

n. 5

PURE PRINT ARCHEOLOGY  
RESERVA TECNOLÓGICA

Editors

Graciela Machado  
David Lopes

Organization

David Lopes

Texts

Authors

Revision

Flor de Ceres Rabaçal

Photography

Diana de Brito,  
Telma Dias, Marta Belkot  
and David Lopes.

Video

Rafaela Lima

Editorial design

David Lopes,  
Joana Lourencinho Carneiro  
(base)

Scientific Committee

Ana João Romana (ESAD.  
CR/CIAC/ LIDA)  
Cláudia Amandi (i2ADS/  
FBAUP)  
Domingos Loureiro (i2ADS/  
FBAUP)  
Fernando Quintas  
(VICARTE/ FBAUL)

Graciela Machado (i2ADS/  
FBAUP) Joana Rego  
Joana Pereira (RCA)  
Jorge Marques (i2ADS/  
FBAUP)  
Paula Almozara (PUC-  
Campinas)

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Regina Lara (UPM-São  
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Rosa Venâncio (IPVC/ESTG)  
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Soraya Vasconcelos  
(ICNOVA/U. Lusófona)  
Teresa Almeida (VICARTE e  
i2ADS/ FBAUP)

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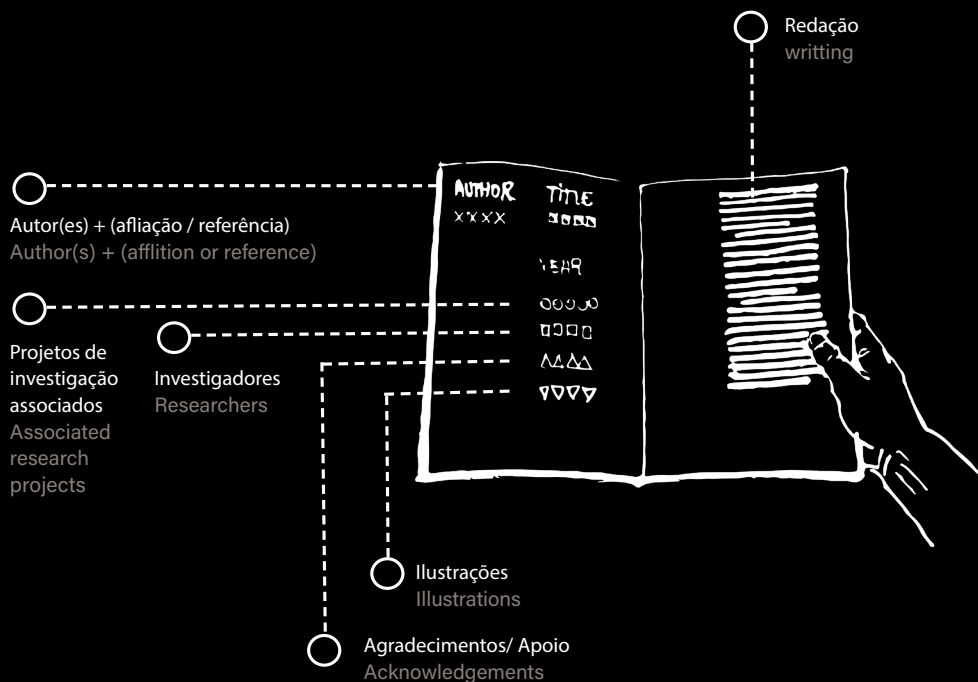
João Carlos Garcia (FLUP);  
Vasco Cardoso (i2ADS/  
FBAUP);  
Luis Espinheira (FBAUP);  
Paula Abrunhosa (FIMS);  
Ana Freitas (UP);  
Ana Fonseca (i2ADS);  
Fabrício Fava (i2ADS);  
Filipa Leite (BMP/CMP);



# O QUE É A RESERVA TECNOLÓGICA?

## WHAT IS "RESERVA TECNOLÓGICA"?

PURE PRINT  
ARCHEOLOGY (PPA)



*Reserva Tecnológica* é uma publicação periódica, lançada após uma exposição organizada pelo grupo Pure Print Archeology (i2ADS/FBAUP). | *Reserva Tecnológica* are unique, periodical publications released after exhibitions organized by Pure Print Archeology (i2ADS/FBAUP)

*Reserva Tecnológica* publica as fichas técnicas na língua originalmente redigida para o contexto da exposições apresentadas. Na mesma publicação as *fichas técnicas* poderão surgir com diferentes traduções. | *Reserva Tecnológica* publishes these exhibition labels in the language originally written for the exhibitions. In the same periodical, the labels can appear written in different languages.

*Reserva Tecnológica* publica fichas técnicas expandidas\*, preparadas especificamente para acompanharem os objetos em exposições organizadas pelo PPA. | *Reserva Tecnológica* specializes in releasing exhibition labels in a unique, expanded format. These are written and placed next to research specimens in PPA's exhibitions.

*Reserva Tecnológica* não pretende ser um catálogo mas um objeto editorial autónomo, que dá a comunicar a um público abrangente e não especializado, a produção e a investigação do PPA. | *Reserva Tecnológica* is not an exhibition catalogue, but rather an autonomous publication with the main goal of helping communicate technological research in printmaking to the general public.

As *fichas técnicas expandidas\** são habitualmente constituídas por um texto e por ilustrações de carácter instrutório, produzidas pelos artistas e investigadores. | These expanded format exhibition labels combine instructive texts and illustrations, usually written and designed by the artists & researchers.

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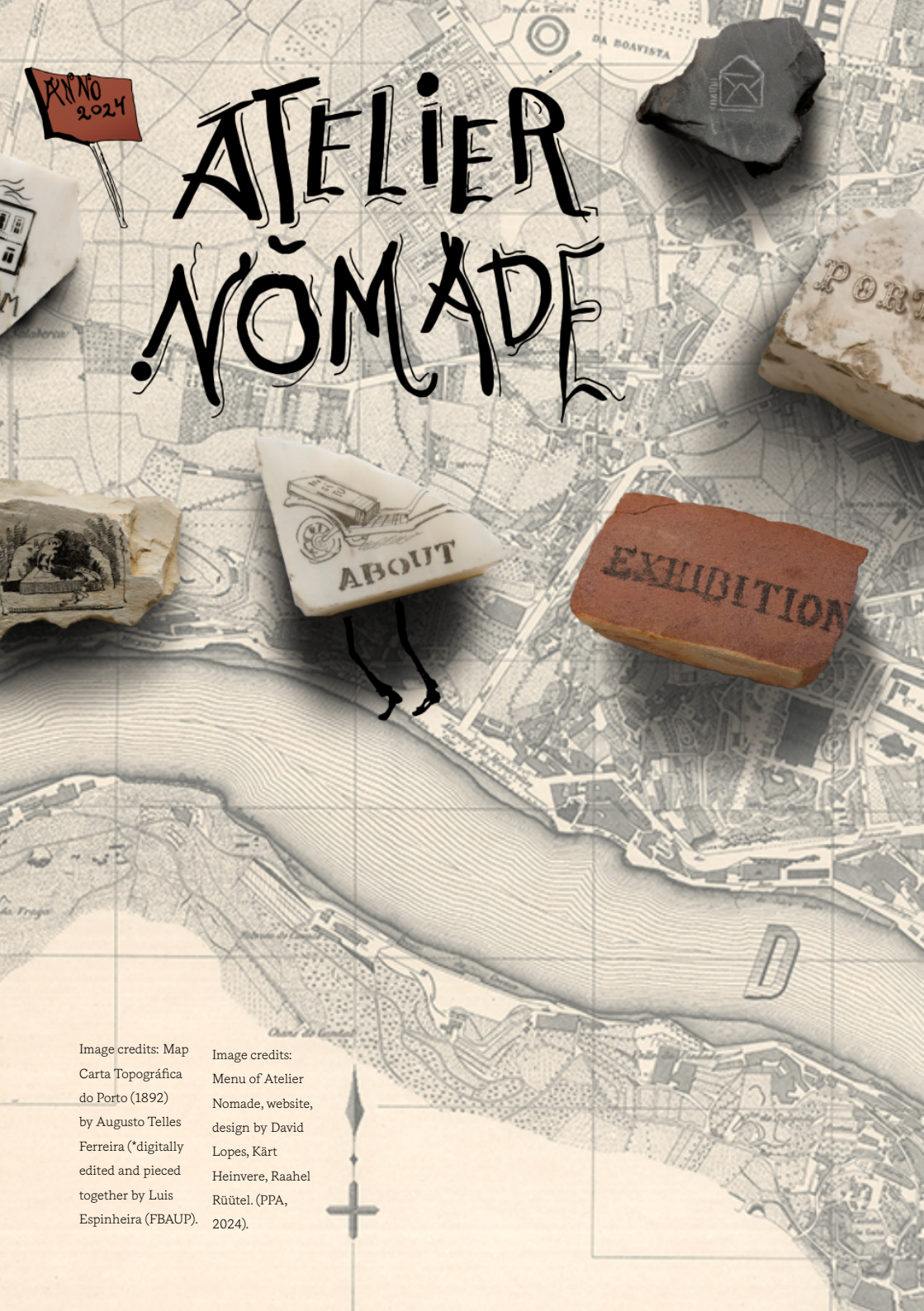


Image credits: Map  
Carta Topográfica  
do Porto (1892)  
by Augusto Telles  
Ferreira (\*digitally  
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together by Luis  
Espinheira (FBAUP).

Image credits:  
Menu of Atelier  
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## EDITORIAL

Graciela Machado  
Júlio Dolbeth  
Rui Vitorino dos Santos

*Atelier NOMADE: lithography in situ*<sup>1</sup>, presented in January 2024, is an all-encompassing project that brings together illustration, architecture, geology, and urban geography through the practice of lithography, allowing its participants to take part in a unique and enriching experience. Throughout this event, participants got involved in a multidisciplinary practice, exploring the complexity and interconnectedness of these disciplines by mapping the city of Porto's terrain and the lithographers who lived and worked in the city.

Focusing on an art form more commonly practiced and associated with a designated workshop space and challenging the sepa-

ration between cultural and architectural heritage and artistic investigation, this project promoted this dialogue by using lithography as a means to approximate lithography itself with urban territory and the visual archives that originate from this same territory.

This project's program was organized around a technologically based approach, centered on getting intimately acquainted with the tools used in the art of lithography, making use of raw materials such as supports, pigments, among others of local extraction, the study of lithography and its relationship with the history and growth of the city and, finally, the application of these concepts through in situ excursions throughout the city to practice in situ lithography. With the help of technological archaeology, artistic

1 Original text first published in <https://www.researchcatalogue.net/view/2425517/2425518>

investigation, and experimentation within the medium of lithography, the program proposes to reflect upon relevant ecological questions, reaffirming the need to rethink the dualities of human nature and human city. Every stage of the proposed program was established to challenge what we perceive to be a gap between technological and historical knowledge, giving particular importance to relearning processes and instruments used as tools for the observation and the questioning of what we perceive to be real. This is something we believe transcends all of these disciplines and areas of knowledge and that has the potential to be part of a significant discussion for future generations.

Historically, lithography has been associated with scientific development, allowing it to access raw materials, develop tools and solutions based on this same development, construct equipment, and develop printing processes of both small and large scale. The very history of the development of the city- scape allows us a glimpse of the importance of this graphic industry and the way in which it took part in the trans-

formation of the urban landscape.

*Atelier NOMADE: in situ lithography* aimed to bridge the gap between the scientific and the technological, analyzing the use of portable equipment, as well as the need to respect native and local resources, suggesting pathways throughout the city that reveal the importance of lithography's graphic industry.

The starting point was FBAUP's printmaking workshop, where we will discuss lithography's artistic relevance and intimate relationship with artisanal processes. At this stage, we will reaffirm the need to produce artwork within the printmaking workshop based on what we call *technological archaeology*, in addition to confronting this method's relevance in the study of Fine Arts, giving special importance to its use of instruments, matrixes, and protocols. We demonstrated how, for example, making use of equipment that has been unused for decades, or perhaps just the mere act of observing the gestures of preparatory tasks, can be relevant within a learning environment and give historical context to its inherent graphic heritage. The next stage of the program

was dedicated to discussing lithography on a national and international scale, additionally discussing its relationship with geology as well as its presence on specific buildings found around the city that to this day reveal the part it played in the transformation of the city as a whole. We wanted to create a sort of experimental "mobile laboratory" that functioned until we reached the nomadic studio that was setted in the Marques da Silva Foundation. The foundation itself is an archive dedicated to the city's architectural and artistic legacy, and where we tested our ability to adapt and to question how the practice of lithography can be rebuilt today.

The program was comprised of a week-long intensive workshop designed to construct the necessary materials for the in situ method, to strengthen the collaborative process in artistic investigation, to allow for the use of an interdisciplinary approach in research, to deconstruct preconceived ideas related to the use of different technologies in art and, finally, to question the idea of space, of archive and the city.

We designed this intensive model so it would combine these

different components seamlessly, taking shape in short-term mobility exercises around the city, consulting historical archives, drawing and printing, setting up the resulting exhibition, and, finally, discussing the results to promote innovative methods of teaching and learning the art of lithography.

Beyond our interest in practicing lithography in such a way that explores its historical and technical legacy in contexts both local and global, the Atelier NOMADE brought together geology, geography, architecture, illustration, and design as its main areas of research and image production. We've found that these areas have a deep-rooted connection with lithography, the latter having played significant roles in different points of these disciplines' history.

Geology plays a crucial part in providing us with informed notions about the physical formation of the city.

We see urban geography as a dynamic background that molds human environments. Through specific case studies, the participants will examine how geography influences the distribution of urban



spaces, connecting the exercises planned for the workshop with the city's physicality.

Architecture is like a narrative that molds the very identity of the city. Through practical exercises and case studies, the participants will explore how buildings and urban structures reflect the historical evolution and cultural influences that contribute to the unique aesthetic of a place.

Illustration and design establish the importance of artistic expression in understanding and representing the city and its multiple narratives. We will use lithography to capture the visual essence of the city and its multiple cultural and historical layers. We will explore these narrative possibilities by drawing as we move through the city and by analyzing editorial artifacts from the 19th century, contemporaneous with the development of lithography and chromolithography in our local and national context. Contact with this printed material reinforces lithography's part in the democratization of publications and editorials, demonstrating how its use allowed for the creation of layouts in which text and image work in tandem to

communicate political, commercial, and ideological content or even entertainment. We will explore the development of this graphical, reproductive, and distributive potential of printed material by analyzing newspapers and bulletins produced by Rafael Bordalo Pinheiro and Sebastião Sanhudo (1851-1901), founder of Litografia Portuguesa, a great contributor to the cultural sphere in Porto, as well as a renowned illustrator.

To summarize, *Atelier NO-MADE: in situ lithography* attempted to provide an enriching and collaborative work week to be experienced in different places and contexts. Our activities have been devised for students, and scholars of the Faculty of Fine Arts of the University of Porto, and international group from the Schools of cole Supérieur d'Art et Design de Saint- Étienne, Académie Royale des Beaux Arts de Bruxelles École supérieure des Arts. They worked around four places in the city, where there would've been allocated the lithography workshops first recorded in Porto.<sup>2</sup>

<sup>2</sup> Declarações dos proprietários de oficinas de impressão, litografia e gravura, na conformidade do art.º 1º da lei de 22 de Dezembro de 1834. Série, 1835 – 1866. PT-CMP-AM/PUB/CMPRT/FANT/2049.



PART I -  
LITHOGRAPHY IN  
PORTUGAL: MAPPING  
AND REPARING



ANTONIO REGIS  
DA SILVA

(FCT 2022.11886.BD/2022)

GRACIELA  
MACHADO

(i2ADS)

# Lithographic Press Repair – Technological archeology around printing devices

2023–24

**Research projects:** In situ Lithography,  
Pure Print /i2ADS, GroundLab/i2ADS

**Researchers:** Antonio Regis da Silva,  
Graciela Machado, Marta Belköt  
(SFRH/BD/149042/2019)

**Support:** Tiago Cruz, Carlos Lima  
(collaboration and technical support  
from the wood and metal workshops of  
FBAUP). Dr<sup>a</sup>.Paula da Costa Machado,  
Museologist at the Municipal  
Museum of Valongo

**Illustrations:** Antonio Regis da Silva

**Consulting:** José Emídio, Director of  
Cooperativa Árvore;  
Tomás Dias, Master printer at Escola  
Árvore.

Repair of the FBAUP lithographic press, Model. Acquisition date  
in 2006.

Lithographic press  
installed outside  
FBAUP after  
returning from Vila  
Nova de Cerveira.  
Image credits:  
Graciela Machado.



Manually operated lithographic presses have undergone few changes throughout history<sup>1</sup>, harking back to Senefelder's proposals.<sup>2</sup> FBAUP's model, based on a model similar to the French lithographic press, possesses unique properties and characteristics due to its construction design and metal components (iron and bronze), with leather belts and essential components rooted in wood, such as the missing roller and wooden wheel. The model is particularly well-suited for printing large-format stones. We traced the seal of the company embedded in the lithographic press, kept in reserve at the entrance of FBAUP's Technology Pavilion. From this seal, it was possible to obtain images of locations that are currently abandoned grounds.

1 Cumming, D. (1948). Handbook of Lithography (3rd Edition ed.). London: A. & C. Black, Ltd.

2 Gallow-press, Senefelder, A. (1819). A Complete Course of Lithography. London: R. Ackermann.



As a mark and identification record, this press bears a seal with the inscription "Cerralharia Mecânica:



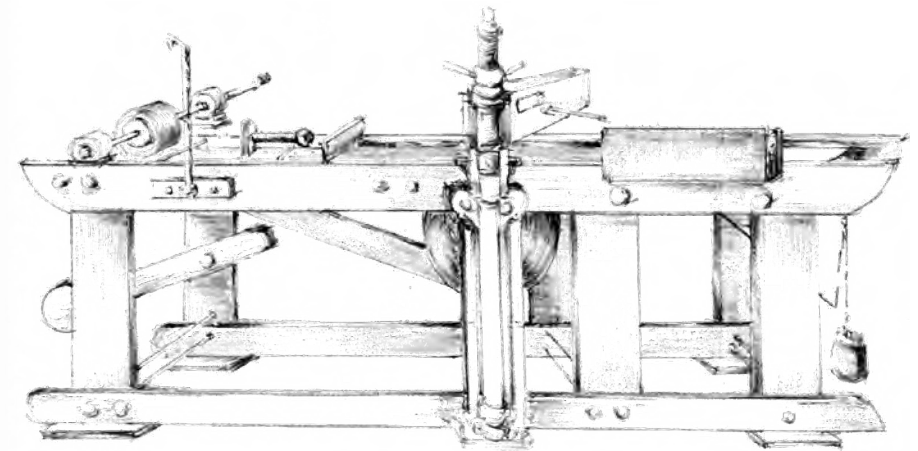
Cerralharia Mecânica: Fernando José Ferreira Rua Formiga 175, Porto, Portugal.

Since returning to FBAUP, presumably through a donation from Amândio Silva<sup>3</sup>, the lithographic press hasn't been used. To make it operational again, replacement parts were created, such as the star wheel, and some adaptations were made with reference to the French lithographic press known as Voirin<sup>4</sup> from Cooperativa Árvore.<sup>5</sup>

3 Professor at ESBAP between 1958 and 1993, Source: [https://sigarra.up.pt/up/pt/web\\_base.gera\\_pagina?p\\_pagina=antigos%20estudantes%20ilustres%20-%20am%c3%a2ndio%20silva](https://sigarra.up.pt/up/pt/web_base.gera_pagina?p_pagina=antigos%20estudantes%20ilustres%20-%20am%c3%a2ndio%20silva)

4 The manual lithographic press from the 19th century. made by the French manufacturer Voirin, the press is similar to one shown in an 1893 poster by Henri Toulouse-Lautrec. Source: <https://www.nmhistorymuseum.org/blog/2010/01/the-printing-press-lives-in-the-museum's-jewel-box-at-least/>

5 <https://arvorecoop.pt>



Elevation drawing of the lithographic press, engraving workshop entrance, FBAUP.

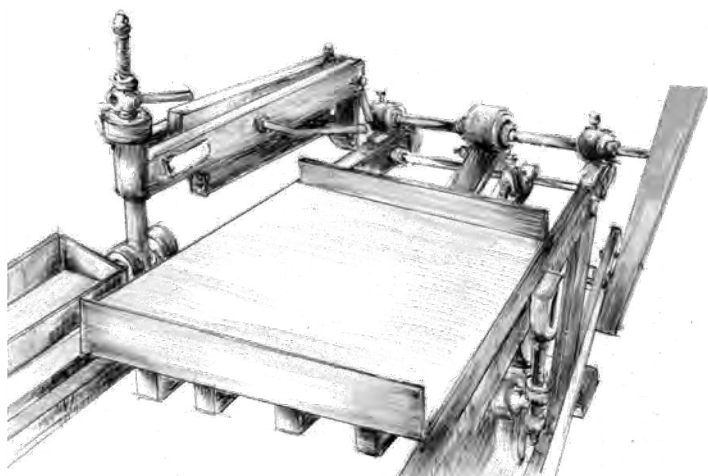
In this press model, the iron sides are positioned in parallel, containing an overlapping frame with the carriage and a central cylinder. Above the cylinder is the carriage or bed for loading the stone. The carriage's movement is ensured through a navigation wheel<sup>6</sup> that runs over a centrally fixed cylinder to ensure the stability of its entire structure. This press features a pressure system in the upper body, specifically in the box where the roller is positioned<sup>7</sup>. It moves laterally, from right to left, unlike the Voirin press, in which the roller operates vertically. As a practical characteristic, it is possible to replace the roller whenever necessary to adjust its dimensions to those of the selected stone.

The carriage moves, pulled by a leather belt when activating the navigation wheel. The navigation wheel was developed and produced in the wood and metal workshops at FBAUP.

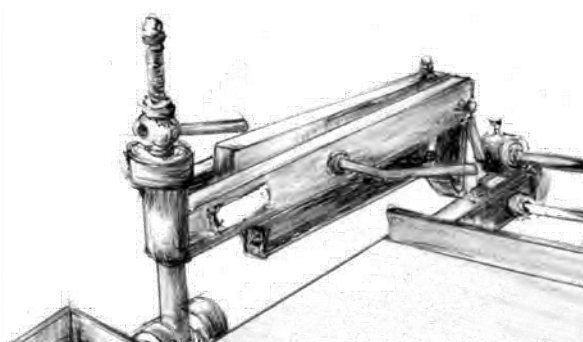
6 Identified as the large wooden star-shaped wheel.

7 For the scraper bar to be produced, the wood and metal workshops at FBAUP selected Robínea wood from the trees in the university garden.



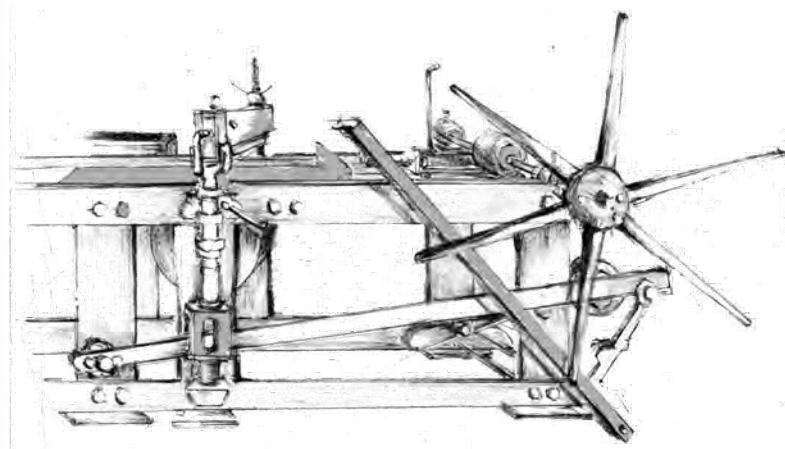


Pressure system at the top with lateral movement from left to right or vice versa.



Detailed image of the compartment with the capability to change the scraper bar based on the stone's dimensions.

To obtain the missing elements and accessories such as the arms of the star wheel, wood obtained from the felled trees in FBAUP's garden was used. The original belt had to be restored. To repair it, the belt was placed in a container and immersed in milk for 48 hours. Once dried, it was covered with petroleum jelly paste and repaired by a leather specialist, reinforcing the manually stitched broken parts.



Elevation drawing of the press with the navigation wheel applied.

The central disk of the wheel was produced by a turner equipped with the necessary equipment for some of the components of this piece, such as the disks. In this case, the same dimensions as the reference press were followed, although adaptations were made based on the suggestions of the technicians from the wood and metal workshops at FBAUP.

Process of restoration leather belt with milk, development of the navigation wheel for the lithography press



Since the press was heavily rusted, we applied a coating of used motor oil, giving it its current black and oily finish. This process also served to lubricate its key parts. This step took about a week, with multiple applications and careful attention to ensure that smaller parts and joints were adequately soaked, ensuring the absorption of the oil.











DAVID LOPES

(FCT 2020.09546.BD.)

GRACIELA  
MACHADO

(i2ADS)

## A touristic Map for lithographers in Oporto

2024

### Research projects:

FCT 2020.09546.BD.

### Researchers:

David Lopes (2020.09546.BD); Graciela  
Machado (IP: I2ADS/FBAUP);

### Illustrations:

David Lopes, Raahel Rüütel & Kärt Hein-  
vere.

### Acknowledgements:

João Carlos Garcia (Professor at FLUP,  
Porto).

Vasco Cardoso (i2ADS/FBAUP).

Alcides Rodrigues (Technician for Mode-  
ling and Molding Technical and Official  
Service of FBAUP).

Catarina Marques da Cruz (Technician at  
the Printmaking Workshop of FBAUP).

Connecting the research by Ph.D. candidate Antonio Regis da Silva (2022.11886.BD) and Ph.D. candidate David Lopes (2020.09546.BD), Atelier Nomade's participants had the opportunity to witness the reactivation of an antique lithographic press, which had been stationed on the lower floor and atrium of the Pavilhão de Tecnologias of the Faculty of Fine Arts of Porto. This took place during the printing of Porto's city map, previously drawn on stone in the engraved manner, a technique which was popular in the 19th century for printing cartography.

After this activity, the participants received copies of the printed map. Illustrations produced by Raahel Rüütel & Kärt Heinvere depicting the façades of early 19th-century lithography companies in Porto were made into stamps and printed on top of the map, pointing to their geographical locations. The map highlighted the streets that housed the first printing houses and lithography workshops of the 19th century. These were also the locations where the participants would work in-situ during the rest of the week.

The map was then wrapped in original mid-20th century paper collected by Graciela Machado from a company in the Porto that used to make such kind of decorative papers. This chintz paper, printed in many colors alongside floral and decorative elements, featured the main tourist attractions of the city of Porto, such as the Clérigos Tower, the Palácio da Bolsa (Stock Exchange Palace) and the view from 31 de Janeiro street. It also depicted the D. Maria railway bridge with the iconic Rebelo boat and the Crystal Palace, which no longer exists.



Litografia Ribeiro



Litografia Portuguesa

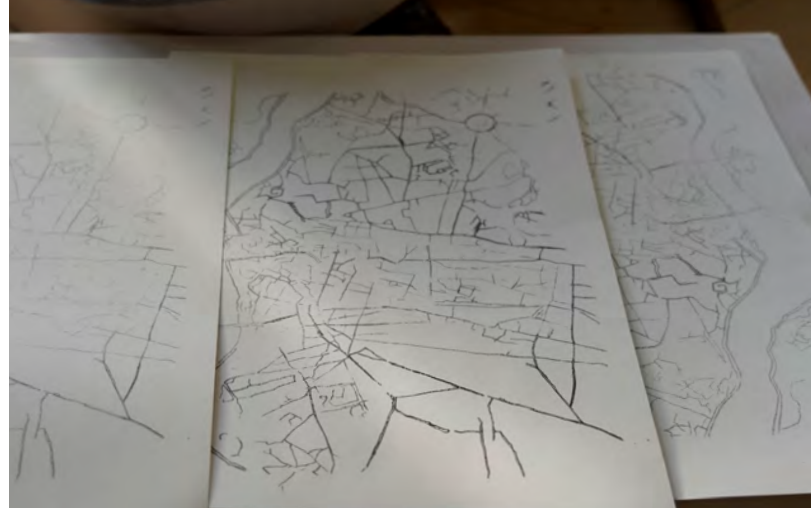


Villa Nova

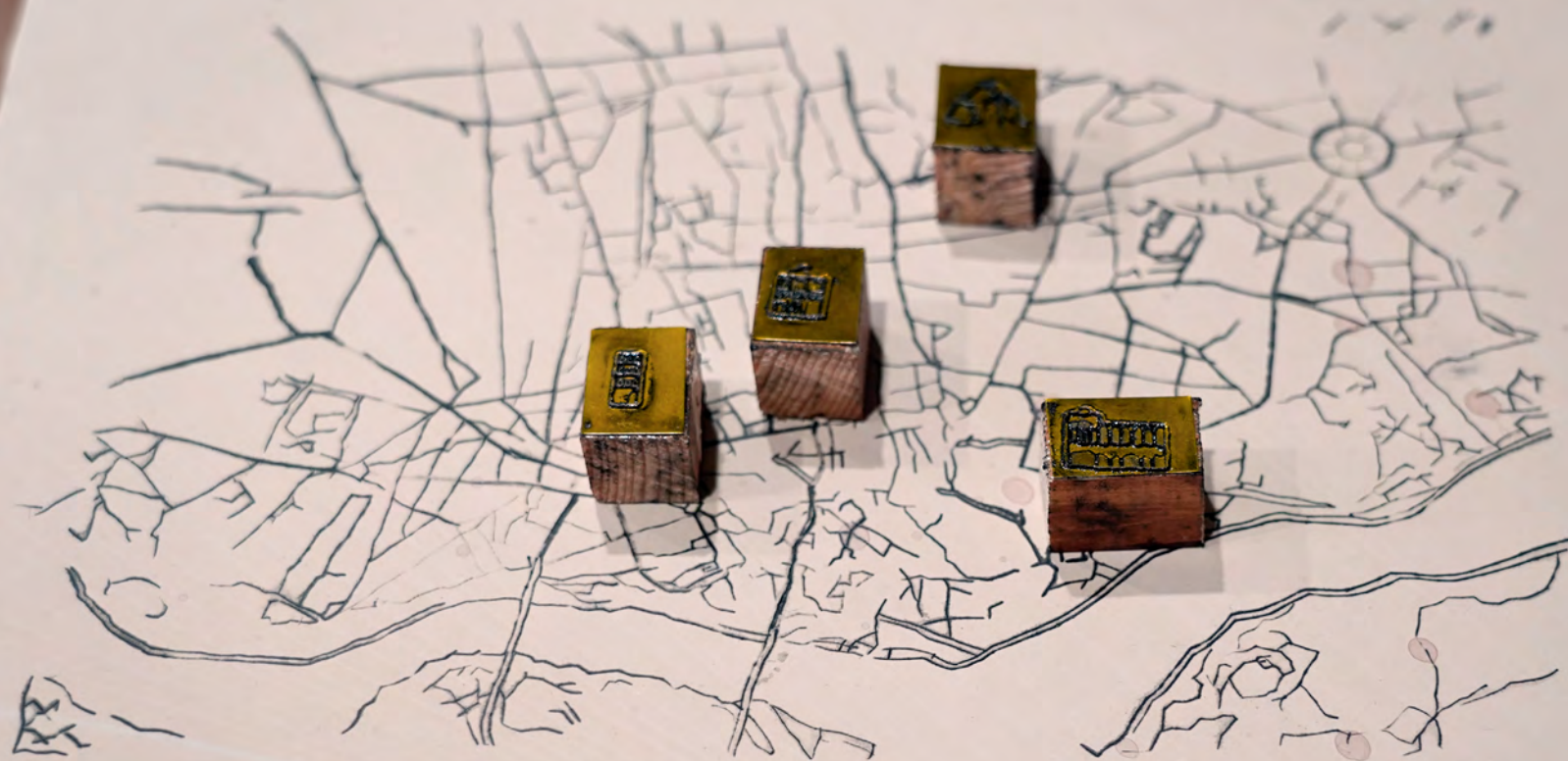


Litografia Nacional

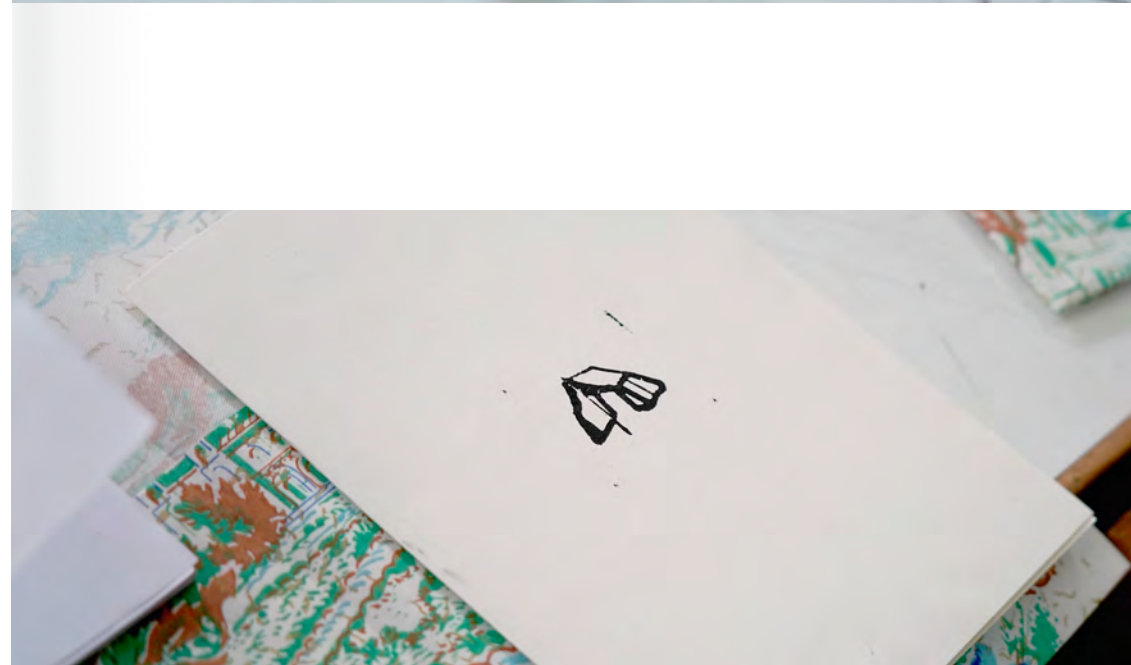




















DAVID LOPES

(FCT 2020.09546.BD.)

GRACIELA  
MACHADO

(i2ADS)

Specimens of  
lithograph  
stone and  
prints  
displaying  
the step by  
step process  
of the manner  
of etching on  
stone

2023

various dimensions of stones  
and prints on fine art print  
paper

**Research projects:**

FCT 2020.09546.BD.

**Researchers:**

David Lopes (2020.09546.BD); Graciela  
Machado (IP: I2ADS/FBAUP);

**Illustrations:**

David Lopes

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Alcides Rodrigues (Technician for Mode-  
ling and Molding Technical and Official  
Service of FBAUP).

Ana Margarida Freitas (Conservator for  
Documentation and Information Manage-

Manuals used for teaching lithography today often fail to men-  
tion the technical variant of line engraving or etching on stone.  
The elevated manner<sup>1</sup> prevails instead, created by Senefelder  
himself. The manner of Etching on Stone<sup>2</sup> belongs to the “en-  
graved” category in which Senefelder grouped lithography with  
aquatint as well as soft-ground.

Several historians fairly note that in the 19th century  
there was an initial resistance in adopting lithography in most  
printing establishments as people couldn’t help but to compa-  
re intaglio and printing from stone, especially when it came to  
discussing printed work such as maps or plans, material that re-  
quired very precise lines and fine details. (Jomard, E.F. (1826, 1st  
of July)). Walter Ristow also makes the argument that initially  
there wasn’t a clear understanding of what the technical defini-  
tion for lithography should be: sometimes the stone would be  
etched or engraved to emulate either relief or an intaglio print.  
(Ristow: Woodward, 1975, p. 78 quotes Twyman, 1970, p. 64).

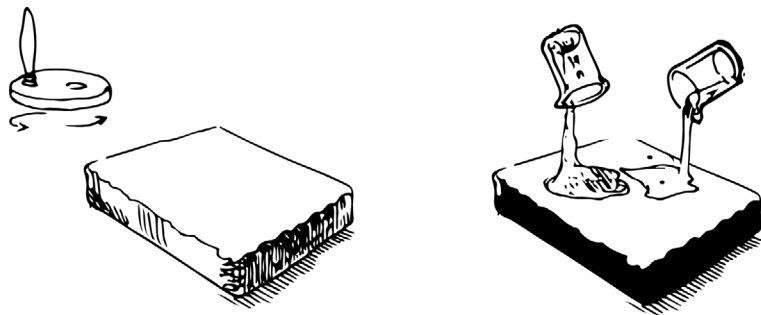
In the late 19th-century, we started to notice a wider  
acceptance of the use of lithography in the etching manner for  
commercial printing. As Charles Lorilleux said, “there are more  
people used to engraving than to write, and most writers know  
to manipulate the burin, the metal or the diamond point”.  
(1889, p. 62). Practicality was a factor, but the main one was the  
economic standpoint, which pointed towards a general prefe-  
rence for lithography. Grandidier, for example, shows how the  
price of printing an etching from stone was much lower than  
from a copper plate: a wide format map printed from a lithogra-

1 The elevated manner opposing the engraved manner is how  
Senefelder distinguished between the different ways one could print from  
stone. These terms are how these are translated in the English edition of Sen-  
nefelder’s A complete course of lithography published in London in 1819. (p.  
203-320).

2 The manner of Etching on Stone is found translated in the same  
1819 edition between page 290 and 304.

ph in such a manner would've cost only 50 cents in France, which rounds about to an average of 7 francs. (1882, p. 358). But the disadvantages of such a method should also be mentioned: printmakers were aware that the stone matrix was much more likely to break, and the etching of the drawing itself was slightly slower than doing it conventionally on metal. The heavy weight of stone made the work more painstaking, as it was harder to transport the stone from the drawing station to the press.

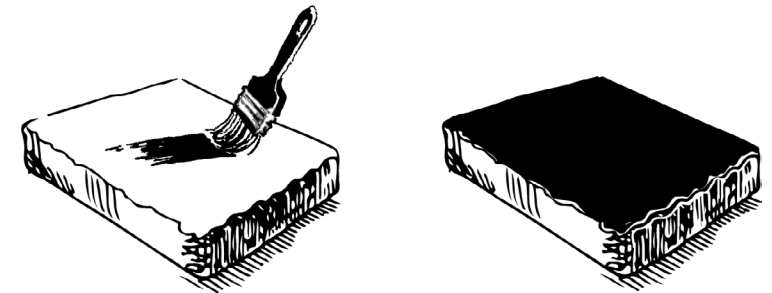
To produce a lithograph in the etching manner, the stone is cleaned and prepared with gum arabic and nitric acid. (Senefelder, 1819, p. 203). According to Godefroi Engelmann (1839), one prepares the stone with a shallow layer of gum, which will prevent the grease from fully attaching to the surface of the stone. (p. 293).



The stone is fully covered with etching ground, normally used by printmakers on metal.<sup>3</sup> If the ground is in its solid form, it is advised to warm the stone and let the ball sit and melt on its surface. In the 19th century, both Engelman and Senefelder talked about having an available baker's oven to do so. The heat would have to be controlled carefully, as too much

<sup>3</sup> We've tried any liquid Charbonnel Ground for etching. Either the L'amour or Ultraflex will work perfectly.

heat could break the stone itself. To prevent it, a ball of etching ground could've instead been dissolved in turpentine oil and brushed in the liquid form on the surface of the stone.

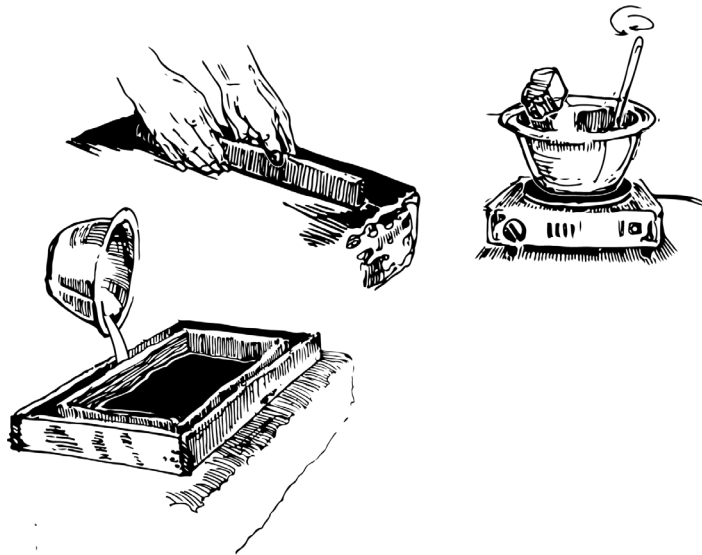


The stone could be smoked as well to produce a contrast when drawing on its surface. According to Senefelder, a white ground could've been applied on top of the ground coating the stone in order to emulate the surface of paper, like it was done for intaglio. Unlike copper however, the lithograph stone is white, so it's not possible to create enough contrast between the white ground and the stone. Therefore Senefelder suggests practitioners to color the surface of the stone with blue, brown or black. (1819, p. 292-293).

Producing the linework on top of the ground can be made directly on the coat, or, alternatively, drawn first on paper, and then traced by rubbing its surface with sanguine against the stone. Other transfer methods available could also have been employed. Drawing is performed by needle or burin, and Senefelder notes that one should only pierce through the coat enough to see the surface of the stone (1819, p. 293). Very sharp tools will scratch, which isn't the intention of this method. Needles that were more blunt were advised as these would help to draw more fluidly in the direction the user desired. (Engelman, 1839, p. 294).

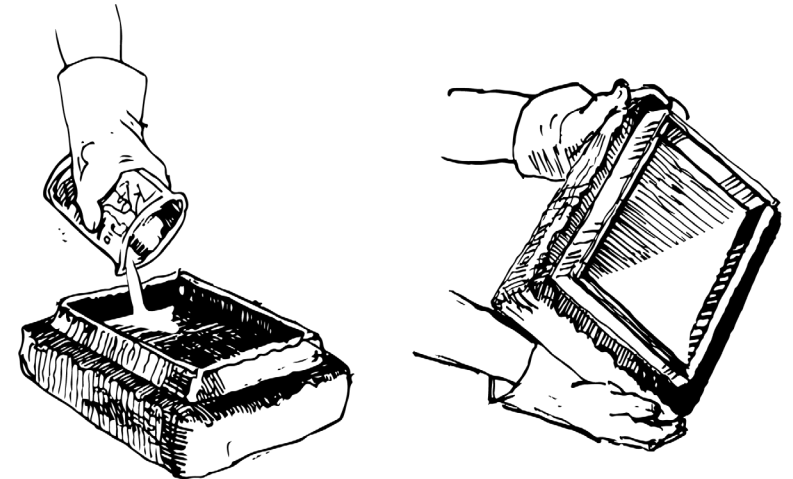


As Engelman explains, in order to etch the stone one can assemble a wax border around its edges (1839, p. 294). To make a perfectly regular border we devised a mold system<sup>4</sup> by making two concentric frames of clay, leaving some space in between them. The beeswax has to be melted and poured into this space between the concentric frames of clay. The clay won't allow the melted wax to escape the mold onto the other areas of the stone.



<sup>4</sup> Technical solution devised with the help of Alcides Rodrigues, technician for Modeling and Molding Technical and Official Service of FBAUP.

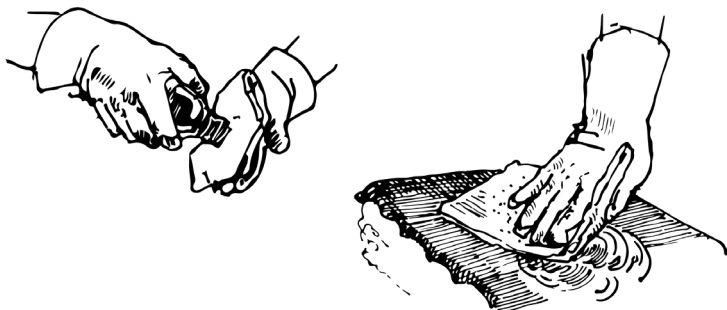
Having created the wax border, one should add 1 part of nitric acid per 40 times the volume of water, which is then poured and left out to etch the drawing on the etching ground coat, like one would do when etching a copper plate. A small and soft brush can be useful to break the small bubbles created by the nitric acid, but take note to closely inspect the drawing, as the lighter lines will start to widen more than the drawing initially made throughout the etching process. To effectively control the thickness of the drawn lines, several etching baths should be undertaken, much like one would do when etching metal. The used solution of nitric acid is poured down into a container by lifting the stone up in the air and turning it on one side with your hands, which should be protected with the right equipment.



One should determine the depth of the etching on the stone with a magnifying glass and piece it with a small needle. Take notice of the most shallow cavities as well as the wider lines, as these will be the most difficult to print.

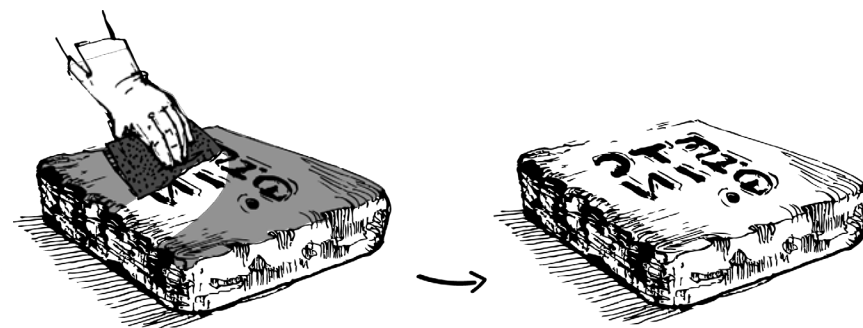


The next steps are crucial and must be done with care and adaptability, starting with drying the stone properly to ensure the ink will attach itself to the hollow cavities of the etched drawing. Senefelder's chemical ink should be warmed up in the heating source, and the stone itself should also be slightly heated. A hairbrush will easily suffice for the next step: hold it against the etched surface for a while, and use the palm of your hand to assure the surface is warm but not enough to burn your skin. Do not overheat the surface, otherwise small portions of the etching ground might melt into the cavities. Because the chemical ink is now more malleable due to the heat, it will now easily fill even the shallowest lines. A sponge or a disposable piece of soft fabric can be used to push the ink in. Make sure not to deposit excess ink on the stone, taking care to spread a fine film gently over its surface.



Once the ink has completely filled the etched lines, let it sit for a while. A lunch break of 1 hour would be advisable, although we aren't able to accurately pinpoint the specific amount of time. The stone could be left to rest for a day if possible. Pour a small portion of turpentine oil on a piece of soft fabric and gently remove the etching ground in a circular motion.

In theory, as per Engelmann's writings (1839), the etching ground should easily come out because there is a small layer of gum protecting the surface of the stone. However, the process is not that simple: one shouldn't apply a lot of pressure as the ink might be accidentally removed from the cavities during this process. It's important to do this part patiently, assuring only the etching ground is being removed whilst rubbing the surface with turpentine oil. If small portions of ink do come out of the cavities do not concern yourself too much with it, as you are expected to regularly ink it during the rest of the process. Once you have removed a fair amount of the etching ground, your drawing should be filled with ink but partially stained around. Here, a pumice stone can come in hand by using it to rub the stone gently until its surface is white and clean. If you do not have a pumice stone, a very fine grain sandpaper will suffice.



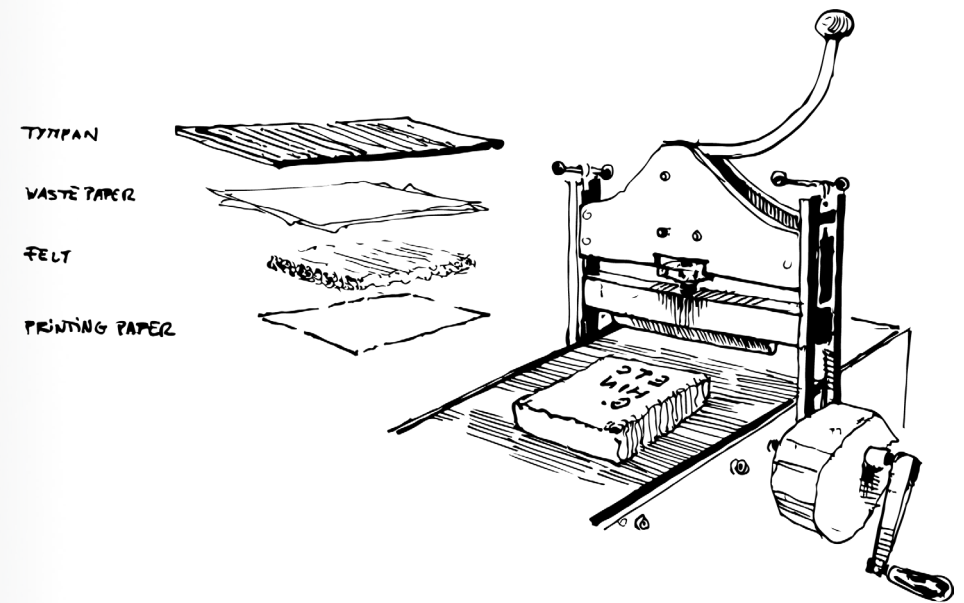
Now, the etched area of the stone is filled with greasy ink and its surface bare and receptive to water. If the drawing is not fully filled up with ink, spread a very fine film of gum arabic on the surface of the stone, and dry it. Another piece of fabric is rubbed with liquid asphalt on the areas of the drawing that are missing ink. Let it sit for a couple of minutes and then use a wet sponge to remove the excess asphalt on the upper surfa-

ce. Do this as many times as possible, little by little until you're satisfied with its appearance.



Roll up the lithography printing ink and slowly ink the stone with a leather roll, after moistening it with a clean sponge. Take notes of the directions and the amount of times you are rolling up the stone during printing.

You'll be working with a regular lithograph press. Although it's not mentioned in the original writings, we advise you add a felt in between the stacked paper and the tympan. The press' bed should include a felt — such as the one used for intaglio printing — to effectively collect all the information on the etched stone onto the paper during the printing process.



According to the Bibliothèque Pratique De l'imprimeur (1887), one can prepare a mixture of tallow, lampblack and turpentine to conserve the stone for later printing. The essence will evaporate and leave the black coloured grease protecting the drawing. (p. 65).

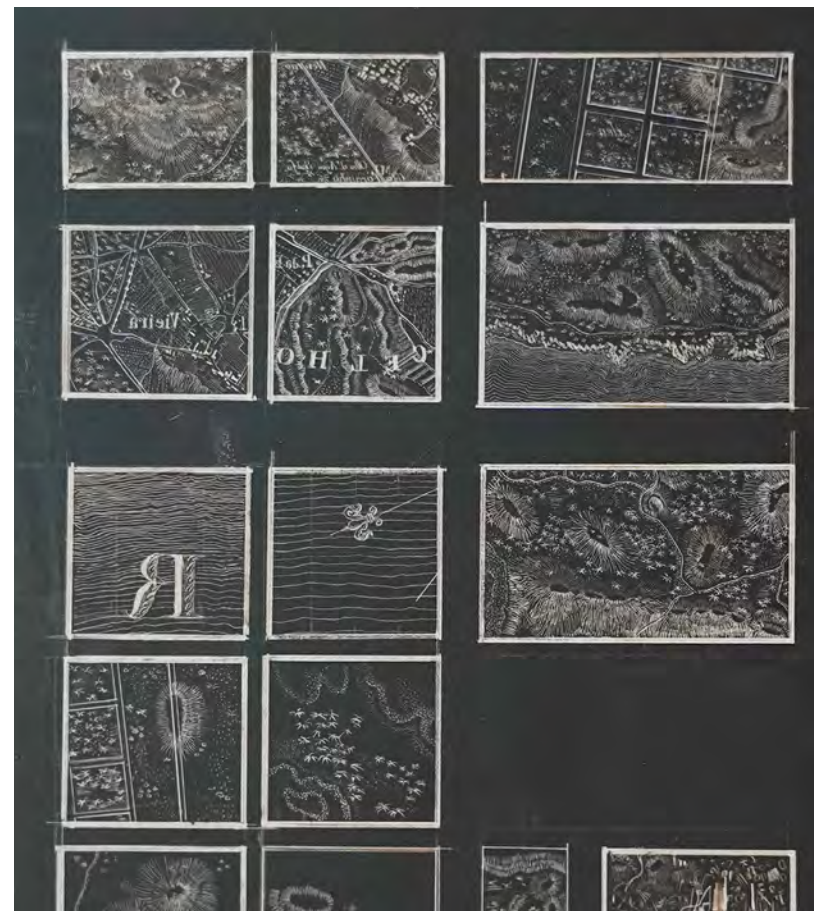


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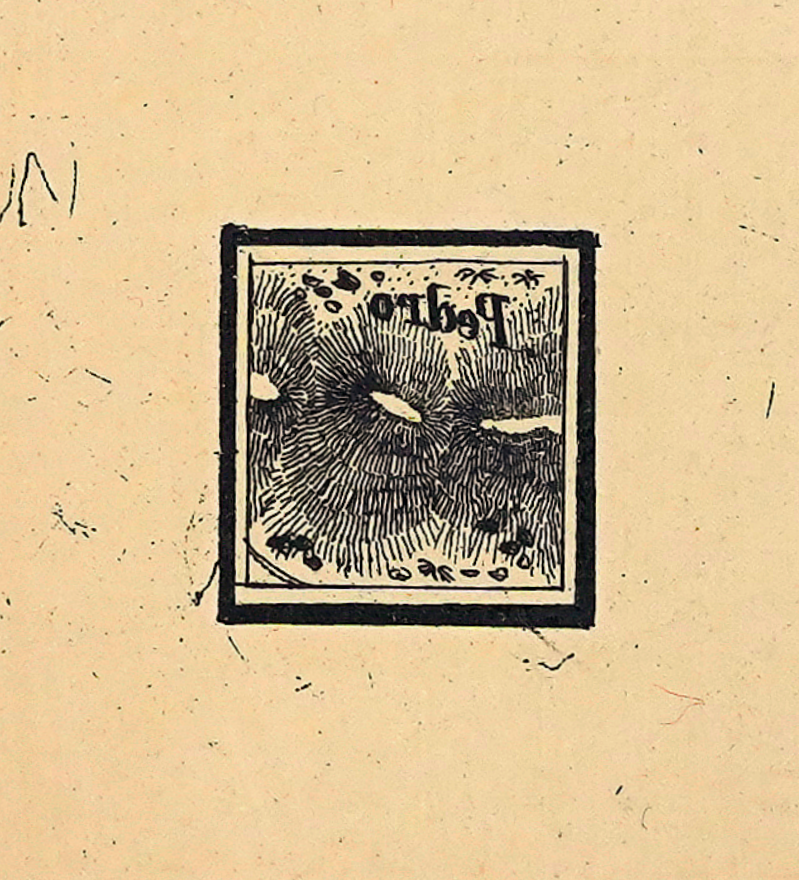






















JOÃO GARCIA  
(FLUP)

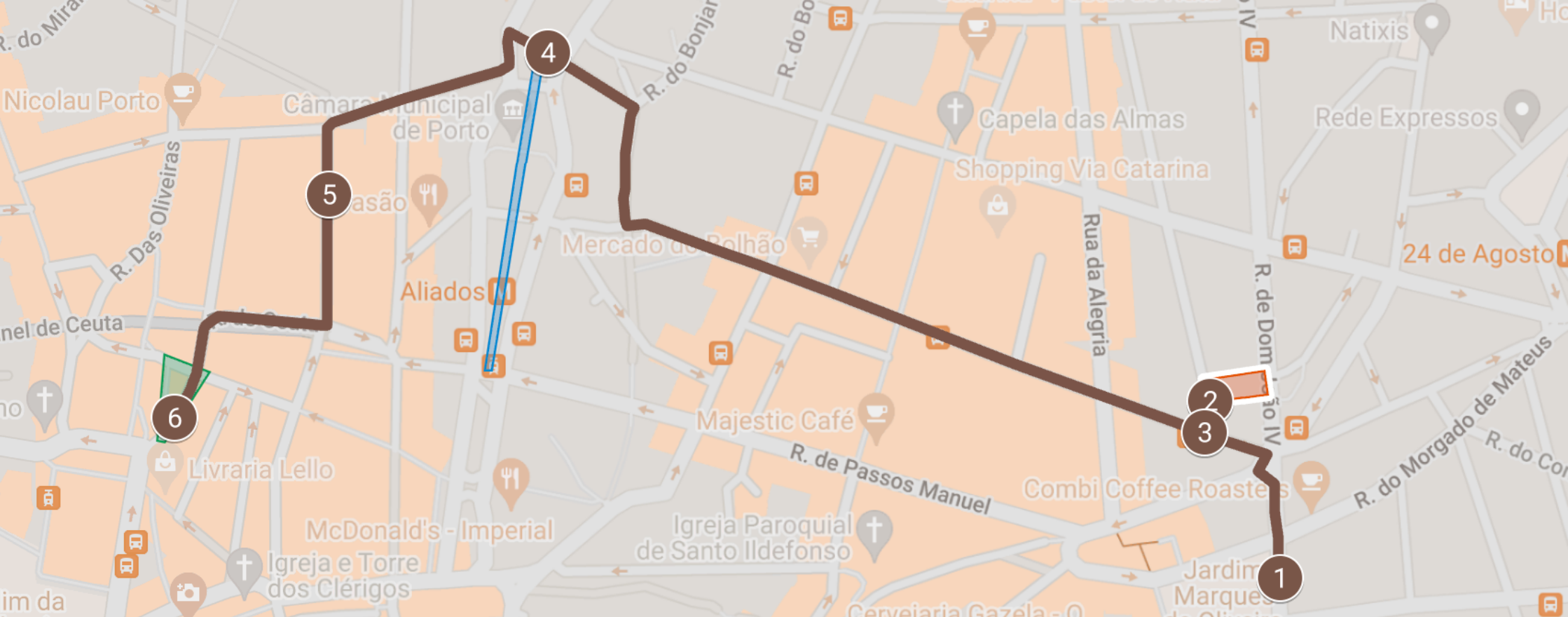
PURE PRINT  
ARCHEOLOGY

(i2ADS / FBAUP)

Mapping  
Lithography  
in Porto  
— [INCURSION]







Please click on the map to access a public database on Google Maps, or follow the link through:

<https://www.google.com/maps/d/u/0/edit?mid=1CoqnE-hX17djTYgKvyiDt1k-0whmO97g8&usp=sharing>











GRACIELA  
MACHADO

(i2ADS)

# The Ançã Stone Trail: Specimens of a Real and Fictional Trail

2023–24

## Research projects associated:

Pure Print /i2ADS, GroundLab/i2ADS

Arts and Crafts Aujourd'hui

## Researchers

Graciela Machado (PI: i2ADS/FBAUP),

Antonio da Silva. (FCT 2022.11886.

BD/2022)

## Support: Catarina Marques da Cruz

(collaboration and technical support from  
the Printing Techniques Workshop at

FBAUP).

**Illustrations:** Graciela Machado

## Translation and Revision:

Flor de Ceres Rabaçal

Here we will attempt to shed light into the relationship between raw materials and their geological origins. The raw material in question is the limestone extracted from the Ançã-Portunhos region. Here, we argue that lithographic stones nestled in workshop spaces are not just raw material: they are the first significant ex-situ artifacts. In this archive of specimens, the more or less faded material traces of their lithographic use, such as those resulting from the graphic industry, as well marks left by the printing houses that specialized in commercial lithography, add a historic context of both its industrial use and its use in artistic lithography. Therefore, they provide a wealth of knowledge and poetic action about extraction sites, geological heritage, biodiversity, natural processes, and the human activity associated with their extraction.

We documented the trail to one of the original quarries, providing thorough explanation on our reasoning<sup>1</sup>: the aim of this exercise was to locate the provenance of the materials used in FBAUP's printmaking studio, where the lithographic stone persists in a functional role as a printing stone. This way we intended to shed light into the subtle but existing human intervention present within each stone used in the workshop. We additionally attempted to amplify its symbolic qualities and identify the inherent relationship between the Ançã stone and its potential lithographic use, and this way both its real and fictional relationships with the territory from whence it from can ultimately come to

1

Field visit conducted in November 2023.



fruition as an artistic intervention<sup>2</sup>.

Our interest was mainly in reconstructing the lithographic stone trail rather than determining its exact provenance. It is, however, from the paths taken to reach it that various modes of extraction, observation, and fictionalization were defined. First and foremost, our method was through field observation, which we planned by studying the geological and historical conditions of successive human interventions and occupations of the territory. We found a very clear relationship between humans and nature to be present in this stone extraction site from which, it is speculated, stones were also taken for the purpose of lithography. Simultaneously, we collected a series of images from what remains, such as wood engravings, postcards, chromolithographs, and printed photographs documenting the historical contexts of stone extraction. A lithographic stone that exists in the workshop space is thus the first of many material and documentary steps aimed at drawing an erased technological landscape. With this retreat to its origins and our attempt to repair knowledge on these same origins, the intention was to deconstruct the idea of a lithographic stone as something too obscure, restricted to a raw material reading. The stone found in a printmaking workshop and worked by our hand provokes in us the desire to return it to the ground from which it is presumed to have been detached.

2 Certainly, it is not merely due to the fact of how a resource marks and occupies the imagination of a region filled with concessions from the extractive industry, as here, the relationship with lithography is erased from memory. At the "Stone Museum" in Cantanhede, the uses of limestone as raw material are systematized, with emphasis on the classical and medieval traditions of this memory and the millennia-old relationship between Man and the limestone landscape. Some examples of extraction for industrial purposes are also listed.

## The local stone and imported stone: a scenario described in technical manuals

Antoine Raucourt was the first to suggest in his lithography manual that "(...) any stone that reacts to acid effervescence, absorbs water easily and that can be penetrated by fatty substances, is suitable for lithography"<sup>3</sup>. Nevertheless, according to Raucourt, it also has to be compact, light-colored, and uniform, without faults and receptive to a good polish. The acid test must also confirm its validity in the field<sup>4</sup>.

Godefroy Engelmann did not deviate from these qualities when illustrating the fundamental chemical principle: "Write on egg with melted fat, apply weak acid, and after a short time the written part will appear in relief"<sup>5</sup>. (1839, p. 6) In the early manuals, the arguments are clear and suggest a wealth of choices, providing the reader with the possibility of saving resources in the selection of suitable stones, and, as a definition of lithographic stone in a 19th-century dictionary explicitly states, the essential

3 The same passage published in 1820 continues to select stones with calcium carbonate, this being limestone, which like flint, is one of the most abundant on the earth's surface. See Antoine Raucourt, *A manual of lithography; Or memoir on the lithographical experiments Made in Paris, at the Royal School of the Roads and Bridges: Clearly explaining the Whole Art, as well as All the Accidents that may happen in Printing, and the Different Methods of Avoiding them*, translated By Charles Hullmandel (London, 1821), p. 29..

4 Instructions on how to identify suitable stones. This information contradicts the composition requirements - nearly pure calcium carbonate - or how it appears in the quarry. See Raucourt, *A Manual of Lithography*, p. 30..

5 In the original french version: "Ecrivez sur une coquille d'œuf avec du suif fondu; laissez figer le suif; plongez l'œuf dans un acide faible, du vinaigre par exemple; au bout de peu de temps la partie écrite paraîtra en relief, et sera tout-à-fait nette". Engelmann, Godefroy (1839). *Traité theorique et pratique de Lithographie*. MULHOUSE: Haut-Rhin.



characteristic of a lithographic stone is simply to be porous<sup>6</sup>. In a national context, the promotional magazine *O panorama*, the first major Portuguese cultural dissemination newspaper to emerge in the 19th century, was very optimistic about the wealth and quality of specimens to be found in the Portuguese context, writing that in this corner of Europe<sup>7</sup> it's possible to find lithographic stones as good as those from Bavaria. However, more detailed descriptions show that there was a high level of quality expected from these stones<sup>8</sup>.

To learn a little more about the Portuguese lithographic stone, we had to go back and read testimonials written in 19th-century periodicals, or find engravings published in illustrated magazines. These sources confirm the fact that archives that display the most trivial stones — the so-called *Ançã* stones — do so describing, the most exquisite stones, were the ones imported directly from Bavaria. These accounts and observations immerse us in another time period, in another context, and lead us to not

6 New Critical and Etymological Dictionary of the Portuguese Language, Francisco Solano Constâncio, 1836, p. 660.

7 "God endowed this corner of Europe, called Portugal, with so many natural riches that it should not be surprising that among the very precious and varied species of stones found within it, lithographic stones as good as those from Bavaria might be found, from which not only will the great benefit of not having to import them immediately be derived, but even that of exporting them, if, having them in abundance, their quality is proven, and known to foreigners, who, being offered them more cheaply, will prefer to come to Portugal to buy them, especially the English."

8 "The best stones are porous yet vitreous, with a faded yellowish color, and sometimes a somewhat indistinct gray: they are fashioned into slabs of an inch and a half to two and a half inches in thickness, well smoothed on one side; to serve afterward, they should be granulated or polished, according to the purpose for which they are intended." from *Lithographia*, *Lithographia em Portugal*, company for the exploration of lithographic quarries, *O Panorama*, literary and instructive newspaper, April 6, 1839, p. 106.

only conclude that it was necessary to discover stones of a more convenient and less costly nature, but also stones of various origins. We found that most of the specimens we encountered were indeed local stones and not imported ones, as described above<sup>9</sup>.

### Beyond the *Ançã* Stone

In the catalogue of Portuguese products at the Universal Exhibition in London, published in the *Revista Universal Lisbonense* on the 25th of September of 1851, the extraction sites for lithographic stones competing are listed: Sesimbra, Arrábida and, more importantly, Calhariz. The map that reconstructs the Portuguese lithographic stone extraction sites in the mid-19th century also includes Coimbra, Sesimbra, Arrábida, Ourém, and Cascais<sup>10</sup>. This map is much too vague and yet to be thoroughly investigated, but it provides a new perspective on lithography in the Portuguese context.

Chooffat map listed various barren places, suggests where the search for these stones can be made, and gives us further context regarding the breadth of the lithographic stone bearing terrain in Portugal, showing us yet again

9 By direct observation, in the Portuguese workshop context for artistic lithography use, the most abundant are very light yellowish batches, soft, and thus symptomatic of the local extraction option of the same set of quarries. Stones from Cooperativa *Árvore* in Porto, Galeria *diferença* in Lisbon, Bartolomeu Cid dos Santos Print Workshop in Tavira, museum collections associated with canning industries such as the Museum of Vila Real de Santo António, and also stones from FBAUP fall into this category. In this latter archive, there are some loose stones, reduced to one or two specimens, denser and darker, with a dark gray and bluish tone, loose and broken stones indicating a distinct origin.

10 Descriptive in "Useful Products of the Mineral Kingdom," *O Panorama*, March 30, 1839, p. 104.

that the primary source of extraction is the Ançã region<sup>11</sup>.

Our foray began with the Ançã stone from the Ançã-Portunhos region, and we were determined to pay attention to any potential lost links, as well as to regain knowledge predicated by our presence in this place. The trail begins at FBAUP's printmaking workshop with a specific stone, light beige in color, inadvertently trimmed so as to lose any evidence of craftsmanship that associated it with the artisanal quarry (Machado, 2023).

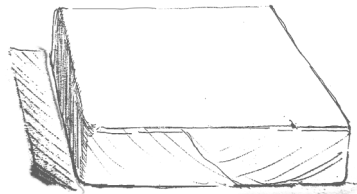


Fig. 1.  
Drawing by  
Graciela Machado.

We deemed this stone to be suitable to work on, though it lacked a few of the common characteristics of the bluish-gray stones, which are harder, allowing for more delicate details, giving the printmaker space to achieve higher levels of rigor that the low hardness of the stone we were working with could not. Could this be a Portuguese lithographic stone, one of the many that came from the valley bathed by the Ançã waterway, where the sheer scale of the dismantling of the landscape by man created the void that we see today?

11 "Ançã Stone" refers to a type of very pure and soft limestone, with a whitish tone, extracted in the Ançã-Portunhos region, in Jurassic units of the Cantanhede anticline. During a visit, we can observe various limestone quarrying operations, both active and abandoned.

## Redrawn Postcard Figure

As we entered the valley, we were confronted with the results of man interacting with nature and how this interaction is expressed in a new, manmade landscape torn by human action. This took us back to the Solnhofen postcards, a place where we've never been to.

A first visit to the abandoned quarry revealed the ups and downs of the extractive industry and its role in shaping this region, and now, with a small stone in hand, we surmised that this could've been the original extraction site.

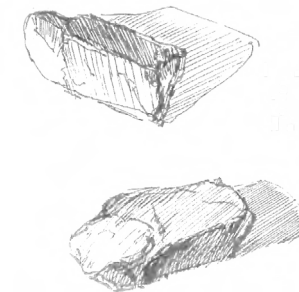


Fig. 2.  
Drawing by Graciela  
Machado.

In the abandoned quarry, we took note of the ruins of the structures, piles of materials already covered by low vegetation, the recent use of these areas to dump construction debris, and the immense walls surrounding the quarry with a visible yet distant tree line in the background.

On the extraction wall we recognized the typical stratigraphy of sedimentary units, and irregular and thick slabs were observed in engravings on lithographic quarries (Fig. 3.).





Fig. 3.  
Drawing on  
lithographic stone  
Graciela Machado.  
2024.

A fragment of stone we collected corresponded to the description of lithographic stones extracted in the Coimbra region in terms of chemical composition, porosity, and very fine grain, leading to it being described as glassy, slow drying, of a faded yellow color, or very light gray color, without fissures and crystals and without any defects that could interfere with printing<sup>12</sup>.

The visit continued with a trip to an active quarry, where heavy machinery, not men, horses, and carts, lifts up blocks and massive slabs. In the quarry located in the Ançã region, the material interactions we observed such as picking up larger stones, taking note of the stones left behind, climbing the ruined steps, the mud on the ground, and unused devices, suggest a long gone geological landscape beyond what we can observe.

12 Ibid, O Panorama, p. 100 e p. 101.



Fig. 4.  
Drawing on  
lithographic stone  
Graciela Machado.  
2024.

We found ourselves confronted by a physical space conditioned by numerous factors, uses, histories, as well as a series of material transformations that took place in that very space (machinery, shelters, tools). Human interference manifests itself through the selection of various samples, in which we search for smooth surfaces or more particular geological characteristics, along with what remains on the ground, bringing us back to something one does not want to give up: having the practical experience of seeing the materials in their original context. In the search for the mother stone, the comparison of weight, color, density, the apparent friendliness to carving, and the attention to the possible fossilized presence of organisms (mollusks, shell fragments, among others) revealed a series of

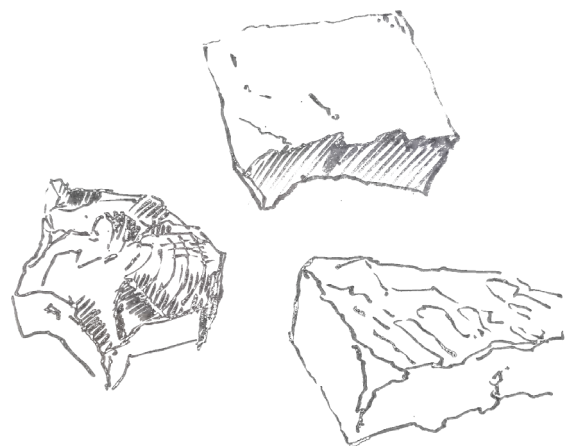


Fig. 4.  
Drawings by  
Graciela Machado.

characteristics inherent to that specific limestone. In the quarry's museum, as we tried to decipher the signs of contact with different tools and instruments used in its extraction by observing the black and white photographs enlarged next to the tool bench provided by the museum, the reality makes itself clear to us, slowly and discreetly: two medium-sized lithographic stones appear in our line of sight, next to one another. (Fig. 4).–



Fig. 5.  
Photograph taken  
at Museu da Pedra,  
Cantanhede.

## The staging of a trail

The trail in question was constructed based on an interpretation of the relationships between humans, non-humans, and the environment, as well as the use of technological artifacts and how they reappear in a museum's constructed narratives. It traces a specific path and ultimately leads us to the place where these stones were excavated, and what we ended up traversing was a ruin, a historical and technical ruin produced by man over centuries. Despite extensive documentation, there are some notable absences of information in its history, which lead us to examine how today's lithographer may have the desire to restore these absences. We seek to experience the landscape in such a way that would ultimately result in a renewed interest for this subject. We project that new associations will emerge from traversing these ruins and allow us to reconsider the relationships between objects and practices used in printmaking today. We will establish new connections between various types of spaces and objects: the quarry, the workshop, the museum and the printed image.

Through clues from the industry, the crafts, as well as word-of-mouth stories, the trail of the The Ançã lithographic stone lead us to return to its extraction site. These stones ended up losing almost all signs of craftsmanship that a lithographic stone usually retains, and thus, by returning to the extraction site and, more importantly, the mother stone, we mean to find clues such as signs of contact with different tools, instruments, protocols used in extraction now only displayed as museum material. In this context, the stone gains a different appreciation, namely in its geological dimension through the perspec-





tive of the museum curators, geologists and craftsmen. What we conclude with this deliberately performative field research-action ends up being the creation of a new network of meaningful relationships constructed throughout this action, where the various exhibited objects gathered - raw stones, chromolithographs, and engravings from the late 19th century, postcards, stones prepared in an improvised workshop – make it clear what

images we have in mind when we go out into the field, and what images we are predisposed to develop upon returning from a trail that represents the origins of Portuguese lithographic stone.

Thus, a trip to the quarry already carries within itself other images and ideas that will later be materialized in its relationship with the stone. An enlarged photograph

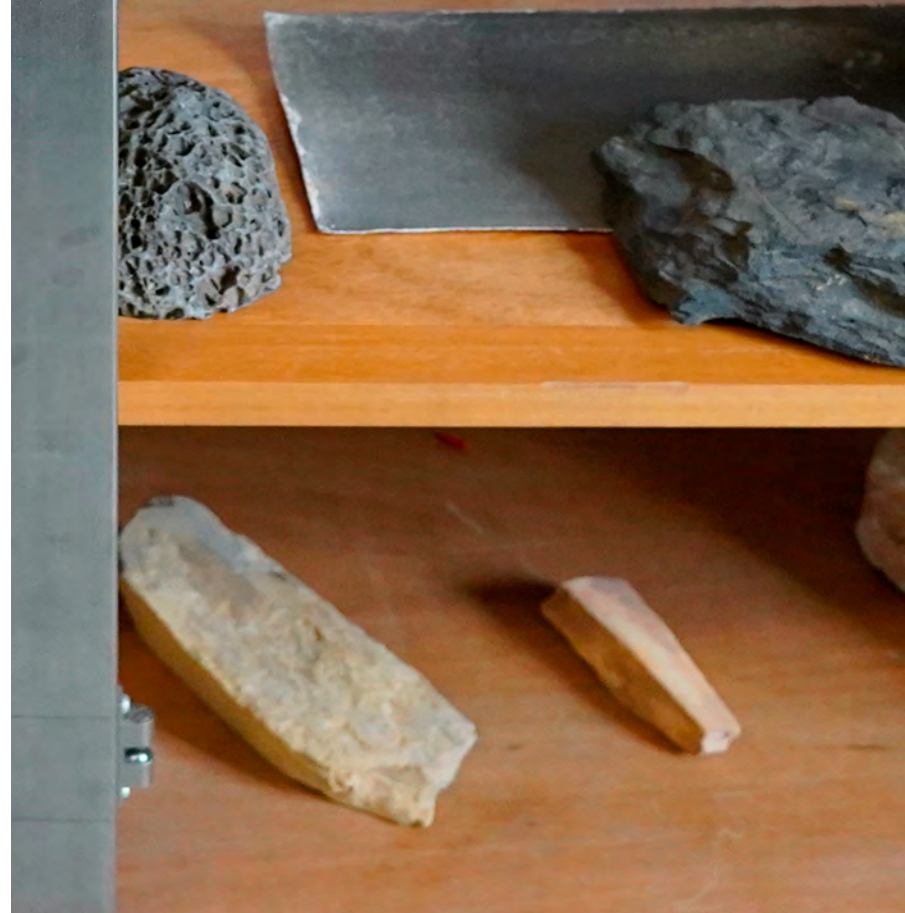
is just one of several images displaying the memory of other forms of intervention and extraction, simultaneously artisanal and industrialized.

## Conclusion

Geological characteristics constitute only part of the equation for us. The lithographic stone is embedded with its own geological footprint, which in itself makes it easier for us to become acquainted with its origins, which in turn provides us with the ability to contemplate anachronistic scenarios around lithography. This research pushed us onto a continuum of care, attention and curiosity about unknown factors around lithography. This includes how the stone relates to technological artifacts, systemic relationships, and extraction practices directed towards masonry, paving stones, among other practical uses. In the search for stratigraphic units more directly related to human action linked to an anticline structure illustrated in Choffat's cartography (1927), where we can find lithography itself: in the heterogeneity and multiplicity of geology.













PART II – ORAL  
COMMUNICATIONS

5517/2425518







## NOMADS & VOICES OF THE LANDSCAPE

Pedro Maia

It was a happy coincidence and a sign of our transdisciplinary age that we hosted both Project No-made: Lithography in situ and the exhibition "Voices of the Landscape" in late 2023, both initiatives developed at the Faculty of Fine Arts of the University of Porto. For this reason, and taking into consideration both the articulation and the dissolution of any boundaries between different disciplines and research activities, both initiatives crossed spontaneously, establishing bridges and new pathways for the future in terms of research in art, science and technology.

From its inception, the main idea for the exhibition was to build a great *Kunstkamera* inspired by the halls and exhibition devices that cropped up in Europe in the seventeenth and

eighteenth centuries<sup>1</sup>, creating a dialogue directed towards 21st century, art, literature, science and technology vested on the idea of landscape. Another concept adopted was the promotion of a model of assembly of the works and their articulation under the guidance of Aby Warburg's *Mnemosyne*, as well as its later interpretation by George Didi-Huberman<sup>2</sup>. In other words, by setting the works side by side, we aimed to promote a visual dialogue between different artifacts and approaches nestled in the idea of landscape.

Due to the sheer amount of work

1 Smith, Jeffrey Chipps (2023). *Kunstskammer: Early Modern Art and Curiosity Cabinets in the Holy Roman Empire*. Chicago: The University Chicago Press.

2 Didi-Huberman, George (2018). *Atlas Or The Anxious Gay Science*. Chicago: The University of Chicago Press; Heil, Alex; Ohrt, / Roberto (2020). *Aby Warburg Bilderatlas Mnemosyne – The Original*. Berlin: Ed. Hatje Cantz.



selected for the exhibition and present in the space for assembly (over 200 works), as well as the amount of scientific and artistic posters (26 in total), the exhibition design, the installation of the works on the ground, walls, panels and tables, all of these had to be tested in a first phase from a model built to scale 1/25. This way, working directly from the model, several compositional trials were rehearsed from two to three-dimensional miniature replicas of all the works, in order to enable and experiment with various possible compositions and designs.

Not only was it necessary to ensure that all the works would fit in the space, but also that they could have the proper visibility according to the variety of sizes and media, while ensuring, at the same time, that each work could be articulated with others and enter into dialogue, regardless of its artistic, scientific or technological nature. There was also a need to ensure that the larger works, which could be perceived at a greater distance, were placed on the walls at a greater height (up to 5 meters high). It was also important to assure that the videos with sound were located in areas of the pavilion

that wouldn't interfere with other artistic installations also displaying sound. Having invited 7 composers to create a soundtrack for the exhibition in order to create a dialogue with the exterior area of the pavilion, as well as with the sounds of the garden of the Faculty of Fine Arts of Porto and with the sound of the city itself, the organization of the exhibition created for each of these soundtracks QR codes also available to consult after the opening inside the exhibition space.

One of the main objectives of the research project *The Landscape Speaks* is presenting was a different types of approach to the concept of landscape, all in the same context and at one only glance. A renewed understanding of the term, be it objective, subjective or personal. As whole, this project, much like *Atelier Nomade: Lithography in situ*, intended to unveil new concepts, contribute with new images and new knowledge linked to the analysis of the contemporary concepts of art, technology and landscape. It's derived, and in a certain way birthed, from the studies developed after the historical and artistic interpretations of the landscape, art and science, integrating a set

of methodologies and humanistic proposals in the field of contemporary visual arts, performance, architecture, urbanism, literature, musicology, allied to the latest systems of information and communication technologies.

In this way, historical memory and cultural heritage are understood in their relationship with the present in its widest possible sense and, although these disciplines have remarkable historiographical precedents in their understanding of the concept of landscape, they have not always been the subject of a homogeneous or detailed study that links them to global scenarios and contemporary proposals. In this sense, the project integrates different areas of knowledge, treated by the research and work teams individually or in groups. Through this, we identified the need to carry out common approaches and joint research discourses, through different scientific, technological and artistic events. Among these areas there is a clear premise that embraces the entire project: the representation of a landscape (visual, audible, haptic, oral, patrimonial, technological, virtual, etc.) that "speaks to us", through an interdisciplinary

language and a historical phenomenon that is cultural, technological and artistic.

Concurrently, the cycle of conferences, organized in parallel with the exhibition, featured more than 34 artists and researchers from many countries, and was also a way to put art and science dialoguing with the idea of landscape. Looking back, the conferences and the exhibition promoted, in the perspective of the curators themselves, the speakers and the participants, a dialogue that was always aimed at activating new contacts between artists and researchers from other fields of expertise, a new vision about their own work, outlining new ideas for the future, new projects and new partnerships in the realm of the concept of landscape. In sum, a new understanding of the concept in an era in which perception, representation and sustainability of place and territory, both local and global, become more and more pressing to configure, develop and idealize.







# VOZES DA PAISAGEM

VOCES DEL  
PAISAGE

VOICES OF  
THE LANDSCAPE





## THE HISTORY AND THE MAP COLLECTION OF BMP

João Carlos Garcia

The Porto Public Library (BMP) was founded in 1833, after the establishment of the Liberal Regime in Portugal. Its initial heritage was based on the libraries of defunct catholic religious institutes (Benedictines, Franciscans, Dominicans) and also on private libraries, lost to members of the nobility or clergy, related to the Old Regime, in the North of Portugal. The BMP gathers a notable collection of bibliographic titles, including manuscripts, incunabula and rare prints, specially of maps and prints.



## LITHOGRAPHY AND PORTUGUESE ILLUSTRATION

Julio Dolbeth & Rui Vitorino Santos

The relationship between lithography, illustration and design is a shared history, a history we intend to present in this session. Lithography expanded narrative possibilities that allowed for the printing of images and texts simultaneously, as well as the graphic fusion between text and illustration, made possible by drawing on stone. We will delve into this technological advance in illustration and design through the analysis of 19th century editorial artifacts contemporaneous with the development of lithography and chromolithography in the local and national context. Contact with this printed material reinforces the role of lithography in the democratization of editing and publishing, just as the narrative and graphic possibilities allowed for the creation of layouts in which text and image are combined for better communica-

tion, be it through messages with political content, commercial, ideological or mere entertainment.

This graphic innovation, which allowed for reproduction and dissemination of printed material, will be explored through contact with newspapers and bulletins carried out by Rafael Bordalo Pinheiro (1946-1905). We will also give special attention to Sebastião Sanhudo (1851 – 1901), caricaturist and founder of Litografia Portuguesa, known for his contribution to Porto's culture through the practice of illustration.







## LAYERS: CROSSING THE BORDERS OF VISIBILITY

Paula Abrunhosa

Visiting the spaces where the headquarters of the Marques da Silva Foundation are located involves engaging with a unique space, shaped by the architectural memory of the houses, their relationship with the city, and the history of their inhabitants. It also reflects the challenge of transforming its original domesticity into a place for an institution designed to house architectural archives, notably those of José Marques da Silva and his daughter and son-in-law, who were also architects. Born under the auspices of the University of Porto, the foundation combines the primary function of being an archive with the additional mission of promoting research and disseminating the preserved collections, numbering around 40 different collections.

As a project under construction and in constant expansion,

it intertwines times, identities, and geographies, whose meanings and relationships go far beyond what is visible at first glance.



## FROM JURASSIC TO LITHOGRAPHY

José Manuel Brandão



The invention of lithography by Alois Senefelder (1771-1834) at the end of the 18th century brought new and revolutionary uses to the limestone extracted from Bavaria's quarries: a medium for artistic creation. Formed in lagoon environments with calm, hypersaline and anoxic waters at around 150 M.y. (Upper Jurassic), these limestones are compact, shock-resistant and characterized by their light grey or yellowish colors and low porosity. The slow sedimentation produced the very fine grain (1/250 mm) these stones present, which in itself provides great surface regularity when polished. The regularity of the strata is also desirable, in tabular decimetric structures, which facilitate extraction in slabs of varying sizes.

The most important European lithographic limestone deposit is undoubtedly Solnhofen (Bavaria),

from which thousands of slabs have been shipped all over the world; however, the high commercial price of these stones was an incentive for other countries to look for limestones with similar characteristics, namely in Portugal. It was in this context that a few small deposits of Jurassic-age limestone were discovered and exploited during the 19th century some of which were exhibited at the Crystal Palace Exhibition, London 1851, making it possible to supply some workshops with these stones.





## OPORTO IN HISTORY AND BUILDINGS BY MARQUES DA SILVA

Gonçalo Furtado

In this brief lecture, we delved into the historical aspects of the city of Porto, the education at the Porto School, and the work of José Marques da Silva (1869-1947). In a concise introduction, we referenced an article (co-authored with Ricardo Martins) that encompasses the development of the Fernandino urban core, the urban foundation of the 21st century, and the transition to the current 21st century.

In the first part, we established the connection between the city's development and that of the Porto School: the "aulas de debuxo" (1779-1803), the separation between academy and school (1833-1908), the establishment of the Polytechnic Academy (1881), and the Urban Improvement Plans (1784, 1877). In the 19th century, following the establishment of the Portuguese Republic (1911) and

the University of Porto (1911), urban drawings and plans emerged (1913, 1915-1916, 1932, 1938-40). In terms of artistic education, a new reform stands out (1931), along with the creation of the 'Porto School of Fine Arts.' This coincides with Marques da Silva's tenure (1913-1939). A graduate of Paris in 1896, he was a notable draughtsman and introduced new techniques and programs, being responsible for assimilating the "beaux-arts" system into the Porto School. A careful selection of 11 examples illustrates his extensive work.



PART III – NOMADIC  
TECHNOLOGICAL  
ARCHEOLOGY



MARTA BELKOT

(SFRH/BD/149042/2019)

GRACIELA  
MACHADO

(i2ADS)

## Use of handheld devices: Dabber

2020–22

- Dabber
- "*Ferramenta a ferramenta*"

**Research projects:** Pure Print/i2ADS,  
GroundLab/i2ADS

**Researchers:** Graciela Machado (IP:  
i2ADS/FBAUP). Marta Belkot (SFRH/  
BD/149042/2019. Tiago Marques da Cruz.  
Norberto Jorge.

**Illustrations:** Marta Belkot and  
Kasia Harciarek

**Acknowledgement:** Cristiana Macedo  
contributed with tutorial documentation  
and construction of manual *Ferramenta  
a Ferramenta*, (2022)

We became interested in the construction of the dabber while working in the field, where such an instrument, then simulated with cloth, made it possible to print on uneven stones found in situ and adapted for lithography (Anadia, Bairrada, flash residency, 2020). Later, Marta Belkot, in collaboration with Tiago Cruz (wood, metal and stone workshop technician, STOMMP FBAUP), constructed a dabber based on the illustration and description in the 19th-century book: *Traité théorique et pratique de lithographie* (1839) by Engelmann (plate 44, appendix). Tiago Cruz carved the handle with great precision from Robinia Pseudoacacia, a hard, resistant and invasive tree that had fallen in the university's garden. He carefully selected the part of the wood that was suitable for carving in one piece, but also dry enough to be turned on a lathe. Later, Marta filled it with rags, felt and soft leather and closed it with needles. Tests were made by inking a lithographic stone, a gillotage metal plate and a relief matrix with excellent results.

Our first dabber prototype, made from a continuous wooden structure, proved easy to handle, spread and coat ink with. The dabber is widely used in printmaking due its versatility, being used for inking, printing, varnishing, painting or drawing. Similar instruments in different cultures and languages, such as frotton, tampon, baren, or mobang, have the same purposes but different shapes and materials used for its construction. Over the centuries, the dabber was often mistaken with inking balls.<sup>1</sup> Its appearance changed, depending on the purpose, becoming more flat, rounder, sometimes made from umbrella cloth, felt, leather, with a rod or wooden handle.

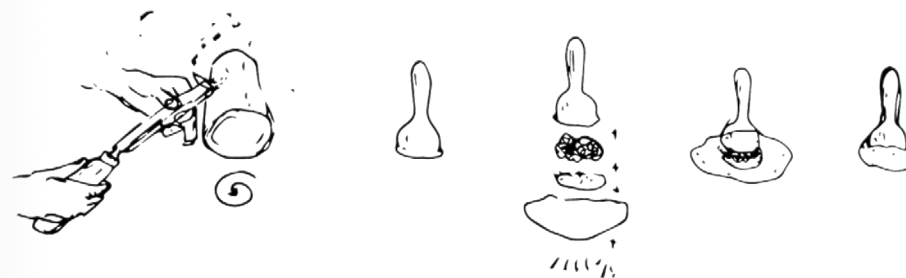
<sup>1</sup> Inking balls are definitively older than dabbers. We can find some information about the tradition of using inking balls, dating back from 1040 to the invention of movable type, based on portable components, at a time ceramic, in typography printing technology, developed in China by Bi Sheng (NEEDHAM & RONAN 1994). Inking balls are slightly bigger, rounder and always used in pairs.



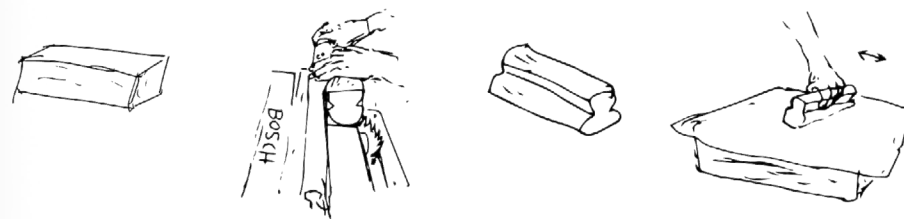
Abraham Bosse (1645)<sup>2</sup> describes it the following way:

*“A good dabber must be made with good grade white cloth which must be soft and already somewhat used. When you have a sufficient amount of such cloth roll it up the way you would roll up a bandage, but make sure that you roll it much more tightly since the tighter it is, the better it will be. The result should be something that looks like a painter's muller. At this point take some good grade string made with several strands and, using a kind of awl, make some holes along the length of the rolled up cloth. Make sure that the holes are made in different places then pass the string through them and sew everything up tightly so as to reduce the rolled up cloth to a diameter of three inches and a length of about five or six inches. The end that will be used should then be prepared by making a clean cut with a very sharp knife. The cut should be made in such a way that the detached piece looks like a slice of sausage. The other end should then be sewn so as to form a ball. This is the end that will fit into the palm of the artist's hand and will permit him to ink the plate firmly without too much difficulty.”*

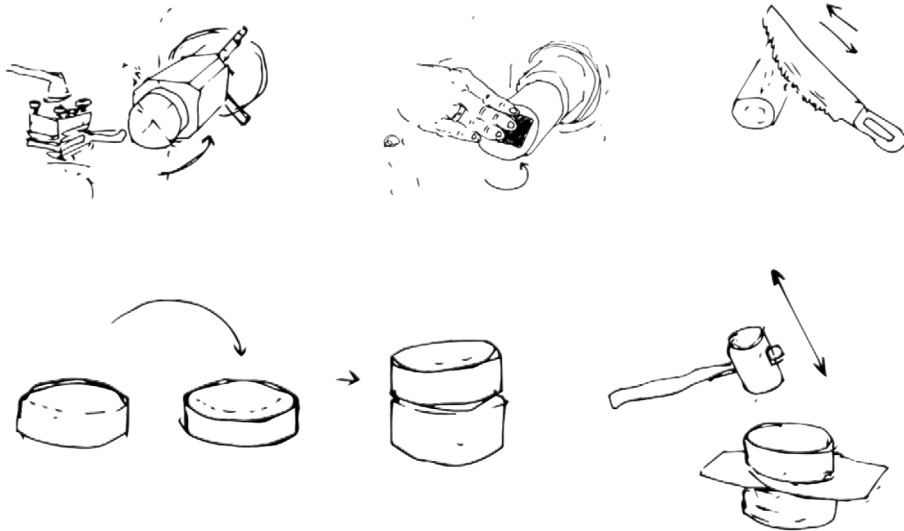
2 Taken from: A technical dictionary of printmaking Béguin, André (1977-1) access online: <https://www.polymetaal.nl/beguिन/mapd/dabber.htm>, The Traicté des manieres de graver en taille doctve svr l'airin. Par le moyen des eaux fortes, & des vernix durs & mols. Ensemble de la façon d'en imprimer les planches & d'en construire la presse, & autres choses concernans lesdits arts written by Bosse, Abraham Bosse in 1645 in translation to Portuguese by Menezes, Jose Joaquim Viegas in 1801 entitled: The Tratado da gravura a agua forte, e a buril, e em maneira negra com o modo de construir as prensas modernas, e de imprimir em talho doce by Bosse, Abraham, 1602-1676; in chapter describing application of soft ground (varnish mole) portuguese name for dabber is ponceta: pillow made with cotton to beat the plate while varnish is still in liquid form, (page 54) access: [https://archive.org/details/tratadodagravura00boss\\_0/page/54/mode/2up](https://archive.org/details/tratadodagravura00boss_0/page/54/mode/2up)



In our second attempt (2022) we (Professor Norberto Jorge Ogórek, Tiago Cruz and Marta Belköt) constructed another dabber prototype as described in *Every man his own printer; or, Lithography made easy: being an essay upon lithography in all its branches* by Waterlow and Sons (1859), as well as a replica of a metal stamping mold used in the photo enamel process – a tool borrowed from a family-owned photo-enameling workshop in Porto. From this pursuit to make our own tools, we enjoyed a close collaboration between the printmaking and wood, metal and stone workshops, and ended up producing a small tutorial: *Ferramenta a ferramenta*. In the tutorial, Norberto Jorge Ogórek and Tiago Cruz developed an exercise in which they adapted existing tools from the lithography and metal workshops to create two distinctive tools used for embossing metal and printing from stone.



The dabber in the elongated rectangular version, also made of Robinia Pseudoacacia like the first vertical round dabber, has a different function. Its ergonomic handle helps to spread pressure evenly while printing by hand. While holding it on top of the printing surface, one can decide the pressure, the movement, and the speed.

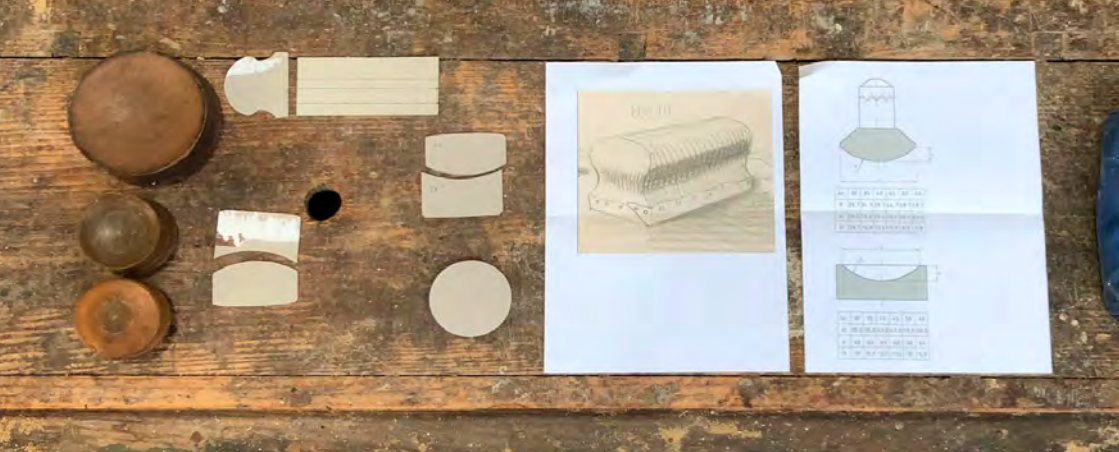


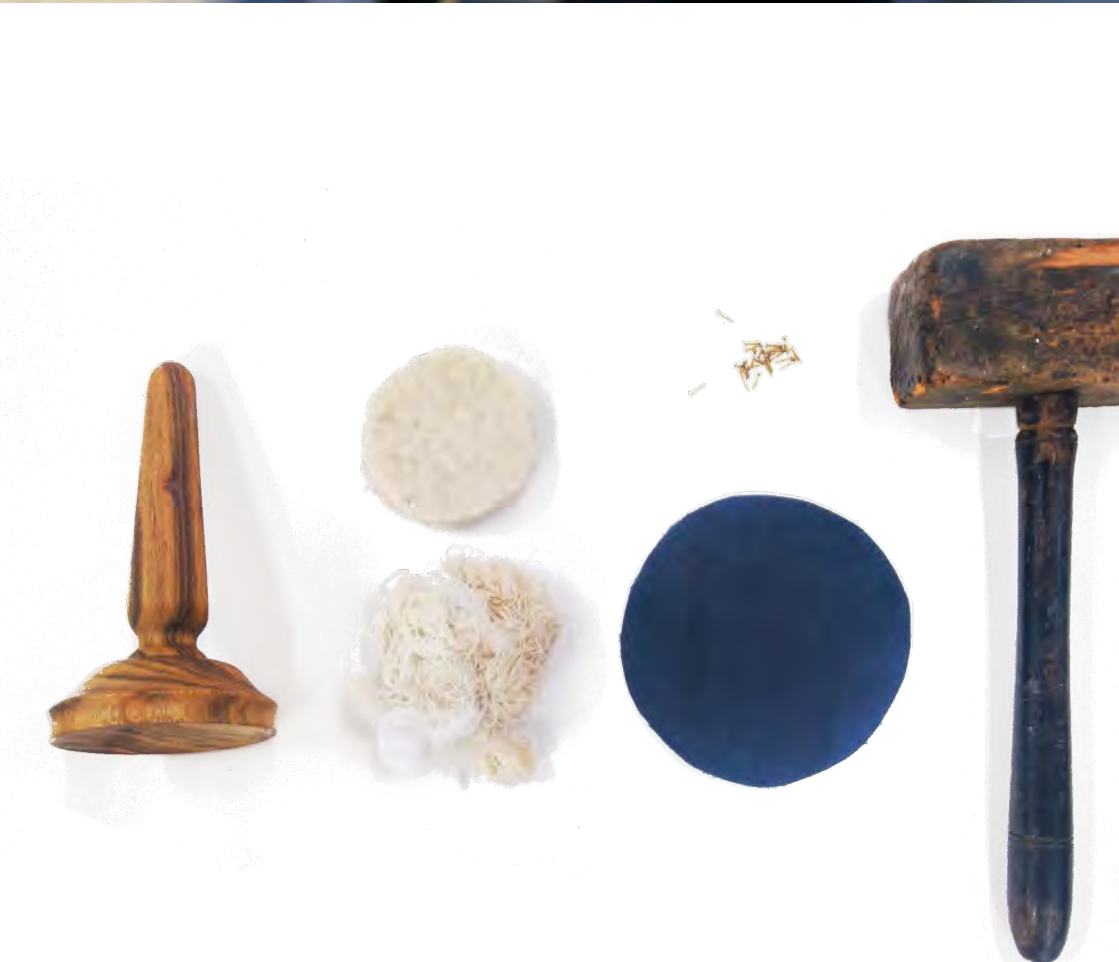
The replica for the metal stamping mold or, as named by enamellers, the "form", also made from Robinia Pseudoacacia, is hard and resistant. The form is identical in efficiency and elegance to the original 19th century artefact.

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MARTA BEŁKOT

(SFRH/BD/149042/2019)

GRACIELA  
MACHADO

(i2ADS)

## Lithographic crayons

2020–22

- Black, white and grey  
lithographic crayon
- Black and white drawing  
lithographic ink and black  
slate crayon

**Research projects:** Pure Print/i2ADS,  
GroundLab/i2ADS

**Researchers:** Graciela Machado (IP:  
i2ADS/FBAUP). Marta Bełkot (SFRH/  
BD/149042/2019, Rafaela Lima

**Partner and contributor:** Katarzyna  
Harciaiek.

**Illustrations:** Marta Bełkot and Kasia  
Harciaiek

**Acknowledgement:** The great  
contribution, involvement and  
fascination of the late Sandra Costa  
Brás to this research.

Before the invention of lithography<sup>1</sup>, and, consequently, of lithographic crayons and inks (tusche), the usual crayons or chalks used for drawing on paper, could consist of various binders such as: ale (beer), gum tragacanth, gum Arabic, size (any of various sticky materials), milk or oat milk, sugar, olive oil or linseed oil, apart from the usual pigments, according to Robert Dossie's "The handmaid to the arts" (1796). Until Senefelder's contributions, soap, comprised of saponified oils and fats, was only used for cleaning pictures, and saponified waxes mixed with pigments were used as painting mediums (WARD, 2008). Senefelder carried out experiments to establish the composition of an ink for drawing on stone, which he called the "chemical ink". This ink would adhere strongly to the stone, be resistant to acid and allow a considerable number of proofs to be taken from an etched drawing. This chemical ink should contain a correct mixture of materials in order to deposit the necessary fat-receptive and water-repellent substances (MAYER, p. 380). What differentiates lithographic crayons and inks from ordinary ones is, essentially, their resistance to the action of acids (LEHNER, 1902).

Lithographic inks (tusche) and crayons derive their characteristics from the chemical properties of their components; yellow beeswax is highly resistant to acid and provides smoothness and adhesion; shellac in flakes provides hardness and elasticity to the ink; mutton fat (tallow) gives the ink its necessary greasiness and softness; Marseille soap, made from soda, stimulates the porosity of the stone and helps the fat to penetrate, giving it a smooth or slippery quality, along

<sup>1</sup> The process of lithography (Aloys Senefelder invention, 1796) consists of drawing or painting with greasy chalks and inks on limestone. The stone is etched and, when moistened with water, the traces of ink repel the water and remain dry. Oily inks applied with a roller adhere only to the drawing and are repelled by the wet parts of the stone (MAYER, 1930) page 377.

with solubility in water; mastic gives the ink fluidity; resins give it tackiness and solidity; potassium nitrate gives the crayons some hardness and elasticity; lampblack pigment gives it its dark color and solidity (BRÉGEAUT, LEMERCIER, MAYER). Lithographic crayon has the same effect on the stone as ink, but differs in its ability to adhere or penetrate. It is used in the form of a drawing stick, available in variable grades of softness depending on the composition of wax and shellac (SENEFELDER, 1819).

Despite the fact that whether to print in color or black and white is a decision made in the last stage of the printing process, drawing on stone (or on the transfer paper) is generally done in black or dark brown. What is drawn on the limestone will disappear due to the “processing” that takes place, and will later appear in the desired color when printed on paper. This crucial fact explains the unavailability of colorful crayons or drawing lithographic inks on the market. Still, the idea to work with alternative lithographic stones like local black slate makes way for the necessity to construct white crayon and autographic ink so as to make the drawing visible on a dark surface. At first Marta Bełkot and Sandra Costa Brás (2020), having already prepared mutton tallow for the previous experiments with transfer ink, cooked the black, grey and white lithographic crayons first in FBAUP’s facilities – unsuccessfully, and later in Sandra’s house. Following Senefelder’s and Lemerrier’s crayons recipes and guided by the complete description of the process, they divided the substance in two, one using the suggested lampblack, the other the titanium white instead.

The number four crayon<sup>2</sup> that they produced did not contain shellac, which naturally darkens the substance, and this

2 Lemerrier, A. (1896). *La Lithographie Française de 1796 a 1896*. Ch. Lorilleux et Cle, Paris. p.20)

made it possible to manipulate the resulting color easily. Later Marta Bełkot and Rafaela Lima produced dark lithographic inks based on original recipes found in the lithographic recipe books and Portuguese manuals *Bibliotheca do Povo e da Escola* (1888) and *Mil Segredos de Oficinas* (1925) (BEŁKOT, LIMA, SILVA & MACHADO, 2023). They used soot as a pigment, producing a range of five slightly different inks and crayons (as a dry form of ink). For II Biennial de Ardósia De Valongo, Marta Bełkot produced four white lithographic drawing inks as well as black slate crayons (2021). All of the drawing and painting tools produced were tested along by different students, showing high quality effects and satisfactory results.





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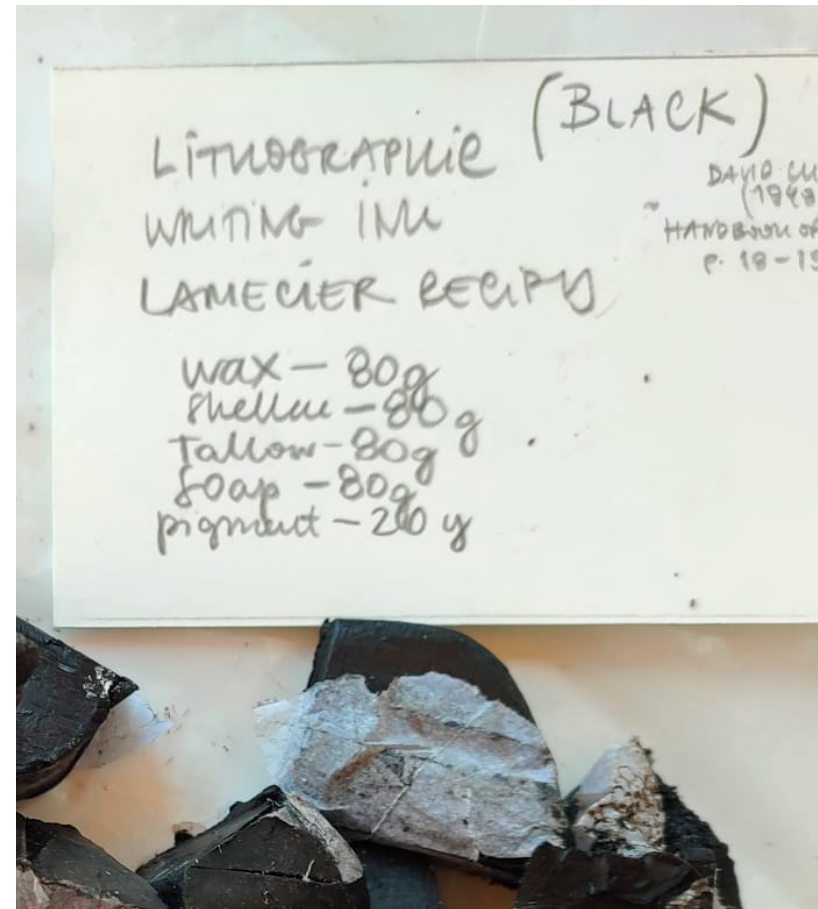




















## MARTA BEŁKOT

(SFRH/BD/149042/2019)

## GRACIELA MACHADO

(i2ADS)

## Stone paper

2020–22

- Senefelder Stone paper
- Gericault Stone paper
- Stone paper based on animal glue
- Stone paper with black slate
- Senefelder Stone paper patent

**Research projects:** Pure Print/i2ADS, GroundLab/i2ADS

**Researchers:** Graciela Machado (IP: i2ADS/FBAUP). Marta Bełkot (SFRH/BD/149042/2019, Cristiana Macedo

**Illustrations:** Marta Bełkot and Kasia Harciarek

**Partner and contributor:** Katarzyna Harciarek, Antonio Regis da Silva.

**Acknowledgement:** The great contribution, involvement and fascination of the late Sandra Costa Brás to this research.

Created by Aloys Senefelder himself, the inventor of lithography, "stone paper" (also called: carton-pierre, artificial stone, pierre factice, papyrographie) is essentially nothing more than a substitute for the lithographic stone and can be considered, therefore, a matrix. As early as 1814, Senefelder noticed certain disadvantages in lithographic stone, such as its high price point, its fragility and its considerable weight. He then set out to create a composition that could replace it. He worked on his experiments for nine years until roughly 1822 (LORILLEUX, 1889). Senefelder noticed that an oil stain on a lithographic stone spreads and penetrates for a few days, after which it is absorbed and, due to acidification, the stain no longer takes in the ink. This observation was the starting point for his experiments. He soaked the cardboard in linseed oil and then, based on the average composition of Solenhofen lithographic limestone, made a paste with chalk and linseed oil, adding some clay and iron oxide, and spread it on the cardboard. This "stone paper" took 3/4 months to absorb and mature<sup>1</sup>. Unsatisfied with the results, Senefelder kept changing the recipes, trying different mixtures with fat, lime and casein, polished and coated with vitriol.

This process became known as "papyrographie"; and although the pen drawings on these plates were printed by the hundreds for the committee of the Société d' Encouragement, they won no prizes: the coated cardboard or paper stretched and the pulp cracked under the pressure of the press (LORILLEUX, 1889). Senefelder included 15 different recipes in his patent for "papyrographie"<sup>2</sup>, although he probably used only one of them. Perhaps he wanted to create confusion so that it

<sup>1</sup> Senefelder also tried to replace the paper with zinc, aluminium or wooden plates, which were the starting point for various techniques later developed by many.

<sup>2</sup> French patent nr. 1BA1258 and 1BA1258(1) filed in 1819, issued in 1820.



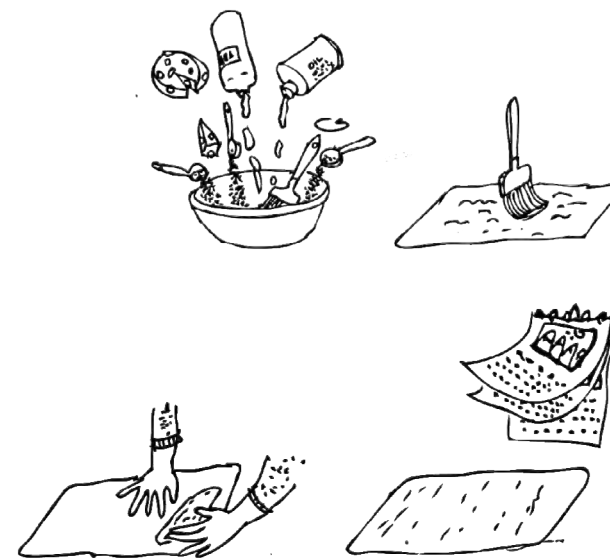
could not be copied, while at the same time trying to improve it and make it a commercial product. Ultimately, this "carton-pierre" recipe didn't work as well as expected, the technique wasn't stable, it didn't work consistently, some white parts could absorb the ink, and the drawing section could possibly fall apart. Senefelder was very attached to this technique, as he wrote in his book *The invention of lithography* (1821) "This invention will facilitate the introduction of lithography in all places, because one can make

the stones himself (...)" He continues: "I desire that soon it shall be spread over the whole world, bringing much good to humanity through many excellent productions, and that it may work toward man's greater culture, but never be misused for evil purposes. This grant the Almighty! Then may the hour be blessed in which I invented it!" (SENEFELDER, 1821). As the result was not convincing, people stopped buying them and his invention was forgotten in less than a year (ENGELMANN, 1839).

Our first attempt to reproduce stone paper (2019, 2020)<sup>3</sup> was based on Senefelder's improved recipe, in which we adjusted the quantities of substances to allow their homogeneous distribution. The second attempt (2020) was based on the use of animal glues and casein, following the identification of the recipe applied to the support used by

3 Machado, G., Bełkot, M., Costa Brás, S., Lopes, D. (2020). Coated or prepared paper: new grounds where process becomes matter. CONFIA-8th International Conference on Illustration and Animation, Barcelos, Portugal. Online access: 4.02.2023: [https://confia.ipca.pt/2020/files/confia\\_2020\\_proceedings.pdf](https://confia.ipca.pt/2020/files/confia_2020_proceedings.pdf)

Géricault<sup>4</sup>. For the second Valongo Slate Biennial (2021)<sup>5</sup>, a series of surface papers were created, together with stone paper, using slate as a pigment and filler. The latest technological works on the theme, within the framework of the SHS project (2022)<sup>6</sup>, insist on reproducing Senefelder's fifteen patented recipes, using raw materials from the quarries of Valongo and Arouca, expanding the wide range of colours, layers and areas of observation.



4 Christina Taylor, Georgina Rayner, Christopher Wallace & Katherine Eremin (2020) Géricault's *Lion Devouring a Horse* Stone Paper Matrix: Technical Study, *Journal of the American Institute for Conservation*.

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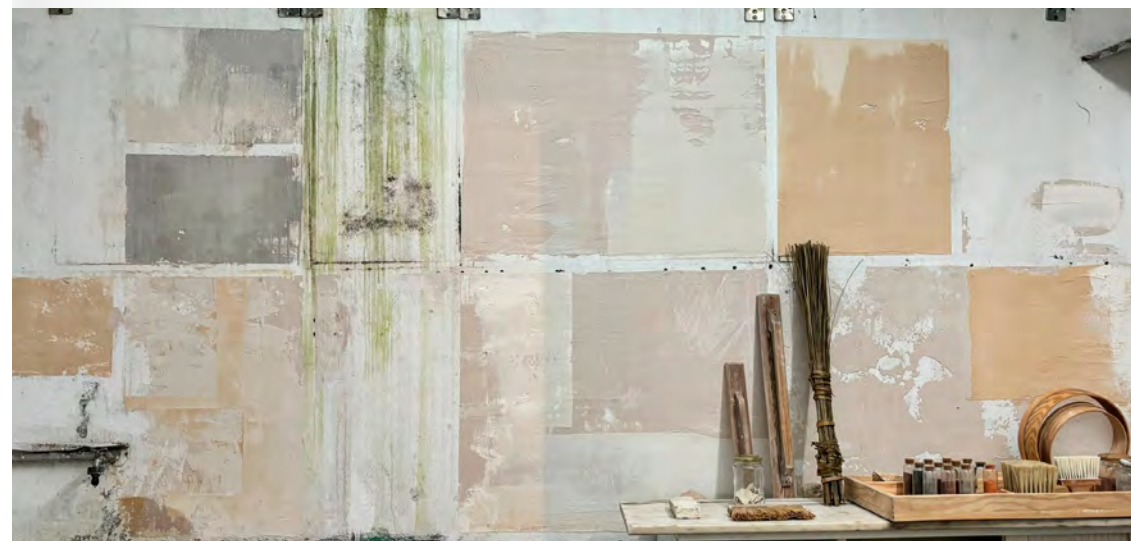




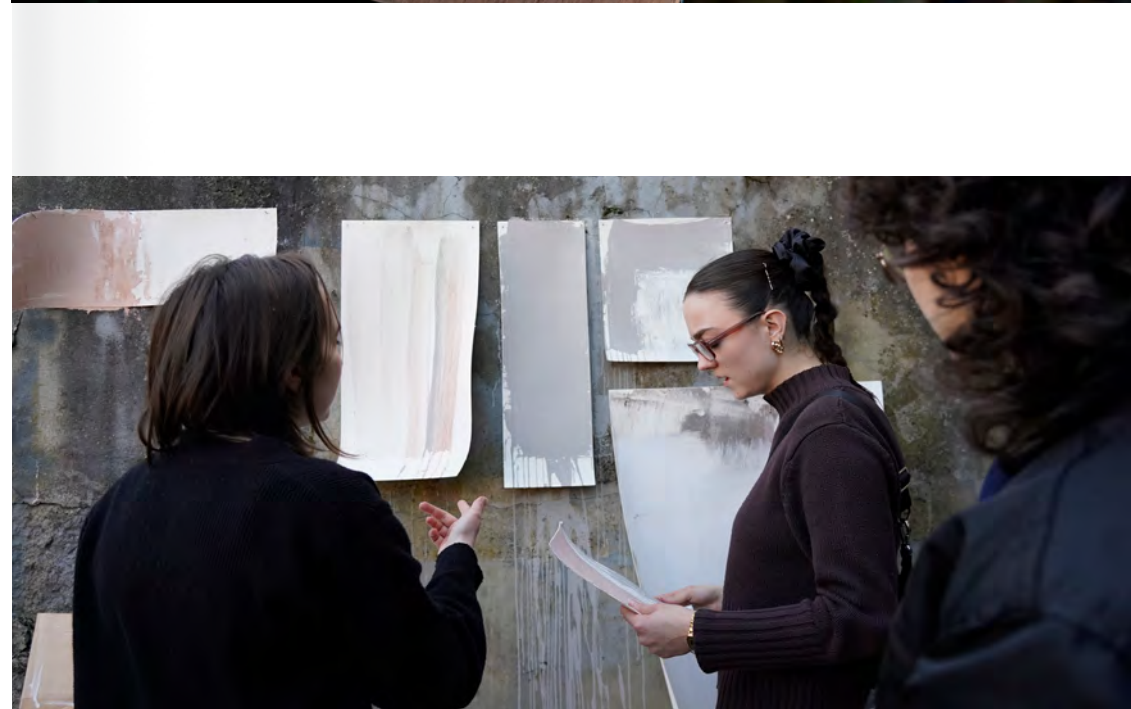








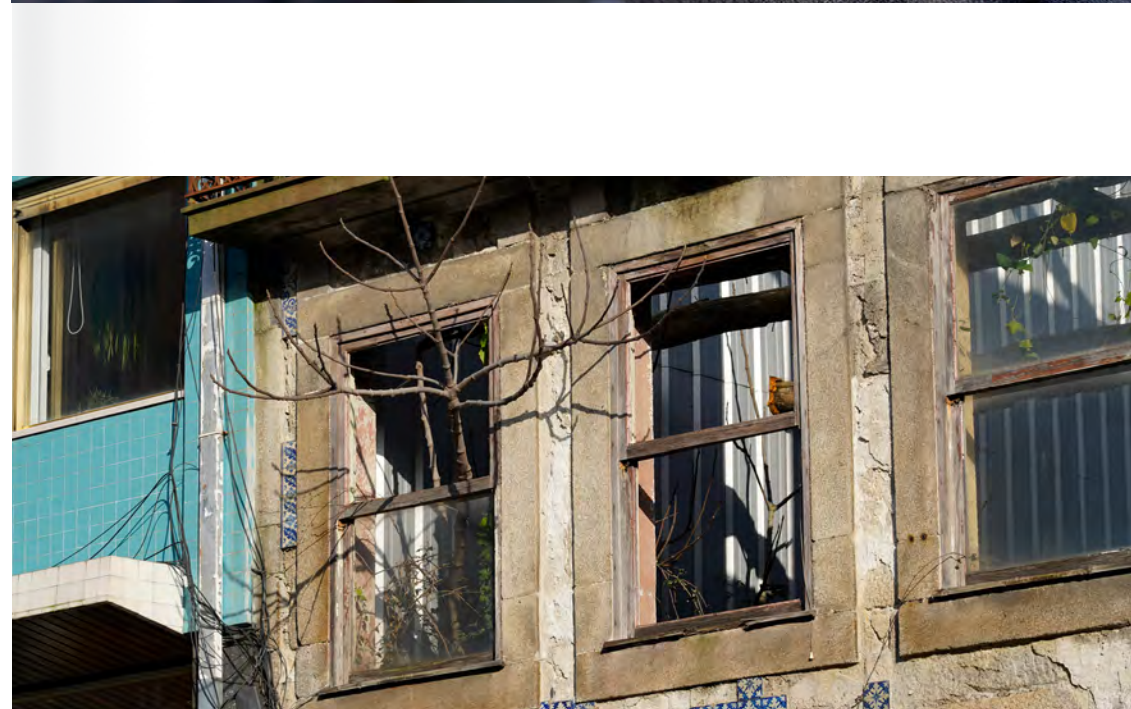




















CATARINA  
MARQUES  
DA CRUZ

(FBAUP)

GRACIELA  
MACHADO

(i2ADS)

## STONE STATION

2024

**Research projects:** Pure Print/i2ADS,  
GroundLab/i2ADS

**Researchers:** Catarina Marques da Cruz,  
Graciela Machado, Marta Belköt; António  
Regis da Silva.

**Partners:** Katarzyna Harciarek.

**Illustrations:** Catarina Marques da Cruz

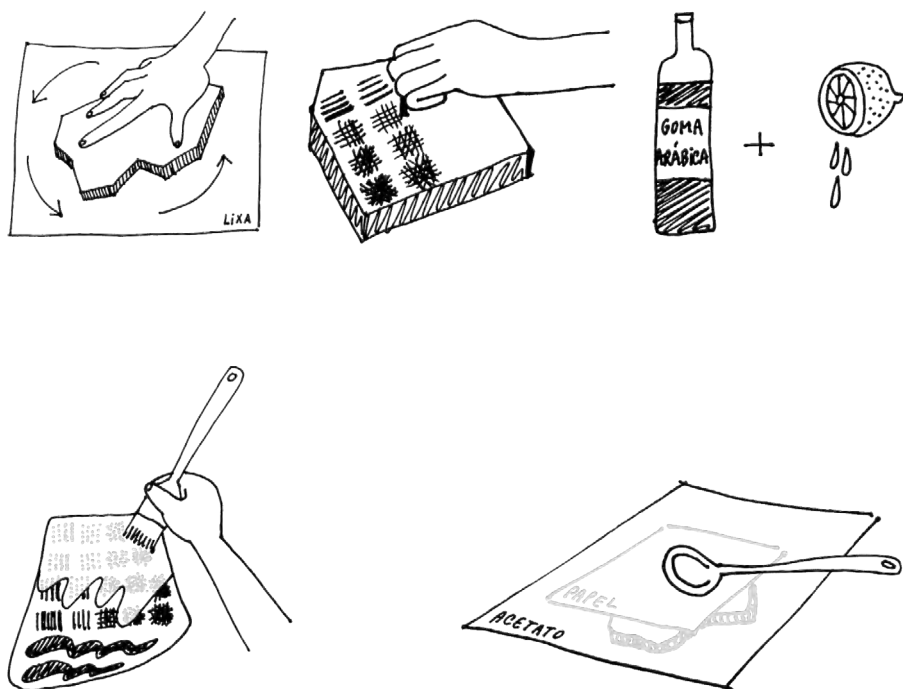
This theme presents a series of experiments that were conducted in FBAUP's printmaking workshop, with the purpose of reinforcing the use of local stones, both as an option for FBAUP's students and to also create a reference model for those who don't have lithographic stones<sup>1</sup> readily available and want to reproduce images through lithographic processes. During the COVID-19 pandemic, access to the more efficient lithographic limestone available at FBAUP was limited. To propose new print studio alternatives, the presence of a stone archive located at the glass, mosaic, and ceramic workshop was crucial and became a stone-collecting resource from which several variants of local stone were gathered. Eight different samples were selected, taking into consideration color and pattern. It wasn't possible to be certain of the origin of all the stones, nor to correctly identify all of them, so we took into consideration the use of ornamental stones like marble, limestone, and slate. Regarding the latter, during the stone's preparation, we took note of its soft texture, which we found particularly easy to achieve by using sandpaper. Practical exercises were based on the classical stone etching method, and we made use of FBAUP's established materials and protocols.

After a successful trial done using aluminum foil and lemon juice as an etchant, we performed the same experiment with marble and it also worked. These particular experiments confirm the viability of replacing classical lithographic stones with other stones and still get good printed results. It also confirmed the viability of replacing a toxic etchant with a non-toxic

1 [https://en.wikipedia.org/wiki/Lithographic\\_limestone](https://en.wikipedia.org/wiki/Lithographic_limestone)



one. If the original lithographic stone, Solnhofen's<sup>2</sup> limestone, is considered to be ideal, through these exercises we confirmed that it is also possible to perform lithography with numerous other stones of different origins, and also use protocols based on weaker etchants, such as common lemon juice.



2 "Practical printmaking", Colin Gale, Bloomsbury Publishing PLC, 2009, ISBN: 9780713688092, pág. 72

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Limestone from Cantanhede cutted and leveled by Antonio Régis da Silva and grinded by Catarina Marques da Cruz.



















Stone with inked drawing executed by the engraved manner. during "Atelier Nomade".



Two samples from Cantanhede and marble fragments found *in situ*.







Irregular marble  
stone with drawing  
of what's left of  
Litografia Nacional  
building. Rua Dr.  
Alves da Veiga.  
Drawing in-situ by  
David Lopes.







ANTONIO REGIS  
DA SILVA

(FCT 2022.11886.BD/2022)

GRACIELA  
MACHADO

(i2ADS)

# Portable Lithographic Device Model 003

2023

**Research projects:** Pure Print/i2ADS,  
GroundLab/i2ADS

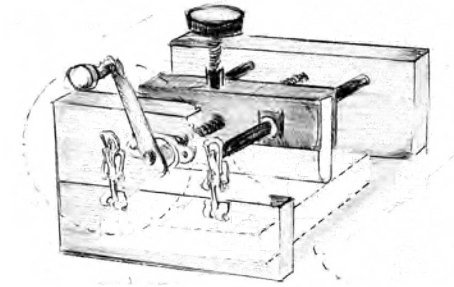
**Researchers:** Antonio Regis da Silva,  
Graciela Machado

**Support:** Tiago Cruz, Carlos Lima  
(collaboration and technical support  
from the wood and metal workshops at  
FBAUP). Pedro Rosa, President of the  
Sustainable Tourism Association of Faial

**Illustrations:** Antonio Regis da Silva

**Consulting:** Engineer Pedro Lanhas

Lithographic  
device Model 03,  
illustration Antonio  
Regis da Silva.  
Model developed in  
reference to the  
LK-35 model.



For model 003, we followed the same structure as the Box LK-35<sup>1</sup> lithographic press, which uses the principles established by Senefelder but with adaptations that allowed us to change the external dimensions of the device and consequently reduce the weight of the model 01 (the first developed model) produced in November 2020 at the wood and metal workshops of FBAUP.

The prototype's construction had the support of Pedro Rosa, who provided cryptomeria<sup>2</sup> boards and information about the properties of this raw material introduced in the 19th century in the Azores, establishing a model for use in future models. We counted on the support of Flávio Medeiros from the carpentry department of the Museum of Horta, and,

1 Supplier: Joop Stoop. Available at: <https://www.joopstoop.fr/en/presses/771-coffre-litho-lk-35.html>

2 The prototype's construction had the support of Pedro Rosa, who provided cryptomeria boards and information about the properties of this raw material introduced in the 19th century in the Azores, establishing a model for use in future models. We counted on the support of Flávio Medeiros from the carpentry department of the Museum of Horta, and, following the same principle of reusing resources, we were provided with abandoned materials (hinges, screws, handles, metal table torso), and by using these materials we attempted to demonstrate how reusing applied mechanical components reinforces our specific design principles.



following the same principle of reusing resources, we were provided with abandoned materials (hinges, screws, handles, metal table torso), and by using these materials we attempted to demonstrate how reusing applied mechanical components reinforces our specific design principles.

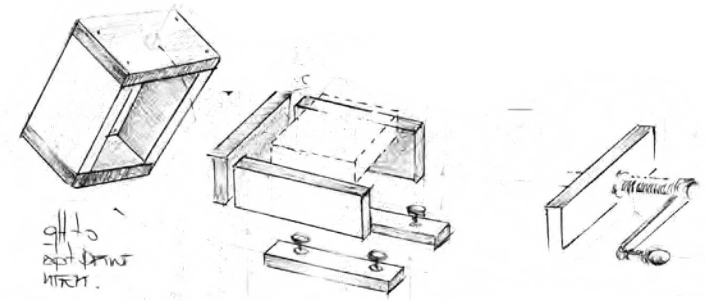
In this exhibition, we will present one of the essential elements for the development of this project: Model 03 as the device for a nomadic lithography practice. The device was developed and refined in the wood and metal workshops of FBAUP in November 2023, with the collaboration of technicians Tiago Cruz and Carlos Lima, and consulting by engineer Pedro Lanhas. For this model, access to local materials during the artistic residency on the island of Faial ensured solutions to a series of problems previously identified in earlier models<sup>3</sup>: flexibility of use, weight, and consequently, portability. The need to reconsider the construction of this device, using cryptomeria boards<sup>4</sup>, wood identified on the island of Faial, arose from the transportation of the portable device from one territory to another.<sup>5</sup>

3 See reference Pure Print Archeology: Technological Reserve Nº1.

4 Cryptomeria japonica is considered the most important tree species in the Azores archipelago, not only because of its economic importance, occupying 60% of the production forest area, but also because it stands a structural element of the Azorean landscapes. / Accessed on: 18 nov 2023: <https://www.almanaqueacorianano.com/index.php/recursos/26-florista/2601-crip-tomeria-cryptomeria-japonica>

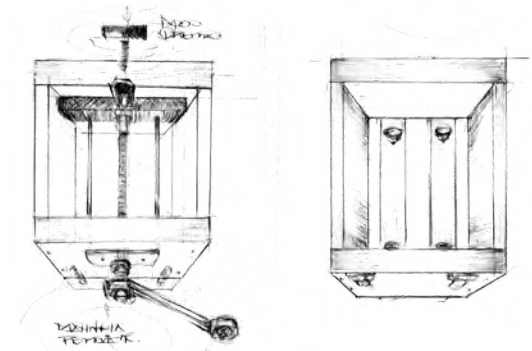
5 Jr. Carpenter, Edwin H. (1956). Army Field printing in the new world. The paper of the Bibliographical Society of America, Second Quarter, 1956, Vol. 50, n. ° 2, p.p. 169-180. Disponível em: <https://www.jstor.org/stable/24299394>. Acesso em: 18 jun. 2023.

Development of the assembly process following the strategies of model 01. Final assembly October 2023, FBAUP wood and



According to the research conducted for the selection of the reference model, we found that the first version of the lithographic box was designed over 200 years ago for the "traveling" lithographer<sup>6</sup>. Prints could then be pulled in the open field, and in this particular case, on battlefields. Naturally, there was also a military application: creating maps. The LK-35 is technically adapted to that era and has a printing format of a maximum of 35 x 40 cm with a weight of 23.00 kg.

The dimension of the external structure was designed for a maximum A4 dimensions. The central internal part, the screw rod, was modified to 14mm, making it possible to reduce printing time due to rotation.

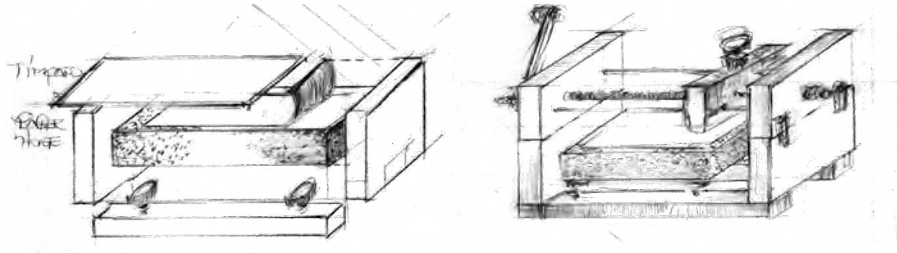


The prepared stone is placed in the box and inked the-

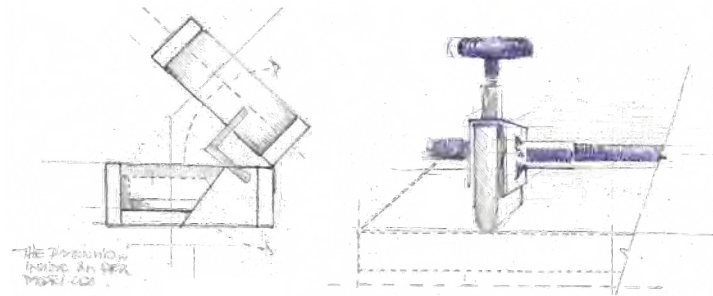
6 Data acquired from Polymetaal, a company that designs and produces engraving equipment since 1978, located in Leiden, Netherlands. Available 18/12/2023: [https://www.polymetaal.nl/contents/en-uk/d1299\\_Lithographic-Box-LK-35.html](https://www.polymetaal.nl/contents/en-uk/d1299_Lithographic-Box-LK-35.html)

re. The paper and tympanum are applied, and the box is closed. The squeegee (screwed rod) is then activated over the stone by turning a crank, thus allowing the printing to take place.

For assembly, the crank can be attached and retained to facilitate transport of the device.



The height of the roller is adjustable, depending on the thickness of the stone, and for a more functional solution, its base can also be adjusted for stones of different thicknesses.



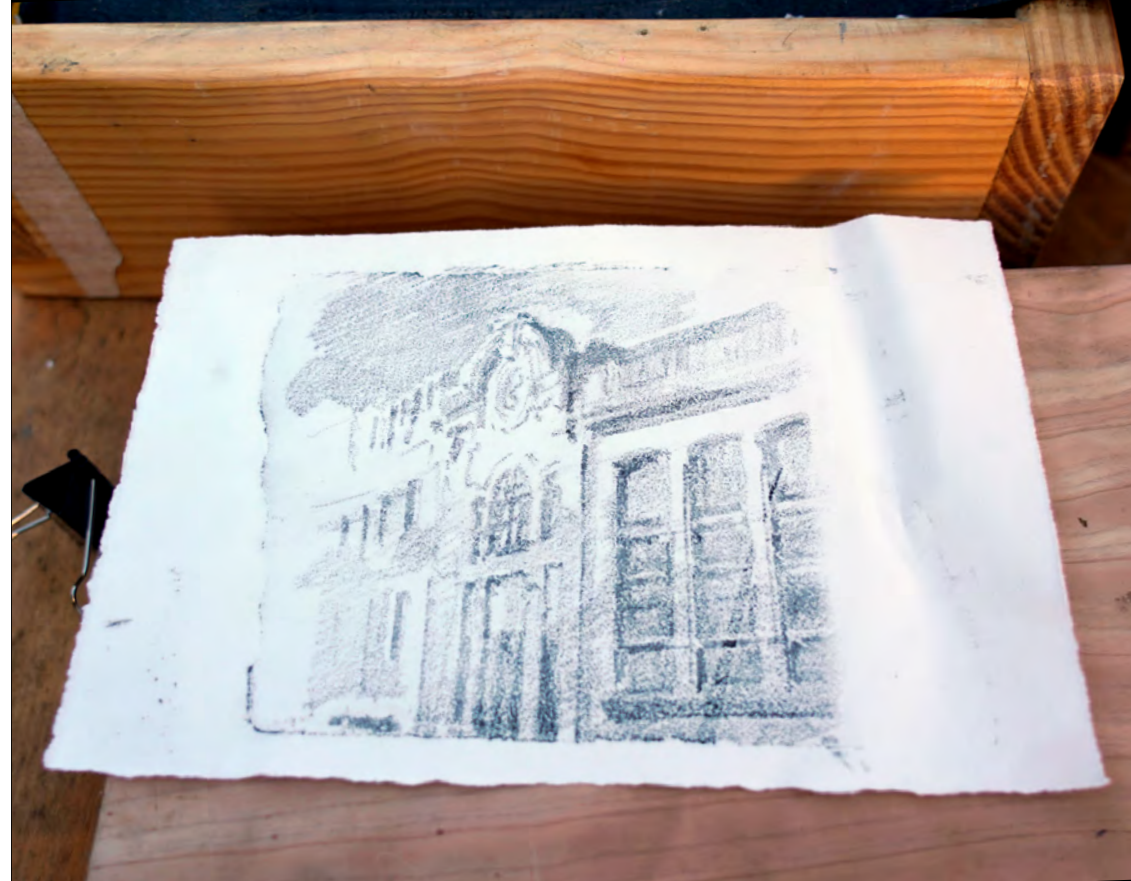
Details in the model include adaptations for the stone, and its opening features a side support. For the scraper (raclette), its adjustment process has been maintained at the top.













ANTONIO REGIS  
DA SILVA

(FCT 2022.11886.BD/2022)

GRACIELA  
MACHADO

(i2ADS)

## Portable Lithographic Device Model 002

2021

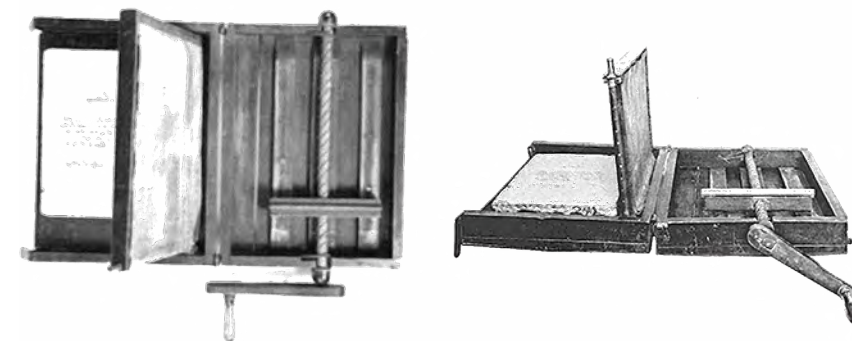
**Research projects:** Pure Print/i2ADS,  
GroundLab/i2ADS

**Researchers:** Antonio Regis da Silva,  
Graciela Machado, Marta Belköt  
(SFRH/BD/149042/2019)

**Support:** Tiago Cruz, Carlos Lima  
(collaboration and technical support  
from the wood and metal workshops of  
FBAUP). Dr<sup>a</sup>.Paula da Costa Machado,  
Museologist at the Municipal  
Museum of Valongo

**Illustrations:** Antonio Regis da Silva

**Consulting:** Engineer Carlos  
Moreira (FEUP)



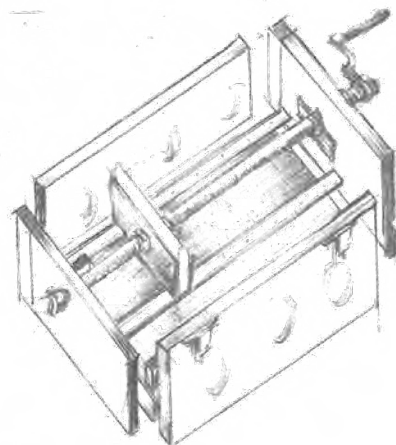
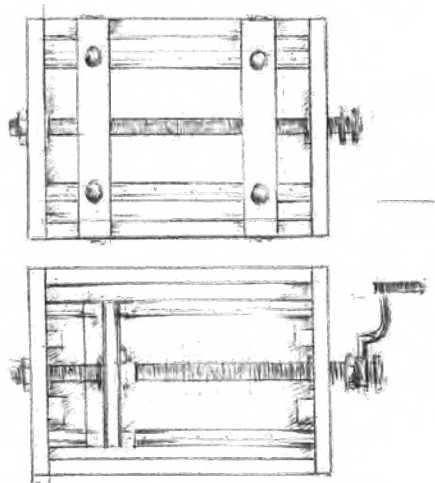
Photograph of the  
lithographic press  
Senefelder's manual.  
The last manual  
press Senefelder (42  
x59 16 cm) with  
lithographic stone  
(42 x 30 x 3cm)

Image provided  
by the Museum  
German/Museum  
Islands, Munich, on  
11/02/2023 at  
Department:  
Collection managers.  
Object ID: 470365.  
Inv. n° 4341.  
Thematic area:  
560.05.01

This research was conducted within the scope of the lithography in situ research topic, carried out in recent years through projects such as Pure Print (i2ADS/FBAUP 2013-2021) and GroundLAB (i2ADS/FBAUP 2021-2024). For the II Valongo Biennial 2021, a case study was proposed focusing on the use of black slate with the reconstruction of the portable lithographic press, called Model 2, based on the design proposed by Alois Senefelder, and testing its application in situ.<sup>1</sup>

The decision to make advancements with respect to Model 02 involved the application of a galvanized metal screw bar, a mechanism that ensures better functionality in movement. The press was designed to support dimensions up until an A3 sized stone.

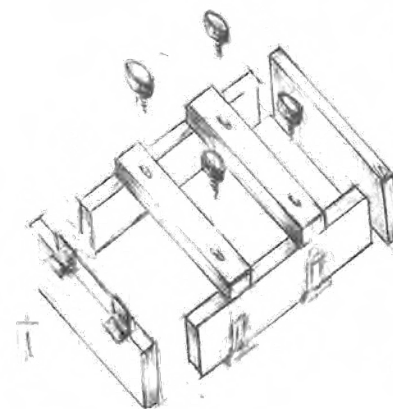
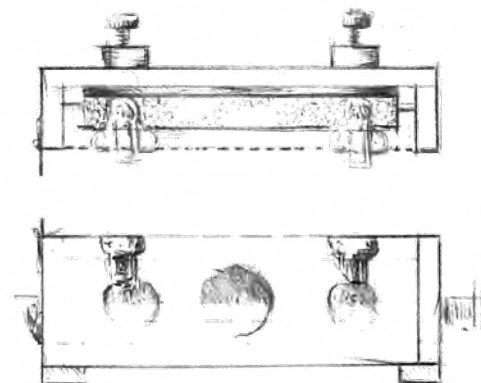
<sup>1</sup> Allocation of two grants dedicated to technological research on slate as a substrate, material, and matrix. For the II Valongo Biennial, a technological systematization was proposed to assess slate as a support and chemical impression; lithography in situ (in situ printing and printing from the portable printing press); study of lithographic matrix alternatives based on slate lamination and/or experimentation on "slate paper." Proposal and coordination by Graciela Machado (i2ADS/FBAUP) with researchers Marta Belköt (FCT/i2ADS) and Antonio Regis da Silva (FCT/i2ADS).



The use of the device allowed for the reassessment as well as retention of the opening at the top of the model implemented in the final phase of the technological residency. To reduce the weight of the wooden box supporting the mechanism, the side walls were cut into various wooden circles under the guidance of engineer Carlos Moreira. This also allows for visibility of the inside of the press. The top cover in this model was designed to accommodate the stone during the process, and the adjustments for the positioning of the stone, analyzed and recorded from the experiments conducted during its in situ use, led to the revision of a functional pressure system.

Technical drawing of the plan and axonometry of the device. The center piece with galvanized threaded rod and with the crank that can be removed for easier transport. Pine wood with 4cm thickness and the external structure dimension 40cm x 50cm x 32cm.

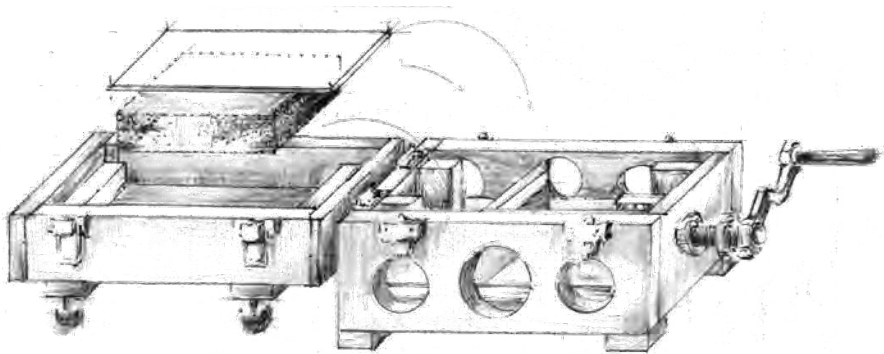
Technical drawing of the plan and axonometry of the device, featuring the central piece with a galvanized screwed rod and a removable crank for ease of transportation.



These were based on studies by John Phillips.<sup>2</sup> Pressure becomes increasingly relevant for the printing process in this model, in which the stone is positioned at the top on a scraper bar. This strategy allows for good quality prints on this type of device.

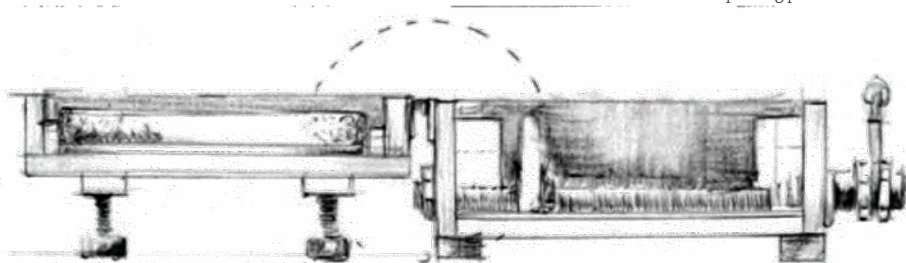
<sup>2</sup> Twyman, Michael (2016) Johns Phillips's lithographic notebook. London: Printing Historical Society. Development based on Alois Senefelder's and John Phillips' portable model, both adapted for in situ use.





The practical aspects of locomotion proved to be a challenge in this last phase, deserving careful consideration to optimize its transport, as we identified during technological residency at the Valongo Slate Factory S.A. in 2021.

To position the stone, the upper part opens and closes over the lower part of the device. The side openings allow the printer to observe the printing process.



Transportation and locomotion were facilitated through the use of an aluminum trolley<sup>3</sup> during the last testing phase at the Valongo Slate Factory S.A. in 2022. In addition to its functional performance, it became evident that the functionality and mobility of the equipment plays a crucial role in enabling future in situ expeditions.

Technical drawing of the elevation showing the internal part of the device, and the stone support uses solid wooden cubes that can be positioned according to the size of the stone.







Image on onto black  
slate made with  
paper transfer. Inking  
white ink during  
"Atelier Nomade".









# FLOR DE CERES RABAÇAL

(FCT 2023.02603.BD)

# GRACIELA MACHADO

(i2ADS)

## Fictional tent studies for practicing printmaking *in-situ*

2023

Pen and markers on papers of  
various dimensions

### Associated research project:

FCT 2023.02603.BD

### Researchers:

Flor de Ceres Rabaçal (FCT 2023.02603.  
BD/i2ADS); Graciela Machado (i2ADS).

### Illustrations:

Flor de Ceres Rabaçal; All other illustra-  
tions attributed to their original sources.

### Acknowledgements:

Francisco Amado Rodrigues (Director of  
Museu Militar de Lisboa);

Cosme Delgadinho (Coordinator for the  
collection of the O.G.F.E.);

Museu Militar de Lisboa;

Núcleo Museológico das Oficinas Gerais  
de Fardamento e Equipamento.

Adriano de Sousa Lopes was a Portuguese painter and print-maker who produced a portfolio of etchings during the First World War, working directly from the trenches. During this almost 2-year period, he produced dozens of drawings and sketches that he later adapted and reused to produce these etchings. Records show<sup>1</sup> that Lopes had an improvised studio set up in the Portuguese sector, working from the trenches alongside the soldiers. He also took regular, official military trips to Paris to visit his studio<sup>2</sup>, presumably to work on etchings. There is extensive documentation of the artists' stint as an official army artist during this time, namely correspondence written by him, but there is no solid evidence (found thus far in the ongoing investigation) that indicates that he effectively produced etchings while in the battlefield, considering the immense difficulties an endeavor of this kind would present.

The presence of an improvised studio in the form of a shack or a shed near the trenches, perhaps used to store drawings or perform specific interventions, as well as earlier research on 19th century plein air etching, motivated us to apply this notion to the ongoing investigation on in-situ lithography, and to create a sort of a fictionalization of the printmaker in the field. The printmaker creates all the specific devices and apparatuses, as well as the conditions to perform in-situ print-making, including the construction or adaptation of a covered shelter. As such, a vast array of collections, artworks, documents and other similar material was consulted so as to make a comprehensive study of the documented use of improvised studios,

1 Gonçalves, C. S. (2016). Adriano de Sousa Lopes: um pintor na Grande Guerra (dissertation). Access link: <https://run.unl.pt/handle/10362/18445>

2 Gonçalves, C. S. (2016). Adriano de Sousa Lopes: um pintor na Grande Guerra (dissertation). Access link: <https://run.unl.pt/handle/10362/18445>



namely tents, that would be most appropriate for this specific purpose, both in the Portuguese and international contexts, namely in a military environment. From these initial observations arise a set of tents and shelters that we envision could serve as protective coverings for improvised studios for on-site printing practices, including observation tents such as those used in scientific research.

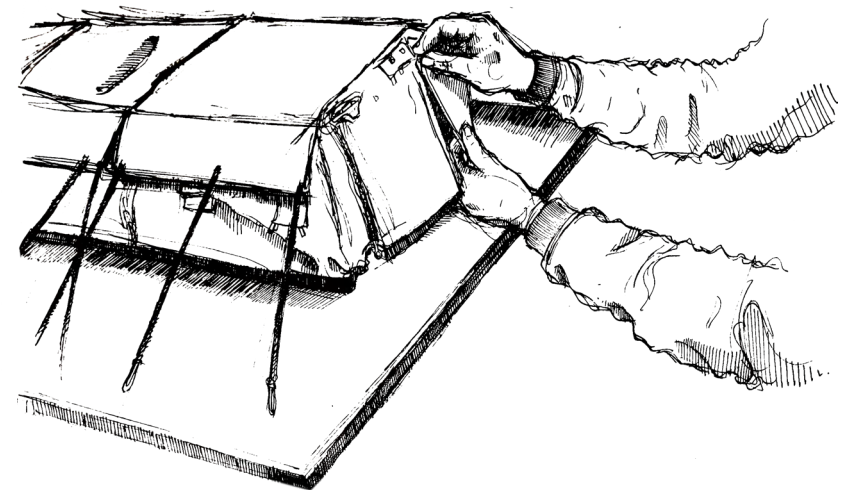
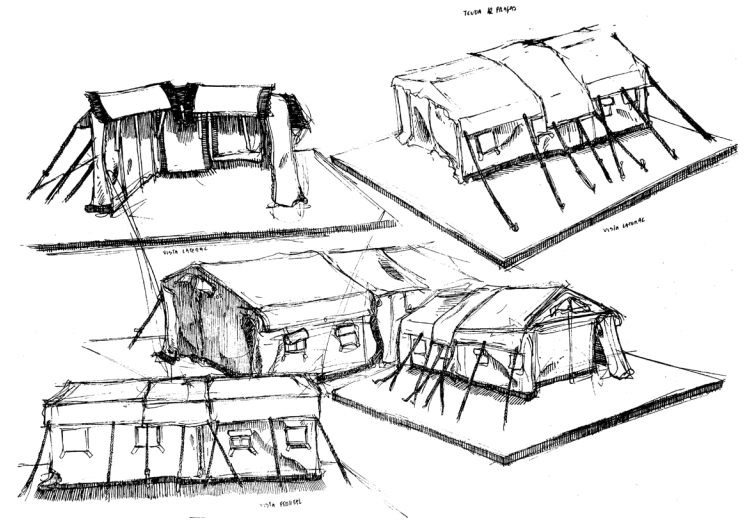
Later, if one looks into such structures and temporary devices – shelter tents made of cloth and wood, stakes, and virtually any available material on site, one understands how buildings repeat themselves in their definitive operational definition, and tents become this all-encompassing device in the spaces of art, science, war, and areas associated with mining concessions



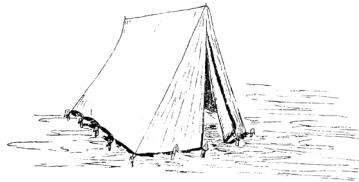
Tents stored in bags  
at the O.G.F.E

A series of preliminary sketches, drawings, studies and imagined scenarios were produced afterwards and as of this writing are still ongoing.

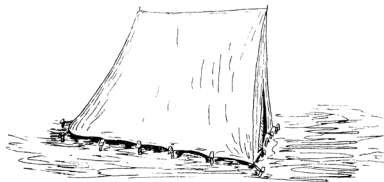
Sketches after  
miniature 12-person  
tent stored at the  
O.G.F.E.



Founded in 1907, the O.G.F.E, Oficinas Gerais de Fardamento e Equipamento<sup>3</sup> was the production center of uniforms, tents, footwear and other assorted military equipment expressly produced for the military and the armed forces, later converted into the Núcleo Museológico das Oficinas Gerais de Fardamento e Equipamento.<sup>3</sup> There, we had access to a miniature version of a 12-person tent dating from the 1970s. From this collection, we also had access to a vast archive with a considerable number of sketches, detailed technical plans and schemes for barracks, tents, shelters and the like, the most relevant of which is an instruction manual<sup>4</sup> detailing how to set up a 12-person barrack, possibly the same type as the aforementioned miniature found at the museum.



*Tenda rectangular (ou barraquim) p<sup>a</sup> infant<sup>a</sup>*



*Tenda rectangular (ou barraquim) p<sup>a</sup> caval<sup>a</sup>*

Rectangular tent  
for infantry and  
Rectangular tent for  
cavalry, Lithography  
of the School, 1901

3 “Núcleo Museológico das Oficinas Gerais de Fardamento e Equipamento” Accessed at: <https://www.turismomilitar.gov.pt/pt-pt/patrimonio-details/90>

4 Manual de Instruções Barraca 12p, (Nov. 84). Oficinas Gerais de Fardamento e Equipamento: Lisboa

Sourced from the Military Library in Lisbon, the book “Tendas de Campanha” (translated as Campaign Tents) was also consulted. Published in 1901 by Lithografia da Escola for the Escola Prática de Engenharia, it is an extensively detailed account of types of tents, the military ranks each of them were designed for as well as detailed instructions on how to set them up, including illustrations, presumably lithographs all.

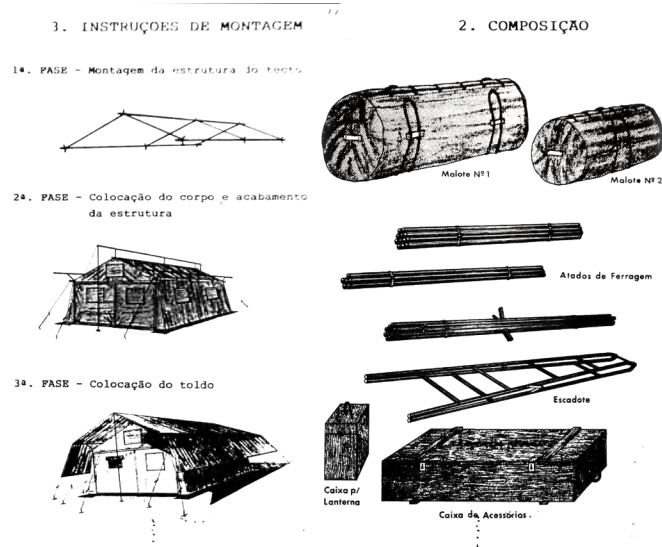
Sibley tents,  
Sid Richardson  
Museum. Source: Sir  
Richardson Museum



Aside from the aforementioned Portuguese based sources, other international examples of tents, sheds and barracks were consulted so as to have a more general overview of the type of tent that has been used by the military and military adjacent organizations for various purposes. One such example is the Sibley tent, designed in 1857 by Henry Sibley, 18 feet in diameter at the base and reached 12 feet high, with room enough fit around a dozen soldiers. It was widely used during the civil war in the U.S., being the main type of tent used by the Union Army.<sup>5</sup>

5 “Nobody can soldier without coffee” Accessed at: <https://sidrichardsonmuseum.org/nobody-can-soldier-without-coffee/>



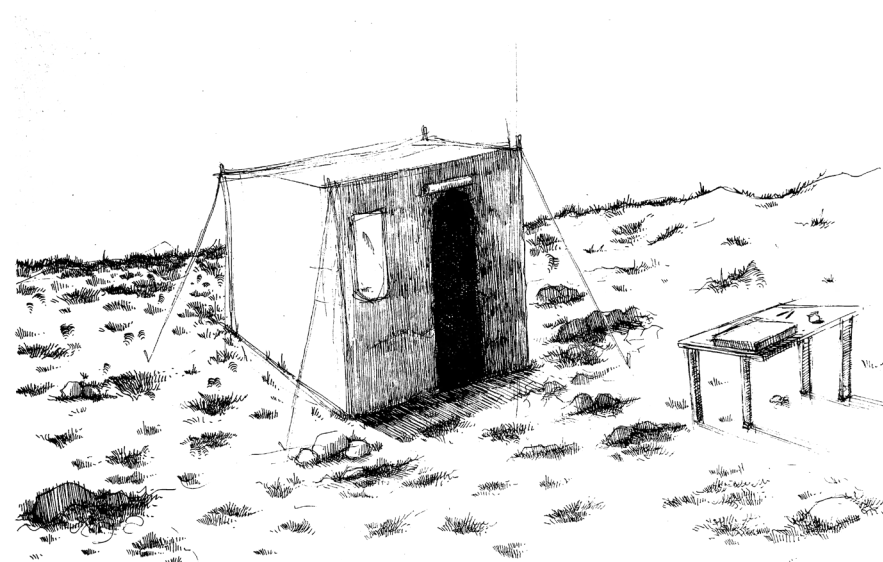


Page 2-3 of  
instruction manual  
for 12-person  
barracks

During this project there were multiple excursions to several quarries (Valongo, Cantanhede, Faial and São Miguel), and multiple samples of stone were collected for investigation within the lithography process. During the excursion to Cantanhede to the site of former lithographic stone quarries, for example, we took note of the prevalence of small makeshift structures as well as abandoned buildings that we project that may be adapted into shelters for the in-situ lithographic project. Recent research on the use of shelters during the Great War led us to numerous postcards where entrances to the mines and their makeshift shelters are camouflaged for specific purposes. In these postcards we can identify in these structures the use of limestone as a method to create shelters, offering solid refuge to combatants during bombardments.

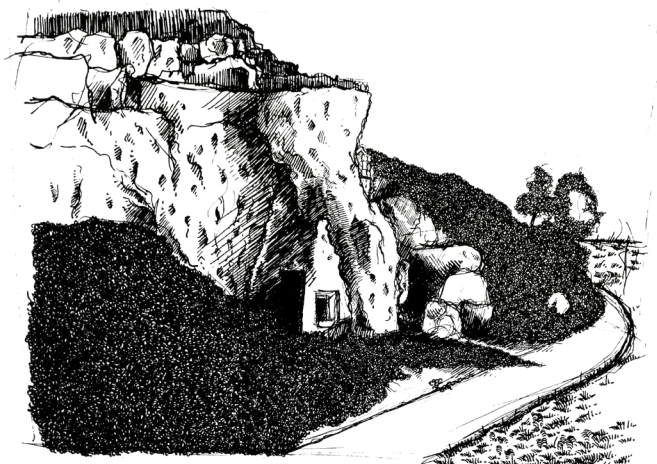
Furthermore, these quarries are adapted by each belligerent into deposits where men, ammunition, supplies, neces-

sary for launching new offensives, accumulated. Outside these quarries, we also identify the unusual sight of tents, which in rare cases appear to complement these scenarios.



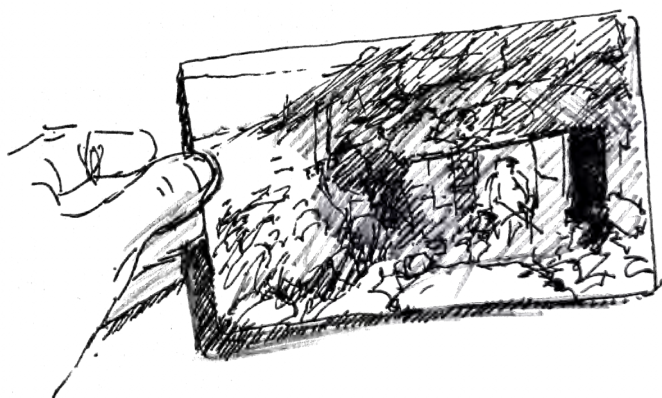
Fictional lithography  
shelter based on  
photograph of tent  
from the Instituto  
de Investigação  
Científica Tropical.

Our motivation to create a mobile laboratory, in which every step of the lithographic process is tackled and resolved in a nomadic fashion, led us to create a sort of itinerary that would ultimately lead us to the Marques da Silva Foundation. The Foundation is an institution that functions as an archive for the study and conservation of the history of Porto's architecture. We will be converting a pre-existing space into a sort of shelter that we will adapt for this express purpose, located at the Foundation. The very history of the layout of this building reinforced the relevance of this intervention: it used to be a car repair shop, now converted into a laboratory and the roof itself used to be an improvised brick, plate and canvas cover.

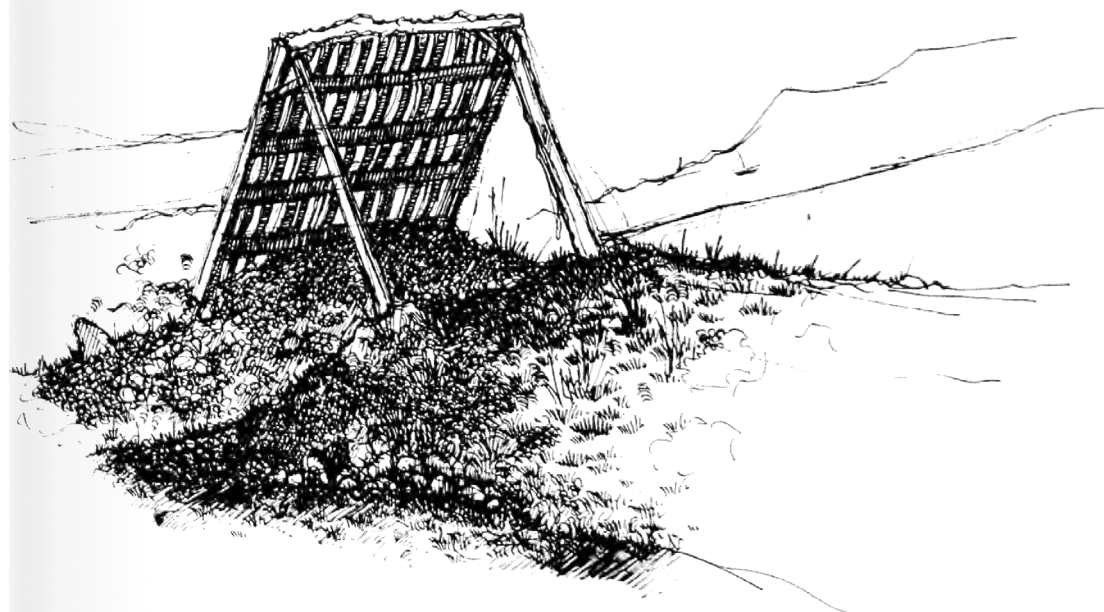


Sketch based on postcard  
dating from 1914-1915 pe-  
riod of the First World War.  
Original postcard reads:  
"War of 1914-1915. Near  
Soissons Pasly. The Roman  
quarries behind which the  
Ger-mans hid so impressive-  
ly." [loosely translated from  
the original French]<sup>1</sup>

By developing this itinerary, we intend to further em-  
phasize the relationship between the nomadic printmaker,  
working in-situ with whatever tools they can forge, and the  
terrain which, in this case, happens to be the city of Porto.

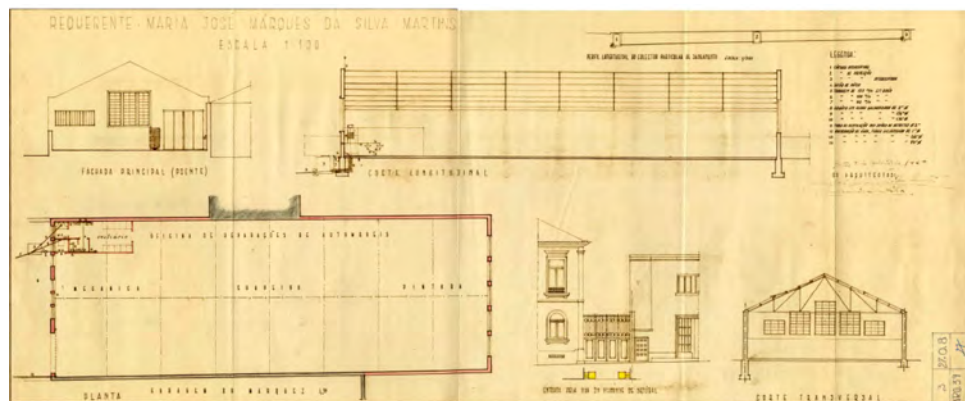


Drawing by Graciela  
Machado.



Sketch based on  
structure found in  
Cantanhede's quarry  
used as shelter.





Floor plans and general structure for the building belonging to the Marques da Silva Foundation where the improvised is located. (C) Fundação Marques da Silva, Arquivo Marques da Silva, lithography shelter da Silva Martins e Daniel Moreira da Silva.

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- “Núcleo Museológico das Oficinas Gerais de Fardamento e Equipamento” Accessed at: <https://www.turismomilitar.gov.pt/pt-pt/patrimonio-details/90>
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ARTUR PRUDENTE

(Alumni FBAUP)

GRACIELA  
MACHADO

(i2ADS)

## Encapsulation with Ozalid Paper

2024

### Researchers:

Artur Prudente, Graciela Machado.

### Illustrations:

Artur Prudente and David Lopes.

### Support

Bruna Sousa

Ozalid is the name given to a type of photosensitive paper developed in 1890 in Germany by Gustav Kogel<sup>1</sup>, and it was mainly used by architects for making multiple copies of images. An easy to use method, it was a relatively inexpensive paper option and it revealed images very quickly, which was an improvement over the more common blueprint. Due to this, it gained popularity over other reproductive methods. It was Kogel who coined the term ozalid, although different names are also applied, such as diazotypie in German, or whiteprint in English. Its name is an anagram of the main compound used in its process, diazo, or aromatic diazonium salts, these were observed to have a great capacity to generate various dyes in combination with other coupling elements (also known as couplers).

This research began in 2021, and we were focused on the industrialized Ozalid paper and its presence in Fundação Marques da Silva's archives. We transformed this space into a laboratory, and this allowed us to delve into on-site production of heliographic prints by artists and designers<sup>2</sup>.

Ozalid was incorporated into the Atelier Nomade project in order to fulfill a necessity: the encapsulation of plaster models belonging to the Foundation's archive, which were stored and on display in Visconde de Setúbal. The decision to incorporate Ozalid paper into the encapsulation process proved to be crucial. As the delicate plaster models from the Foundation's reserves found their new home within the Visconde de Setúbal space, they were carefully wrapped in a first layer of

<sup>1</sup> Pai, D.M., Melnyk, A.R., Weiss, D.S., Hann, R., Crooks, W., Pennington, K.S., Lee, F.C., Jaeger, C.W., Titterington, D.R., Lutz, W., Bräuninger, A., de Brabandere, L., Claes, F., de Keyser, R., Janssens, W. and Potts, R. (2017). Imaging Technology, 2. Copying and Non Impact Printing Processes. In Ullmann's Encyclopedia of Industrial Chemistry, (Ed.). p. 29-31.

<sup>2</sup> Machado, Graciela; Prudente, Artur. (2024) Diazotipia: a começar pelo Ozalid. p. 47.

tissue paper followed by a protective layer of Ozalid paper.

This Ozalid layer not only shielded the models but also served as a canvas for the underlying content, featuring reproductions of the original project drawings and photographs taken by Marques da Silva, the architect who designed the project. This choice was not merely practical but deeply symbolic, weaving together threads of materiality and conceptuality inherent to both the objects themselves and the architectural archive that housed them.

The Ozalid paper, with its unique properties, served as a conduit between past and present, tradition and innovation. Its ability to allow the models to breathe ensured their preservation while also enabling artistic interventions that hinted at the inevitability of change. As participants of the Atelier Nomade were drawn to the paper's surface, they experienced its significance beyond its practical utility. Each encapsulated plaster model became intertwined with content and photographs collected from the archive. These elements, carefully curated and selected, formed a secondary narrative that mirrored and complemented the sculptural plasters still visible in the exhibition space.

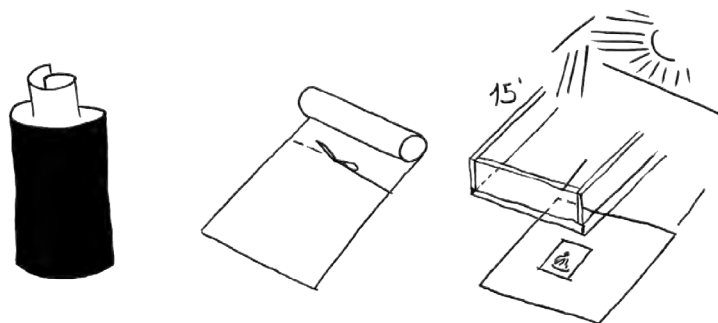
Visitors who wandered through the Visconde de Setúbal space were invited to engage with these fabricated dialogues allowed by this encapsulation. No longer mere objects of historical significance, the plaster models emerged as living embodiments of the archive's collective memory. Through the bluish veil of Ozalid paper, glimpses of the past intertwined with the present, sparking conversations and connections transcending time and space.

In this way, Atelier Nomade fulfilled its mission not only to preserve cultural heritage but also to serve as a catalyst for creativity and exploration. To create these encapsulations, we crafted newspaper maquettes, which resulted in a set of cut-

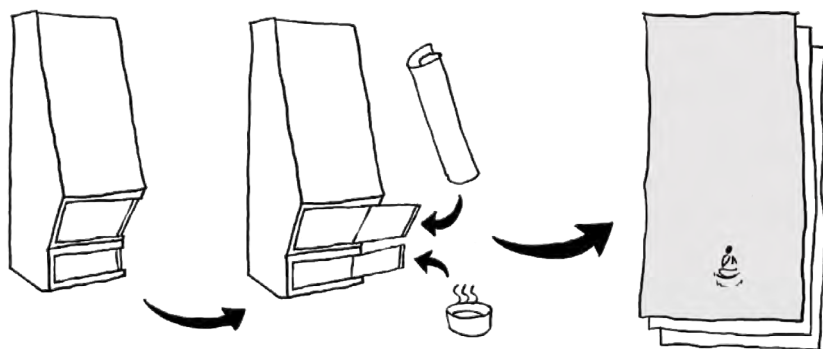
-out papers based on studies of the volumetric characteristics of the sculptural objects. Paper templates were additionally devised for potential future use. Due to the scale of the copies that we had to produce, we determined that existing display devices present in these spaces, such as the acrylic domes, could be used as improvised contact presses, since their transparency and scale allowed for the production of the models. While making the Ozalid cutouts, large paper strips of Ozalid paper were cut and exposed to indirect natural daylight, with translucent positives reproducing images collected from the archive. As large-format sheets were developed, it was necessary to use an original Ozalid revelation chimney that is also part of the Marques da Silva archives, this way re-activating it and re-using for its original purpose. Following the paper exposure and cutting, we sewed the model's faces with a sewing machine. The completed encapsulation, which we thought resembled a time capsule, was then placed over the piece.



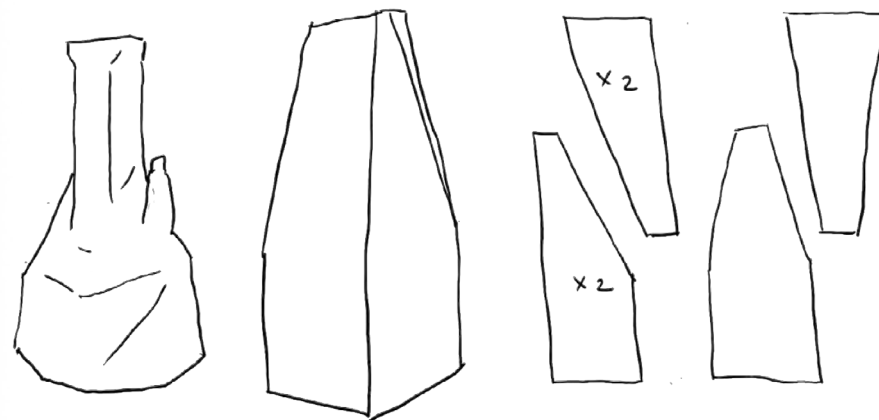
Cut and expose the large ozalid sheets, utilizing acrylic domes from furniture of architect Fernando Távora.



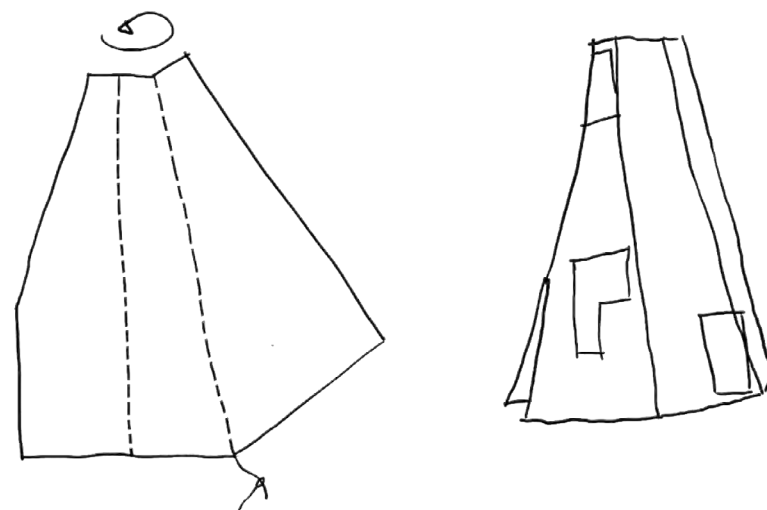
Development of the ozalid paper using a revelation chimney stored in the archive, originally belonging to the architect Alfredo Matos Ferreira.



Modeling the necessary encapsulation faces and cutting the sheets to size.



Machine stitching and placing the encapsulation on the model.







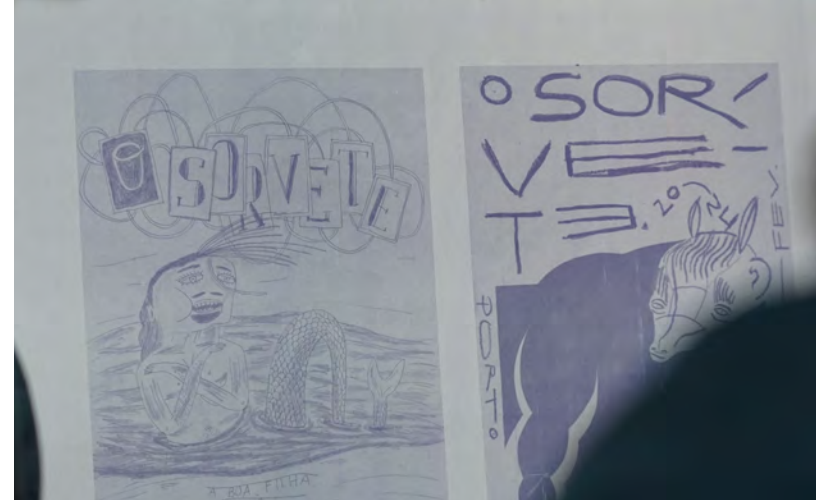




















## ATELIER NOMADE: LITHOGRAPHY IN SITU

Testimony by  
Stephanie Turnbull

At the end of January I attended what I now understand was to be three events held between the Faculty of Fine Arts of the University of Porto, École Supérieure d'Art et Design and Academie Royale des Beaux Arts de Bruxelles École Supérieure des Arts. The first of which I attended in Porto having reached out to Graciela Machado due to our research interests.

This was a week-long event allowing students to learn about different aspects of the research carried out by Pure Print Archeology, and learn about the local history of lithography, and towards the end of the week have a chance to engage and interact with all of these things. Porto has such a rich lithographic history right on their doorstep and it made me realise how little I know about the lithographic roots

and origins of British and especially Welsh lithography. Unfortunately due to a family bereavement I was only able to attend the first two days and after the initial introduction and a tour of the printroom which is a well equipped printmaking studio. The afternoon provided a couple of demonstrations from David Lopes and Antonio Regis da Silva.

The printing of maps and engraving onto stone with David was fascinating. I have read about this technique but never had the chance to see it and to have examples of the stones with the prints just aided in that understanding. David talked about the four lithographic houses in Porto and their printers and participants were given a printed city map to find and add the little stamp houses too. This connectedness between the process, the history of that process and its signi-



ficance within local history was really profound. Antonio gave a demonstration on a star wheel press he had been restoring followed by a print demo, he also touched upon some of the other research being carried out on local stones.

The following day there was a talk at the library to learn more about the local history and lithography in Porto. What was particularly interesting for me was that some of the prints and magazines stated that they had been printed on local stone. It wasn't clear if this was a local limestone or marble but it is important especially for students to understand that while Bavarian limestone is considered the most superior stone for lithography, there are other sources of stones available for lithographers to use.

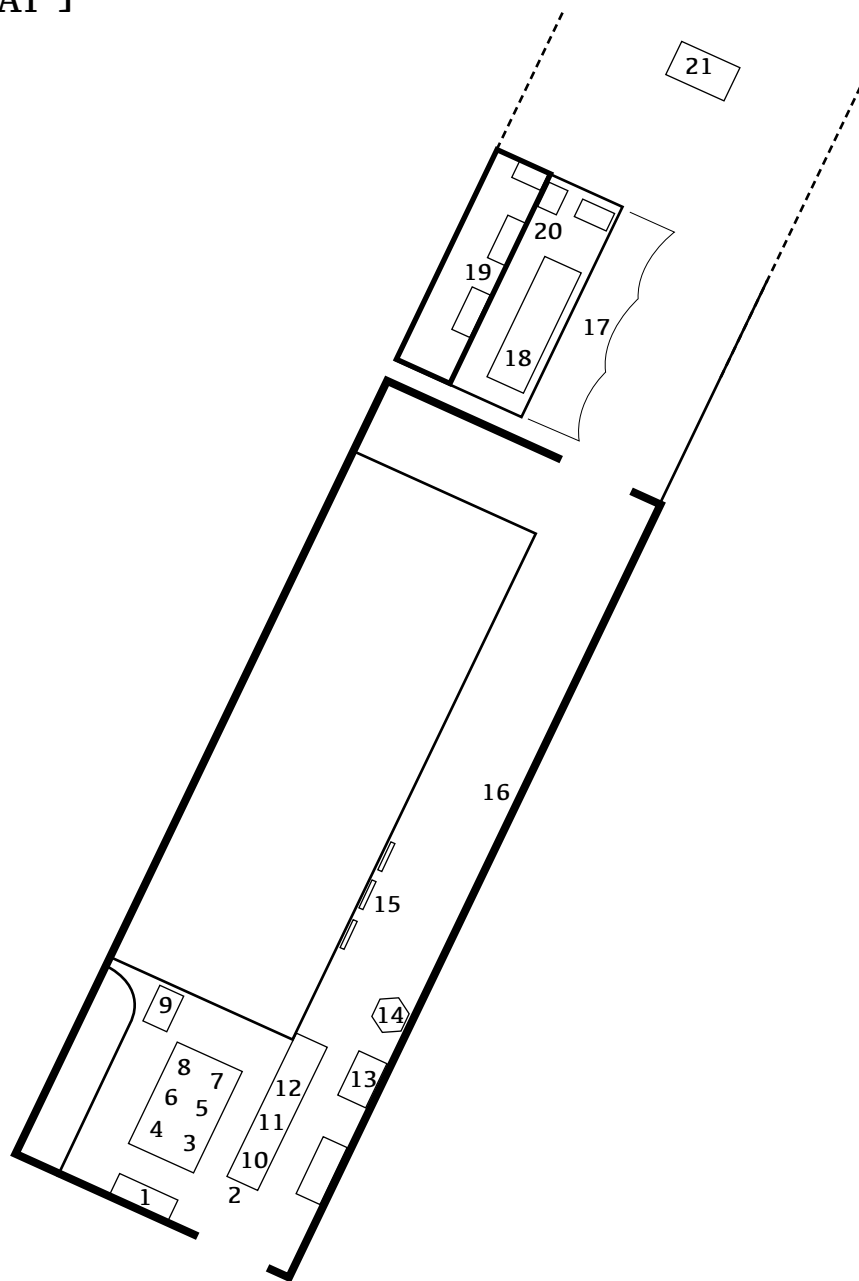
We were then taken on a walk through the city to see where the first lithographic print shops were located. Again it must be incredible for students to have that historical grounding (physically) in the place they live then learn about these processes that are so deeply ingrained within that.

The afternoon's performance was something I had been particularly looking forward to with the making of drawing materials and stone paper. Unfortunately due to timing issues I was unable to stay for the whole event, but as someone who is also currently researching lithographic materials and considering local resources it is both encouraging and inspiring to be around Graciela and her team. Lithography is normally confined to inside the studio but the Atelier Nomade is finding a way to connect with their local area through historical context and the use of local materials.

The team's passion for lithography, its heritage, its relevance, the preservation of knowledge, its connections within the local history and then the desire to share that with others is truly inspiring. The interactive website they have created too is an incredible resource not just for those lucky enough to participate in these events but for anyone wishing to access it. It is a great way to share research and enable others to learn about some of the technical processes such as stone paper that has almost been forgotten about.



## [ EXHIBITION MAP ]



- |  |  |  |   |
|--|--|--|---|
| 1. Graciela Machado & Marta Belkot. Pure Print Archeology, stone papers                                | "A turistic map for litographers in Oporto" (publication pack and printed map) with photopolymer stamps.   | Szkola (2021).   | da Silva. Drawings, Pigment on Glass jars, Stones, and interventions on the wall. |
| 2. Pure Print Archeology, Atelier Nomade, Diazotype.   | 8. David Lopes. Specimens of lithograph in manner of etching on stone reproducing maps from the historical archive of the University of Porto.                                 | 12. FIMS. Maquetes do Arquitecto Marques da Silva.   | 18. Antonio Regis da Silva. Portable Lithographic Device Model 002. 2021.         |
| 3. Results of "transferring the streets to paper", Flor de Ceres Rabaçal's group — Litografia Ribeiro. | 9. Kärt Heinvere & Raahel Rüütel. Typewriter MESSA M1 repairing.   | 13. Results of the activity developed by Júlio Dolbeth & Rui Vitorino dos Santos. "Sorvete". Ozalids.  | 20. Marta Belkot. Lithographic crayons. 2020-22.                                  |
| 4. Results of "urban sketching lithography", David Lopes's group — Litografia Nacional.                | 10. Graciela Machado. The Ançã Stone Trail: Specimens of a Real and Fictional Trail / Marta Belkot Use of handheld devices: Dabber. / Catarina Marques da Cruz. Stone Station. | 14. Graciela Machado & Artur Prudente. Ozalid wrapping Architect Marques da Silva's plaster maquete.   | 21. Antonio Regis da Silva. Portable Lithographic Device Model 003. 2023.         |
| 5. Results of "Translating the landscape", Artur Prudente's group — Litografia Portuguesa A Vapor.     | 11. Graciela Machado & Marta Belkot. Stone Paper. / Escola /   | 15. Results of the activity developed by Júlio Dolbeth & Rui Vitorino dos Santos. "Sorvete". Ozalids. / Chimney used in developping ozalid prints. |   |
| 6. Results of "Stone Paper Postcards", Marta Belkot's group — Litografia Villanova.                    |  | 16. Atelier Nomade. Vídeo. Diana de Brito.   |   |
| 7. David Lopes, Kärt Heinvere & Raahel Rüütel.   |  | 17. Antonio Regis da Silva. Nomade Tent. Installation.   |   |
|  |  | 19. Graciela Machado & Antonio Regis   |   |





























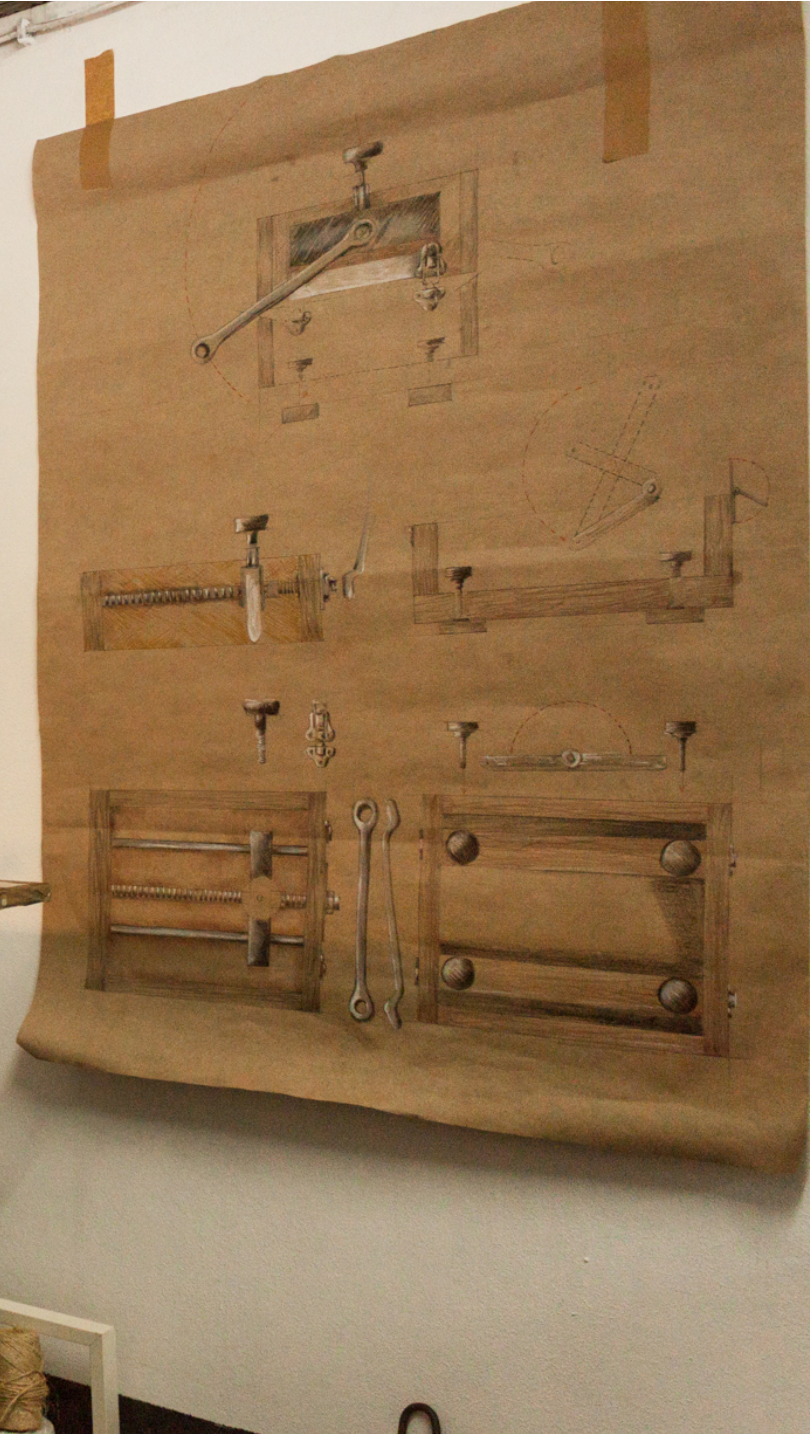


















# BIOGRAPHIES

## **Antonio Régis da Silva**

Holds a BTEC degree in Interior Design (2003) from Chelsea College of Art & Design in London, United Kingdom, and a Bachelor of Fine Art (2015) with first-class honors from Croydon University Center (University of Sussex), United Kingdom. He completed his Master's in Fine Arts (2019) at the University of Évora, Portugal. Currently, he is enrolled in the Ph.D program in Fine Arts at the Faculty of Fine Arts of the University of Porto (FBAUP) as an FCT fellow, developing a doctoral project entitled Lithography in situ: a journey through technological archaeology and the national territory.

## **Artur Prudente**

Repetition, copying, difference and error are some of the concepts that drive the practice of Brazilian artist-researcher Artur Prudente. Interested in the in-between spaces and the disciplinary dialogues between anthropology and art, Prudente explores the power dynamics that take place in public spaces.

It is from this perspective that, since 2018, he has dedicated himself to scaffolding, signs, safety nets, easels, protection nets, trestles, cranes and trucks, revealing the constant processes of transformation of the social and urban landscape of the city of Porto.

Through printmaking - which he sees as a translation tool - Prudente transports these elements into a

plastic dimension with the aim of producing a living and portable archive, materializing evidence of landscapes and temporalities that no longer exist.

## **Catarina Marques da Cruz**

Technician and printmaking teacher at FBAUP since 2014. Has a Master's degree in Drawing and Printmaking from FBAUP and also BA from the same university in Architecture. Erasmus at the School of Architecture and Society, Milan, Italy (2005). Erasmus+ mobility at the Strzemiński Academy of Art Łódź, Poland (2016). Iacobus Mobility at the Facultad de Belas Artes de Pontevedra, Spain (2015).

Article published in The International Journal of New Media, Technology and the Arts, 2015. Participation in the Seventh International Conference on the Arts in Society, Liverpool, UK, 2012. She has been exhibiting collectively nationally and internationally since 2010.

## **David Lopes**

(b.1993) lives and works in Porto.

He has an MA in Drawing and Printmaking (2018) and a BA in Painting (2016) from the Faculty of Fine Arts of the University of Porto. Awarded in 2019, at the KoMASK Masters of Printmaking (BE) 2019 and in 2021, at the Cubos de las Tentaciones at FIG 21, in Bilbao (ES). Currently, he's assisting and teaching Drawing at the Faculty of Fine Arts of the University of Porto, while attending a PhD in Fine Arts at FBAUP, as a non-doctoral integrated researcher for



i2ADS and as a grantee from the FCT (2020.09546).

David Lopes' work focuses on themes that connect History and Technology and archives. With particular interest in printmaking, David has been studying historical archives to bring new insights into issues of identity, class representation, and cultural heritage. (website: <https://david-lopes.persona.co/>).

#### **Flor De Ceres Rabaçal**

(b. 1995, Lisbon) Portuguese printmaker and illustrator. Holds a B.A. in Fine Arts from Escola Superior de Artes e Design das Caldas da Rainha (2017) and an M.A. in Drawing from the Faculty of Fine Arts of the University of Porto (2020), and is currently working towards a PhD. Her work is primarily focused on death and violence and how these reflect themselves in art. She explores the medium of printmaking in a way that makes this relationship evident not only in the resulting work but also within the very practice of printmaking. Primary proposal being that etching is an exercise in violence and that this character manifests itself in each and every single act of its creation, ultimately being an expression of forceful acts directed upon the metal.

#### **Graciela Machado**

b. 1970, Porto) She holds a Ph.D. in Drawing from the University of the Basque Country in Spain, with a thesis on "Time representation within the

image". Has graduated BA in Painting from the Faculty of Fine Arts in the University of Porto and Master's in Printmaking at the Slade School of Fine Art London. She is an Associate Professor at FBAUP and an integrated researcher at the Research Institute in Art, Design and Society (I2ADS). Also PURE PRINT/i2ADS coordinator. She dedicated herself to developing methods of research aiming to reassess historical techniques of image reproduction.

#### **Gonçalo Furtado**

Gonçalo Furtado holds a degree in architecture from the University of Porto, a master's degree in urban culture from the Polytechnic University of Catalonia, and a doctorate from University College London. Gonçalo Furtado researched archives at the University of Vienna, Canadian Centre for Architecture, MoMA, among others. He was a fellow of the Foundation for Science and Technology and the Luso-British Foundation, and currently teaches at the Faculty of Architecture at the University of Porto. Gonçalo Furtado has been on the editorial team for magazines such as Arqa, Unidade 5, and Nada. He is also a member of the scientific committees of international journals, including those at the University of Lublin and the University of A Coruña. Has co-organized events such as "Plugin Multiple Scale" for Experimenta Design, "O Corpo Enquadrado" at Serralves, "Tracing Portugal" at the Architectural Association in London, "Contemporary Architectural Challenges" at FAUP,

and "Critical Machine" at Meetroom in Barcelona, among others. Gonçalo Furtado has delivered lectures in various European, South American, and North American countries. They are the author or co-editor of books such as "Notes on the Space of Digital Technique," "Gordon Pask: Envisaging and Evolving Environment," "Cedric Price's Generator," "A Sobrevivência da Cidade Pós-Industrial," "Escola do Porto: Notas Dispersas," etc...

#### **João Carlos Garcia**

Geographer, earned an MSc from University of Lisbon and a PhD on Human Geography from Faculty of Arts and Humanities of University of Porto. He is an Associate Professor at the University of Porto's Faculty of Arts and has been a guest lecturer at Eötvös Loránd University in Hungary. He's a researcher on cartography and historical climatology.

#### **José Manuel Brandão**

Geologist, earned an MSc. in Museology, a Ph.D. in History and Philosophy of Science. He's held positions in teaching, as curator at the National Museum of Natural History, University of Lisbon, and keeper of collections of the Geological Museum (Lisbon). Currently, he is a member of a Research Unit at the New University of Lisbon. Main interests: History and heritage of Earth Sciences and Mining in Portugal.

#### **Júlio Dolbeth**

(b.1973, Angola) Lives and works

in Porto, Portugal. Has a degree in Communication Design from the Fine Arts Faculty of Porto, M.A. in Multimedia Art, and a PhD in Illustration. Júlio teaches Design & Illustration at the Design department at Fine Arts Faculty of Porto University. He is a co-founder of "Dama Aflita", a cultural association and art gallery dedicated to illustration and drawing in Porto. Júlio Dolbeth likes to draw random faces, friend's faces, some made-up faces, sometimes a lumberjack, and sometimes draws Snow White several times until she comes out perfect. Once in a while he makes up plants, most of the times logs, sometimes a skull trying to be proportional. Most of the drawings are in his head, many of them in his sketchbook, some of them are hanging on a wall, a few of them are published and part of them are in a few friends' walls.

#### **Kärt Heinvere**

Contemporary artist. Kärt graduated with a Bachelor's degree at the Estonian Academy of Arts in the Fine Arts department - Graphic Arts. She has also studied at Edinburgh College of Arts - Intermedia.

#### **Marta Belkot**

(b. 1989, Tarnowskie Góry, Poland) With an integrated master degree in printmaking and drawing at the Academy of Fine Arts in Katowice, she also studied at the Faculty of Fine Arts of the University of Porto and the Academy of Fine Arts in Lodz, Poland. In the same area, completed a professional



internship at the University of Porto where she later worked as a technician assistant. With a FCT scholarship, she is currently attending PhD studies in the Faculty of Fine Arts in Porto with research project entitled: A practical re-appraisal of surface prepared paper and enamel as alternative substrates to a contemporary print based practice. As a visual artist, she is interested in the concept of "displacement" creating objects, drawings, photos, movies, and graphics.

#### Paula Abrunhosa

Paula Abrunhosa holds a Bachelor's degree in History from the Faculty of Arts at the University of Porto and a Master's degree in Musical Sciences from the Faculty of Arts at the University of Coimbra. She has been a trainer for children's groups, a primary school teacher, and an artistic coordinator for the National Orchestra of Porto. Since 2009, she has worked as a communication and production advisor at the Marques da Silva Foundation. Simultaneously, she has been involved in projects intersecting different artistic and cultural territories.

#### Stephanie Turnbull

Currently undertaking a PhD at Aberystwyth University, researching the sustainability of lithography in the UK. She has a Masters in multi-disciplinary printmaking from UWE (2016) and completed the Tamarind Printer Training Programme back in 2010. Stephanie is based at the Lemonade Press, a

lithographic studio in Bristol where she collaborates with artists alongside her research.

#### Raahel Rüütel

Contemporary Artist. She's a member of the Estonian Young Contemporary Artist Union (ENKKL). She earned her Bachelor's degree at the Estonian Academy of Arts in Fine Arts - Sculpture and Installation departments. She has also studied sculpture at Escola Massana in Barcelona.

#### Rui Vitorino Santos

(b. 1971, Batalha, Portugal) has a PhD in Art and Design (2015) at University of Porto, where he is also lecturing. He has a MA in Multimedia Art (2001) and a BA in Communication Design (1995) at the Faculty of Fine Arts of the University of Porto. He is an Integrated Researcher at ID+ – Research Institute for Design, Media and Culture and also a collaborator researcher at i2ADS. His main research areas are illustration, visual narratives, self-publishing and the intersections between individual and collective design and visual practices. He regularly participates as an author or curator at illustration and visual narratives events. **Has a** producer of images he had been exploring the narrative possibilities of illustration and design as social, cultural and political repositories that rethink the post-digital and multiliteracy condition.