etched with different acids: weak, strong, and the strongest, applied with a brush. **ALWAYS CHECK THE STRENGTH OF THE ACID ON THE STONE MARGIN.**

Weak acid (6-8 drops of acid per 30 ml of gum arabic)
Weak acid is obtained by adding nitric acid to a dextrin solution (water, gum arabic and some formalin) in a quantity that makes it gently react with the stone upon contact. Weak acid is not foamy and releases very smallisolated air bubbles during etching.

Medium acid (10-12 drops of acid per 30 ml of gum arabic)
Medium acid is foamy and releases medium isolated air bubbles during etching. Apply with brush.

Strong acid (20-30 drops of acid per 30 ml of gum arabic)
The strong acid should begin to foam immediately upon contact with the stone and etch the spots almost all at once. It is applied with a brush, never by hand, and has the highest concentration of acid. It is useful in etching the margins.

Gum arabic

Gum arabic is collected from an acacia tree that grows in Africa, especially in Senegal and Sudan. Before the dry season, the tree accumulates stores of resin just beneath its bark to be able to survive long period without water. Holes are then cut into the bark to collect the precious substance; the gum is exuded in the form of crystals.
In order to obtain the form of gum arabic used in lithography, the crystals are then dissolved in distilled water with a few drops of formalin. The latter is added because, as an organic substance, the solution is susceptible to bacterial activity and tends to get mouldy rather quickly. The mucous liquid thus obtained is used to impregnate the drawing on the stone and etch very delicate wash drawings. The gum can also be used to create a negative image.

Lithographic tincture

Tincture is used to grease the matrix. It is used in cases when the stone does not want to or unevenly takes on the printing ink. The tincture is rubbed into the drawing with a cloth, it washes away the pigment, but strengthens the grease. After washing the stone with tincture, the stone should be reprinted with a lithographic roller.

Shellac

Shellac is a resin secreted by lac bugs living on tropical trees such as, for instance, the fig trees of South Asia, and comes in

the form of very thin golden yellow, orange, or brown flakes. Chemically, it consists primarily of fatty acid esters, and is insoluble in water, which makes it popular in lithography.

Dissolved in denatured alcohol, shellac is used also in lithography in the process of image inversion (negative).

Colophony

Colophony, also known as rosin, is a brittle, transparent, reddish yellow or dark brown substance, mostly composed of acids, produced as a residue from the distillation of conifer resins, especially those collected from various species of pine trees. In lithography, it serves to make the material substance of the drawing more resistant to etching, especially in delicate areas. Particles of ground rosin adhere to the oily surface to form a kind of acid-resistant enamel. Lithography uses colophony in the form of fine-grained powder.

Nitro solvent

The solvent is used to transfer a xerox print to stone, as well as during tile printing.

Talcum

Tiny talcum particles stick to oil droplets and dry them off, allowing the etching substance to reach all areas of the drawing. Talc is also partially resistant to acid and removes the excess of rosin.

Syrian asphalt

Syrian asphalt comes in the form of powder and can be dissolved in pure turpentine. Before use, however, it should be filtered through a cloth. It is recommended to store the powder in light-proof containers. *Use for ossa sepia technique, (manière noire – Mezzotint on stone).*

Lithographic varnish

Lithographic ink is usually diluted in weak, medium, or strong lithographic varnish, the weak one being the most frequently used. The varnish increases the viscosity of ink.

Petroleum

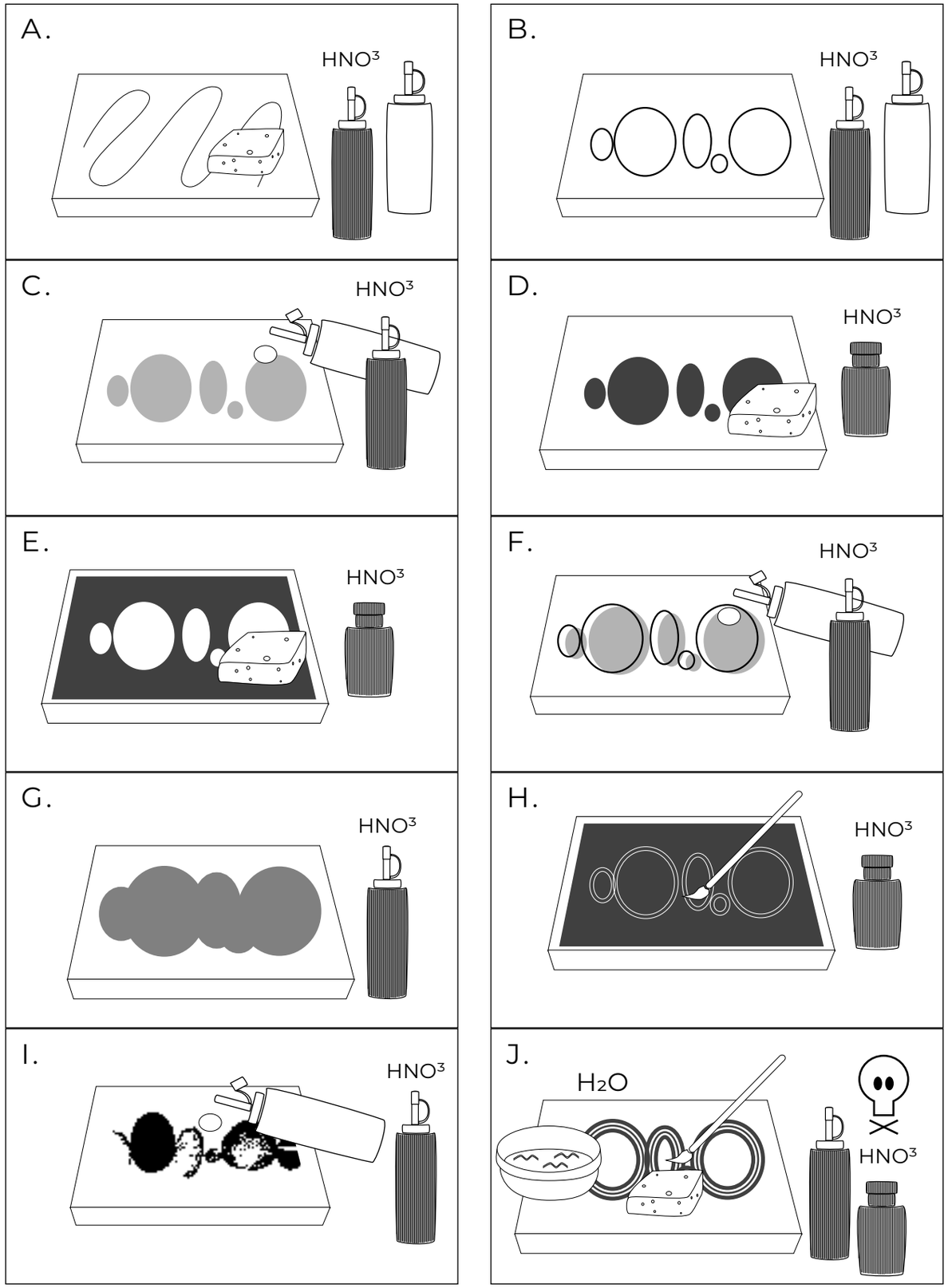
Used to wipe the tile and clean the rollers. When added to asphalt in small quantities, it helps it to dry faster.

Magnesia

When you need to produce a colour lithograph quickly from many stones, the ink should be dried with flash powder to facilitate fast printing.

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4. ETCHING THE STONE



A. **After each use of acid, clean acid with water and apply gum arabic to the entire surface of the stone.** Each etching process must be done only once a day.

B. **Crayon drawing** – first apply talk, wait 1 day; use gum arabic, dry it and use gradually weak acid for the entire surface. Clean acid and put gum arabic. **Drawing requires etching the stone several times (3-5 times):** for each etching process apply first: fresh litho ink with leather roller than do the etching than apply gum arabic.

C. **Wash drawing** – first etching do with weak acid on gum arabic. Then put gun arabic. The drawing must go through the process of heating the stone ** see chapter: HEATING THE STONE.*

D. **Syrian asphalt washing** – use medium acid with sponge. For thin lines use the brush with acid.

E. **Negative drawing** – use strong acid with brush or sponge.

F. **Drawing with litho ink** – leave the drawing to dry **for 1 week,** first etching do with weak acid on gum arabic. The drawing must go through the process of heating the stone. ** see chapter: HEATING THE STONE.*

G. **Flat colour** – use weak acid.

H. **Drawings scratched in asphalt** – use stronger acid with small brush.

I. **Xerox print** – apply gum arabic, dry it. Wet the stone and apply with roller the litho ink and then, use weak acid.

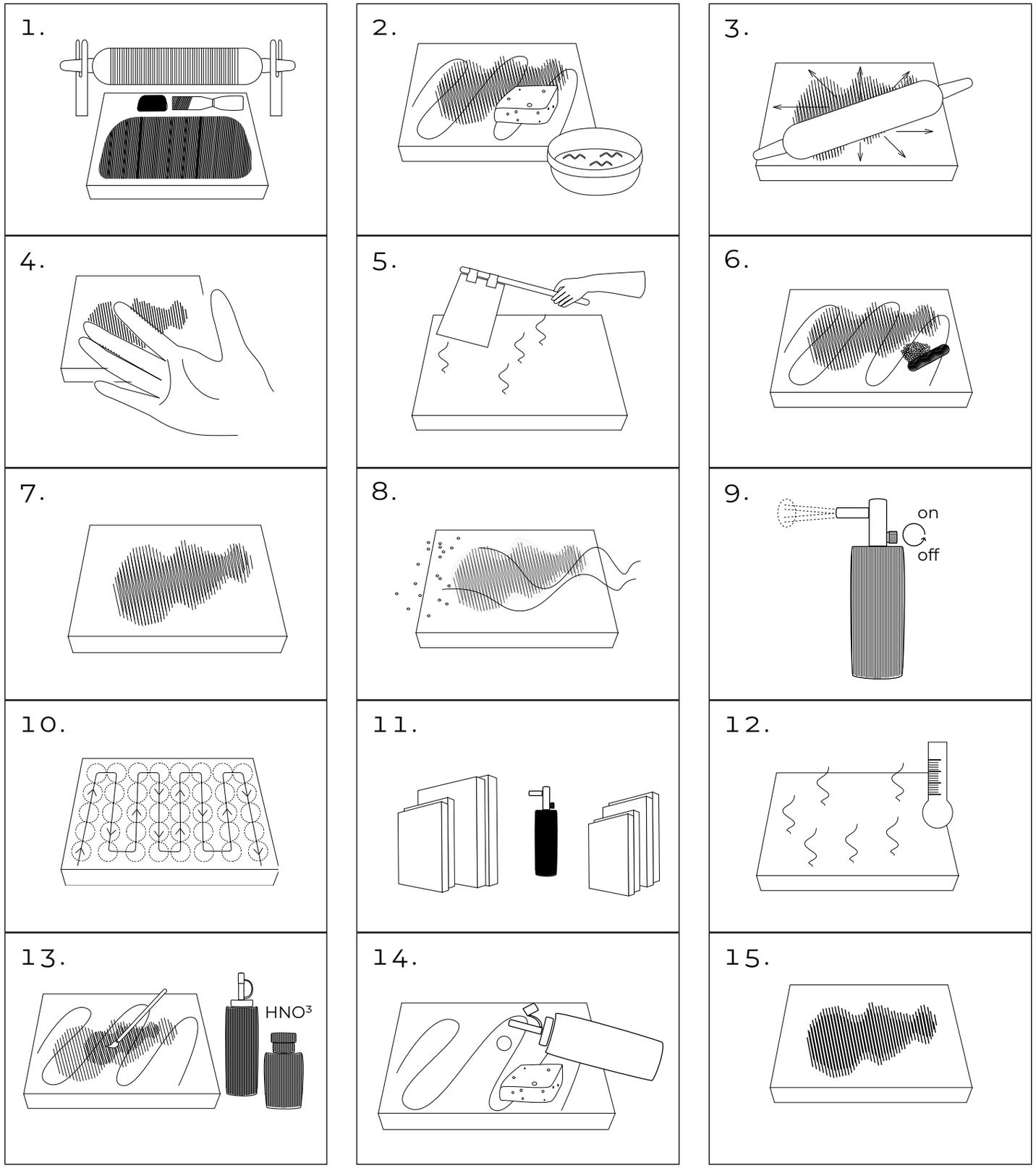
J. **Do not inhale the acid.** Always use the protection mask. For etching process use brush. Use sponge with water to wipe the acid from the stone.

TOOLS:

1. gum arabic
2. brush
3. bowl of water
4. sponge
5. weak, medium strong acid
6. blak litho ink (for etching)
7. leather roller
8. protection mask

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5. HEATING THE STONE



1. Apply a small quantity of ink to the printing roller.

2. Remember to wet the stone with water before and during applying ink.

3. Apply a thin layer of ink to all the surface of the stone.

4. Make sure that the amount of ink is sufficient. (it will leave a mark on your finger or on a piece of paper).

5. Dry the stone with a fan.

6. Cover the dry surface with a thin layer of colophony.

7. Distribute the colophony throughout the surface; it will only adhere to the surface of the drawing.

8. Remove excess of colophony so that it only sticks to the areas where you have applied paint. (This can be done with pantyhose or a cotton ball.)

9. Fill the burner with gas and turn the switch to the *on* position, while pressing the knob a spark will appear which will ignite the flame.

10. Burn the entire surface of the stone evenly and slowly, remember to keep the flame approx. 2 cm from the surface of the drawing. Burn only the stone fragments that contain the drawing.

11. Turn off the burner and wait for the remaining gas to burn out. Put the burner in a safe place.

12. Leave the stone aside to cool.

13. Etch the surface of the stone with strong acid and use the strongest acid to treat the darkest-coloured parts of the drawing.

14. Wipe the acid off the stone and apply gum arabic.

15. Leave the gum on the stone for c. 1 week to stabilize the process.

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TOOLS:

1. black litho ink

2. bowl of water and sponge

3. fan

4. powdered colophony

5. burner

6. weak and strong acid

7. gum arabic

Transfer ink

Transfer ink is highly resistant to the corrosive effects of acid thanks to the large concentration of oil, colophony and other resins. Because it does not contain any siccative, however, it takes a while to dry. Transfer ink is applied with leather printing rollers and can be subjected to etching. It is often used for test prints, highly saturated tonal contrasts, delicate wash drawings, as well as for strengthening the stone, heating the stone, and even drawing. The ink is prepared on a special kind of stone, where it can stay without the risk of drying up.

Lithographic printing ink

Lithographic inks are specifically designed for printing: they dry up much faster and are less greasy. Their consistency may vary depending on the type of drawing, ranging from rarefied agents used for printing flat surfaces, to viscous inks for use in ink washes. Lithography uses a broad palette of colours which can be combined with one another. Colour inks are mixed with transparent or opaque white, depending on the desired final effect.

Transparent

Transparent white adds a transparent tone to the print; it does not cover up the previously added colours, but intensifies and saturates them. Colours obtained with the use of transparent white are luminous and vivid, which gives lithography its painterly quality.

Opaque white

Opaque white brightens the colour and makes it more opaque. It lacks the luminosity of transparent inks because the previous layer of ink or paper cannot be seen through.

Turpentine

Turpentine has a characteristic smell, since it is obtained from the resin of coniferous trees. Composed of terpenes, it is either yellow or colourless. Turpentine is used as a solvent for oils, also those used in lithography, such as printing ink, crayon and lithographic ink. It is not usually soluble in water.

Printing paper

Examples of papers used in lithography:

· ***Rosaspina Fabriano*** is a smooth, non-acidic paper, containing 60% of cotton. A neutral pH guarantees its resistance to „ageing" – it can be stored in perfect condition for a long time.

· ***Canson Edition*** is made entirely of cotton and meets the rigorous ISO 9706 standard of durability, which guarantees

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its optimal protection. Importantly, it has a different texture on either side – one is smooth, one fine-grained.

· ***Hahnemühle*** is produced sheet by sheet by traditional cylinder machines, which gives it the unique deckled edges reminiscent of classical laid paper. The paper stands out for its volume and elasticity. All sheets are matte, soft and slightly coarse, which results in the accurate impression of even the minutest details of the drawing. They do not contain acid and are resistant to ageing in accordance with the DIN 6738 and ISO 9706 standards.

Ink slab

Printing inks are prepared on ink slabs, lithographic stones with a polished surface that allows the ink to spread and roll freely. The slab is cleaned with solvents such as, petroleum.

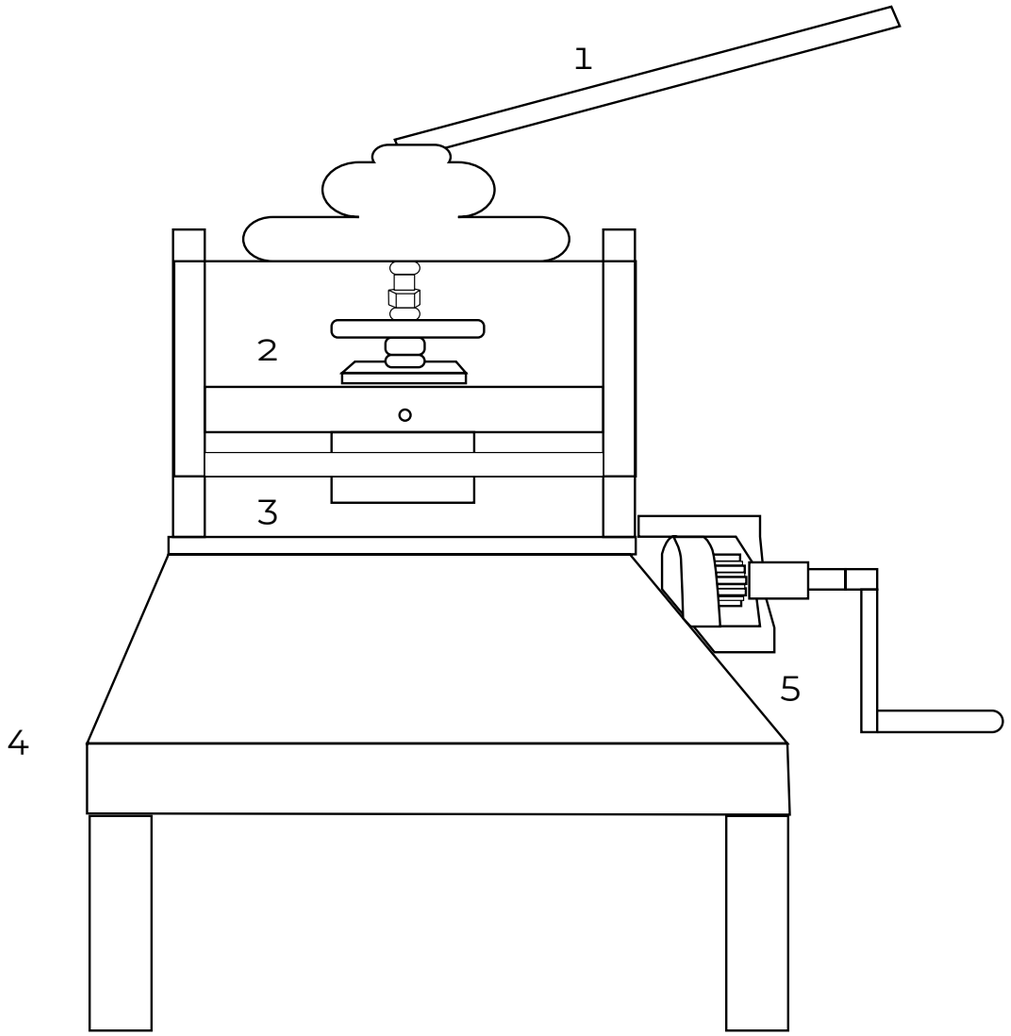
Lithographic press

A lithographic press differs from other types of printmaking machines primarily in the way that pressure is exerted on the template. Intaglio presses, for instance, consist of two rollers that simultaneously turn and slide the table on which the template (metal plate, linoleum), paper, and felt, have been placed. The pressure is preset long before the table passes between them. Printmaking from a stone template, however, requires a different solution: the degree of pressure is defined directly on the stone and this is where the movement of the table ends as well. A lithographic press relies on the simultaneous effects of pressure and friction. A clamping plate is placed on top of the template and covered with grease to facilitate rolling. The width of the runner must be adjusted to the size of the stone; do not use a shorter runner because it may cause the stone to crack. Make sure that the clamping plate has no dips that could make it exert uneven pressure on the paper and the template; its other side should remain clean. Underneath, place a layer of cardboard and backing paper, adjusted to the size of the print.

The press table should be kept clean at all times to prevent soiling the print. Cleanliness is very important, as it affects the products of our work.

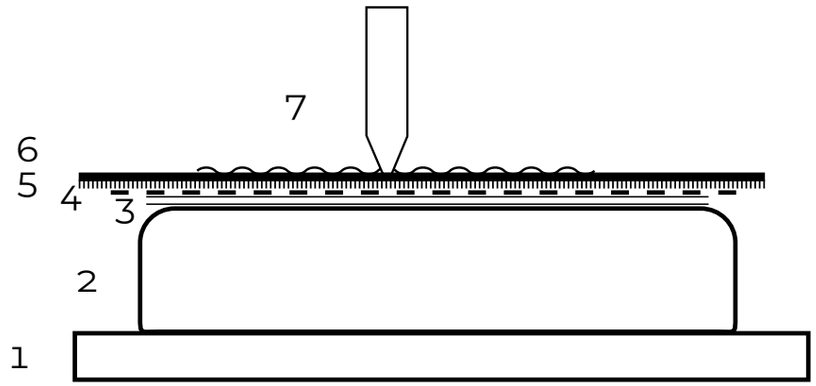
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Lithographic press – scheme



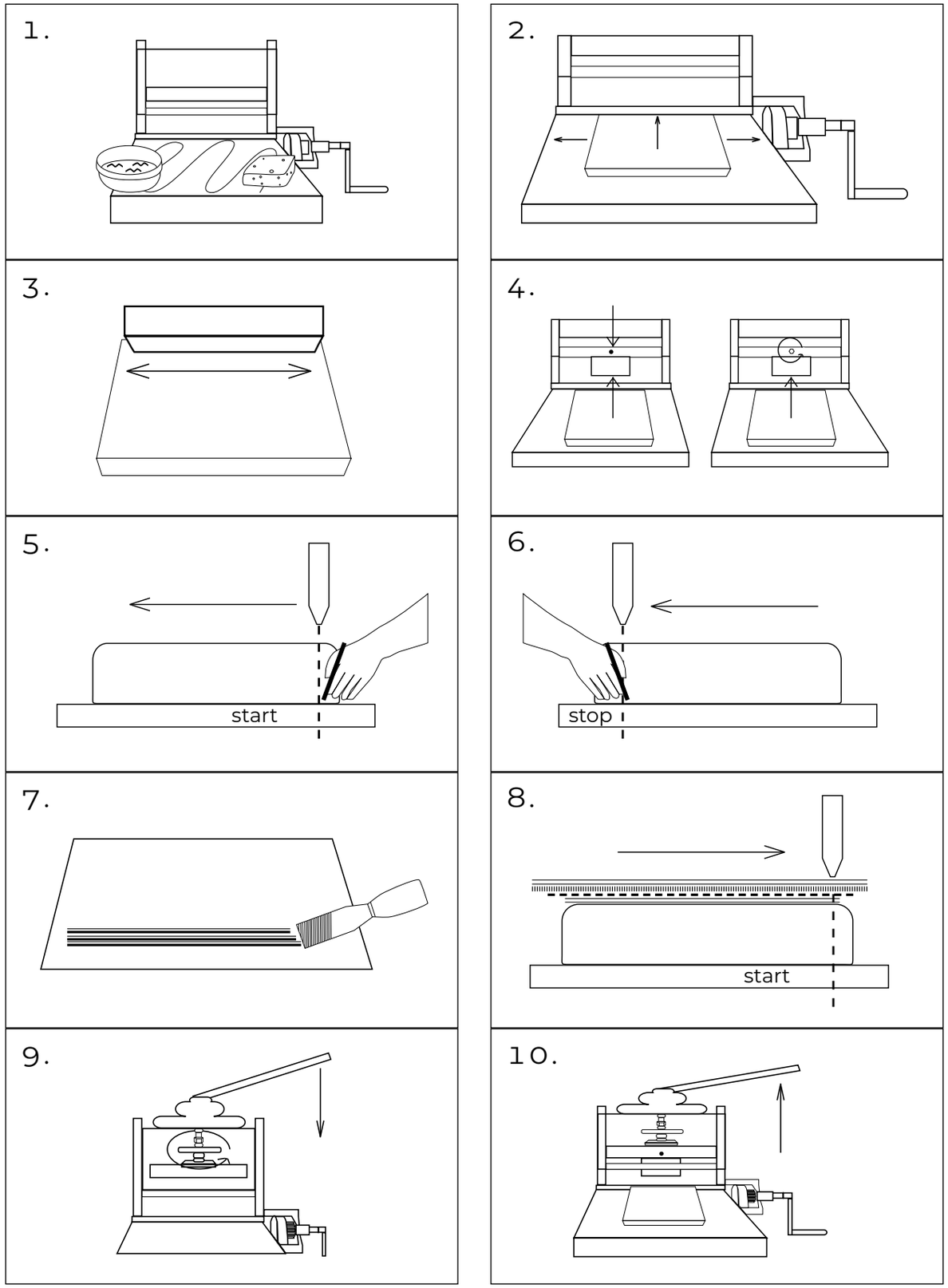
1. **lever** – used for lowering the runner onto the stone and controlling the amount of pressure.
2. **knob** – used for regulating the amount of pressure: turn it clockwise, to increase, and anti-clockwise to reduce, pressure; the knob can only be used when the lever is raised.
3. **runner** – an interchangeable part of the press; its width needs to be adjusted to the size of the stone.
4. **lithographic table** – movable, blocked by the handle; this is where the stone is placed.
5. **handle** – causes the table to slide; it is connected to a system of cog wheels with gears that allow the table to move quite freely even at high pressure; remember to raise it in order to move the table out after printing.

Lithographic press – side view



1. lithographic table
2. litho stone
3. printing paper
4. backing paper / cardboard
5. clamping plate
6. grease
7. runner

6. PREPARING THE PRESS FOR PRINTING



1. Carefully clean the table before you place the stone.

2. Place the stone in the middle of the litho table.

3. Choose a runner of appropriate width, adjusted to the size of the stone. The runner should be less than the width of the stone so that it does not extend over the edges of the stone.

4. Change / insert the runner by removing its fastener from the press, as shown in the picture.

5. Slide the table under the press so that the edge of the stone is placed directly under the runner. Mark the starting point with a white chalk – on both the moving and the stationary part of the press.

6. Slide the whole press to the other edge of the stone and mark the end point with a white chalk – to the other edge and mark the end of printing on the moving part of the press, according to the previously made indicator on the stationary part of the press.

7. Make sure that the clamping plate is covered with enough grease. If not add in (under the runner).

8. Cover the stone with test paper, backing paper or cardboard, clamping pad (in that order), and then place it at the starting point.

9. Use the press knob to regulate the clamping pressure so that the lever offers resistance when lowered.

10. After preparing the printing press, ready the stone for printing.

TOOLS:

1. runner

2. bowl of water and sponge

3. white chalk

4. clamping plate

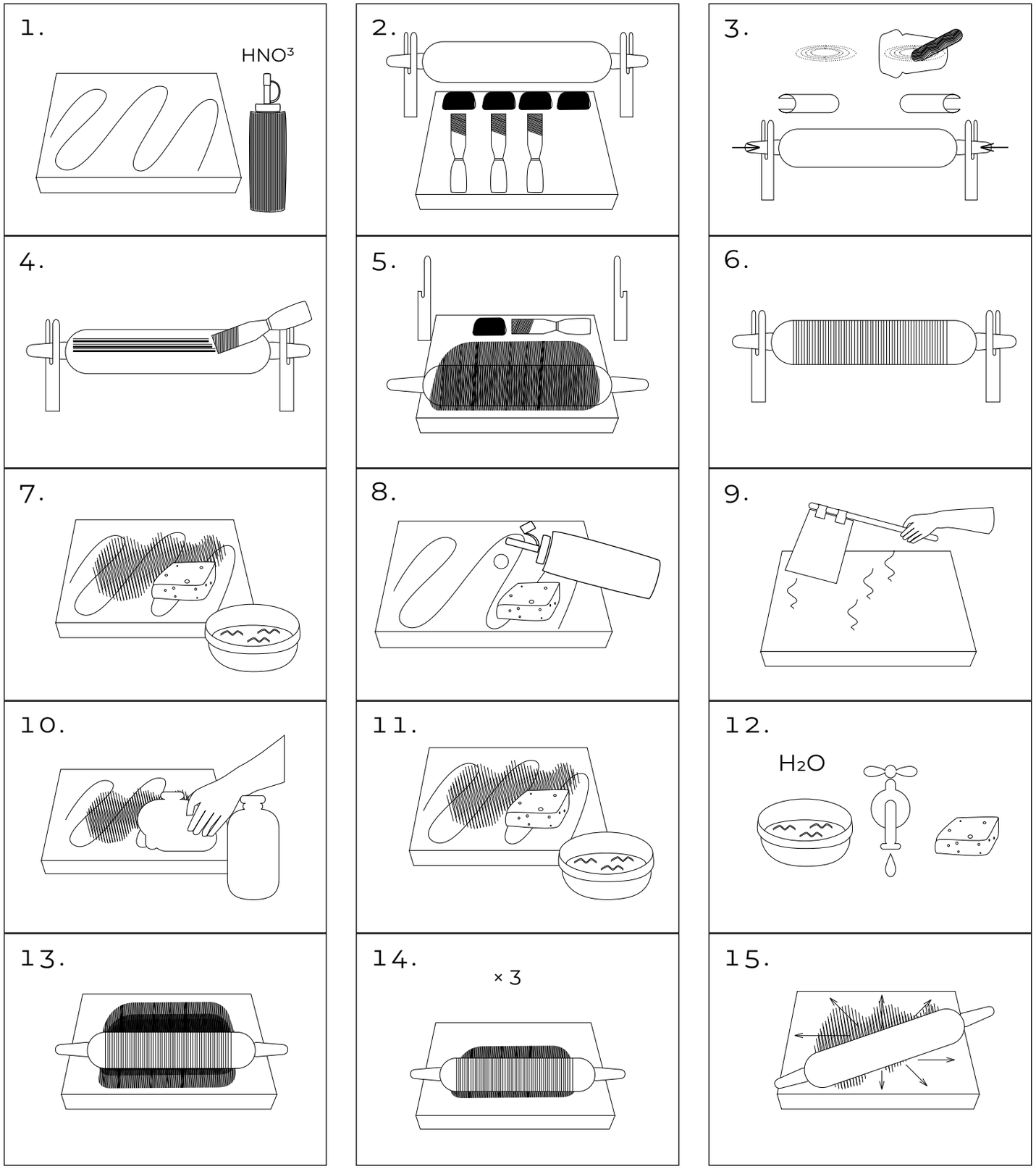
5. grease

6. proof paper

7. backing paper / cardboard

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7. PRINTING THE STONE with colour part I



1. Pour weak acid onto the stone, spread it evenly and leave to one side for about 10 minutes.

2. Prepare the printing ink on the ink slab. Apply each colour with a new, clean spatula. **If you are printing with black ink – use a wooden roller and feather ink from the ink slab.**

3. Prepare a rubber roller by putting it on wooden legs and putting on the handles.

4. Apply a small amount of ink across the surface of the roller.

5. Spread the ink evenly on the ink slab, so that a thin layer of colour is distributed on the roller.

6. Place the roller on the stand.

7. Carefully wipe the acid off the stone.

8. Apply gum arabic on the stone.

9. Dry the stone with a fan.

10. Pour turpentine and use a dry cloth to remove the drawing from the stone. Clean the stone with a wet cloth so that it is completely free of turpentine.

11. When the drawing and all traces of ink have disappeared completely, clean the stone thoroughly with water.

12. Bring clean water (repeat often to prevent the stone from getting greasy).

13. Apply ink to the stone until the drawing appears. Remember to keep the stone damp throughout the process.

14. Apply three layers of ink from the ink slab.

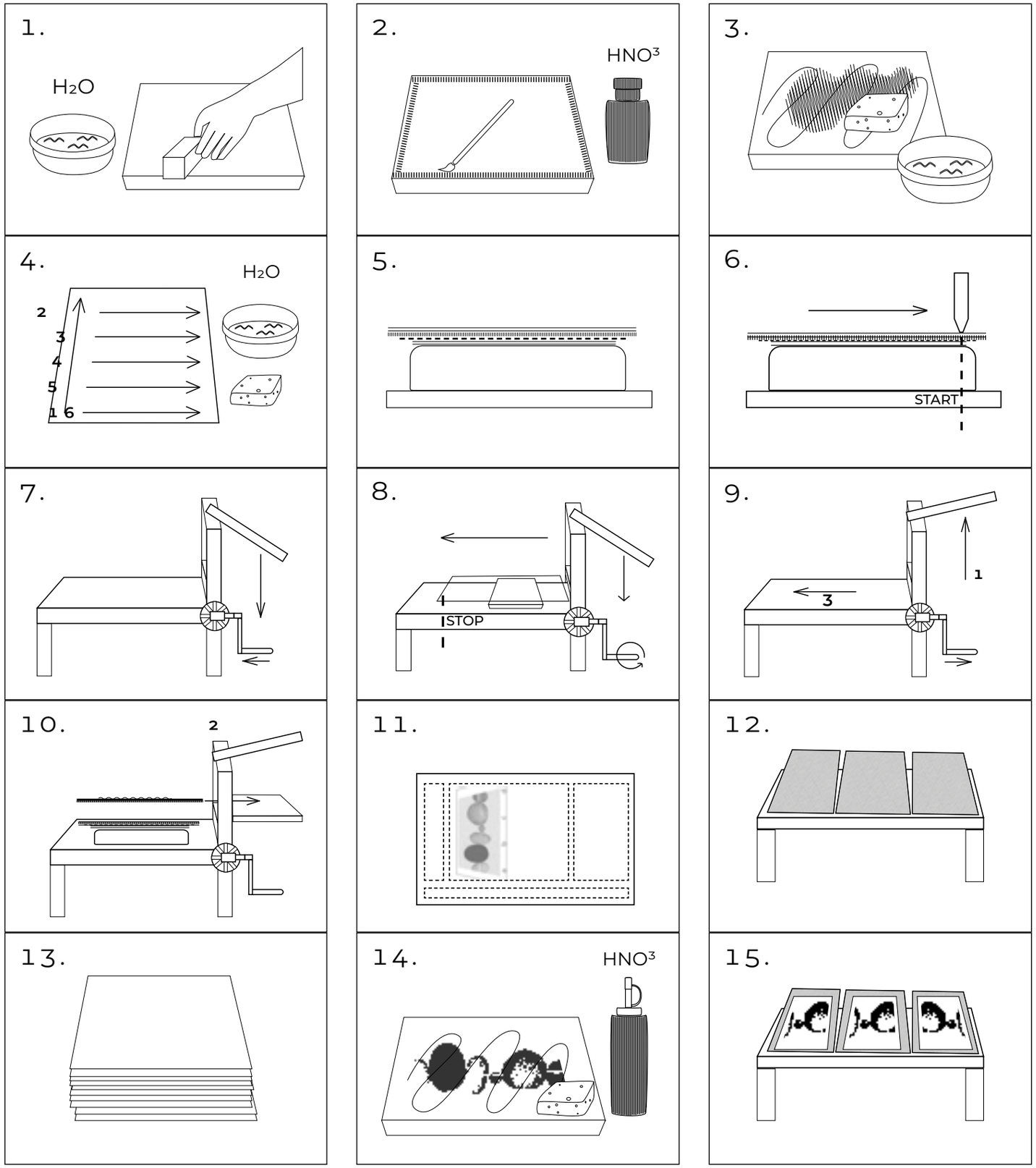
15. Remember to saturate the image with ink by moving the roller in all possible directions.

TOOLS:

1. acid
2. the printing ink
3. clean spatula
4. handles for roller
5. bowl of water and sponge
6. gum arabic
7. fan
8. turpentine
9. dry cloth

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8. PRINTING THE STONE with colour part II



1. Use a correction stone and water to remove unnecessary drawing elements from the drawing. Clean the margins with pantyhose.

2. Etch with strong acid the places where the correction stone has been used.

3. Wipe the stone with a damp sponge.

4. Moisten the test paper with a damp sponge on both sides. The paper needs to be slightly moist, not wet. **If you are printing on delicate or chalky papers, do not wet the paper and dry the stone thoroughly before printing.**

5. Place paper, backing paper or cardboard and the clamping pad (in that order) on the stone.

6. Slide the table to the **starting point**.

7. Block the handle and push the lever down.

8. Slide the press to the stop mark (end of print).

9. Reduce the pressure by lifting the lever, unblock the handle, slide the table to the starting position.

10. Remove the individual elements. Remember to put the clamping plate away in a separate place.

11. Analyse **the first print** and plan the printing process. The test print is always less saturated.

12. Make room for the prints to dry.

13. Print out all the prints.

14. If the drawing absorbs too much ink, wipe the stone with a sponge soaked in acid or clean all the drawing with turpentine and repeat the printing process.

15. After printing leave the prints flat to dry.

TOOLS:

1. correction stone

2. bowl of water and sponge

3. pantyhose

4. weak and strong acid

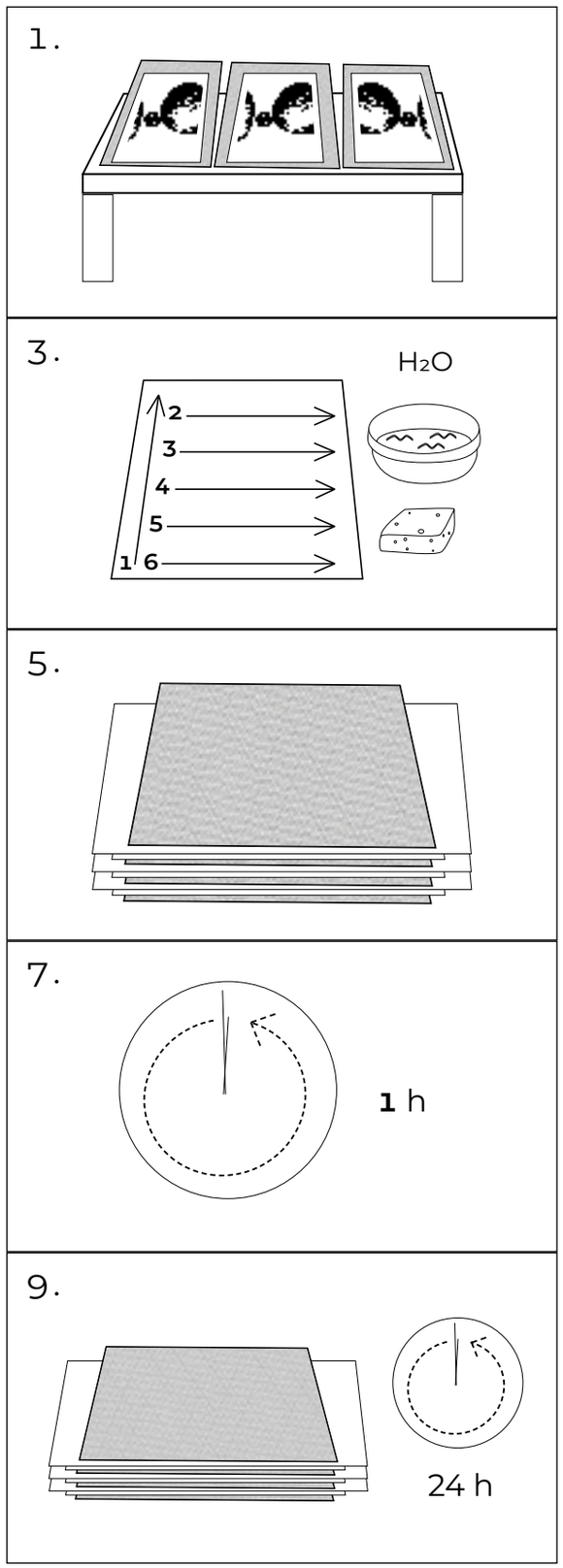
5. test paper

6. backing paper / cardboard

7. clamping pad

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9. DRYING PRINTS



1. Make sure the ink has dried completely.

2. Prepare the first layer of the pile, including cardboard and backing paper (in that order).

3. Moisten the print on both sides just like before printing. The print needs to be moist.

4. Place the print on the first layer of the pile and cover it with backing paper and more cardboard.

5. Repeat for all prints in accordance with the pile forming process.

6. Press the pile down evenly by placing litho stones on the surface.

7. Leave the prints in the pile for 30–60 minutes.

8. Remove all the backing paper sheets from the pile.

9. Place the prints in another pile with new cardboard sheets only. Leave the pile aside for 1 day. If needed, form a new pile with new cardboard.

10. Sign the print:

a. number / edition

b. year

c. title

d. author

You can also dry the prints in other ways, e.g. by stretching the wet print with needles (just like in the case of other workshop graphics techniques).

TOOLS:

1. place for a pile
2. bowl of water and clean sponge
3. dried prints
4. paper (2 sheets for 1 print)
5. big cardoards
6. litho stones
7. pencil

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