Inventory. Cultural Heritage Objects of the Sericulture Station of Murcia (1892-1976)

Inventory

Cultural Heritage Objects

of the Sericiculture Station of Murcia (1892-1976)

Silk is the product of those tiny eggs, of those gluttonous caterpillars, of those cocoons that built their seeming tomb, of those moths that perished so soon...

Lorenzo Jou y Olió

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The Sericulture Station of Murcia, origin of today's IMIDA, was for 84 years Spain's leading centre for scientific research on the silkworm and the mulberry tree.

From its inauguration in 1892 until its closure in 1976, the State invested substantial resources in this centre, whose principal aim was to study the insect *Bombyx mori* and to promote the reintroduction of its rearing into private households using the most advanced scientific methods of the time.

Only through the adoption of modern sericulture could the diseases that had been decimating silkworms across Europe since the eighteenth century be brought under control. These outbreaks had led silk producers to gradually abandon what had once been a vital rural household industry—an activity that for generations had provided the main source of income for thousands of families.

The dissemination and application of the new rearing techniques—based on strict control of egg quality and thorough disinfection of rearing facilities—also required the difficult task of eliminating the old and rudimentary practices that had governed domestic silkworm rearing for generations, especially in the 'Huerta' of Murcia (the region's irrigated farmland).

Through its work in research, training, and the dissemination of knowledge, the Sericulture Station of Murcia left behind a rich and diverse legacy of instruments, machinery, and materials used by its staff throughout the laboratories and pavilions of this pioneering centre.

Within the framework of the European ARACNE project (2023–2026), intensive efforts have been made to identify, inventory, preserve, and showcase this rich historical, scientific, and cultural heritage, which reflects our longstanding and influential tradition in silk production.

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Furniture
of the Sericulture Station

In June 1912, twenty years after its inauguration at the beginning of the El Palmar road (in the Aljucer area) and following the completion of the initial lease agreement, the Sericulture Station had to be relocated to La Alberca de las Torres, specifically to an estate of nearly 12 hectares acquired by the Provincial Council and transferred to the State for this purpose.

The new grounds at the time consisted only of a small house for the estate's caretaker. Due to the lack of space for installing machinery as well as office furnishings and laboratory equipment, they were forced to lease a large nearby building that had until recently operated as an inn for the famous and bustling Verdolay baths—an important leisure and bathing site for the people of Murcia since ancient times, which, however, had lost its popularity to the El Valle baths due to the extensive construction of housing in its surroundings.

Since the funds for the construction of the new Sericulture Station came from the State and were allocated annually, the completion of the initial project took several years.

According to the centre's reports, the first works carried out in 1914 included the levelling of the land, the construction of a water reservoir and a well with a pump for irrigation, the fencing of the estate, and the layout of the main internal road. The nursery was also established, with the planting of thousands of mulberry trees of various varieties.

The first buildings to become operational, in 1916, were the cold-storage chamber, the steam stifling facility, and a pavilion with four classrooms, a lecture hall, three offices, and restrooms. From 1919 until its closure in 1924, this pavilion was used as a school for foremen and agricultural workers.

In 1918, the Sericulture Pavilion was inaugurated, housing workshops for ordinary and branch rearing (equipped with underground ventilation), rooms for egg-laying, incubation, and cocoon stringing, a paper-perforation room for handling rearing waste, a spinning room, and a laboratory for silk analysis.

Nearly twenty years after its relocation, the construction of the Murcia Sericulture Station was finally completed.

By 1939, the centre comprised seven pavilions: one for offices and a seed-analysis laboratory; another housing a didactic museum and various laboratories; a third for rearing; and four others serving as staff housing. In addition to the buildings for the cold-storage chamber and the steam stifling facility, the Station also included a group of structures containing a cinema booth, an assembly hall, and the spinning room, as well as facilities for the various animals that, by law, also had to be studied at the centre.

These installations—gradually adapted to the functions assigned by successive state regulations—were further complemented by the Ronda de Garay hot-air stifling facility (1916) and the Bullas Seed Station (1949).

A general inventory of assets (the only one preserved, dating from late 1954) lists as the Station's own furnishings only the items corresponding to the offices of the director and the agronomist engineer, excluding the rest of the offices and staff housing. The value of these items amounted to 9,870 pesetas (€59.40).

1

2

3

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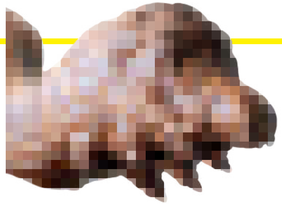
1 Wooden bench upholstered in silk
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 115 × 183 × 58 cm
Inventory No.: 2024/1/6 (1994/1/38)

2 Wooden armchair upholstered in silk
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 115 × 74 × 59 cm
Inventory No.: 2024/1/8 (1994/1/38)

3 Wooden chair upholstered in silk
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 105 × 40 × 41 cm
Inventory No.: 2024/1/7 (1994/1/38)

4 Display cabinet
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 133 × 300 × 50 cm
Inventory No.: 2024/1/2

5 Lectern with upper drawer
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 105 × 40 × 34 cm
Inventory No.: 2024/1/3



6

The mulberry tree provides high-quality wood whose hardness protects it from woodworm.

In the Huerta of Murcia, mulberry wood has been used to make furniture such as chairs, tables, and cradles, as well as for crafting tools.

6 Carved wooden table with worm motif
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 76 × 110 × 70 cm
Inventory No.: 2024/1/1 (1994/1/38)

16

Laboratory
Materials

> *Almost every family in the Huerta had, or had once had, a member involved in silk production—not only locally, but across the global silk industry. As a result, there was little incentive to adopt methods different from those practised since ancient times.*
>
> Emiliano López Peñafiel

The principles of modern sericulture, initially aimed at protecting silkworm breeding from hereditary and infectious diseases, required profound changes in the rearing habits that breeders had followed for years. To prevent hereditary pathologies, it became necessary to stop using seed harvested in private homes and to raise only officially certified and selected stock, following the method proposed by the scientist Louis Pasteur. At the same time, avoiding infectious diseases required strict adherence to proper rearing and cleaning techniques, as determined through scientific experiments.

The Pasteur method required meticulous microscopic examination of most of the moths whose eggs were to be raised the following season.

In its early years, the Sericulture Station devoted itself to producing, selecting, and distributing healthy stock, entirely free from hereditary diseases. This painstaking laboratory work was only part of the challenge; equally difficult was persuading local farmers of the value of the new method and convincing them to provide samples for analysis.

It took nearly a decade to prove to the breeders the benefits of using carefully selected stock. It was only from 1901 onward that the farmers began to place their trust in the Sericulture Station and its methods, thanks to Emiliano López Peñafiel, the Station's director at the time, who made it his mission to win over the silk-producing community by personally visiting breeders and providing them with disease-free stock.

Thus, in 1902, seventeen silk farmers went to the Sericulture Station to try the technique that would prevent the appearance of the dreaded pebrine and flacherie (called negrillo by the local farmers). Of the 1,949 samples submitted that year, only 731 (37.5%) were found to be healthy. By 1905, 507 farmers had come to the centre to analyze a total of 82,931 samples, of which 54,707 were certified healthy (66%).

Also in 1902, practical courses in seed analysis began, with seven students in the first edition. By 1910, the 108 certified microscopists were helping the Sericulture Station select seed in the various areas of the Huerta, quickly achieving a significant reduction in larval mortality.

Some of them would later form the 'Guild of Seed Specialists', to whom many breeders turned to acquire seed. This also led to the creation of the so-called 'seed plots' in locations far from the Huerta, free from excessive heat and humidity, such as the Alpujarra or Elche de la Sierra.

Once the effectiveness of the method had been demonstrated, the work of the Sericulture Station only continued to grow, expanding its scientific, technical, and educational functions. To support this, the centre came to have laboratories for seed analysis, chemistry and bacteriology, silk and hijuela processing, and micrography.

According to the official inventory, in 1954 the centre had 23 microscopes of 16 different models (including the Carl Zeiss Greenough—the first stereoscopic model in history) and dozens of accessories (objectives, eyepieces, and mirrors). The Sericulture Station also possessed valuable state-of-the-art instruments, such as precision balances, serimeters, and modern devices for capturing and reproducing images observed under the microscope.

7 Monocular Microscope
Manufacturer / Model: Beck Kassel CBS
Year: 1930
Dimensions: 36 × 12 × 18 cm
Inventory No.: 2024/2/5-2 (1994/1/33/6)

8 Binocular Microscope
Manufacturer / Model: Ernst Leitz Wetzlar
Year: 1932
Dimensions: 38 × 15 × 21 cm
Inventory No.: 2024/2/5-3 (1994/1/33/6)

9 Monocular Microscope
Manufacturer / Model: Reichert
Year: 1890
Dimensions: 30 × 8 × 9 cm
Inventory No.: 2024/2/5-5 (1994/1/33/6)

Since 1903, the Sericulture Station had awarded the three best students from its seed analysis courses with this microscope and its basic accessories (funded by the municipal corporation at the proposal of Emiliano López Peñafiel). The awards ceremony took place at a public event during the September festivities, which gave the centre great publicity. This initiative also made it possible to bring scientific research and egg inspection to every corner of the Huerta.

10 Stereoscopic Microscope
Manufacturer / Model: Carl Zeiss Greenough
Serial No.: 203882
Year: 1912
Dimensions: 32 × 14 × 19 cm
Inventory No.: 2024/2/5-6 (1994/1/33/6)

11 Monocular Microscope
Manufacturer / Model: Carl Zeiss Jena Stand GCE
Serial No.: 195087
Year: 1929
Dimensions: 33 × 15 × 22 cm
Inventory No.: 2024/2/5-4 (1994/1/33/6)

12 Protective Glass Dome for Microscope
Manufacturer / Model: Unknown
Year: Early 20th century
Dimensions: 43 × 25 × 25 cm
Inventory No.: 2024/2/19

13 Protective Case for Microscope with Organiser for Five Eyepieces
Manufacturer / Model: Unknown
Year: Early 20th century
Dimensions: 43 × 23 × 26 cm
Inventory No.: 2024/2/17

14

15

Until the advent of macro and photomicrography, the camera lucida made it possible to transfer to paper the images seen through the microscope by tracing their outlines and producing illustrations with perspective and great detail.

Until the mid-twentieth century, microbiological and micro-anatomical illustrations in textbooks were hand-drawn using a camera lucida.

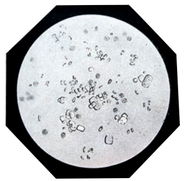
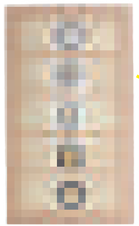


Illustration of pebrine corpuscles in formation and development, according to Louis Pasteur, made using a camera lucida.

14 Camera Lucida
Manufacturer / Model: E. Leitz Wetzlar
Year: Early 20th century
Dimensions: 5.5 × 14 × 9 cm
Inventory No.: 2024/2/13

15 Camera Lucida
Manufacturer / Model: Carl Zeiss Jena
Serial No.: 842
Year: 1920
Dimensions: 10 × 21 × 4 cm
Inventory No.: 2024/2/18

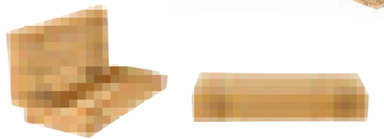


Tray containing five microscopic samples. Box capacity: ten trays (fifty samples).

16

17

Microscope slide: silkworm infected by mycosis, in cross-section.



18

19

When attached to a microtome, these blades enable the preparation of extremely thin slices or small sections for microscopic analysis.

20

16 Microtome Blades
Manufacturer / Model: Manuel Álvarez
Year: Early 20th century
Dimensions: 2.5 × 27 × 11 cm (case)
Inventory No.: 2024/2/14

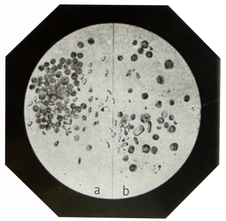
17 Box of Microscopic Samples with Trays
Manufacturer / Model: Manuel Álvarez
Year: Early 20th century
Dimensions: 14 × 35 × 35 cm
Inventory No.: 2024/2/3 (1994/1/33/6)

18 Box of Microscopic Samples
Manufacturer / Model: Manuel Álvarez
Year: Early 20th century
Dimensions: 3 × 17.5 × 10 cm
Inventory No.: 2024/2/4

19 Box for Microscopic Samples
Manufacturer / Model: Unknown
Year: Early 20th century
Dimensions: 4 × 24 × 10 cm
Inventory No.: 2024/2/22

20 Blade with Handle for Sample Collection
Manufacturer / Model: Sartorius Coitiage
Year: Early 20th century
Dimensions: 26 × 3 × 2 cm
Inventory No.: 2024/2/23

21



Photomicrograph of two moth samples infected with pebrine, showing the presence of adult or aged corpuscles (a) and newly formed corpuscles (b), according to Louis Pasteur.

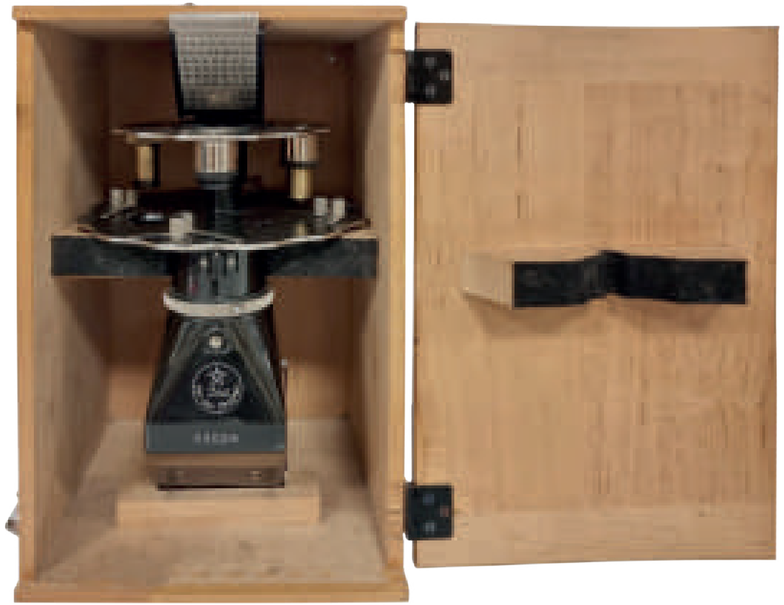
22

21 Apparatus for Macro and Microphotography
Manufacturer / Model: Unknown
Year: Early 20th century
Dimensions: 44 × 31 × 30 cm
Inventory No.: 2024/2/1 (1994/1/33/5)

22 Apparatus for Macro and Microphotography
Manufacturer / Modell: Emil Busch Rathenow / Metaphot 400
Serial No.: 28752
Year: 1935
Dimensions: 62 × 34 × 28 cm
Inventory No.: 2024/2/5-1 (1994/1/33/5)

The Busch Metaphot 400, slightly larger than any microscope of its time, represented a major breakthrough in the field of macro- and microphotography, as it greatly reduced the space previously required by the bulky optical benches (which could reach several metres in length).

The Metaphot was compatible with objectives and eyepieces from different manufacturers and could be fitted with additional accessories such as colour filters, focusing magnifiers, and various drawing devices.



23

23 Apparatus for Photomicrography and Projection of Specimens, in Protective Case
Manufacturer / Model: ICA / Mikrophot
Serial No.: 53026
Year: Before 1926
Dimensions: 29 × 16 × 16 cm (object); 30 × 19 × 19 cm (case)
Inventory No.: 2024/2/24

24

25

In Spanish sericulture, the unit of weight was the ounce, equivalent to 30 grams of seed.

One ounce typically contained approximately 40,000 eggs from European breeds and 60,000 from Japanese breeds.

Newly hatched silkworms weighed around 27 grams per ounce, meaning that roughly 1,500 larvae corresponded to one gram.

Precision balances were employed to determine the yield of silkworm rearings, expressed as the quantity of silk obtained per ounce of ready-hatched seed, and to establish the average weight of cocoons for each breed. This information facilitated the differentiation between male and female cocoons for seed production purposes, as male cocoons are lighter than female ones.

26

27

24 Precision Balance
Manufacturer / Model: Beckers Sons
Year: Late 19th century
Dimensions: 62.5 × 34 × 28
Inventory No.: 2024/2/2-1 (1994/1/28)

25 Precision Balance
Manufacturer / Model: Luis Vasquez
Year: Late 19th century
Dimensions: 44 × 41 × 25
Inventory No.: 2024/2/2-4 (1994/1/28)

26 Precision Balance
Manufacturer / Model: Sartorius Werke
Year: 1930
Dimensions: 48 × 39 × 29
Inventory No.: 2024/2/2-5

27 Stand for a Set of 14 Weights
Manufacturer / Model: Unknown
Year: First half of the 20th century
Dimensions: 7 × 25.5 × 9
Inventory No.: 2024/2/25

28

29

Spun silks were classified according to their count (density) and their quality.

The count is a unit of measurement that establishes the weight of a fixed length of thread and is expressed in deniers (‘dineros’ in Murcia).

According to the universal Italian legal system, which was the one generally adopted, 1 denier corresponded to a silk thread 450 metres long that weighed one-twentieth of a gram (0.05 g).

Therefore, each 450-metre silk sample obtained with the reeling machines of the Sericulture Station had to be weighed in dineros or deniers in order to determine its count.

To this end, the centre used these spherical precision balances, which indicated directly the weight in deniers of the sample hung from the upper hooks.

28 Spherical Precision Balance for Textile Fibres
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 44 × 41 × 25
Inventory No.: 2024/2/2-2 (1994/1/29)

29 Balance for Textile Fibres
Manufacturer / Model: Denier
Year: Late 19th century
Dimensions: 63 × 42 × 15
Inventory No.: 2024/2/2-3

The sodium spectral lamp with frequency selection made it possible to observe tissues or any type of cell by means of the different colours offered by the spectrum.

These lamps—particularly useful for refractometric and polarimetric examinations—quickly replaced sodium Bunsen burners, owing to their high luminosity, ease of use, constant light intensity, and the absence of open flames that produced uncomfortable heat.

The lamp also retains its original sodium spectral bulb, made by Osram, model Natrium Spektrallampe, measuring 16 × 3 × 3 cm.

30

30 Sodium Spectral Lamp
Manufacturer / Model: Carl Zeiss Jena
Year: 1930–1940
Dimensions: 31 × 13 × 13
Inventory No.: 2024/11/6-3

31 Box with Eyepieces, Objectives, and Mirrors
Manufacturer / Model: Unknown
Year: Unknown
Dimensions: 11.5 × 28.5 × 18
Inventory No.: 2024/2/16

31

32

33

In addition to covering and protecting samples, coverslips help to minimise aberrations caused by the lenses of optical microscopes, preventing distorted or blurry images and producing higher-quality images that are brighter, sharper, and more detailed.

Sample or Staining Vial

34

35

32 Microscope Eyepiece, f20 mm
Manufacturer / Model: Homal I. Carl Zeiss Jena
Serial No.: 729
Year: Unknown
Dimensions: 4 × 4 × 4 (box)
Inventory No.: 2024/2/26

33 Pack of 100 Glass Coverslips
Manufacturer / Model: Chance Propper LTD
Year: 1970
Dimensions: 2.2 × 2.2 (covers); 3 × 4 × 4 (box)
Inventory No.: 2024/2/21

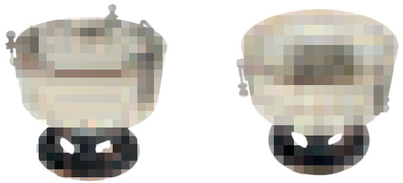
34 Rack with 5 Sample or Staining Vials
Manufacturer / Model: Material Cientifico Manuel Álvarez
Year: First half of the 20th century
Dimensions: 9 × 5 × 3 (vials); 27 × 8 × 3 (rack)
Inventory No.: 2024/2/27 (1994/1/33/6)

35 Thermostatic Bath with Temperature Gradient
Manufacturer / Model: Jodra
Year: Early 20th century
Dimensions: 26 × 34 × 20
Inventory No.: 2024/2/10

36

Porcelain mortars were key tools during the early years of work at the Sericulture Station. Moths were manually crushed in these mortars in order to examine them under the microscope and determine whether they were infected with any hereditary diseases that could subsequently affect the larvae from their eggs. This procedure was essential for selecting disease-free breeding stock, which was then distributed to breeders both during the national reintroduction of sericulture and in the modernisation of silkworm-rearing techniques in the Huerta of Murcia.

37



38

36 Porcelain Mortar
Manufacturer / Model: Unknown
Year: 1892
Dimensions: 8 × 8 × 8
Inventory No.: 2024/2/6

37 Laboratory Centrifuge
Manufacturer / Model: Unknown
Year: After 1926
Dimensions: 30 × 35 × 35
Inventory No.: 2024/2/11

38 Autoclave
Manufacturer / Model: Jodra
Year: Early 20th century
Dimensions: 67 × 26 × 22
Inventory No.: 2024/2/15

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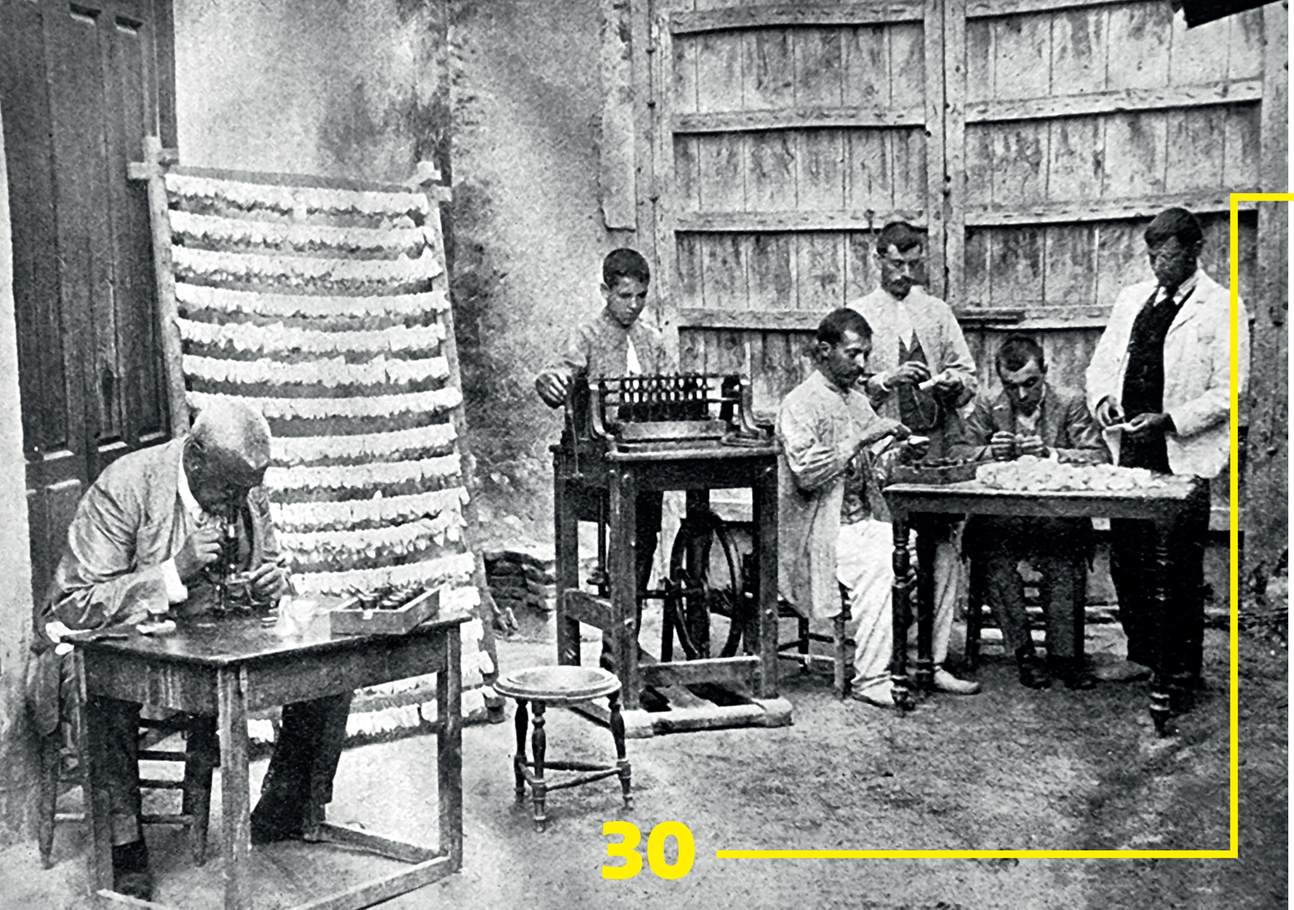
39 pH Tester 'Capillator Case'
Manufacturer / Model: British Drug Houses, distributed in Spain by Jodra
Year: First half of the 20th century
Dimensions: 10 × 14 × 6 (closed); 38.5 × 34 × 4.5 (open)
Inventory No.: 2024/2/20

40 Microscope Polarisation Device
Manufacturer / Model: Carl Zeiss
Year: Early 20th century
Dimensions: 5 × 8 × 9
Inventory No.: 2024/12/11

41 Caliper Compass
Manufacturer / Model: Unknown
Year: First half of the 20th century
Dimensions: 17 × 10 × 1.5
Inventory No.: 2024/3/2

42 Laboratory Forceps
Manufacturer / Model: Unknown
Year: First half of the 20th century
Dimensions: 17 × 2.5 × 1
Inventory No.: 2024/10/17-2

43 Laboratory Forceps
Manufacturer / Model: Unknown
Year: First half of the 20th century
Dimensions: 22 × 8 × 2 (b)
Inventory No.: 2024/10/17-1



30

Work Machinery
and Accessories

The Sericulture Station was equipped with a large variety of machinery, some of it state-of-the-art, necessary for the work carried out in its various departments and laboratories.

The centre's functions, supported by the relevant national laws and regulations protecting the silk industry, included a range of services, many of them free for silkworm breeders (such as seed analysis and registration, cold-storage overwintering, egg incubation, etc.).

Use of these services, as well as compliance with the obligations and requirements specified in the regulations, was a sine qua non condition for receiving the substantial protective subsidies intended to encourage silkworm breeding and the planting of mulberry trees at home, with the aim of re-establishing the silk industry. Part of the centre's machinery was, from the outset, dedicated to providing these public services.

However, despite the significant development in later years, the early days of the Sericulture Station were quite modest in terms of equipment. It initially had only the essential apparatus and instruments needed to carry out the State-mandated core functions (analysis, selection, distribution, and incubation of healthy seed, silkworm cocoon stifling, mulberry cultivation, study of the most suitable varieties for the Huerta of Murcia, and analysis of the properties of silk produced at the centre).

Thus, the Station began its work in 1892 in a modest premises on the El Palmar road, equipped only with two microscopes, a moth crusher, seven silkworm rearing frames —known as '*andanas*'—, an Orlandi incubator for 40 ounces of seed, two spinning machines, a serimeter, a measuring cylinder, a precision balance, and three models (two of moths and one of the mulberry fruit). For cocoon stifling, a six-horsepower steam generator and four airtight chambers were installed.

Despite these limitations, the Sericulture Station fulfilled its obligations, particularly from 1900 onwards, when Peñafiel took over as director, and especially after the centre moved to the new La Alberca de las Torres estate.

To meet the growing demand for services and products from increasingly confident farmers, the Station gradually acquired significant and innovative machinery. Purchases were always constrained by the centre's budget, which until 1933 amounted to 12,500 pesetas per quarter (50,000 pesetas annually), reduced from 1934 to 10,000 pesetas per quarter (40,000 annually).

These budgets fluctuated slightly over the years, ultimately allowing the Sericulture Station of Murcia to possess more than sufficient machinery to carry out its functions effectively.

44

To streamline sample preparation compared with manual mortars, the Sericulture Station acquired a moth grinding machine. The moths to be analysed were placed individually into the machine's metal mortars, which were arranged in wooden trays.

The lower cavity of each mortar contained the corresponding moth's egg clutch. A glass sphere was then placed over each moth, followed by a lid. Operating the machine's pedal caused the ten upper pistons to rotate, which in turn rotated the lids and spheres, grinding ten moths in just a few seconds. To prevent cross-contamination between samples, the glass sphere from each mortar was removed using special three-pronged metal tongs.

Once examined under the microscope, the egg clutches from disease-free moths were preserved and stored in a cold chamber for breeding the following year. Clutches from infected moths were discarded.

45

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47

48

Cavity where the moth's egg clutch was placed, in cloth or paper bags, to be grinded and analysed in the mortar.

49

44 Tray for Mortars of Grinding Machine
Manufacturer / Model: Ranzani & Uboldi
Year: 1892
Dimensions: 5 × 37 × 17
Inventory No.: 2024/12/1

45 Industrial Moth Grinding Machine
Manufacturer / Model: Ranzani & Uboldi
Year: 1892
Dimensions: 113 × 60 × 58
Inventory No.: 2024/3/7 (1994/1/24)

46 Lid for Metal Mortar
Manufacturer / Model: Ranzani & Uboldi
Year: 1892
Dimensions: 1 × 5 × 5
Inventory No.: 2024/12/7

47 Glass Sphere
Manufacturer / Model: Ranzani & Uboldi
Year: 1892
Dimensions: 3 × 3 × 3
Inventory No.: 2024/12/3

48 Metal Mortar for Grinding Machine
Manufacturer / Model: Ranzani & Uboldi
Year: 1892
Dimensions: 4.5 × 6.5 × 4.5
Inventory No.: 2024/12/4

49 Tongs for Extracting Spheres
Manufacturer / Model: Ranzani & Uboldi
Year: 1892
Dimensions: 7.5 × 2.5 × 2.5
Inventory No.: 2024/12/5

50

The cold storage chamber of the Sericulture Station consisted of three underground chambers and an antechamber, with a capacity to preserve 45,000 ounces of seed (1,350 kilograms), sufficient to overwinter annually all the seed required for rearing across the country.

It was powered by a 10-horsepower electric motor and had an auxiliary low-gas engine for use in case of breakdowns.

The building housed the cold storage chamber.

A certificate of seed deposit, which was necessary for its removal after the overwintering period.

Overwintering the seed, by maintaining a constant temperature, prevented harmful changes in the embryo, conserving its energy for the critical moment: hatching.

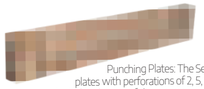
Broods raised from overwintered seed were 25% more productive than those from non-overwintered seed, producing stronger, more disease-resistant worms and higher-quality silk.

The conditions for overwintering were established by a special 1916 regulation and required the seed to be stored for a minimum of 90 days (from 1 December to 28 February) at a temperature between 0 and 2 °C.

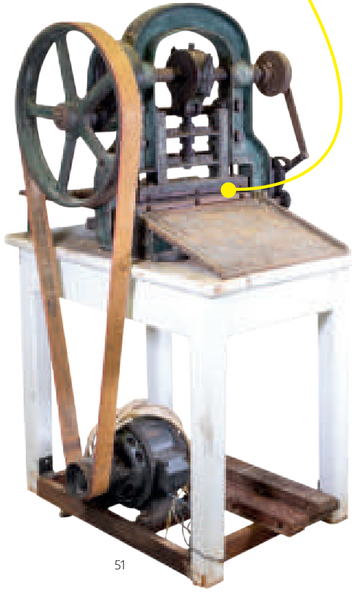
From 1925, sericulturists wishing to receive subsidies for silk production were obliged to overwinter their seed in the Sericulture Station chamber at La Alberca, which had begun operating in 1917.

In its first ten years of operation, more than 10,000 ounces of seed (300,000 grams), both private and from the centre itself, had already been successfully overwintered in this chamber.

50 Cold Storage Chamber
Manufacturer / Model: Teddington Industrial Equipment Ltd.
Year: 1916
Dimensions: 204 × 178 × 75 cm
Inventory Number: 2024/3/15



Punching Plates: The Sericulture Station had plates with perforations of 2, 5, 10, and 15 mm, to be adapted to the age of the worms.



51

The use of perforated paper greatly facilitated the cleaning of the racks containing rearing waste, without the need to handle the larvae.

Sheets of paper, perforated to match the size of the larvae, were placed over the rearing beds, with fresh mulberry leaves on top. In search of food, the larvae climbed through the holes. The sheets, now carrying the larvae, could then be transferred to a clean rearing bed to remove excrement and leftover leaves, the fermentation of which could produce harmful agents and cause serious infections in the brood.

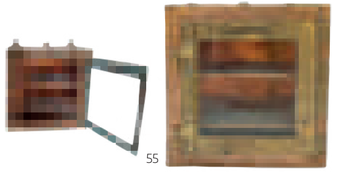
52

51 Automatic Perforator
Manufacturer / Model: G. Pradella & Figli
Year: 1942
Dimensions: 120 × 69 × 50 cm
Inventory No.: 2024/3/11-1 (1994/1/25)

52 Pedal-operated Perforator
Manufacturer / Model: E. Peñalver
Year: 1942
Dimensions: 119 × 45 × 38 cm
Inventory No.: 2024/3/11-2 (1994/1/23)

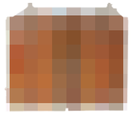
53 Silk Desiccator
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 186 × 133 × 58 cm
Inventory No.: 2024/3/1 (1994/1/27)

53

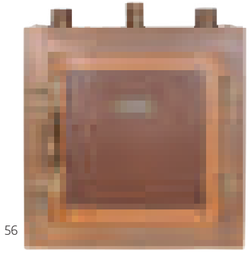


55

During full desiccation, cocoons lose 65% of their fresh weight.



54



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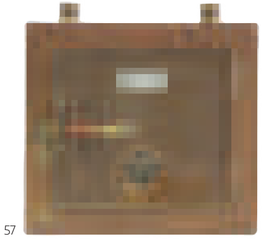

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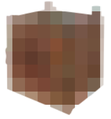
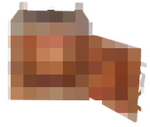
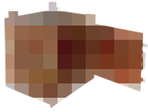
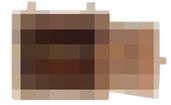








54 Cocoon Drying Oven
Manufacturer / Model: Manuel Álvarez
Year: Early 20th century
Dimensions: 53 × 60 × 38 cm
Inventory No.: 2024/10/14 (1994/1/26)

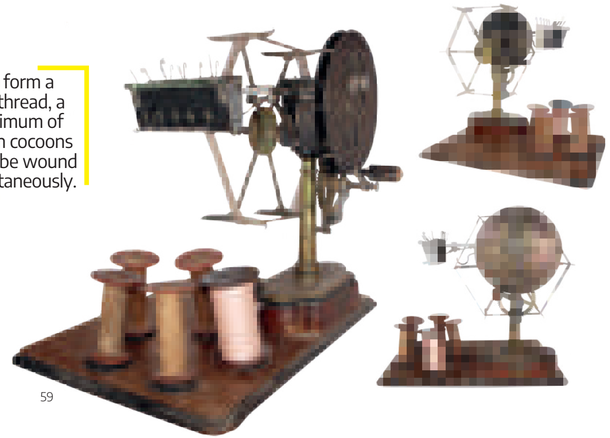
55 Culture Oven
Manufacturer / Model: Manuel Álvarez
Year: Early 20th century
Dimensions: 27 × 24 × 20 cm
Inventory No.: 2024/10/26

56 Culture Oven
Manufacturer / Model: Manuel Álvarez
Year: First half of the 20th century
Dimensions: 27 × 24 × 20 cm
Inventory No.: 2024/10/25

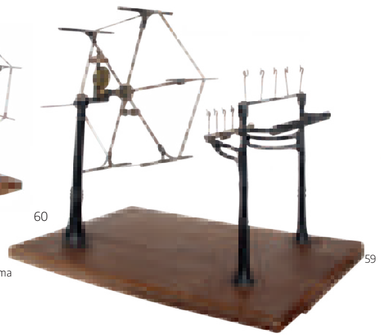
57 Culture Oven
Manufacturer / Model: Jodra
Year: Early 20th century
Dimensions: 23 × 25 × 18.5 cm
Inventory No.: 2024/10/27

58

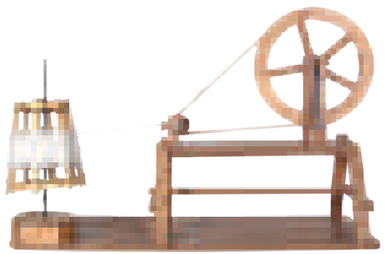
To form a silk thread, a minimum of seven cocoons must be wound simultaneously.



59



60



61

58 Reeler with 100-metre counter
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 46 × 30 × 43 cm
Inventory No.: 2024/3/5-2 (1994/1/32)

59 Reeler with counter up to 500 metres
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 50 × 52 × 36 cm
Inventory No.: 2024/3/5-4 (1994/1/32)

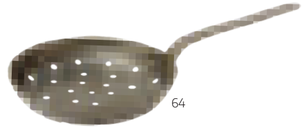
60 Reeler with counter
Manufacturer / Model: Louis Schopper
Year: Late 19th–early 20th century
Dimensions: 50 × 63 × 42 cm
Inventory No.: 2024/3/5-6 (1994/1/32)

61 Manual spinning wheel
Manufacturer / Model: Unknown
Year: Mid 20th century
Dimensions: 43 × 60 × 26 cm
Inventory No.: 2024/3/5-5

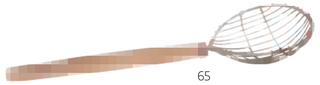
62

63

The ends of the threads were obtained through a process known as 'batido' (beating), which involved stirring the cocoons in hot water with a rotational movement using brushes made from tampico fibres. The surface of the brush had to rub against the floating cocoons, slightly submerging them, for just the right amount of time to avoid excessive waste. The by-product of the beating process (known as 'porrina'), along with other spinning waste, had various uses in the textile industry. The handling and transfer of cocoons between vats during the spinning process was carried out using skimmers.



64



65

66

62 Manual chain spinner with reservoir
Manufacturer / Model: Unknown
Year: Before 1909
Dimensions: 160 × 55 × 60 cm
Inventory No.: 2024/3/17

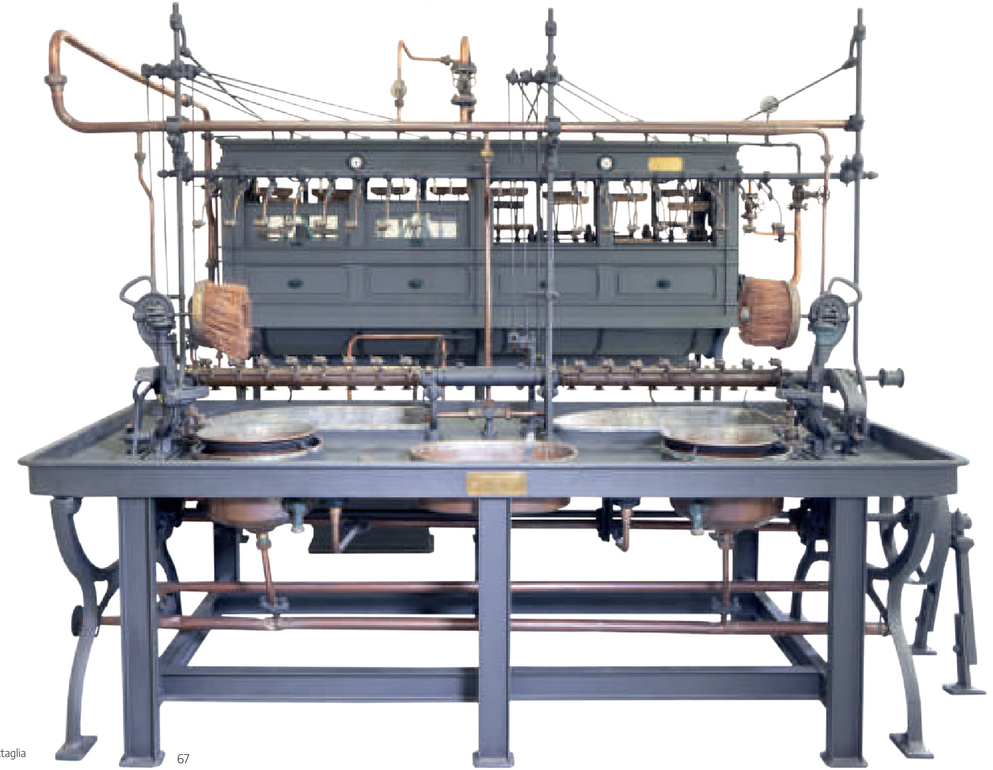
63 Brush for beating cocoons
Manufacturer / Model: Sericulture Station
Year: First quarter of the 20th century
Dimensions: 40 × 25 × 25 cm
Inventory No.: 2024/10/10

64 Metal skimmer
Manufacturer / Model: Unknown
Year: First half of the 20th century
Dimensions: 9 × 30 × 18 cm
Inventory No.: 2024/10/19-1

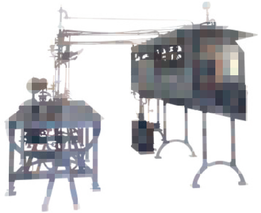
65 Skimmer with wooden handle
Manufacturer / Model: Unknown
Year: First quarter of the 20th century
Dimensions: 8 × 49 × 13 cm
Inventory No.: 2024/10/19-2

66 Manual spinner with reservoir
Manufacturer / Model: Unknown
Year: First quarter of the 20th century
Dimensions: 143 × 40 × 46 cm
Inventory No.: 2024/3/5-1 (1994/1/36B)

Although silk spinning was not among the functions of the Sericulture Station, this process was necessary to assess the quality of the silk—and, therefore, of the silkworm rearings—produced at the centre.

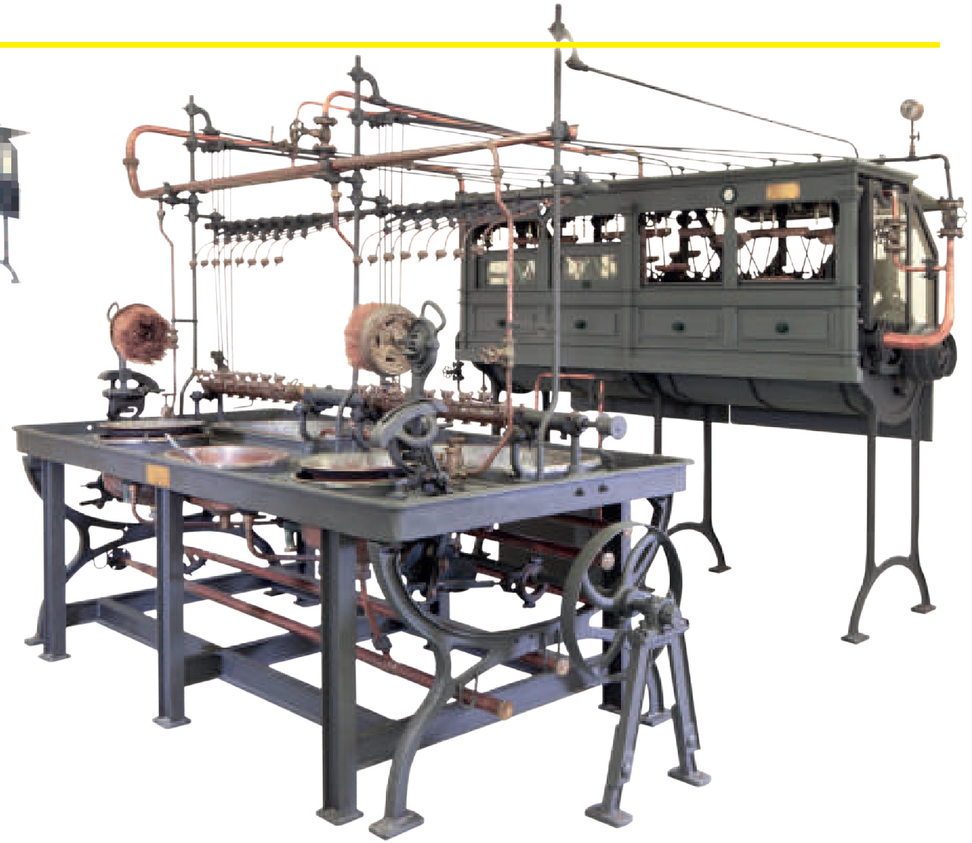


67 Semi-automatic Spinner
Manufacturer / Model: Giovanni Battaglia
Year: Circa 1930
Dimensions: 205 × 290 × 273 cm
Inventory No.: 2024/3/5-3 (1994/1/34)



Semi-automatic direct-winding spinner, imported from Italy, used for reeling silk cocoons. This spinner could work with up to 16 threads simultaneously, which were wound onto the large internal bobbins.

The two rotating brushes performed the beating of the cocoons to obtain the threads. Its pipe system allowed hot water to circulate throughout the different parts of the machine.



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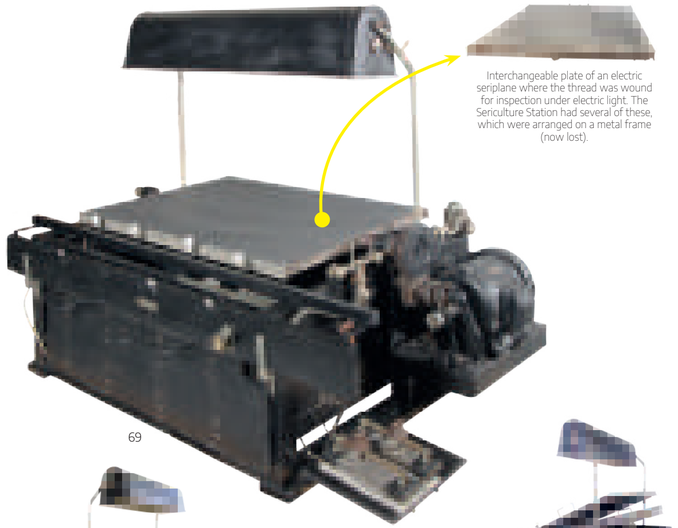


Interchangeable plate of an electric seriplane where the thread was wound for inspection under electric light. The Sericulture Station had several of these, which were arranged on a metal frame (now lost).

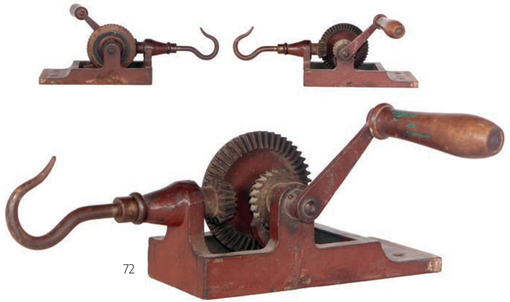
69

68 Manual Seriplane
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 50 × 62 × 55 cm
Inventory No.: 2024/3/16 (1994/1/33-2)

69 Electric Seriplane
Manufacturer / Model: Siemens
Year: 1927
Dimensions: 50 × 62 × 55 cm
Inventory No.: 2024/3/9 (1994/1/33-2)

70

71



72

73

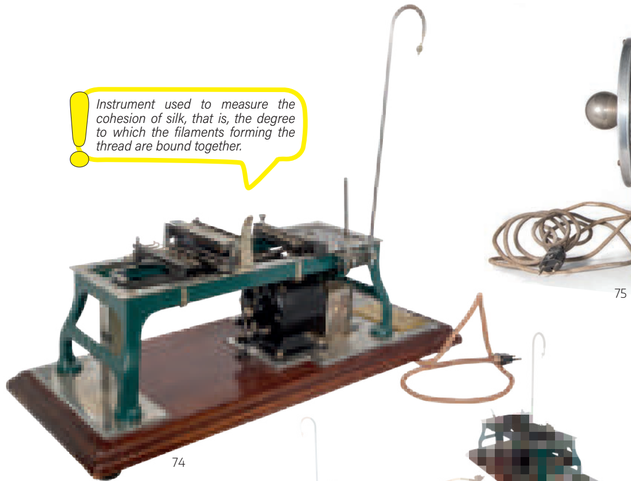
70 Twist Meter
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 17 × 130 × 20 cm
Inventory No.: 2024/3/4 (1994/1/33-1)

71 Thickness Gauge
Manufacturer / Model: Albert Perrenoud
Year: Early 20th century
Dimensions: 21 × 14 × 8 cm
Inventory No.: 2024/3/14

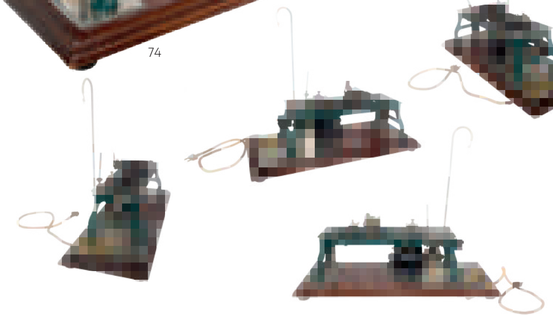
72 Hand-crank Strand Twister
Manufacturer / Model: Unknown
Year: Early 20th century
Dimensions: 16 × 38 × 24 cm
Inventory No.: 2024/3/13-2

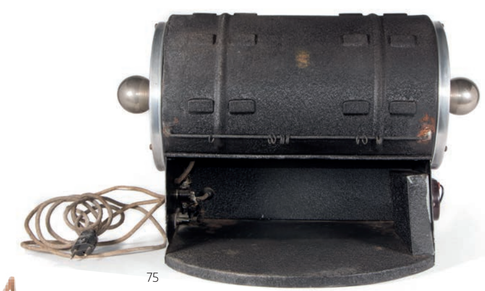
73 Strand Twister
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 51 × 23 × 23 cm
Inventory No.: 2024/11/8

Instrument used to measure the cohesion of silk, that is, the degree to which the filaments forming the thread are bound together.



74





75

Ultraviolet light instrument used to determine the purity of silk. Although the cocoons might appear to be the same colour, examining them under this light allowed the identification of those that were truly uniform from those with slight differences.

Silk was highly valued for several key qualities: its fineness, strength, elasticity, cohesion and the length of thread that could be reeled from it.

76

74 Cohesion Meter
Manufacturer / Model: Unknown
Year: Mid-20th century
Dimensions: 55 × 69 × 28 cm
Inventory No.: 2024/3/3 (1994/1/33-3)

75 Boock Light
Manufacturer / Model: Unknown
Year: 1945
Dimensions: 30 × 45 × 43 cm
Inventory No.: 2024/3/6 (1994/1/33-4)

76 Stand for Cleaning and Inspecting Hanks
Manufacturer / Model: Unknown
Year: Unknown
Dimensions: 110 × 132 × 30 cm
Inventory No.: 2024/3/13-1 (1994/1/36A)

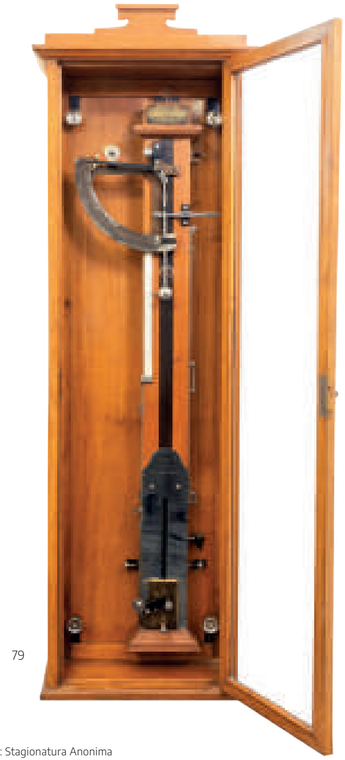
77

78

Serimeters are used to measure the strength and elasticity of fibres by applying tension until they break.

Some of these instruments feature a dual scale: one indicating resistance in kilograms, the other showing elasticity in millimetres.

Depending on the model, they were housed in oak display cases with a front-opening glass door.

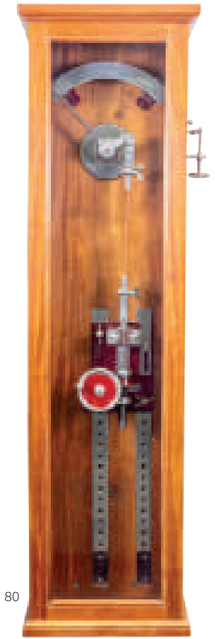


79

77 Serimeter
Manufacturer / Model: J. Berthaud Fils
Year: Late 19th century
Dimensions: 123 × 26 × 13 cm
Inventory No.: 2024/3/8-1

78 Serimeter
Manufacturer / Model: J. Berthaud Fils
Year: Late 19th century
Dimensions: 106 × 18 × 11 cm
Inventory No.: 2024/3/8-2

79 Serimeter
Manufacturer / Model: Stagionatura Anonima
Year: Before 1926
Dimensions: 147 × 47 × 22 cm
Inventory No.: 2024/3/8-3 (1994/1/30)



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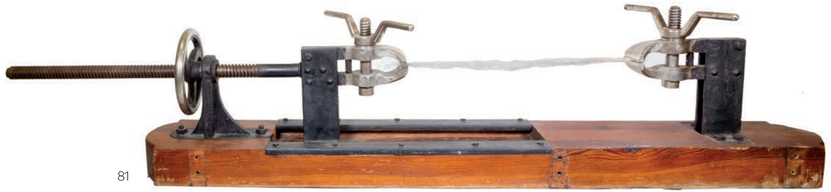


81

Once obtained, the hijuela—silk gland fibre—was dirty and coated with traces of sericin. To clean it, the 'moñas,' or hijuela bundles, were placed in these tensioners, where the 'mazantinero,' seated on a stool and using a suede cloth or piece of leather, polished them before sale.

Hijuela—silk gland fibre—bundle

80 Serimeter
Manufacturer / Model: Unknown
Year: 1927
Dimensions: 102 × 28 × 30 cm
Inventory No.: 2024/3/8-4 (1994/1/30)

81 Tensioner–Polisher for Hijuela
Manufacturer / Model: Unknown
Year: First half of the 20th century
Dimensions: 147 × 23 × 38 cm
Inventory No.: 2024/3/10 (1994/1/40)

A manual loom is a tool used for weaving fabrics and textiles by interlacing the weft (horizontal threads) with the warp (vertical threads).

This repetitive motion allows the creation of a wide variety of patterns and designs in the fabric.

The Sericulture Station preserved several models of looms traditionally used in the Huerta of Murcia.

82

82 Manual loom
Manufacturer / model: Unknown
Date: First half of the 20th century
Dimensions: 125 × 150 × 120 cm
Inventory no.: 2024/3/18 (1994/1/37)

Building and Facility Plans

The Sericulture Station of Murcia had numerous facilities to carry out its work, located in various parts of the Region of Murcia.

In addition to the previously mentioned sites (first on the El Palmar road and later in La Alberca de las Torres), the centre included other buildings such as the Enological Station of Jumilla (inaugurated in 1913), the hot-air stifling facility at Ronda de Garay (1917), and the Bullas Seed Station (1949).

According to the centre's early annual reports, there were also other buildings in use, now unrecorded: the sericulture schools. These centres hosted model rearings, led by Sericulture Station workers, which local silk producers could attend to observe and learn the correct breeding and hygiene techniques.

Workshop of Pacheco Sericulture School.

However, despite all the efforts and work carried out by the centre since its foundation, by 1947 the Sericulture Station faced a twofold problem: on the one hand, seed rearings carried out in Murcia did not reach optimum quality due to the climate, which weakened the obtained seed. On the other hand, the quantity of seed produced was insufficient to meet the national market demand, even with seed plots created by microscopist course students, French seeds (which were in limited supply), or selected Italian seed (which struggled to adapt to the climatic conditions of most of Spain).

For these reasons, in January 1947 the need to create the new Bullas Seed Station was justified in a complete project signed by Felipe González Marín, as chief engineer, and Alfonso Albacete, as agricultural engineer. This project is preserved intact today, and its complementary plans are included as part of this inventory of heritage objects.

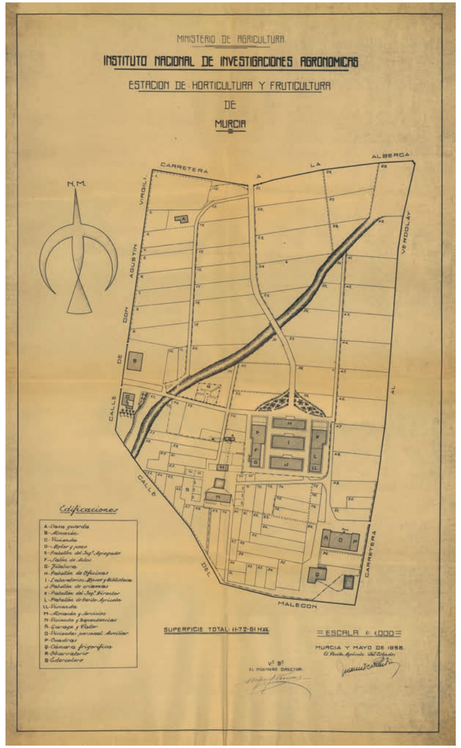
The ARACNE project has facilitated the digitisation and vectorisation of historical plans from various facilities, some of which had suffered severe deterioration over time. In this context, extensive work using specialised software has enabled the recovery of documents that would otherwise have been lost. Vectorisation ensures their permanent preservation in a lightweight, resizable format without any loss of quality.

This was the case, for example, with the only surviving plan of the hot-air stifling facility at Ronda de Garay, an important heritage element of Murcia's sericulture industry, which was demolished in the early 1960s. The processing of this plan also made it possible to recover details and sections that had become imperceptible.

83

The Sericulture Station of Murcia underwent several name changes from its establishment in 1892 until its closure in 1976. In 1924, a Royal Decree elevated its status to the Superior Station of Sericulture and Zoogeny Industries. The 1932 Budget Law changed its name to the Sericulture and Paprika Station. In 1933, it became the Sericulture Station, Paprika Station, and Citrus Substation. In 1935, it changed to the Station of Sericulture and Rural Industries. In 1941, following the creation the previous year of the Segura Basin Centre (now the Segura Hydrographic Confederation), it was renamed the Murcia Station of Horticulture and Fruit Growing. In 1971, it was incorporated into the new INIA (National Institute of Agrarian Research) under the name Murcia Division of CRIDA 07.

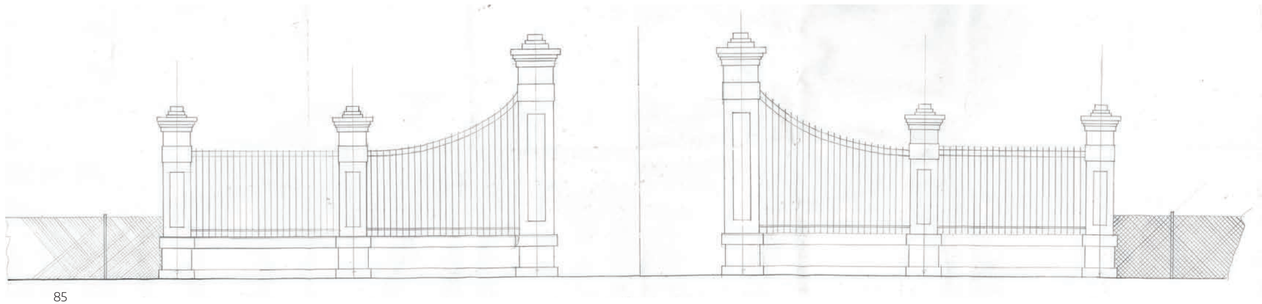
The theodolite is a mechanical-optical surveying instrument used in cartography to measure horizontal and vertical angles with high precision, determine heights and distances, establish control points, trace alignments, and calculate geographic coordinates.



84

83 Theodolite
Manufacturer / model: Wild Heerbrugs T1A
Year: Around 1935
Dimensions: 32 x 16 x 16
Inventory no.: 2024/7/9

84 Plan of the Horticulture and Fruit Growing Station
Author: Sericulture Station of Murcia
Year: 1958
Dimensions: 32 x 16 x 16
Inventory no.: 2024/4/5



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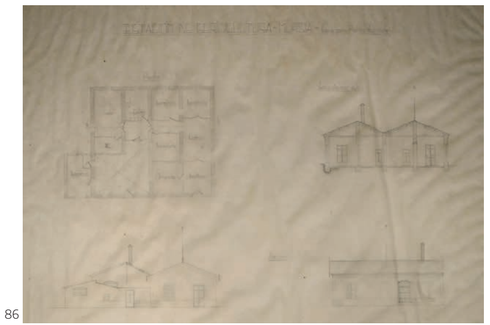
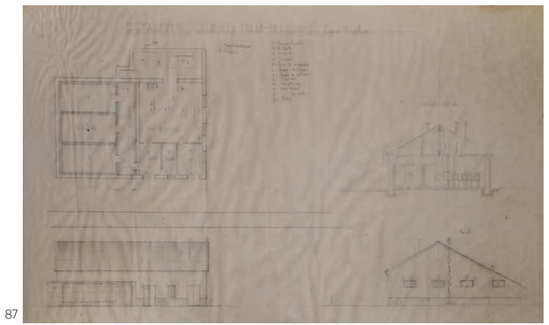


86



87

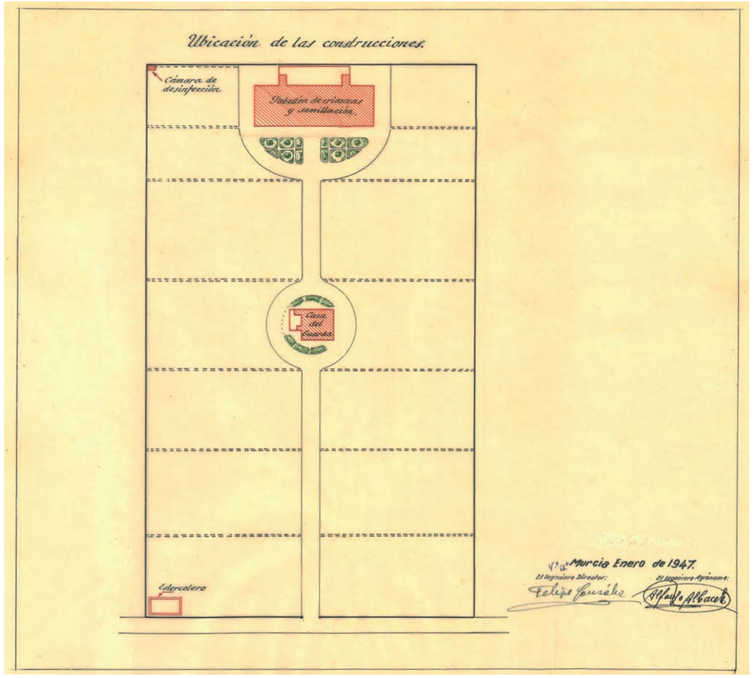
85 Drawing of the main gate of the Sericulture Station
Author: Sericulture Station of Murcia
Year: Around 1914
Dimensions: 32 x 16 x 16
Inventory no.: 2024/4/9

86 Plan of the Agricultural Expert's House
Author: Sericulture Station of Murcia
Year: 1942
Dimensions: 63 x 66
Inventory no.: 2024/4/3

87 Plan of Cold Storage Chambers
Author: Sericulture Station of Murcia
Year: 1942
Dimensions: 62 x 70.5
Inventory no.: 2024/4/2

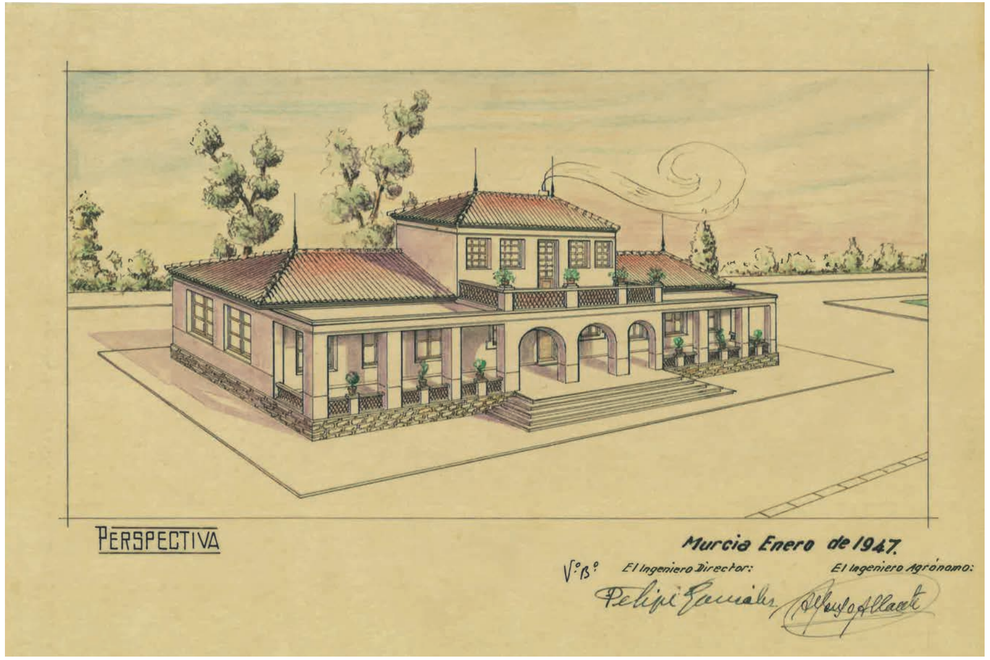
The Bullas Seed Station incorporated all the known advances of its time and consisted of four buildings: the rearing and seed pavilion, designed for breeding silkworms and producing seed; the disinfection chamber, used for cleaning rearing tools after each batch; the caretaker's house, located in the centre of the estate, where the caretaker lived year-round to monitor the facilities outside the breeding season and prepare for the next cycle; and a manure shed, where waste from the rearing beds was transferred from the workshops after cleaning.

The original plans also included a house for the foreman, which was never built.



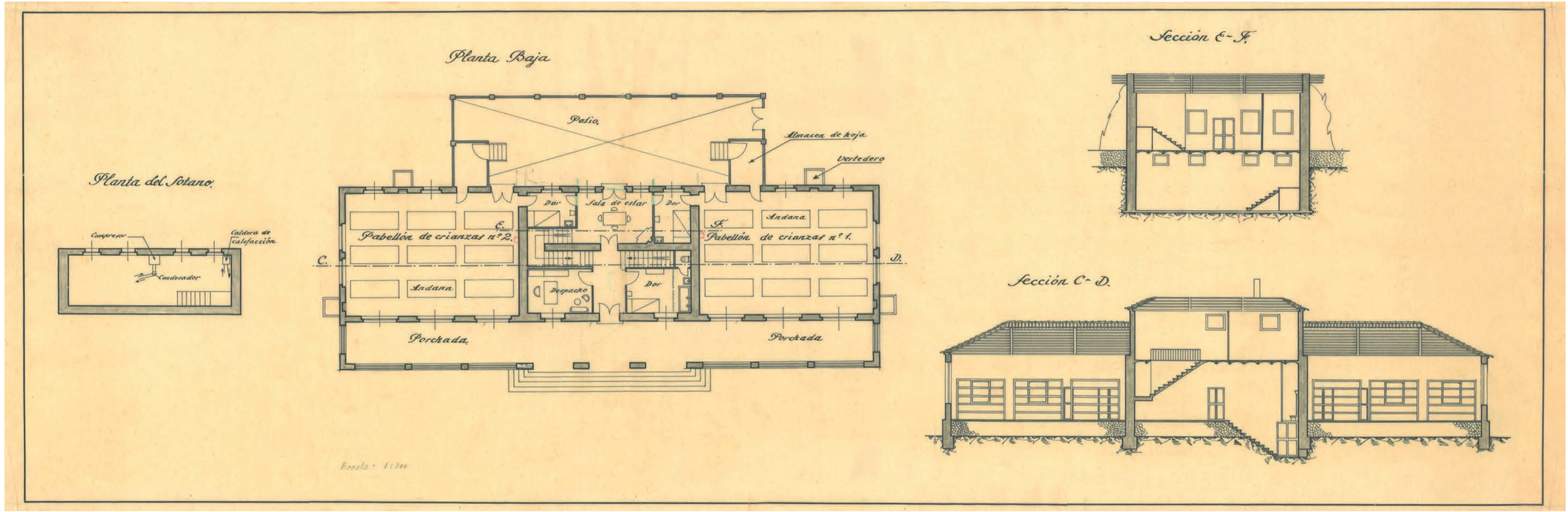
88

88 Location plan of the buildings
Authors: Felipe González Marín and Alfonso Albacete
Year: 1947
Dimensions: 38 x 44.5
Inventory no.: 2024/4/13



89

89 Perspective drawing of the rearing and seed pavilion
Authors: Felipe González Marín and Alfonso Albacete
Year: 1947
Dimensions: 21.8 x 32
Inventory no.: 2024/4/12



90

90 Plan of the rearing and seed pavilion
Authors: Felipe González Marín and Alfonso Albacete
Year: 1947
Dimensions: 30 x 95
Inventory no.: 2024/4/14

This two-storey building with a basement, still standing today, was inaugurated in 1949 and constructed one metre above ground level to minimise the effects of damp.

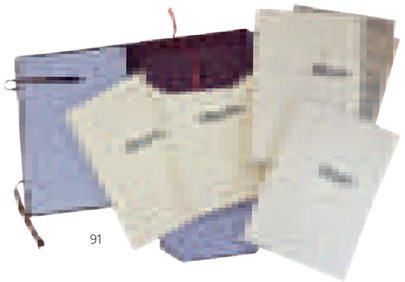
The ground floor, dedicated to rearing, comprised two wings with nine Lombard-style rearing frames, each 2.40 metres high and fitted with six rearing beds. These were removable and could be stacked to free up space after the rearing period, allowing cocoon selection and stringing to be carried out in the same area.

Next to each wing was the bedroom of the worker in charge, who shared a common living room with the other. The ground floor also housed an office and a third room for the engineer or qualified foreman of the service who, although not residing on-site, visited several days a week to supervise the rearing process and the workers' tasks.

There was also a rear courtyard with a leaf store for each rearing wing, each with direct access to its corresponding pavilion. Each wing had its own refuse chute, allowing waste to be discarded directly through guillotine-style windows.

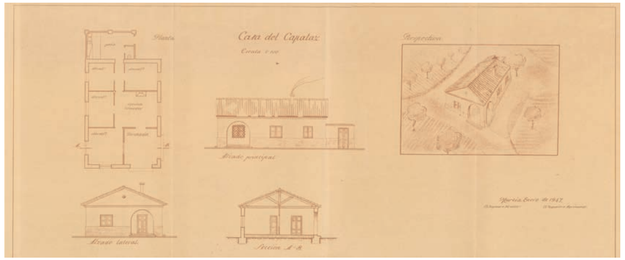
On the upper floor (occupying half of the central section) were the laboratories used for the analysis of larvae and moths, as well as for the selection, washing and packaging of the seed. This floor also included a terrace designed to allow future expansion of the laboratory if required.

The basement housed all the machinery for the building's climate control and ventilation. The building had no kitchen, as meals were provided from the guard's house.

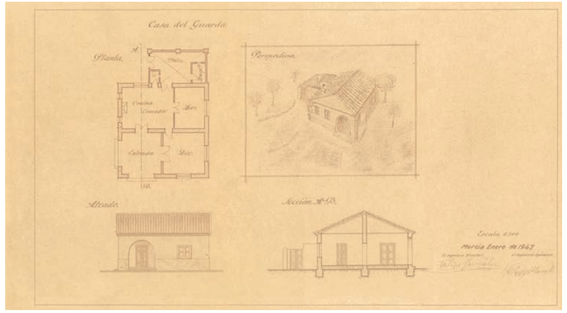


91

92



93



94

91 Leather folder containing the complete project for the Bullas Station
Authors: Felipe González Marín and Alfonso Albacete
Year: 1947
Dimensions: 34 × 24.5 × 3 cm
Inventory No.: 2024/7/10

92 Ventilation diagram of the main pavilion (lower floor)
Authors: Felipe González Marín and Alfonso Albacete
Year: 1947
Dimensions: 30.7 × 73 cm
Inventory No.: 2024/4/15

93 Plan of the foreman's house
Authors: Felipe González Marín and Alfonso Albacete
Year: 1947
Dimensions: 30.5 × 72.5 cm
Inventory No.: 2024/4/17

94 Plan of the guard's house
Authors: Felipe González Marín and Alfonso Albacete
Year: 1947
Dimensions: 30.2 × 53 cm
Inventory No.: 2024/4/16

The hot-air stifling and drying facility of Ronda de Garay marked a major advance for the Murcian sericulture industry and, in particular, for the interests of the silk producers, who until then had been forced to sell their silk quickly to the factories—almost always at abusive prices—to prevent the cocoons from being pierced by the emerging moth.

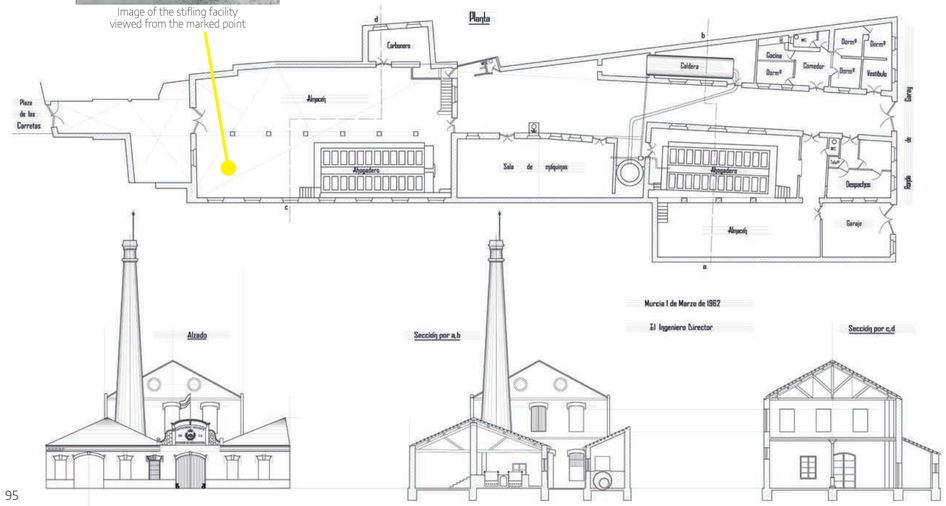
The opening of this facility in 1916 brought an end to this urgency, allowing producers to store their harvest and sell it later at a far more competitive price.

The original installations, which operated with currents of hot air (75 °C), consisted of a single stifling unit with 24 independent drawers, each with a capacity of 80 kilograms of cocoons.

Shortly after its inauguration, a new pavilion was built (with access from Plaza de las Carretas), equipped with another 24-drawer stifling unit and several storage rooms.

The courtyards were also roofed over to protect the sacks of cocoons from rain.
In 1925 the hot-air system was improved with the installation of a large boiler and the construction of a 28-metre-high brick chimney. This facility achieved a daily output of 30,000 kilograms of stifled cocoons and 6,000 kilograms both stifled and dried.

Image of the stifling facility viewed from the marked point



95

95 Vectorised plan of the Ronda de Garay Hot-Air Stifling and drying facility
Authors: Sericulture Station of Murcia (original); Marta Sánchez Alcaraz (digitisation and vectorisation)
Year: 1962 (original); 2024 (vectorised)
Dimensions: 63.5 x 97.5 (original)
Inventory No.: 2024/4/1

Educational
Prints and Posters

The Sericulture Station of Murcia, the first of four established nationally, had among its main missions the task of convincing farmers across Spain of the need to revive the silk industry, which had brought significant economic benefits to families, particularly between the 15th and 18th centuries.

This was a doubly difficult task. On the one hand, it required persuading breeders who were already weary from repeatedly losing their silkworms to infections and diseases for which they were, in principle, not responsible. On the other hand, it demanded convincing them that these rearings should be carried out according to new scientific techniques and procedures, which, from their cautious and simplistic perspective, seemed more laborious and troublesome than the traditional methods used in their own homes.

At least the arduous work of the Station was reinforced and incentivised by the attractive financial rewards for producing cocoons, spinning silk, and cultivating mulberry trees, which had been stipulated in various laws protecting the silk industry since 1915.

The first of these, issued in 1915, provided aid of 50 cents of a peseta (approximately 3 euro cents) per kilogram of fresh cocoon produced by farmers, 50 pesetas (around €0.30) for every 100 mulberry trees planted, and 25 cents of a peseta (about 1.5 euro cents) per kilogram of spun silk.

In this context, and with the aim of fostering the development of Spain's silk industry, the National Economic Council created the Silk Commission in 1926. To achieve its objectives, the Commission could make use of a variety of media, including pamphlets, booklets, posters, films, and educational displays.

Indeed, a large part of the heritage legacy of the framed displays from the Sericulture Station of Murcia consists of a series of educational posters published for the national territory by the Royal Silk Commission, almost all of which are replicas of Italian versions produced by the Italian Society of Silkworm Seed Producers (Società Italiana dei Produttori di Seme di Bachi).

In addition to these posters, a wide variety of panels—paintings, collages, and photographs in various formats and sizes—have been preserved. Some of these carried a clear propagandistic purpose, emphasising the patriotic duty of the farmer to rear silkworms for the good of the nation, under the message: Producing silk is enhancing Spain. Another recurring propaganda theme highlighted the State's commitment to providing substantial financial aid to cocoon-producing families.

Other panels display samples of silk and hijuela, or illustrate different aspects of the work carried out by the Sericulture Station or practical sericulture schools (such as results achieved, quantity of seed incubated, weight of 100 cocoons, properties of the silkworm's secretion, etc.), graphically presenting production data for a given region and period.

All of these framed displays decorated the walls of the pavilions, served as educational tools in the classrooms, or were used as propaganda elements at national and international exhibitions and congresses attended by the staff of the Sericulture Station of Murcia, in their effort to promote interest in reviving this traditional family and rural practice.

96

During their larval phase, the silkworms were reared on frames called "*andanas*", initially designed to provide food in the form of mulberry leaves.

The Sericulture Station also experimented with other rearing systems, feeding the silkworms directly on branches, which greatly simplified the tasks of gathering food and cleaning the workshops.

97

Originally, the educational posters were mounted between two wooden slats, which were later replaced by frames with glass that were smaller than the posters themselves. This resulted in a loss of information at the top and/or bottom.

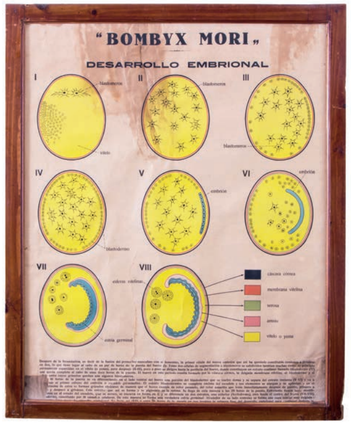
The same poster, framed, clearly shows a loss of information at the top.

98

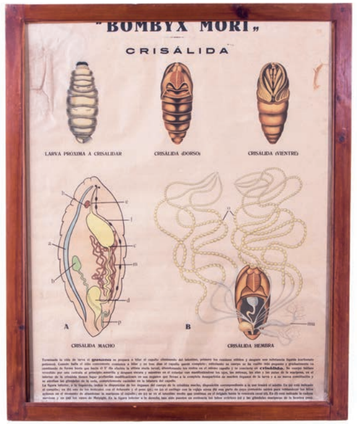
96 Informative Poster 'Metamorphosis'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 98 × 81.5 × 1.3 cm
Inventory Number: 2024/5/4-3

97 Framed Poster 'Allevamento razionale'
Author: Ministry of Agriculture
Year: Second quarter of the 20th century
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-1 (1994/1/12)

98 Informative Poster 'Breeding Systems'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 98 × 81.5 × 1.3 cm
Inventory Number: 2024/5/4-4

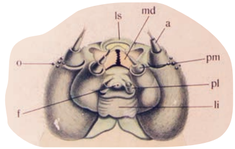


99



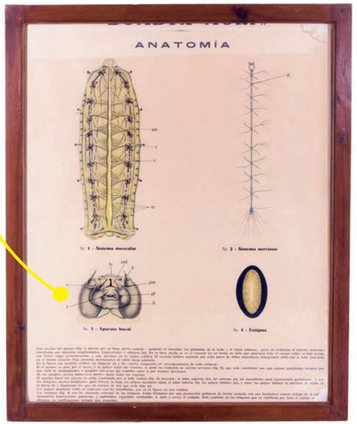
100

The chrysalis (or pupa) is the transitional stage between the larva (the actual silkworm) and the moth, and takes place inside the cocoon.



Worm Head

ls: upper lip.
md: vertical, serrated jaws for shredding the leaf.
a: antennae.
pm: maxillary palps.
pl: labial palps.
li: lower lip.
f: spinneret, through which the worm expels the silk produced by the two sericigenous glands.
o: eyes (six on each side).



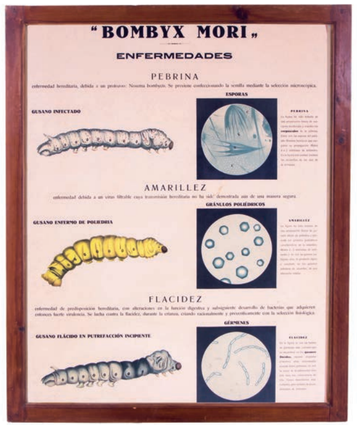
101

99 Framed Informative Poster 'Embryonic Development'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-5 (1994/1/1)

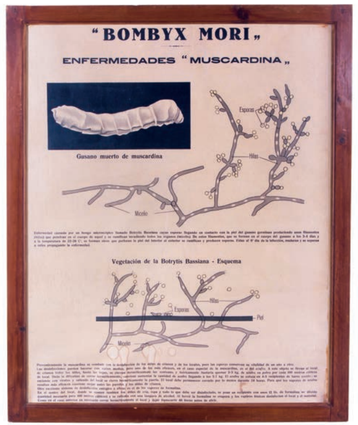
100 Framed Informative Poster 'Chrysalis'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-3 (1994/1/3)

101 Framed Informative Poster 'Silkworm Anatomy'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-2 (1994/1/5)

From around 1850, various silkworm diseases—particularly pebrine and flacherie—became epidemic, threatening silk farms across Europe. Louis Pasteur discovered a way to eradicate these conditions, provided their origin was hereditary, through rigorous control and selection of the eggs. This marked the beginning of scientific research applied to sericulture.

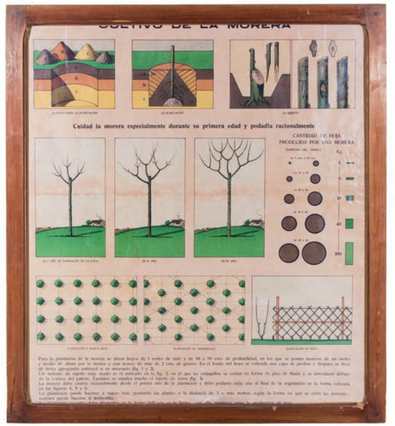


102

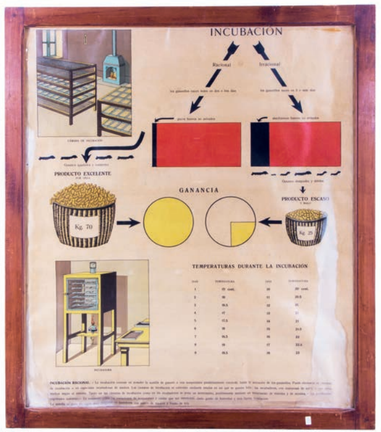


103

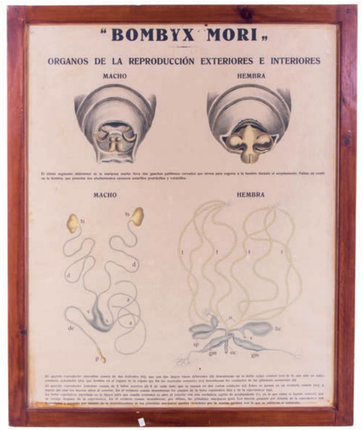
104



105



106



107

Rational breeding referred to model breeding; that is, breeding in which the entire batch of eggs hatched within a maximum of three days, producing larvae of uniform size that moulted simultaneously, leaving few unhatched eggs (minimal waste) and resulting in a high-quality product, with yields of between 70 and 90 kilograms of fresh cocoon per ounce of eggs (compared with the 25 kilograms obtained through irrational breeding).

102 Framed Informative Poster 'Diseases'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-8 (1994/1/7)

103 Framed Informative Poster 'Muscardine'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-6 (1994/1/6)

104 Framed Informative Poster 'Pathology: Flacherie'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-7 (1994/1/8)

105 Framed Informative Poster: 'Mulberry Cultivation'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 94 × 83 × 2 cm
Inventory Number: 2024/5/1-4 (1994/1/11)

106 Framed Informative Poster: 'Incubation'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 94 × 83 × 2 cm
Inventory Number: 2024/5/1-10 (1994/1/10)

107 Framed Informative Poster: 'Reproductive Organs'
Author: Royal Silk Commission
Year: 1926–1941
Dimensions: 95 × 81 × 2 cm
Inventory Number: 2024/5/1-13 (1994/1/4)

The life cycle of the insect *Bombyx mori,* known as the silkworm, lasts around 65 days and goes through four stages: egg, larva, pupa, and moth.

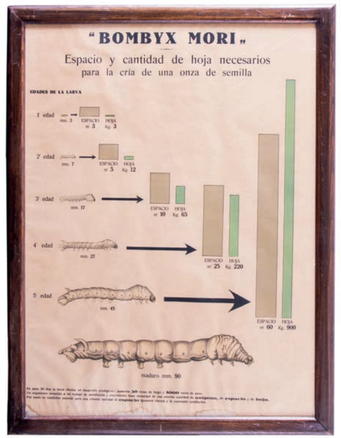
The larval stage lasts about 40 days, during which the worm undergoes enormous growth, increasing from 0.5 milligrams to 4 grams in weight and from 1 millimetre to 8 centimetres in length.

To achieve this development, the larva undergoes four moults, or skin changes, during which it remains immobile for 48 hours. These moults were known in the Huerta as 'dormidas' (dormancy or lethargic phase). After each moult, a new instar begins. The fifth and final instar was known as "freza mayor".

Newly hatched larvae (1st instar)

Mature larvae (end of the 5th instar)

Chrysalis and emergence of the moth

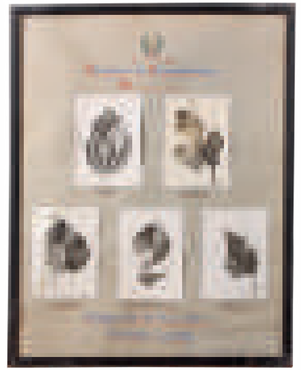


108

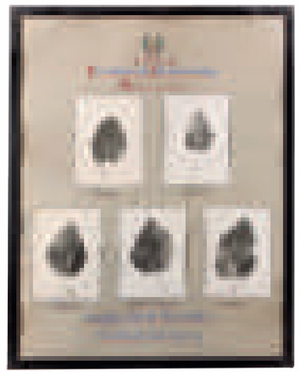
109

108 Framed Informative Poster: 'Space and Leaf Quantity'
Author: Royal Silk Office
Year: 1926–1941
Dimensions: 98 × 82 × 2 cm
Inventory no.: 2024/5/1–9 (1994/1/9)

109 Framed Informative Poster: 'Metamorphosis'
Author: Royal Silk Office
Year: 1926–1941
Dimensions: 95.5 × 81.5 × 1.7 cm
Inventory no.: 2024/5/1–11 (1994/1/2)



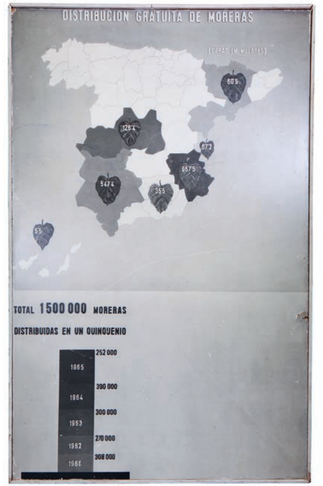
110



111

110 Framed Print: 'Leaf Morphology of Morus alba L., Spanish Varieties'
Author: Sericulture Station of Murcia
Year: 1971
Dimensions: 68 × 53 × 1 cm
Inventory no.: 2024/5/7

111 Framed Print: 'Leaf Morphology of Morus alba L., Foreign Varieties'
Author: Sericulture Station of Murcia
Year: 1971
Dimensions: 68 × 53 × 1 cm
Inventory no.: 2024/5/9



112

The distribution of mulberry seeds and saplings was essential for reviving the national sericulture industry, particularly in areas where these trees had been felled years earlier.

In just 25 years (from 1900 to 1925), the Sericulture Station had distributed more than half a million mulberry trees (394,944 saplings and 288,000 nursery-grown trees) to other sericulture schools and private farmers.

Mulberry leaves are the only food of the silkworm, which is why the agricultural landscape of the Region of Murcia has traditionally been linked to these trees.

Morus nigra, or black mulberry, was the predominant variety in Murcia until the 15th century, when it began to be replaced by Morus alba, or white mulberry.

Silk produced by worms fed on *Morus alba* leaves had higher yield and quality than that produced by worms fed on *Morus nigra*.

Worms hatched from an ounce of seed would consume between 1,200 and 1,600 kilograms of leaves (depending on the breed) during their larval stage.

113

112 Framed Print: 'Free Distribution of Mulberry Trees'
Author: Sericulture Station of Murcia
Year: 1961
Dimensions: 146 × 92 × 3.5 cm
Inventory no.: 2024/5/2–4

113 Mulberry Pruning Hoe
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 39 × 12 × 2 cm
Inventory no.: 2024/10/15

114

The quality and yield of silk vary depending on the breed. Some breeds were raised exclusively for silk spinning, while others were intended for the production of hijuela (silk gland fibre).

The Sericulture Station of Murcia carried out controlled crossbreeding between different breeds to obtain silk that was more productive and of higher quality, with worms stronger against diseases and pests. This led to the creation of the 'Spanish Yellow No. 1' breed.

From 1950 onwards, the goal was to produce white silk to meet the new market demands.

115

Yellow cocoons are produced by worms of traditional European breeds, while white cocoons are obtained from crosses involving breeds of Asian origin.

116

114 Framed Display of Results Obtained by the Schools at Farmers' Homes in 1908
Author: Sericulture Station of Murcia
Year: 1909
Dimensions: 90 × 110 × 10 cm
Inventory no.: 2024/5/13 (1994/1/43)

115 Framed Display of Cocoons by Breed
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 32 × 62 × 7 cm
Inventory no.: 2024/5/3-2

116 Display of Results Obtained at the Centre and Schools
Author: Sericulture Station of Murcia
Year: 1910
Dimensions: 45 × 56 × 2 cm
Inventory no.: 2024/5/2-6

117

118

119

120

117 Display of Raw Silk Hanks
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 32 × 62 × 7 cm
Inventory no.: 2024/5/3-4

118 Display of Twisted Silk Hanks
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 30 × 80 × 3 cm
Inventory no.: 2024/9/8

119 Display of 'Gran Exquís' Silk Hanks, Glossy and Ultra-Matte, 100 and 150 Denier
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 39 × 27 × 6 cm
Inventory no.: 2024/9/8

120 Display of Hanks of Different Qualities
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 39 × 27 × 6 cm
Inventory no.: 2024/9/1-1

121

Dyeing (the addition of colour to silk thread) is one of the final steps in the complex spinning process, giving silk fabrics colours different from those of the original cocoons.

Dyeing was carried out using natural products, usually of plant origin, sometimes supplemented with mineral additives such as tartar and alum, which was produced on a large scale in the mines of Mazarrón.

122

121 Framed Display of Spun and Dyed Silk in Orange Tones
uthor: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 31 × 25 × 5 cm
Inventory no.: 2024/9/9

122 Framed Display of Spun and Dyed Silk in Various Colours
Author: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 31 × 25 × 5 cm
Inventory no.: 2024/5/3-5

123

124

125

126

123 Framed Display of Silk and Fabric Samples
Author: Sericulture Station of Murcia
Year: Before 1935
Dimensions: 26 × 39 × 6 cm
Inventory no.: 2024/5/10

124 Framed Display of French Silk and Fabric Samples
Author: Sericulture Station of Murcia
Year: Before 1935
Dimensions: 26 × 39 × 6 cm
Inventory no.: 2024/9/10

125 Framed Display of French Silk and Fabric Samples
Author: Sericulture Station of Murcia
Year: Before 1935
Dimensions: 26 × 39 × 6 cm
Inventory no.: 2024/9/10

126 Framed Display: 'History of Silk – Raw Materials'
Author: Sericulture Station of Murcia
Year: Before 1935
Dimensions: 58 × 46 × 7 cm
Inventory no.: 2024/9/12

127

128

129

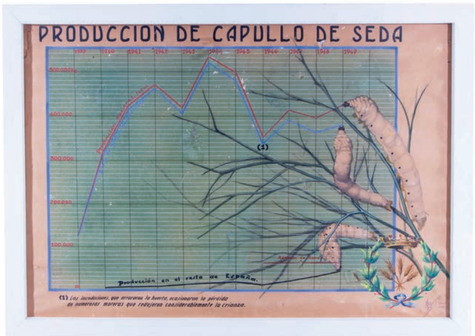
Once processed at the factory, bundles of hijuela were classified into categories, from lowest to highest quality: refina, fina, regular, padrón 2ª, padrón 1ª, maraña 2ª, maraña 1ª, imperial, and hebra. Within each category, three classes were established: selecta, superior, and estriada.

127 Framed Display of hijuela
Author: Higher Sericulture Station
Year: 1924–1932
Dimensions: 66 × 46 × 5
Inventory No.: 2024/5/3-1 (1994/1/42)

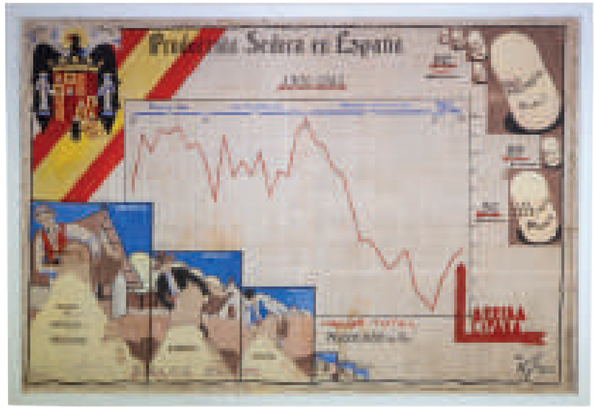
128 Framed Display of hijuela after industrial processing
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 66 × 98 × 5
Inventory No.: 2024/5/15

129 Framed Display of hijuela after industrial processing
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 37 × 28 × 1.5
Inventory No.: 2024/5/14

130



131



132

Until the mid-18th century, Spain produced 12,400 tonnes of fresh cocoon, of which 2,000 came from Murcia.

Despite the commendable work carried out by the Sericulture Station, such high production figures were never again reached until the final disappearance of the silk industry in 1976.

130 Poster of Production Data: 'Total Cocoon Harvest in Spain (1927–1941)'
Author: Higher Sericulture Station of Murcia
Year: 1941
Dimensions: 81 × 120 × 2
Inventory No.: 2024/5/11

131 Poster of Production Data: 'Silk Cocoon Production (1939–1949)
Author: S. Seiquer
Year: 1950
Dimensions: 76 × 106 × 4.5
Inventory No.: 2024/5/2-7 (1994/1/44)

132 Poster of Production Data: 'Silk Production in Spain (1906–1942)
Author: S. Seiquer
Year: 1942
Dimensions: 132 × 191 × 4.5
Inventory No.: 2024/5/2-8

133

135

134

Propaganda postcard aimed at farmers

*"The National Army needs **silk** products. Parachutes and gunpowder pouches are made of silk.

***Farmer:** You have a duty to rear silkworms, as their products are needed for National Defence.

The textile industries consume **150,000 kilos** of silk annually. At present, we produce 40,000 kilos; the rest is imported, causing serious losses to our currency.

***Farmer:** By producing silk cocoons, you render a great service to the National Economy.

Thousands of workers find employment in textile factories, yet our harvest is insufficient to keep up with their production demands.

***Farmer:** Producing silk cocoons will provide work for many working-class families.

FARMERS: PRODUCING SILK IS TO GLORIFY SPAIN!"*

133 Poster: 'An Application of Our Silk'
Author: Sericulture Station of Murcia
Year: Unknown
Dimensions: 124 × 60 × 3.5
Inventory No.: 2024/5/2-1

134 Propaganda Postcard
Author: Sericulture Station of Murcia
Year: 1941–1967
Dimensions: 10.5 × 14.8
Inventory No.: 2024/7/11

135 Poster: 'Distribution of Aid Among Harvesting Families'
Author: S. Seiquer
Year: 1955
Dimensions: 83 × 153 × 3
Inventory No.: 2024/5/12

136

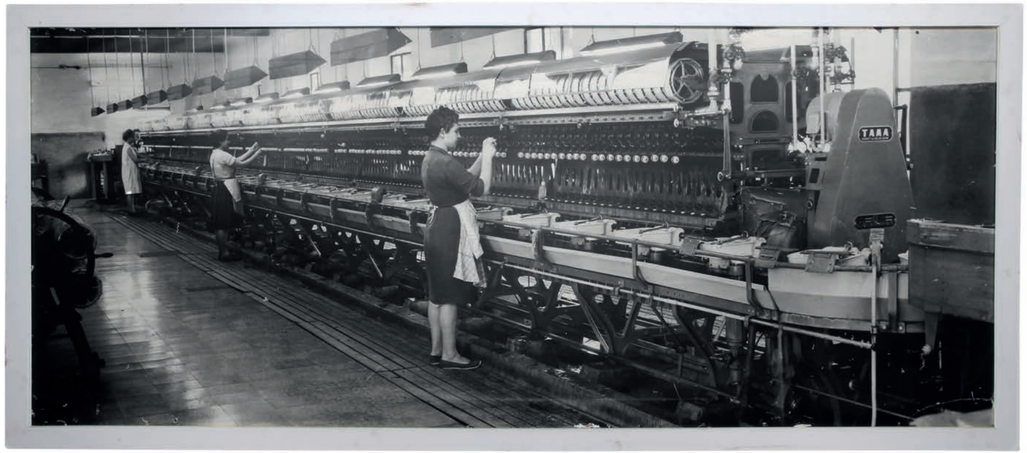
137

138

136 Framed Poster: 'Pure Silk'
Author: Ministry of Agriculture
Year: Between 1934 and 1941
Dimensions: 104 × 64 × 3
Inventory No.: 2024/5/16

137 Framed Poster: 'With Silks, You Will Enhance Its Beauty'
Author: Ministry of Agriculture
Year: Between 1934 and 1941
Dimensions: 104 × 64 × 3
Inventory No.: 2024/5/17

138 Propaganda Pennants
Author: Sericulture Service
Year: 1958
Dimensions: 27 × 5.5
Inventory No.: 2024/5/5



139

Silk spinning was practised in Murcia in some households, especially before the establishment of the Sericulture Station. This work was carried out on very rudimentary spinning wheels, built each year by local farmers outside their huts, which produced highly irregular and low-quality threads. The spun silk was kept to sell or trade with travelling merchants for clothing or other goods.

With the regulation of sericulture in the 20th century, silk spinning became an industrial activity, carried out in silk factories located in various parts of the Huerta of Murcia. These factories were equipped with increasingly sophisticated machinery, often of Japanese make, which automated processes that had previously been performed manually.

Old Spinning Wheel Installed in the Huerta

140

141

139 Framed Display with Image of Japanese Automatic Spinning Machine 'Tama'
Author: Sericulture Station of Murcia
Year: From 1940
Dimensions: 86 × 193 × 4.5
Inventory No.: 2024/5/6

140 Framed Display: 'Modernisation of Silk Spinning'
Author: Sericulture Station of Murcia
Year: From 1940
Dimensions: 128 × 103 × 5
Inventory No.: 2024/5/18

141 Framed Display with Image of Workers in Silk Spinning
Author: Sericulture Station of Murcia
Year: From 1940
Dimensions: 150 × 203 × 4
Inventory No.: 2024/5/19

Pebrine, one of the deadliest diseases for silkworms, was caused by the microsporidian *Nosema bombycis*. Identifying its bodies in microscopic samples of silkworm moths formed the basis of the Pasteur System, the only valid method for preventing this disease.

142

143

144

The nematode Heterodera radicícola Greef was the main pest affecting mulberry trees in Murcia during the 1930s.

This parasite lived in the roots of mulberries and over 500 other cultivated plant species, causing stunted tree growth, yellowing leaves, and reduced yields. The traditional control method involved using trap crops such as rapeseed or turnips, which were preferred by the parasite. These trap crops were planted in spring, attracting all Heterodera radicícola individuals within a few weeks.

The plants were then uprooted, the roots left to dry in the sun, and finally buried mixed with lime or burned.

142 Framed display with Image of Pebrine Bodies Viewed Under the Microscope
Author: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 40 × 30 × 2
Inventory No.: 2024/5/22

143 Photomicrograph of Female *Heterodera radicícola Greef*
Author: Sericulture Station of Murcia
Year: 1935–1941
Dimensions: 53 × 36 × 1
Inventory No.: 2024/5/20

144 Photomicrograph of Male Heterodera radicícola Greef
Author: Sericulture Station of Murcia
Year: 1935–1941
Dimensions: 53 × 36 × 1
Inventory No.: 2024/5/21

145

145 Framed Display with Image of Silkworms on Leaves
Author: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 89 × 96 × 2
Inventory No.: 2024/5/23

146

146 Grand Prize Diploma Awarded to the Sericulture Station of Murcia
Author: Universal Exposition of Brussels
Year: 1910
Dimensions: 100 × 109 × 20
Inventory No.: 2024/5/23

147

After the closure of the school for foremen and agricultural workers in 1924, its four classrooms were repurposed for film development, silk spinning, and the installation of two museums: one educational, covering general sericulture, and another dedicated exclusively to the hijuela.

148

The Institute for the Promotion of Textile Fibre Production (1941) took over the responsibilities of the former silk and cotton promotion bodies, expanding its functions to the regulation and promotion of all textile fibre production (silk, cotton, hemp, flax, ramie, and hard fibres). The Institute was composed of the Central Board and five Commissions (ramie was included in the cotton commission).

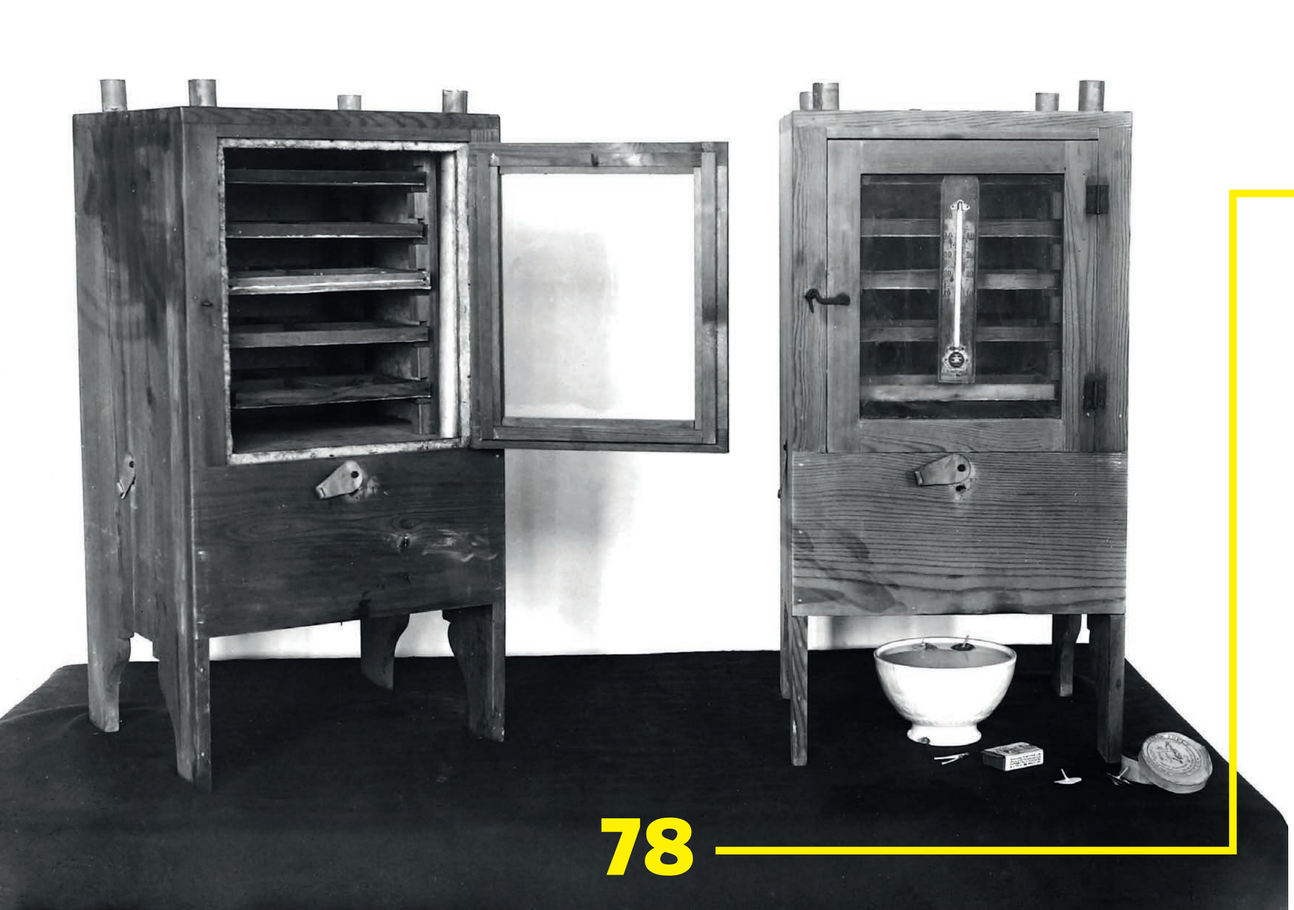
Each Commission was made up of a President and a Secretary (both Ministry personnel); a Vice-President (for the silk commission, the Director of the Sericulture Station of Murcia); and five members: two representatives of cocoon producers (one from the Huerta of Murcia, one from the rest of Spain), one representative of spinning mills, one representative of national seed producers, and one representative of the hijuela guild.

Each Commission also had a corresponding Technical Service responsible for all matters related to the cultivation and production of its textile fibre. The Sericulture Service, based at the Sericulture Station, was organised into three sections: cultivation (silkworm rearing and mulberry cultivation), administration, and agricultural-industrial and commercial management. The Sericulture Service was the body most actively engaged in reviving sericulture throughout Spain, as it had the necessary financial resources and sufficient staff.

The Institute for the Promotion of Textile Fibre Production was abolished on 19 August 1967, along with the Sericulture Service. From that point on, there was no dedicated body responsible for safeguarding the industry, which was only attended to sporadically by various institutions. The campaigns of 1968 and 1969 were managed by the INIA. From 1970 onwards, all silk management in Spain was assumed by the FORPPA (Fund for the Organisation and Regulation of Agricultural Prices and Products), which established a Five-Year Plan for the Organisation of the Silk Sector (1971–1976), attempting to recover an already evident crisis. At the end of the plan, when subsidies were removed, silk production completely collapsed in 1976.

147 Entrance Poster for the Educational Silk Museum
Author: Sericulture Station of Murcia
Date: Circa 1924
Dimensions: 51 × 313 × 3
Inventory No.: 2024/1/5

148 Sign for the Sericulture Service Headquarters
Author: Ministry of Agriculture
Date: 1942
Dimensions: 112 × 78
Inventory No.: 2024/1/4



Rearing
Tools

The Sericulture Station naturally used the most advanced materials and equipment available in its silkworm rearing facilities.

Scientific studies on silkworms consistently highlighted the importance of maintaining an appropriate environment during rearing to ensure the larva developed normally. This meant keeping them free from diseases that could be triggered or worsened by inadequate feeding or sudden changes in temperature and humidity.

This required adopting measures that had never before been considered, including rigorous cleaning of the workshops and rearing beds, and the introduction of new materials and instruments, often acquired or custom-made for this purpose.

Egg-Laying Room

One example was the introduction of cardboard or wooden frames for the 'embojado' (cocoon mounting), brought in with the arrival of polyhybrid silkworms from Japan. Unlike traditional 'embojos' (mountings) made from dry branches, these new frames were reusable, washable, and made the 'desembojo' (removal of the cocoons) much easier.

Another major innovation involved egg-laying techniques, or the preparation of breeding stock. To qualify for state subsidies based on production, it was mandatory to use microscopically verified seed. Breeders who did not wish to purchase this guaranteed seed had to learn the required cellular procedures and comply with official regulations.

This process began with selecting the best cocoons, which had to be kept horizontal to facilitate the emergence of the moth. At the Sericulture Station, selection of the best silkworms began as early as the third larval stage.

Selected cocoons, stripped of their outer fluff, were threaded carefully—taking care not to pierce the chrysalis—to form strands of up to 100 cocoons, which were then suspended from the ceiling until the moths emerged. Once out, the best moths were selected and transferred to mating surfaces, typically fabric frames, where copulation occurred.

After approximately six hours, the pairs were separated, with females placed in fabric pouches (or cells) where they laid their eggs before dying. This method ensured that each moth could be identified with its egg batch for microscopic analysis.

Breeders then threaded their cells and brought them to the Sericulture Station for analysis, a free service provided the number of cells did not exceed 200.

Cells for Analysis

For cellular egg-laying at the Station, special cardboard cells were used.

149

The incubators allowed the eggs to be artificially stimulated without experiencing sudden fluctuations in temperature and humidity, as occurred with the old rural practices of placing them in the sun, on the chimney, inside the beds, or on women's chests.

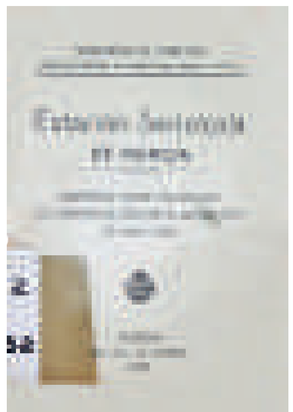
The Sericulture Station began offering free seed incubation services at its facilities in 1892. In 1913, it introduced the free loan of incubators to breeders for use in their own homes, always under the guarantee of mayors, parish priests, or teachers.

The first workshop of the Sericulture Station on the El Palmar road (1892) had an electric industrial incubator with a capacity of 40 ounces.

In 1913, the incubation service was expanded with the construction of another incubator with a 120-ounce capacity and 35 incubators for home loan, each holding 10 ounces.

Years later, the Station had 200 home-loan incubators in circulation.

The Sericulture Station maintained a comprehensive register of all users of the service in its various forms, later publishing these records in small booklets as a way of showcasing its work.

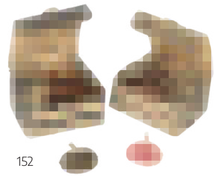


150

149 Industrial Seed Incubator, Orlandi System
Manufacturer: Sericulture Station of Murcia
Year: 1892
Dimensions: 100 × 75 × 63
Inventory No.: 2024/10/16-3

150 Booklet: Incubation Campaigns, Five-Year Period 1913–1917
Author: Sericulture Station of Murcia
Year: 1917
Dimensions: 15.5 × 11
Inventory No.: 2024/13/13

151



152

153

The home-loan incubators, designed in 1913 by the Sericulture Station, could also be purchased for 17.50 pesetas and required 2 pesetas for heating during the 10–12 days of use.

These models operated with hot water and allowed the artificial stimulation of 10 ounces of seed (approximately 300 grams of eggs), which hatched uniformly within a maximum of three days.

154

151 Five-Rack Seed Incubator
Manufacturer: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 61 × 30.5 × 29.7
Inventory No.: 2024/10/16-1 (1994/1/21)

152 Oil Lamp Bowl
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 9 × 13 × 13
Inventory No.: 2024/10/11

153 Floating Oil Wicks (Traditional Oil Lamps)
Manufacturer: Hijo de Tomás López
Year: Early 20th century
Dimensions: 2 × 1.5 × 1.5 (box)
Inventory No.: 2024/10/22

154 Six-Rack Seed Incubator
Manufacturer: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 68 × 22 × 22
Inventory No.: 2024/10/16-2 (1994/1/21)

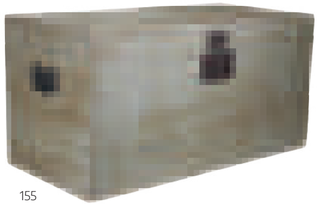
The Sericulture Station offered free training schools to promote the development of the silk industry throughout Spain.

Selected participants chosen based on their place of residence, type of rearing workshop, and the amount of mulberry leaves available—received silkworm eggs, mulberry plants and seeds, and explanatory booklets from the Station, along with a school box containing all the materials needed for rearing. In some cases, a staff member from the Station would visit the site to ensure successful rearing.

These schools, set up in the farmer's own home, were officially recognised as part of the Station. The farmer, acting as Patron of the School, was responsible for teaching neighbours the model rearing techniques, providing local families with small lots of eggs and sufficient leaves for cultivation. The patrons then received a share of the profits from any sale.

Through this system, hundreds of training schools were established across various provinces.

A Sericulture Training School consisted, in addition to a staff member from the Station, of a trunk containing: an incubator with its accessories, a hygrometer, two thermometers, a hole punch, a hammer, a small notebook of brown paper, a twine net, a microscope with its accessories, a porcelain mortar, glass slides and covers, a cleaning cloth, and a rearing inspection logbook (in which all details of the rearing were recorded, including a daily register of environmental conditions in the workshop).



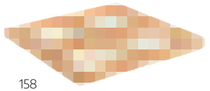
155

Sericulture Training School

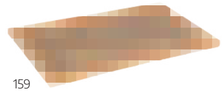
155 Trunk for Transporting Training School Materials
Manufacturer: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 72 × 36 × 37
Inventory No.: 2024/10/7

156

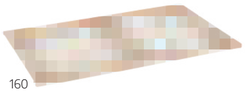
157



158



159



160

Lombard-style *Andana*

161

Traditional *andanas* (rearing frames) usually had five or six tiers of *zarzos* (rearing beds or rearing racks) measuring 1.10 × 3 metres. In private homes, these *zarzos* were movable and made from woven reeds with wire. Those at the Sericulture Station were fixed, with wooden frames and a metal mesh base.

156 Lombard-style *Andana*
Manufacturer: Sericulture Station
Year: Early 20th century
Dimensions: 120 × 101 × 37
Inventory No.: 2024/10/2-1

157 Lombard-style *Andana* for first-instar silkworms
Manufacturer: Sericulture Station
Year: Early 20th century
Dimensions: 44 × 45 × 23
Inventory No.: 2024/10/2-2

158 Incubator Rack
Manufacturer: Sericulture Station
Year: Early 20th century
Dimensions: 1 × 19 × 21
Inventory No.: 2024/10/21-4

159 Black Cloth Rack
Manufacturer: Sericulture Station
Year: Mid-20th century
Dimensions: 1 × 30 × 21
Inventory No.: 2024/10/21-6

160 White Cloth Rack
Manufacturer: Sericulture Station
Year: Mid-20th century
Dimensions: 1 × 37 × 21
Inventory No.: 2024/10/21-5

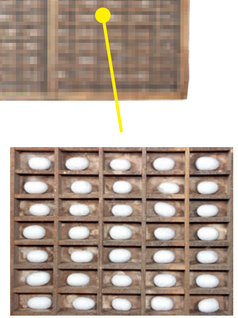
161 Large *Andana* Rack
Manufacturer: Sericulture Station
Year: Mid-20th century
Dimensions: 3 × 225 × 60
Inventory No.: 2024/10/21-2

Efforts to obtain more productive specimens and those resistant to diseases required carrying out controlled crosses between individuals of different breeds. Females of one breed were normally crossed with males of another, so it was necessary to dispose of the moths of the unnecessary sex before mating began.

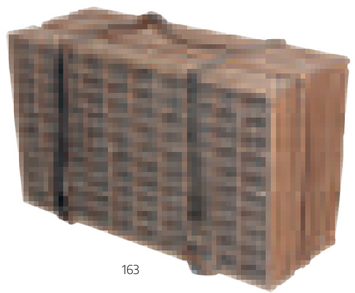
To this end, the cocoons (pre-classified by quality and sex) were placed individually into the compartments of the isolators, where the moth was confined after emerging from the cocoon, allowing staff to confirm that it was indeed of the desired sex.

From among all the females and males, those that appeared strongest and most robust were selected; that is, those without imperfections, well formed, and with well-developed antennae and wings. Defective specimens were discarded immediately, including those with black stains, those excessively swollen, and those with short antennae or wings.

162



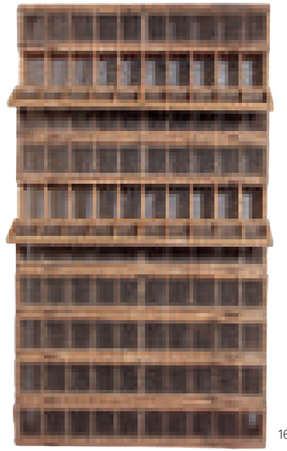
Detail of a section of the isolator, opened and loaded with cocoons



163

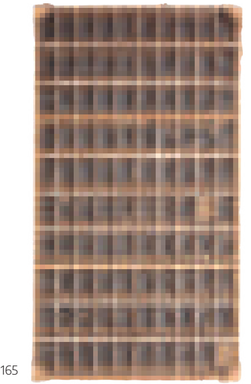
162 Isolator with 480 compartments for moth control
Manufacturer: Sericulture Station of Murcia
Year: Mid-20th century
Dimensions: 91 × 136 × 5
Inventory No.: 2024/10/3-1

163 Portable set of isolators with 1,000 compartments
Manufacturer: Sericulture Station of Murcia
Year: Mid-20th century
Dimensions: 34 × 58 × 23
Inventory No.: 2024/10/3-2



164

Cocoons containing female moths are usually heavier, larger, and more rounded than those containing males, which are smaller and more pointed.



165

Rear view of the isolator

164 Isolator with 100 compartments for moth control
Manufacturer: Sericulture Station of Murcia
Year: Mid-20th century
Dimensions: 102 × 58 × 8
Inventory No.: 2024/10/28

165 Isolator with 100 compartments for moth control
Manufacturer: Sericulture Station of Murcia
Year: Mid-20th century
Dimensions: 76 × 42 × 7.5
Inventory No.: 2024/10/29

Males selected for mating were kept in darkened places to prevent restlessness until the moment of reproduction. At the Sericulture Station, these cabinets were used, placing the specimens of each breed on separate shelves.

166

167

168

In silk factories and at the Sericulture Station, the cross-breeding boxes were stored as drawers within specialised cabinets, allowing for efficient organisation and considerable space savings.

166 Cabinet for males
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 100 × 35 × 11.5
Inventory No.: 2024/10/5-1

167 Industrial cross-breeding box
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 6 × 84 × 67
Inventory No.: 2024/10/5-2-2 (1994/1/20)

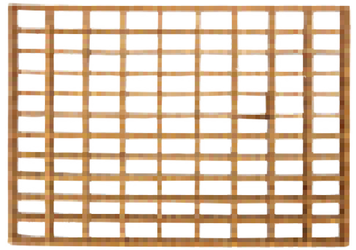
168 Industrial cross-breeding box
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 6 × 59 × 90
Inventory No.: 2024/10/5-2-1 (1994/1/20)

Moth copulation

Moth egg-laying

Traditional mounting on dry branches

In each rearing, a small portion of the harvest was usually kept alive (without stifling) for seeding, in order to have one's own stock for the following year.



169

Mounting on wooden frames with cells

The strongest and best-formed moths, selected after emerging from the cocoon, were transferred to these frames, bringing males close to females to facilitate crosses.

Natural copulations, which could last up to 12 hours, were often interrupted after six or seven hours so that the male could fertilise another female.

170

171

Individual cells (made of cardboard at the Sericulture Station or cloth in private homes) allowed each moth to be identified with its egg-laying. In this way, after microscopic examination, the eggs were kept if the moth was healthy, or discarded if it was diseased.

Each female moth lays between 300 and 500 yellow eggs. Fertilised eggs turn dark grey after being laid, while unfertilised eggs remain yellow.

169 Frame with 99 cells for cocoon mounting
Manufacturer: Sericulture Station of Murcia
Year: First quarter of the 20th century
Dimensions: 36 × 52 × 3
Inventory No.: 2024/10/30

170 Frame for copulations and egg-laying
Manufacturer: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 133 × 120 × 2 (open)
Inventory No.: 2024/10/4

171 Isolation cell for controlled egg-laying
Manufacturer: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 5.5 × 6.5 × 6.5
Inventory No.: 2024/10/9

172

173

Psychrometer on a *zarzo* inside a workshop

174

An instrument that records relative humidity on a graph, allowing the determination of the times when the most significant variations occur. At the Station, it was used in the incubation chambers for Japanese polyhybrid seeds which, due to their bivoltine nature, required much more technical and demanding incubation conditions than traditional breeds (conditions that would have been impossible to achieve in private homes).

175

176

172 Psychrometer
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 50 × 25 × 4
Inventory No.: 2024/10/31

173 Mercury distillation thermometer
Manufacturer: Unknown
Year: 1946
Dimensions: 33.5 × 0.5 × 0.5
Inventory No.: 2024/10/20

174 Sericulture psychrometer
Manufacturer: Lombard S.A.
Year: Early 19th century
Dimensions: 24 × 27 × 2
Inventory No.: 2024/10/18

175 Analogue hygrograph
Manufacturer: Siap Bologna
Serial No.: 2116
Year: Early 20th century
Dimensions: 26 × 31 × 13.5
Inventory No.: 2024/3/12-1

176 Analogue hygrograph
Manufacturer: Lambrech
Year: 1960
Dimensions: 17 × 28 × 14
Inventory No.: 2024/3/12-2

Before the inauguration of the industrial stifling facilities at the Sericulture Station, breeders who did not wish to stifle or sell their harvests at the excessive prices demanded by the silk factories resorted to domestic methods for stifling their cocoons.

For this purpose, the cocoons were exposed to the sun for three or four days, or placed in an oven during inclement weather. Another method involved asphyxiating the chrysalis in a pot or cauldron, using the effect of steam.

177

Metal sieve

Double sieve resting on a trivet

Trivets placed at the bottom of the cauldron to prevent the sieves from coming into contact with the water

Cocoons could be stifled in large cauldrons, allowing a yield of 22 kilograms per hour.

To do this, the cauldron was placed over a fire, covered, with a little water. Once it boiled, two sieves filled with cocoons were placed one on top of the other, supported on trivets to prevent direct contact with the water. After five minutes, the sieves were removed, and the cocoons poured onto a zarzo. They were then transferred to other clean zarzos inside the house.

The main drawback of this system was the high moisture content acquired by the cocoons, requiring a long drying period (sometimes even months), which greatly delayed their sale. During this time, the cocoons could not be stored in sacks (to prevent rotting). In addition, the cocoons had to be stirred frequently (to prevent the chrysalises from sticking to the inner walls), and careful attention was required to keep rats and mice from reaching the harvest and eating the chrysalises.

Detail of the utensils used for stifling cocoons in a cauldron

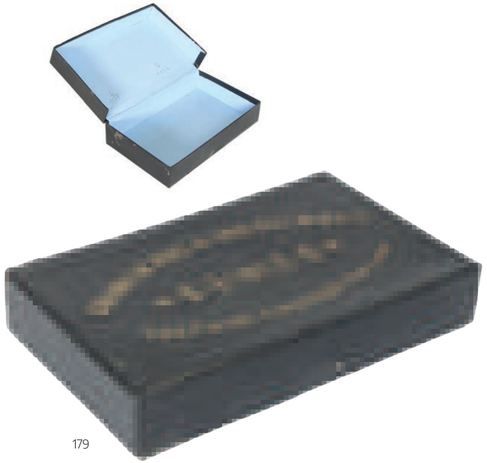
Unloading the sieves and sun-drying the cocoons

177 Cauldron for domestic Stifling Cocoons
Manufacturer: Unknown
Año: Early 20th century
Dimensions: 33 x 40 x 40
Inventory No.: 2024/10/1

178

Spanish seed boxes usually contained one ounce of seed (30 g).

Japanese seed was imported in 10-gram boxes, each containing approximately 20,000 eggs and yielding an average of 30 kilograms of fresh cocoons.



179

Once examined under a microscope, healthy seed was stored in ventilated cardboard boxes, sealed with an official stamp guaranteeing its quality. These boxes were kept in refrigerated chambers and distributed to other sericulture schools and silk producers throughout Spain.

In an effort to ensure that all cultivated seed was free from hereditary diseases, the importation of French seed without an official guarantee seal was prohibited in 1913.

178 Spanish silkworm egg box
Manufacturer: Sericulture Service
Year: From 1941
Dimensions: 2 × 9.5 × 9.5
Inventory No.: 2024/10/8

179 French silkworm egg box
Manufacturer: Taxy et Cie
Year: Early 20th century
Dimensions: 2.5 × 13.5 × 8
Inventory No.: 2024/10/23

180

Spade loaded with silkworms

181

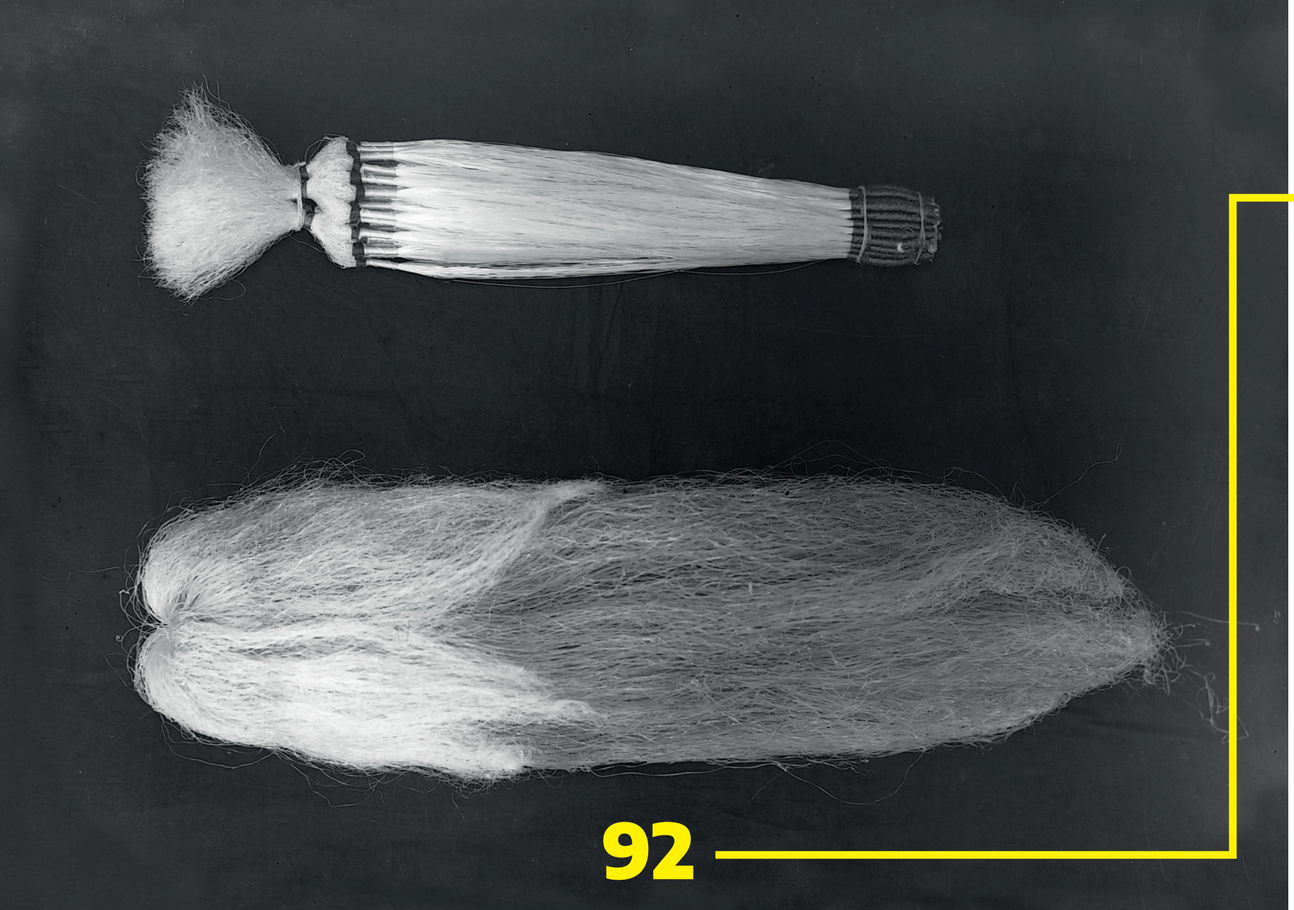
One of the conditions for maintaining the health of the rearing was not to handle the larvae with bare hands during the cleaning (deslechos) or the 'thinning' of the zarzos (moving silkworms between rearing beds to relieve those that were overcrowded). For this purpose, these special wooden spades were used.

182

180 Transport box for eggs or larvae
Manufacturer: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 50 × 41 × 36 cm
Inventory No.: 2024/10/6

181 Sample box for cocoons
Manufacturer: V. Roustan et ses fils
Year: Early 20th century
Dimensions: 3 × 15 × 8.5 cm
Inventory No.: 2024/10/24

182 Wooden spade
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 4.5 × 23.5 × 41.5 cm
Inventory No.: 2024/10/32



92

Silk and Hijuela
Samples

To assess the textile quality of the silk produced by the Sericulture Station under different feeding and rearing systems, the silk had to be spun.

Spinning consists of producing a strong, continuous thread by combining the individual filaments from several cocoons (7 or 8 in industrial processes with specialised machinery, and up to 100 in artisanal reeling).

Transforming cocoon silk into hanks is a complex process that begins with classifying the cocoons according to their external appearance—colour, weight, shape, and consistency. They were divided into three main groups: first-grade reeling cocoons, which were in good condition without stains or holes; discarded cocoons, which were completely eliminated due to mould or damage from poor storage and drying; and second-grade reeling cocoons, which were defective, perforated, double, deformed, or stained, and were destined for cordage and lower-quality fabrics.

Double and Deformed Cocoons

Next, the cocoons are placed in hot water to soften the sericin that binds the silk filaments, and brushed with a heather brush to remove excess fluff and separate the filaments in each cocoon.

The grouped filaments can then be wound to form hanks of raw silk. Reeling requires combining the number of filaments to maintain a consistent thickness, as each filament is irregular—thicker on the outside of the cocoon and finer on the inside.

Once spun, the raw silk is twisted, joining several hanks together and giving them hundreds of turns. This twisting provides greater strength and a more lustrous appearance.

The silk may then be dyed to add colour. Weaving is the final step, giving the silk a specific form, from the simplest fabrics such as taffeta to more complex ones like velvet or plush.

From 1941, the Sericulture Service (through the Sericulture Station) began purchasing silk cocoons directly from breeders at official prices set annually. The silk was delivered to the three collaborating spinning mills (Sedas Orihuela, Lombard, and L. Payen y Cía.), depending on the capacity of their factories. These mills spun the silk and sold it to textile factories, returning to the State the amount paid for the cocoons.

Hijuela, a high-strength fibre also obtained from silkworms, was known as ‘fishing hair’ and used for fishing lines, surgical sutures, instrument strings, and ship rigging.

Murcia was, for years, the world’s leading producer of hijuela due to its superior quality compared with that produced in the other three cities involved (Orihuela, Naples, and Messina). The Murcian product was exported worldwide, including to the USA, Sweden, and Norway.

La importancia de este producto fue equiparable al de la The importance of hijuela was comparable to that of silk. In 1926, Murcia had seven hijuela factories compared with four spinning mills. By the 1950s, hijuela employed around 3,000 Murcian families.

Hijuela was obtained from silkworms that, for various reasons, did not spin (known as zapos, monas, and gorrones), as well as from those reared specifically for this purpose.

There are numerous breeds and varieties of silkworm, producing cocoons of different sizes, shapes, and colours—yellow, white, pink, and green.

A single cocoon contains 800 metres of continuous thread in the traditional (yellow) breeds, and up to 1,500 metres in the improved (white) breeds.

183*

184*

185

186*

* Jars containing cocoon samples from unidentified breeds, obtained from experimental rearings conducted during the first half of the 20th century at the Sericulture Station of Murcia.
Manufacturer: Unknown
Dimensions: 26 × 9 × 9 cm (183); 13 × 7.5 × 7.5 cm (184); 19 × 8 × 8 cm (186)
Inventory No.: 2024/9/6-2 (183); 2024/9/6-1 (184 and 186) (1994/1/22)

185 Jar with Italian Abruzzo breed cocoons
Manufacturer: Unknown
Year: First half of the 20th century
Dimensions: 13 × 8 × 8 cm
Inventory No.: 2024/9/6-1 (1994/1/22)

187

188

189

White silk, compared with yellow silk, has a lower breaking coefficient, a longer filament per cocoon, and better quality. It is more profitable for spinning mills and, above all, shortens the silkworm rearing period to 28 days, compared with the 45 days required for yellow breeds.

Some white silk breeds also allow a second annual rearing in autumn, due to their bivoltine nature.

187 Large jar with Bagdad breed cocoons
Manufacturer: Unknown
Year: 1940
Dimensions: 33 × 13 × 13 cm
Inventory No.: 2024/9/6-2 (1994/1/22)

188 Jar with BI-5 hybrid cocoons
Manufacturer: Unknown
Year: Unknown
Dimensions: 14 × 7 × 7 cm
Inventory No.: 2024/9/6-2 (1994/1/22)

189 Jar with 'VAR' breed cocoons
Manufacturer: Unknown
Year: 1940
Dimensions: 24 × 10 × 10 cm
Inventory No.: 2024/9/6-2 (1994/1/22)

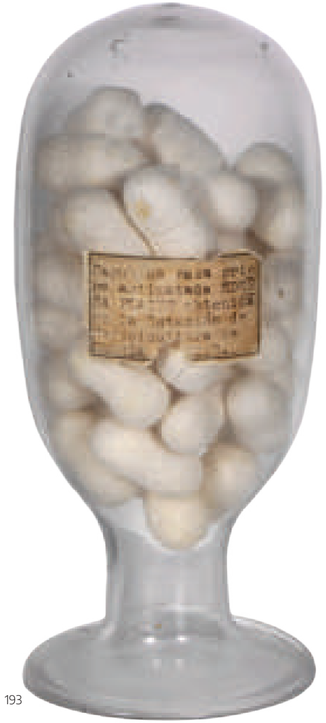
190*

191*

* Jars containing cocoon samples from unidentified breeds, obtained from experimental rearings conducted during the first half of the 20th century at the Sericulture Station of Murcia.
Manufacturer: Unknown
Dimensions: 18 × 15 × 15 cm (190); 15 × 12 × 12 cm (191); 24 × 10 × 10 cm (192); 13 × 9 × 9 cm (194)
Inventory No.: 2024/9/6-1 (192 and 194); 2024/9/6-2 (190, 191) (1994/1/22)

193 Jar with Greek Edessa breed cocoons
Manufacturer: Unknown
Year: 1940
Dimensions: 20 × 8 × 8 cm
Inventory No.: 2024/9/6-2 (1994/1/22)

192*



193

Spun silk varies in quality depending on the type of cocoon from which it is obtained.

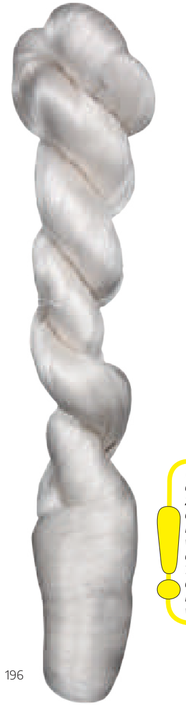
Cocoons are classified into three classes. First-class cocoons are hard, firm, and clean, producing the highest-quality silk (Grand Exquis, Exquis, and Real). Second-class cocoons are ocales or double (spun by two or three associated silkworms), and third-class cocoons are stained, loose, or perforated, producing extra and Realina silks.

194*

In addition to their quality, spun silks were classified according to the twisting and plaiting they had received: trama, orgasín, granadina, crêpon, pelo and cordón.

All waste from the spinning process was fully utilised: the chrysalises were used as food for hens, and the silk remnants were sold as by-products: floss (short fibres treated like cotton or wool, known as borra), porrinas (waste from the first layers of the cocoon after beating), zamarras (waste from the final layers of the cocoon during spinning), and schap (spun floss for the textile industry).

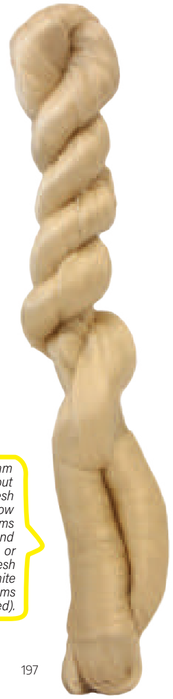
195 Floss (Borra)
Inventory No.: 2024/9/4-13



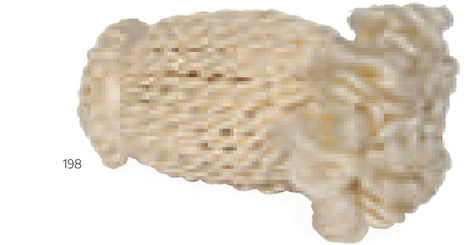
196 Hank of White Grege Silk
Inventory No.: 2024/9/4-5

197 Hank of Yellow Grege Silk
Inventory No.: 2024/9/4-14

To obtain 1 kilogram of spun silk, about 20 kilograms of fresh cocoons from yellow breeds (8 kilograms when stifled and dried) are needed, or 12 kilograms of fresh cocoons from white breeds (4 kilograms when stifled and dried).



198 Bundle of Braided Silk
Inventory No.: 2024/9/4-3



199 Hanks of Yellow Grege Silk
Inventory No.: 2024/9/4-11

Grege silk is raw silk — that is, silk spun directly from the cocoon, which has not undergone any cleaning, bleaching or dyeing processes.

200 White Silk Braid
Inventory No.: 2024/9/4-8

201 Yellow Silk Braid
Inventory No.: 2024/9/4-4

202 Hank of Trama Silk, 3-end, 5 denier
Manufacturer: Sedas Orihuela
Inventory No.: 2024/9/4-9

Orgasín is twisted silk made from two or more ends that have received a first twist of 650 turns and a second twist of 600 turns in the opposite direction.

This is the type of silk generally used for warp threads.

Trama class refers to twisted silk made from two or more folded ends with a twist of 150 to 160 turns per metre.

203 Hank of Orgasín Silk, 3-end, 20 denier
Manufacturer: Sedas Orihuela
Inventory No.: 2024/9/4-2

204

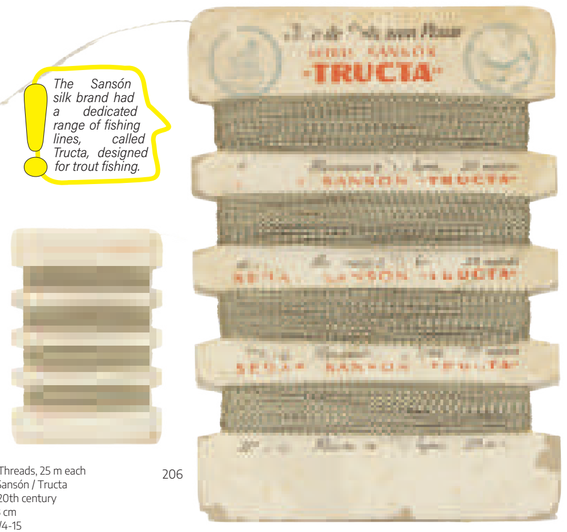
205

Silk produces threads that are extremely lustrous and highly resistant to breakage.

Each silk thread is made up of several filaments that are twisted and retwisted together.

The quantity and quality of the final thread are directly related to the diet provided to the silkworm, as well as to the stability of the conditions maintained in the workshop.

The Sansón silk brand had a dedicated range of fishing lines, called Tructa, designed for trout fishing.



206

204 Spool of Golden Silk Thread
Manufacturer: Unknown
Year: First half of the 20th century
Dimensions: 13.5 × 3 × 3 cm
Inventory No.: 2024/9/4-6

205 Box of Dyed Silk Thread Spools
Manufacturer: Unknown
Year: First half of the 20th century
Dimensions: 1 × 11.5 × 6 cm
Inventory No.: 2024/9/4-7

206 Pack of 4 Fishing Silk Threads, 25 m each
Manufacturer: Sedas Sansón / Tructa
Year: First half of the 20th century
Dimensions: 17.5 × 12.3 cm
Inventory No.: 2024/9/4-15

207

208

The Sansón silk brand also produced a line of surgical threads, called 'Sutur,' intended for various medical applications.

Detail of the suture thread outside its capsule

Traditionally, surgical silk threads have been dyed black to improve visibility and handling during operations.

209

The use of silk in surgery became widespread in the 19th century due to its ability to retain strength and flexibility even after sterilisation.

Silk threads were extensively used during both World Wars for ligatures and wound sutures. Despite the advent of synthetic sutures in the mid-20th century, silk remained the preferred material for many applications because of its ease of handling, knot security, and minimal inflammatory reaction.

Even today, silk is used in various surgical procedures to join soft tissues, particularly in ophthalmic, neurological, and cardiovascular surgery.

207 Glass Capsule with Surgical Silk, No. 0
Manufacturer: New-Yorkia Surgical Sutures
Year: First half of the 20th century
Dimensions: 20 × 1 × 1 cm
Inventory No.: 2024/9/4-16

208 Spool of Surgical Silk, No. 1
Manufacturer: Sedas Sansón
Year: First half of the 20th century
Dimensions: –
Inventory No.: 2024/9/4-16

209 Spool of Black Silk for Ophthalmic Sutures
Manufacturer: Sedas Sansón
Year: First half of the 20th century
Dimensions: 6 × 1 × 1 cm
Inventory No.: 2024/9/4-12

210

The hijuela is the sericigenous gland of the silkworm, coagulated and stretched. Each worm yields two hijuelas with a usable length of 30 to 50 cm.

211

Murcian hijuela, used worldwide as fishing line, surgical thread, and cord for instruments or ship rigging, quickly surpassed the 'Florence horsehair', previously employed for these purposes, due to its superior quality.

212

Raw or branched hijuela was sold by farmers to manufacturers in the form of bundles or bunches.

210 Factory-Treated Hijuela
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 29 × 6 cm
Inventory No.: 2024/9/5-5

211 Raw Hijuelas
Manufacturer: Sericulture Station of Murcia
Year: Mid-20th century
Dimensions: –
Inventory No.: 2024/9/5-1

212 Bundle of Hijuela
Manufacturer: Sericulture Station of Murcia
Year: Mid-20th century
Dimensions: –
Inventory No.: 2024/9/5-4

Sun-Drying of Hijuela Bundles

Introduction of silkworms into the 'caldo' (water, vinegar and salt) for coagulation of their glands.

213

214

The quality of raw or branched hijuela was determined based on its length and thickness.

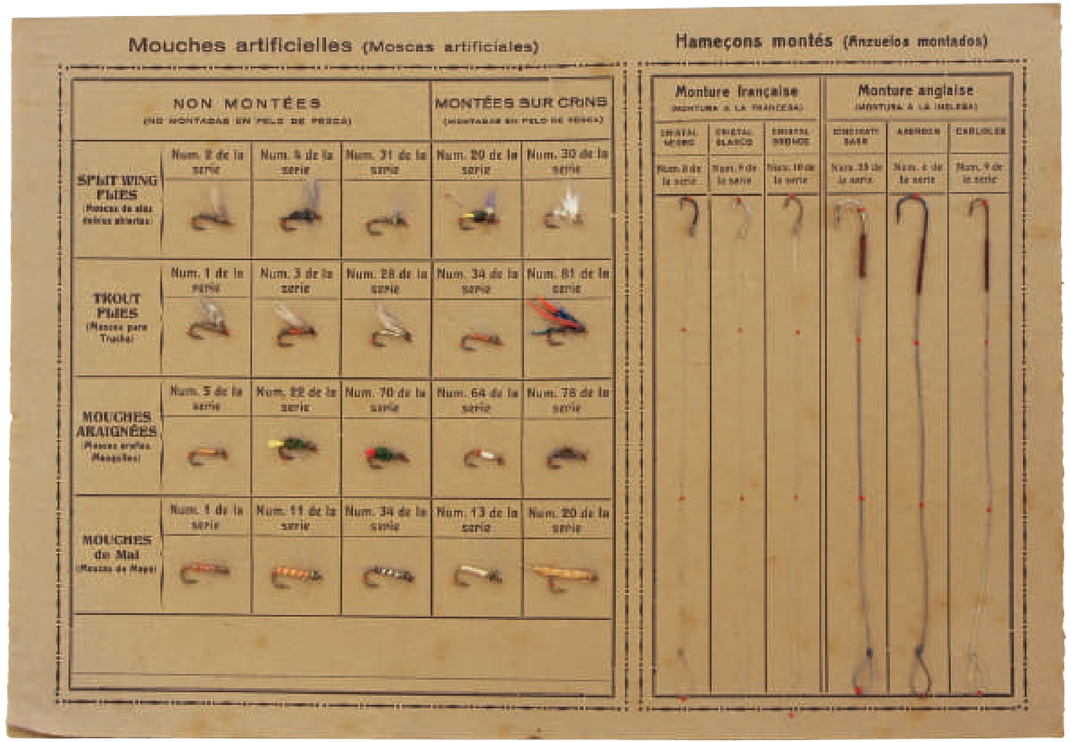
In the 1940s, one ounce of silkworm seed (30 grams) produced around 8 kilograms of hijuela, with an approximate value of 700 pesetas (4.21 €).

215

213 Hijuela Classifier-Display
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 17 × 67 × 41 cm
Inventory No.: 2024/9/7 (1994/1/41)

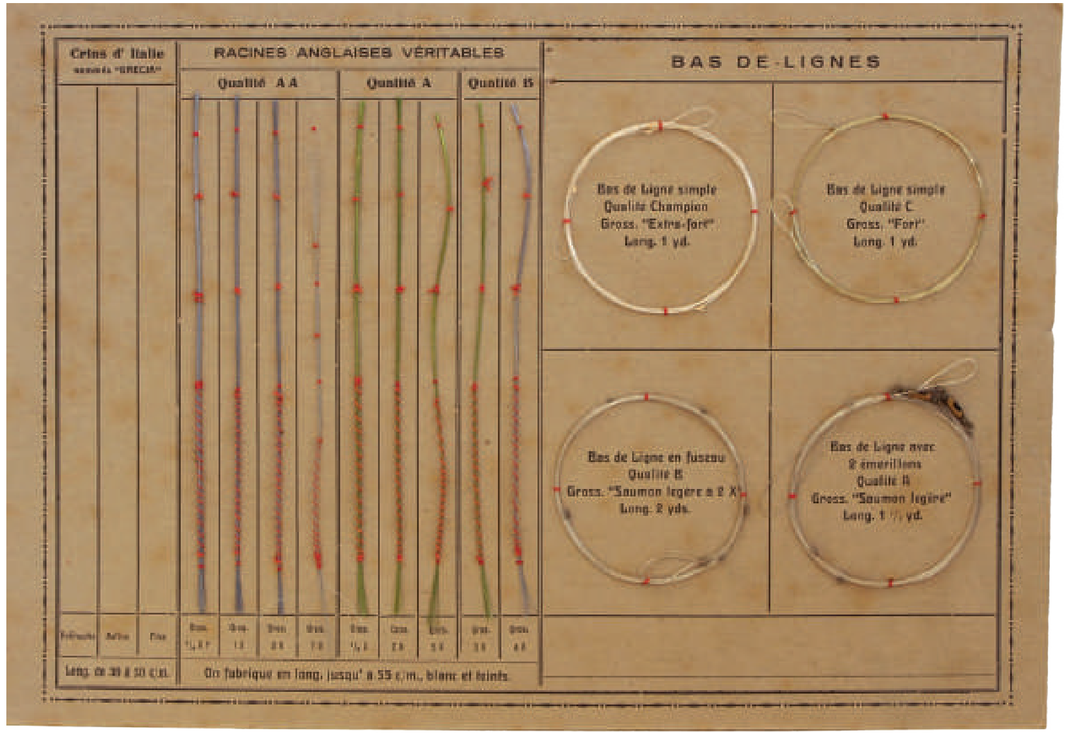
214 Factory-Treated Hijuela Piece
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 17 × 2 × 2 cm
Inventory No.: 2024/9/5-3

215 Pack of 2 Fishing Thread Rings, No. 17
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 12 × 20 × 13 cm
Inventory No.: 2024/9/5-6



216

216 Sample of Hooks Made with Hijuela and Artificial Flies
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 22.5 × 33 cm
Inventory No.: 2024/9/5-7



217

217 Sample of Hijuela Fishing Lines from Various Origins
Manufacturer: Unknown
Year: Mid-20th century
Dimensions: 22.5 × 33 cm
Inventory No.: 2024/9/5-8

Office
Equipment

Given the interest in reviving the silk industry in Spain, in 1891 the Directorate General of Agriculture, Industry and Commerce commissioned agronomist Vicente Sanjuán to develop a project to establish a Sericulture Station in Murcia based on the new techniques already in use in Italy.

After visiting the best Italian sericulture establishments for nearly 90 days, Sanjuán submitted a detailed report describing the most advanced existing systems for obtaining silkworm seed and rearing silkworms. Based on this report, the Sericulture Station of Murcia was established in 1892, with Vicente Sanjuán y Rech appointed as its first director.

Sanjuán's tenure lasted eight years, during which he operated a modest initial workshop, conducting small-scale model rearings of silkworms and distributing a total of 198.5 ounces of selected seed to local growers (through the municipal authorities), with complete ignorance of their results. Except for some press articles, Sanjuán undertook no promotional activity, believing that the difficult situation of the Murcian silk industry was reason enough for a centre with such benevolent aims to become known on its own.

In 1900, Sanjuán was succeeded by Emiliano López Peñafiel, who, upon his arrival, was astonished to discover that neither within the Huerta nor outside it did anyone know about the Sericulture Station or its purpose. He began arduous work aimed at engaging the silk-producing community, personally visiting growers and providing them with disease-free seed. This effort was supplemented by the distribution of thousands of printed notices to the public and their placement on church doors, explaining the function and location of the Station and the procedure for accessing its services, especially the free seed analysis offered to private individuals.

The remarkable results of his work, comparable to those of his successor Adolfo Virgili Vidiella (director from 1910 to 1922), were soon continued by Felipe González Marín, who took over as director following the death of Pedro Tortosa Franco (director from 1922 to 1923) in a traffic accident.

González Marín, director for 33 years (until 1956), worked with great enthusiasm to identify and resolve problems in sericulture, both scientifically and socially. He promoted the development of the silk industry in Spain and guided producers in rational silkworm-rearing practices to achieve healthy and abundant harvests. González Marín also compiled a comprehensive and valuable bibliography on various aspects of sericulture and mulberry cultivation.

Following him, three other directors led the centre: Miguel Pascual Giménez (1956–1966), Agustín Virgili Quintanilla (1966–1967) and Alfonso Albacete Zamora (1967–1976). Despite the efforts of all three, they witnessed the increasingly critical decline of the silk industry until its definitive disappearance in 1976.

Alongside the directors, the technical and support staff were key to the Station's operations. Office work expanded in parallel with the development of the centre, handling administrative services and responding promptly to enquiries received by post from across Spain. These enquiries, concerning not only sericulture but also crops and diseases, were answered directly by letter or through the postal distribution of small pamphlets, brochures, and publications prepared by the Station, which explained in detail how to proceed with each issue.

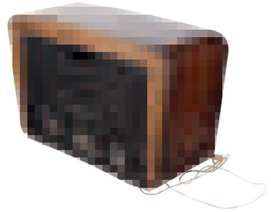
To publicise its activities, the Station also made use of local and national press (with province-specific articles) and annually distributed tens of thousands of work reports prepared directly by each director.

218

The mechanical adding machine printed operations and their results on a roll of paper inserted at the rear. A major innovation of this model was a row of numbers on the front, behind the glass, allowing the user to check the numbers as they were entered.

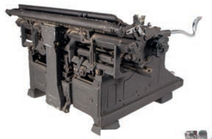
219

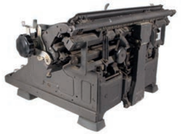
The valve radio represented the second generation of radios, following the crystal radio. These valves were key electrical components that controlled the flow of electric current to process the received radio signal. Initially, valve radios could only tune AM, longwave (LW), and shortwave (SW) bands. They were later replaced by transistor radios, which enabled widespread FM tuning.



218 Máquina sumadora
Adding Machine
Brand/Model: William Burroughs
Year: Circa 1900
Dimensions: 33 × 43 × 50 cm
Inventory No.: 2024/7/12

219 Valve Radio
Brand/Model: DeWALD/25-T
Serial No.: 9472
Year: 1950s
Dimensions: 29 × 43 × 18 cm
Inventory No.: 2024/7/13





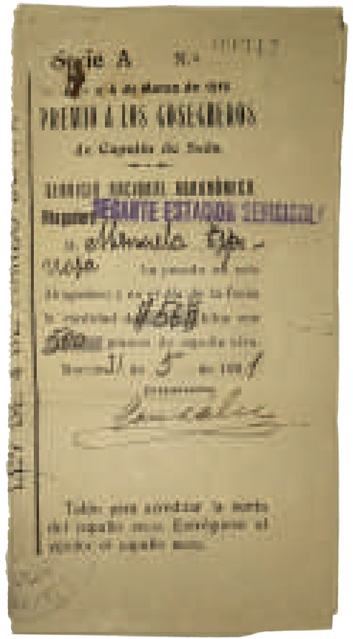
220

This calculator allowed the four basic arithmetic operations: addition, subtraction, multiplication, and division. Numbers were selected using the mechanical levers, while the operations were carried out by turning the side crank (turned upwards for addition and multiplication, and in the opposite direction for subtraction and division). The two sets of front dials allowed the user to read the operations: one displayed the numbers selected, and the other showed the resulting totals.

221

220 Typewriter
Brand/Model: Hispano Olivetti/HO
Year: 1940s
Dimensions: 24 × 48 × 36 cm
Inventory No.: 2024/7/14

221 Rotary Calculator
Brand/Model: Guillermo Truniger y Cía / Brunsviga
Serial No.: 8502
Year: 1920
Dimensions: 37 × 18 × 13 cm
Inventory No.: 2024/7/15



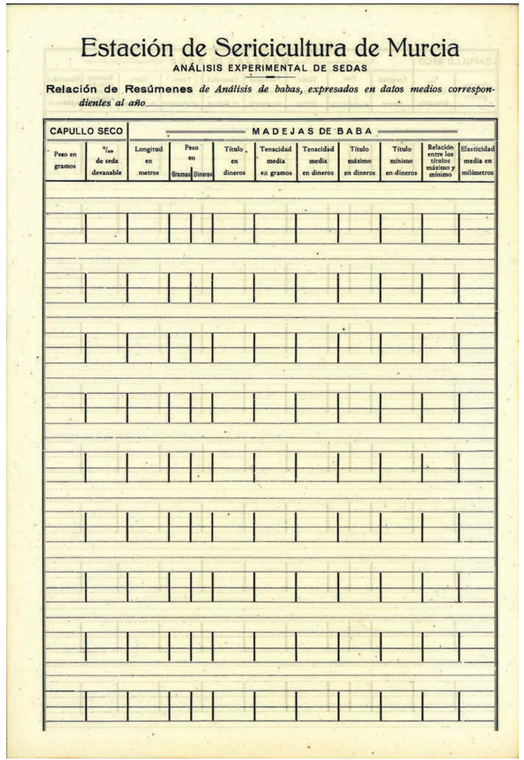
222

In order for growers to receive production subsidies (premiums) and to prevent fraud, all silkworm cocoon weighings had to be verified.

The Sericulture Station, upon request, sent inspectors to the factories (where silk producers sold their harvests directly after the desembojo (removal of the cocoons) and to the stifling houses, to witness the weighing and ensure that production corresponded to the amount of seed registered months earlier.

Applicants were required to present their seed registration receipt and the numbered boxes that had contained the seed (which were then destroyed).

If everything was in order, they received a 'premium receipt,' signed by the inspector, recording their name and the weight in kilograms of fresh cocoons measured.


Estación de Sericicultura de Murcia

ANÁLISIS EXPERIMENTAL DE SEDAS

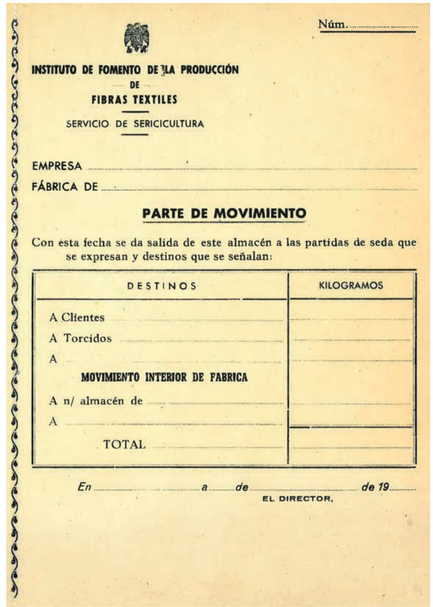
Relación de Resúmenes *de Análisis de babas, expresados en datos medios correspondientes al año*

CAPULLO SECO		MADEJAS DE BABA								
Peso en gramos	% de seda devanable	Longitud en metros	Peso en Gramos	Peso en Dineros	Título en dineros	Tenacidad media en gramos	Tenacidad media en dineros	Título máximo en dineros	Título mínimo en dineros	Relación entre los títulos máximo y mínimo	Elasticidad media en milímetros

223

222 Grower's Premium Receipt
Author: National Agronomic Service
Year: 1915
Dimensions: 16 × 7 cm
Inventory No.: 2024/7/16

223 Experimental Silk Analysis Record
Author: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 34 × 23 cm
Inventory No.: 2024/7/17


Núm.

INSTITUTO DE FOMENTO DE LA PRODUCCIÓN
DE
FIBRAS TEXTILES
SERVICIO DE SERICICULTURA

EMPRESA

FÁBRICA DE

PARTE DE MOVIMIENTO

Con esta fecha se da salida de este almacén a las partidas de seda que se expresan y destinos que se señalan:

DESTINOS	KILOGRAMOS
A Clientes	
A Torcidos	
A	
MOVIMIENTO INTERIOR DE FABRICA	
A n/ almacén de	
A	
TOTAL	

En ..... *a* ..... *de* ..... *de 19*.....

EL DIRECTOR,

224


MINISTERIO DE AGRICULTURA

INSTITUTO DE FOMENTO DE LA PRODUCCION DE FIBRAS TEXTILES

SERVICIO DE SERICULTURA

(Ley de 29 de Marzo de 1941)

Nº 011012

COMPRA DIRECTA POR EL ESTADO DE LA COSECHA DE CAPULLO DE SEDA DE 1965

Servicio prestado por SERVICIO DE SERICICULTURA Depósito

D.

vecino de provincia de declara haber recibido del SERVICIO DE SERICICULTURA, la cantidad de pesetas ( )

por la siguiente entrega de capullo de seda:

CHAPA: Kgs. gramos a 10' - ptas. kgs. ptas.
AMARILLO: » » a 45' - » » (36'75+8'25) »
BLANCO: » » a 47' - » » (38+9) »
POLIHIBRIDO: » » a 75'— » » (85+10) »

TOTAL PESETAS

Dicho capullo procede de onzas de simiente, inscrita al n.º

Quedando depositado en este establecimiento.

de de 1965

El Interventor, Recibí: El Sedero, El Director del Establecimiento,

Este talón recibo caduca el 30 de Noviembre del año actual, antes de cuya fecha debe hacerse efectivo o presentarse reclamación oportuna en caso de robo, perdida, etc.

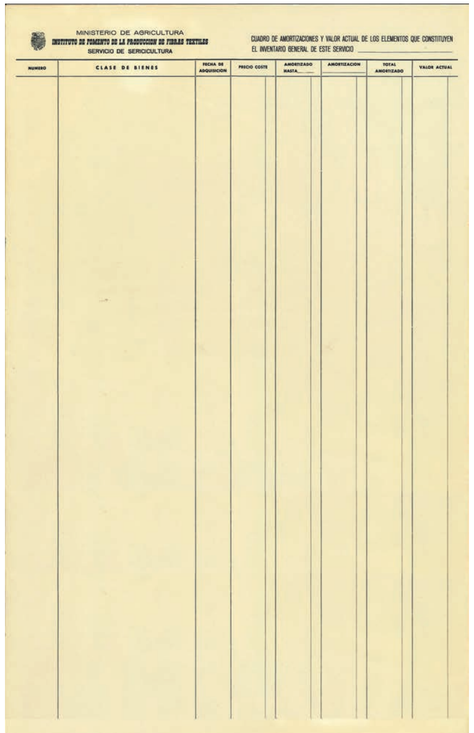
225

224 Warehouse Stock Movement Record
Author: Sericulture Service
Year: 1941–1967
Dimensions: 21.5 × 14 cm
Inventory No.: 2024/7/18

225 Direct Purchase Record of Cocoon Harvest by the State
Author: Sericulture Service
Year: 1965
Dimensions: 16 × 22 cm
Inventory No.: 2024/7/19

226

226 Collaborative Spinning Warehouse Stock Book
Author: Sericulture Service
Year: 1941–1967
Dimensions: 32 × 23 × 3 cm
Inventory No.: 2024/7/2



227

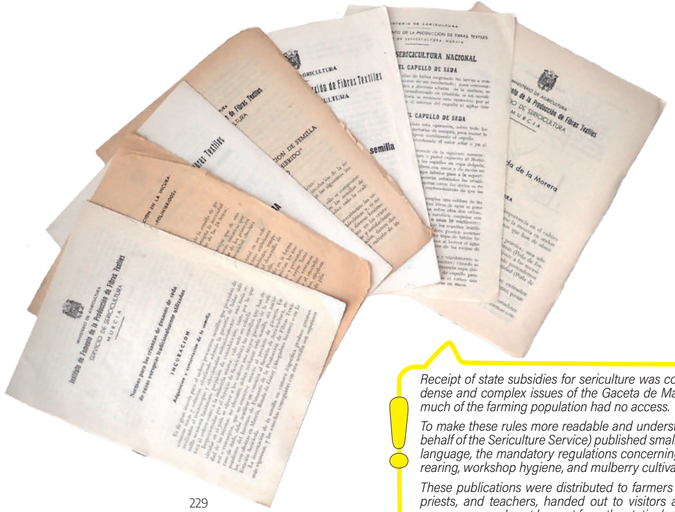
227 Depreciation Table Document
Author: Sericulture Service
Year: 1941–1967
Dimensions: 34 × 23 cm
Inventory No.: 2024/7/2

228

The Breeding Inspection Ledger was one of the materials included in the transport trunks of the practical sericulture schools.

It contained detailed records of the silkworm rearing process, including a daily log of the environmental conditions in the workshop. The ledger comprised nine pages: basic harvest data (first page); seed information and chronological development (second page); environmental monitoring (next two pages); inspection and incidents (four pages); and results obtained (final page).

228 Breeding Inspection Ledger
Author: Sericulture Service
Year: 1941–1967
Dimensions: 10.5 × 16 cm
Inventory No.: 2024/7/21



229

230

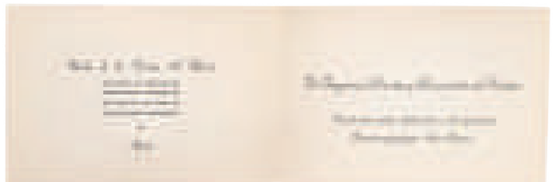
231

Receipt of state subsidies for sericulture was conditional on compliance with regulations published in the dense and complex issues of the Gaceta de Madrid or the BOE (Official State Gazette of Spain), to which much of the farming population had no access.

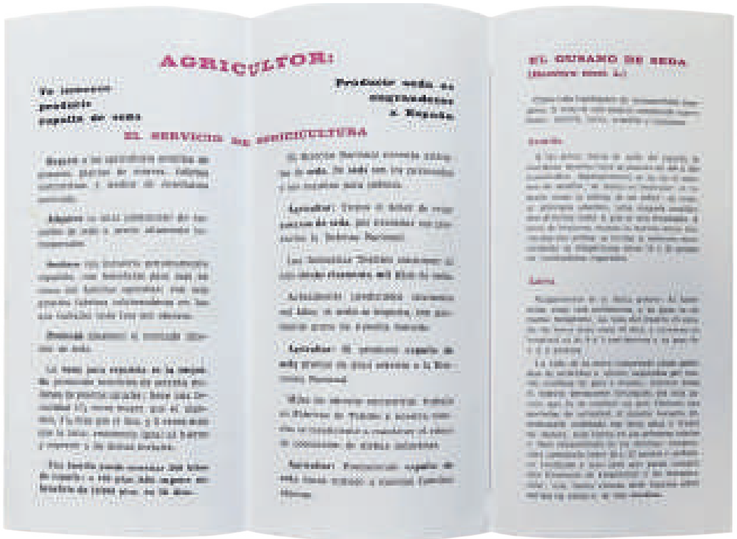
To make these rules more readable and understandable, the Sericulture Station (initially alone and later on behalf of the Sericulture Service) published small edicts and monographic leaflets that summarised, in simple language, the mandatory regulations concerning seed incubation, registration and winter storage, silkworm rearing, workshop hygiene, and mulberry cultivation and pruning.

These publications were distributed to farmers and silk producers with the help of the local mayor, parish priests, and teachers, handed out to visitors at the Sericulture Station and attendees at exhibitions and congresses, and sent by post from the station's offices in response to inquiries received.

232



233



229 Various Leaflets with Legal Instructions
Author: Sericulture Service
Year: 1941–1967
Dimensions: 21.5 × 15.5 cm
Inventory No.: 2024/13/2-10

230 Instructional Pamphlet
Author: Sericulture Station of Murcia
Year: 1917
Dimensions: 15.5 × 10.5 cm
Inventory No.: 2024/13/1

231 Propaganda Pamphlet 'Of National Interest'
Author: Sericulture Station of Murcia
Year: 1925
Dimensions: 15.5 × 10.5 cm
Inventory No.: 2024/13/11

232 Christmas Greeting Card
Author: Sericulture Station of Murcia
Year: 1940
Dimensions: 10 × 15 cm (closed); 10 × 30 cm (open)
Inventory No.: 2024/7/22

233 Propaganda Triptych
Author: Sericulture Service
Year: 1941
Dimensions: 22 × 11 cm (closed); 22 × 32 cm (open)
Inventory No.: 2024/13/12

234

Stamp used for marking domestically produced fabrics made of pure silk intended for local consumption. The stamp bears the international silk mark of the Central Silk Committee of France, consisting of the word 'Soie' (silk), accompanied by the image of a silkworm on a mulberry leaf at the left and a lion at the opposite end.

This stamp began to be used in May 1935, at the suggestion of the National Sericulture Promotion Office, so that consumers could identify fabrics made from pure silk as opposed to synthetic imitations.

Although the mark also had a Spanish version (identical but with the word 'Seda'), this French stamp could be used to mark silk fabrics in accordance with regulations, provided prior authorization was obtained from the Barcelona Guild of the Major Art of Silk, and as long as the official stamp of the National Sericulture Promotion Office appeared at the beginning and end of the fabric.

Spanish Silk Fabric Marking Stamp

235

234 French Silk Fabric Marking Stamp
Author: Central Silk Committee of France
Year: 1935
Dimensions: 2 × 8 × 1.5 cm
Inventory No.: 2024/7/8

235 Silk Board of Trustees Stamp
Author: Silk Board of the Region of Murcia
Year: Unknown
Dimensions: 7.5 × 3 × 3 cm
Inventory No.: 2024/7/23

236

Alfonso Albacete Zamora was the last director of the Sericulture Station, serving from 1967 to 1976.

The 1915 Law for the Protection of the Silk Industry established financial aid of 50 céntimos de peseta (0.0013 €) per kilogram of fresh cocoon harvested. To receive this payment, the seed had to be registered before starting the rearing. From 1925 onwards, only seed that had been microscopically analysed and whose container carried a guarantee seal could be registered.

Silk growers submitted the boxes of seed they intended to rear to the Sericulture Station. Once checked, they were issued a stamped registration receipt showing their personal details, the quantity of seed registered, and its brand and nationality. The containers were labelled with the same number as the receipt.

To assist growers living far from La Alberca, the centre sent staff to Beniel and Calasparra to carry out registrations.

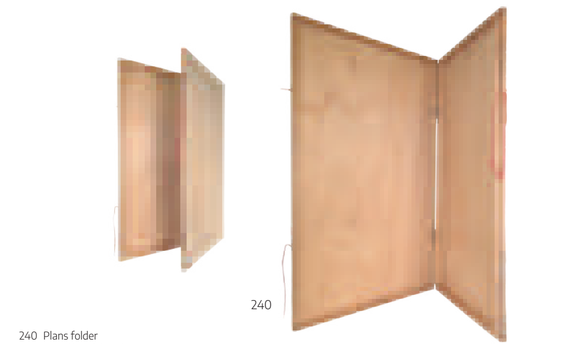
237

236 Alfonso Albacete Zamora Signature Stamp
Author: Sericulture Station of Murcia
Year: 1967
Dimensions: 7.5 × 5 × 3.5 cm
Inventory No.: 2024/7/7

237 eed Registration Stamp
Author: Sericulture Station of Murcia
Year: 1915
Dimensions: 6 × 5 × 3.2 cm
Inventory No.: 2024/7/24

238

239



240

238 Table Lamp
Brand/Model: Unknown
Year: First half of the 20th century
Dimensions: 49 × 11 × 28 cm
Inventory No.: 2024/11/6-2

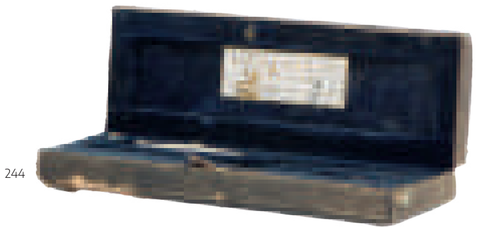
239 Fountain Pen Ink, Blue and Black, in Shatterproof Bottle
Brand/Model: Montblanc
Year: 1960
Dimensions: 6 × 5.5 × 5.5 cm (box); 6 × 5 × 5 cm (ink bottle)
Inventory No.: 2024/7/25

240 Plans folder
Brand/Model: Unknown
Year: Mid-20th century
Dimensions: 64 × 54 × 2.5 cm
Inventory No.: 2024/7/6

241

242

243



244

245

241 Metal Polish, 250 g
Brand/Model: Prodina
Year: Second half of the 20th century
Dimensions: 16 × 6 × 6 cm
Inventory No.: 2024/11/17_2

242 Metal Polish, 70 g
Brand/Model: Prodina
Year: Second half of the 20th century
Dimensions: 11 × 4 × 4 cm
Inventory No.: 2024/11/17_1

243 Carbon Copy Paper
Brand/Model: Contabilidad Mercátor
Year: 1960
Dimensions: 37 × 28.5 × 1 cm
Inventory No.: 2024/7/5

244 Rigid Compass Case
Brand/Model: Castañón Monge y Cía
Year: First half of the 20th century
Dimensions: 2.5 × 13.5 × 4.5 cm
Inventory No.: 2024/11/3-1

245 Variable Current Transformer
Brand/Model: Unknown
Year: First half of the 20th century
Dimensions: 42 × 16 × 36 cm
Inventory No.: 2024/11/9

Film and Audiovisual Material

The films produced by the Sericulture Station quickly became a highly effective teaching tool, showing the various aspects and requirements of the new silkworm-rearing techniques.

From its inception, the centre acquired state-of-the-art photographic and cinematographic equipment, which was used not only to shoot educational films on sericulture but also to document other activities such as participation in fairs and congresses, conducting training both on-site and elsewhere, and business trips by its staff.

The films and other audiovisual material were screened in the Station's auditorium during training courses or for the increasingly frequent visitors from across Europe who came to study this pioneering centre.

In 1922, the Sericulture Station acquired a semi-professional Erneman cine-camera. Following the discontinuation of foremen and agricultural expert courses in 1924, the centre set up a darkroom for developing photographs and cinematographic films.

By 1925, the Sericulture Station of Murcia had produced a total of five films: one in two parts on mulberry cultivation and applications, an initial part on silkworm rearing, another on local customs related to the silk industry; a three-part film titled 'The Silk Industry in Japan', and a film documenting rearing activities carried out at the Royal Palace of El Pardo by King Alfonso XIII and his son Alfonso, Prince of Asturias.

In this film, both r directly in all rearing operations, even removing cocoons from the mountings with their own hands, as done by

King Alfonso XIII and the Prince of Asturias handling cocoons at the Royal Palace of El Pardo

women, children, and elderly workers in the Huerta huts.

The involvement of the monarchy in sericulture at their estates in Aranjuez, La Granja, and El Pardo served as a powerful propagandistic tool in many brochures and books published by the Ministry of Agriculture and the Sericulture Station, encouraging growers and motivating many to resume this ancient practice.

The Station's audiovisual activity has resulted in a diverse collection of objects and documents, some of exceptional heritage value due to their rarity or uniqueness. Many of these items serve as important bibliographic references, providing historical testimony and offering a unique perspective on this aspect of our cultural identity.

Digitization of all this material has been a priority in the ARACNE project to ensure its preservation and long-term conservation.

Historically, projectors worked by shining a strong beam of light through a transparent medium (film or slide), which, passing through the lens system, was focused, enlarged, and projected onto a screen.

The continuous motion of cinematic images is only an optical illusion created by our brain, based on retinal persistence: projectors display a rapid sequence of still images (frames) that our brain interprets as a single, flowing image.

246

Slide and Glass-Plate Transparency Projector and Duplicator – Composed of an arc-lamp light source up to 15 amps in a painted metal body, with bellows for holding and focusing glass plates, mounted on a wooden carriage with an optical tube.

248

247

246 Slide and Transparency Projector and Duplicator
Brand/Model: ICA/Diaskop Bataur
Year: 1916
Dimensions: 51 × 87 × 39 cm (folded)
Inventory No.: 2024/8/2-1

247 Wooden Workbench
Manufacturer: Unknown
Year: Unknown
Dimensions: 99 × 148.5 × 42 cm
Inventory No.: 2024/8/22

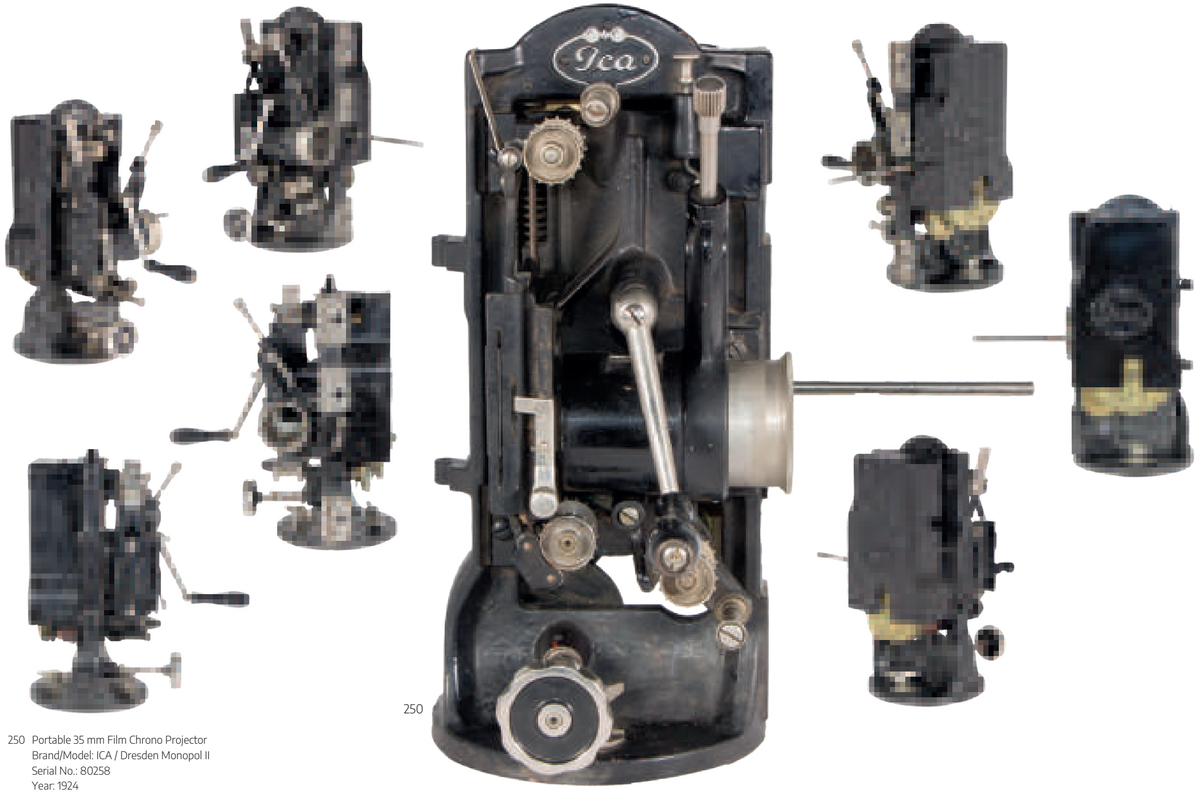
248 Optical Adapter for Magic Lanterns
Brand/Model: ICA/Opt-Duplikator Maximar
Year: 1916
Dimensions: 30 × 17 × 17 cm
Inventory No.: 2024/8/9

249

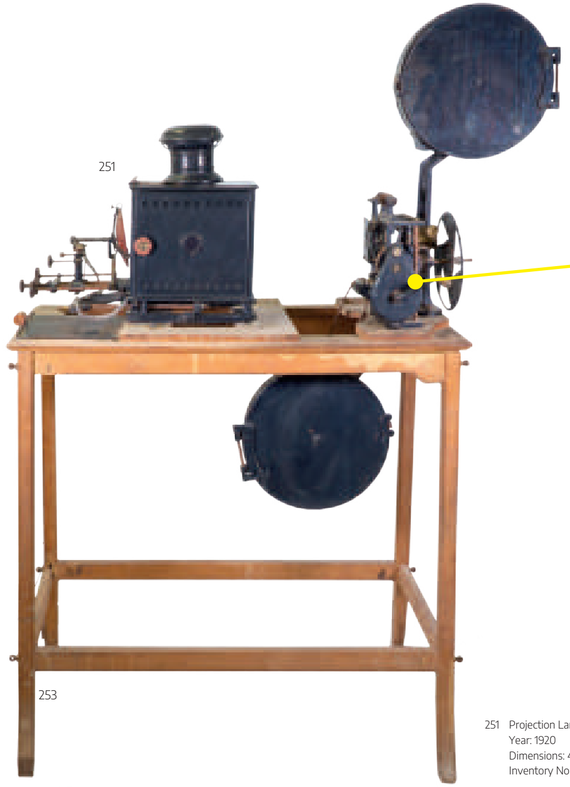
The episcope, or opaque projector, is an optical device designed to project flat opaque sheets made of wood, cardboard, or cardstock (such as maps or prints) onto an external surface, such as a screen or wall.

This model is powered by two side-mounted incandescent lamps, which provide indirect light to the lens via mirrors. The lamps were housed with enough space for ventilation, and in some cases, a small blower was added to aid cooling.

249 Professional Episcope
Brand/Model: ICA
Serial No.: 53865
Year: 1930–1940
Dimensions: 70.5 × 53 × 36 cm
Inventory No.: 2024/8/14

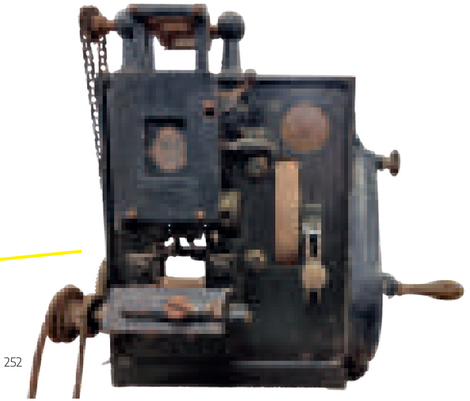


250 Portable 35 mm Film Chrono Projector
Brand/Model: ICA / Dresden Monopol II
Serial No.: 80258
Year: 1924
Dimensions: 33 × 26 × 28 cm
Inventory No.: 2024/8/2-2

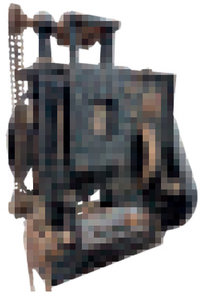


251

253



252

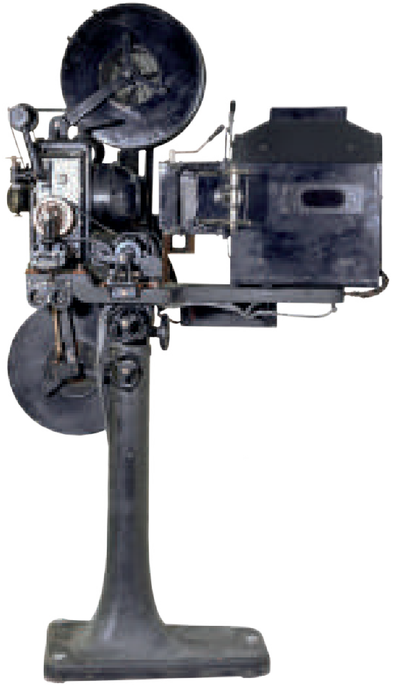


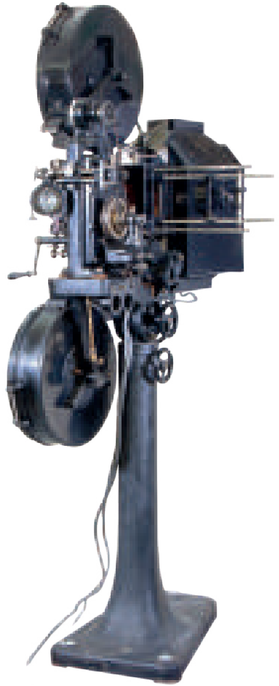
251 Projection Lantern, Molteni Design
Year: 1920
Dimensions: 47 × 30 × 23 cm
Inventory No.: 2024/8/23

252 35 mm Film Projector
Brand/Model: Pathé / N. A. F.
Serial No.: 35352
Year: 1920
Dimensions: 30.5 × 26 × 25.5 cm
Inventory No.: 2024/8/2-4

253 Wooden Stand
Brand/Model: Unknown
Year: Unknown
Dimensions: 101 × 106 × 50 cm
Inventory No.: 2024/8/24

254





254 35 mm Cinematographic Projector
Brand/Model: AEG / Triumphator
Year: 1924
Dimensions: 178 × 105 × 60 cm
Inventory No.: 2024/8/2-3

255

255 35 mm Film Rewinder
Brand/Model: Pathé Machine Ref. 9/300
Year: 1919
Dimensions: 41 x 56 x 27 cm
Inventory No.: 2024/8/15

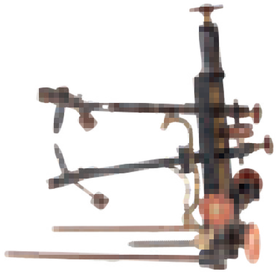
256

256 35 mm Film Rewinder
Brand/Model: AEG – Kinoprojektionswickler M35
Year: 1920
Dimensions: –
Inventory No.: 2024/8/16

The film projectors at the Sericulture Station were equipped with a dual-reel system. The upper reel (supply reel) held the unprojected film, while the lower reel (take-up reel) collected the projected film. This required rewinding after each screening, since the film transport mechanism left the beginning of the reel inaccessible in the centre.

To facilitate this, the centre had two models of rewinders.

257



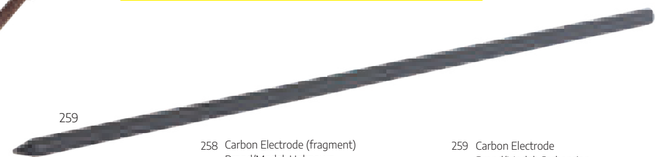
258

Lamp producing an electric arc between the tips of two carbon rods, which function as electrodes, through which a very strong electric current (around 10 amperes) passes.

These lamps, used to illuminate early cinematographic projectors, produced a very bright white light and generated significant heat and smoke (released through the lantern's chimney).

Return screws allowed adjustment of the electric arc and the distance between the carbon rods as they wore down.

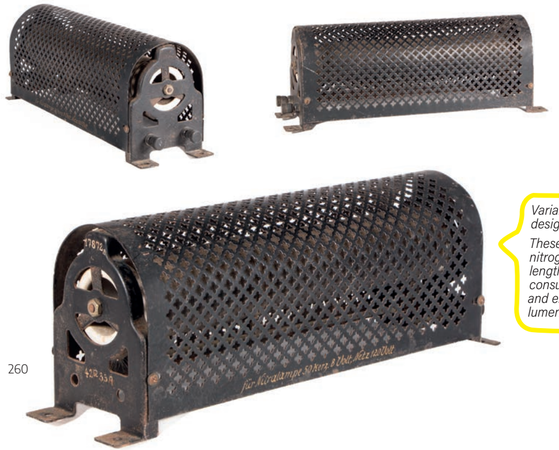
259



257 Voltaic Arc Lamp
Brand/Model: Unknown
Year: Early 20th century
Dimensions: 35 x 35 x 20 cm
Inventory No.: 2024/8/10

258 Carbon Electrode (fragment)
Brand/Model: Unknown
Year: Early 20th century
Dimensions: 7 x 1 cm
Inventory No.: 2024/8/6-2

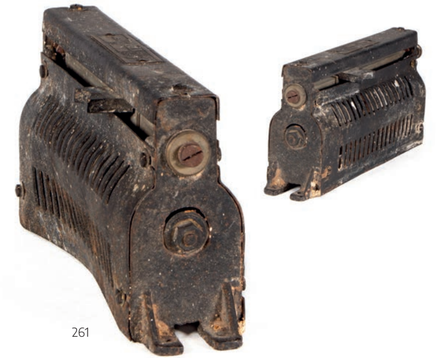
259 Carbon Electrode
Brand/Model: Carbenrion
Year: Early 20th century
Dimensions: 28 x 0.5 cm
Inventory No.: 2024/8/6-1



260

Variable resistor specifically designed for Osram Nitra lamps.

These lamps (gas-filled with an argon-nitrogen mixture) measured 30 cm in length and 15 cm in diameter. They consumed 750 watts at 125–130 volts and emitted a luminous flux of 16,500 lumens.



261

In the 1930s, voltaic arc lamps—high-performance but requiring frequent maintenance due to constant adjustment of the electrodes, replacement, and ash cleaning—began to be replaced by electric lamps, whose current had to be regulated using variable resistors.

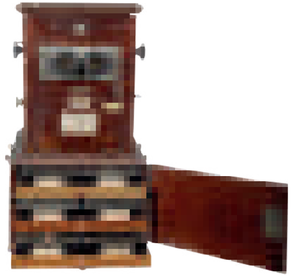
262

260 Variable Resistor
Brand/Model: Unknown
Year: Early 20th century
Dimensions: 12 x 10 x 34 cm
Inventory Number: 2024/11/4-1

261 Variable Resistor
Brand/Model: Unknown
Year: Early 20th century
Dimensions: 9 x 5 x 19.5 cm
Inventory Number: 2024/11/4-2

262 Variable Resistor
Brand/Model: Unknown
Year: Early 20th century
Dimensions: 9 x 7 x 23 cm
Inventory Number: 2024/11/4-3

This instrument allows for the viewing of stereoscopic slides on glass plates, with the particular feature of creating a true three-dimensional illusion in the viewer by processing the two slightly displaced images that make up each slide.



263

263 Stereoscopic Viewer
Brand/model: Richard Freres/Le Taxiphote
Serial number: 12067
Year: 1910-1920
Dimensions: 50 x 28 x 28
Inventory number: 2024/8/17 (1994/1/33-5)

264

265

266

267

268

269

270

271

272

264-272 Stereoscopic Slide Reels for Viewing with Stereoscopic Viewer
Brand/model: Le Taxiphote
Year: 1910-1920
Dimensions: 4 x 12 x 9.5
Inventory numbers: 2024/8/18-1 (Seda 1); 2024/8/18-2 (Seda 2); 2024/8/18-3 (Estación Sericícola y caldera ahogadero); 2024/8/18-4 (Oratava y Jardín de Aclimatación); 2024/8/18-5 (Moreras 1); 2024/8/18-6 (Elche); 2024/8/18-7 (Viajes de propaganda); 2024/8/18-8 (Sección ganadera); 2024/8/18-9 (Bendición simiente y Fiesta del árbol)


273


274


275


281

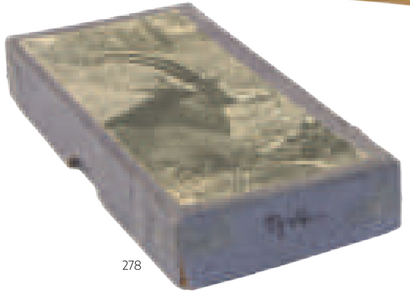

282


276


277


283


284


278


279


280


285


286

273-280 Boxes with stereoscopic glass plates in negative
Brand/Model: A. Lumière & ses fils (273); Agfa (274, 275, and 280); Ilford (276); J. Jougla (277 and 279); Unknown (278)
Year: First half of the 20th century
Dimensions: 2 x 11.5 x 5 cm
Inventory Number: 2024/8/19-1 to 2024/8/19-8

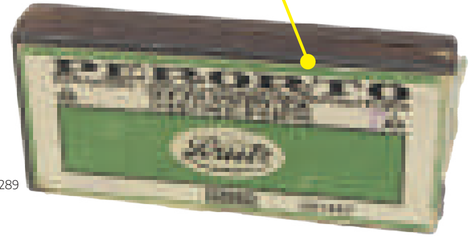
Boxes with Stereoscopic Glass Slides (Negatives)

281-286 Boxes of stereoscopic glass plates
Brand/Model: Ilford (281); J. Jougla (282 and 286); Grieshaber Frères & Cie (283); Eastman Kodak Company (284); Lumière et Jougla (285)
Year: First half of the 20th century
Dimensions: 2 x 11.5 x 5 cm
Inventory Number: 2024/8/19-9 to 2024/8/19-14

287

Digitised Stereoscopic Glass Slide in Negative (4.5 x 10.5 cm)

288



289

290

291

287-291 Boxes with stereoscopic glass plates in negative
Brand/Model: Agfa (287); Perutz Peroro (288 and 289); Ilford (290); J. Jougla (291)
Year: First half of the 20th century
Dimensions: 2 x 11.5 x 5 cm
Inventory Number: 2024/8/19-15 to 2024/8/19-19

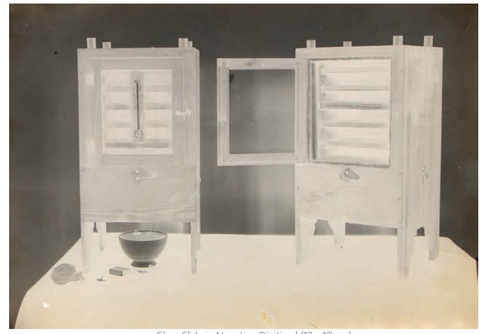
Boxes with Stereoscopic Glass Slides (Negatives)

Digitised Glass Slide (9 x 12 cm)

292

292 Box with glass slides in negative
Brand/Model: Kodak
Year: First half of the 20th century
Dimensions: 2 x 13.5 x 10 cm
Inventory Number: 2024/8/20-1

293 Box with glass slides in negative
Manufacturer: Sericulture Station of Murcia
Year: First quarter of the 20th century
Dimensions: 3 x 19 x 14 cm
Inventory Number: 2024/8/20-2



Glass Slide in Negative Digitised (13 x 18 cm)

293

294

295

296

297

294-297 Boxes with glass plate slide negatives
Brand/Model: Vafca (294 and 295); Sericulture Station of Murcia (296); Agfa (297)
Year: First quarter of the 20th century
Dimensions: 3 x 19 x 14 cm
Inventory Number: 2024/8/20-3 to 2024/8/20-6

298

300

299

301

298-301 Boxes with glass plate slide negatives
Brand/Model: Sericulture Station of Murcia (298 and 301); Vafca (299); Agfa (300)
Year: First quarter of the 20th century
Dimensions: 3 x 19 x 14 cm
Inventory Number: 2024/8/20-7 to 2024/8/20-10

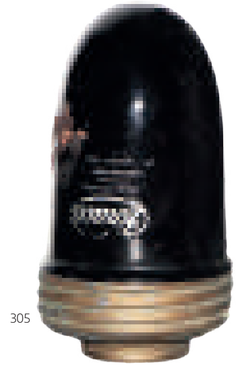
302

303

302 Film reel for 35 mm cinematographic film
Brand/Model: Zeiss Ikon
Year: After 1926
Dimensions: 35 x 35 x 4.5 cm
Inventory Number: 2024/8/21

303 Box for cinematographic film reel
Brand/Model: Unknown
Year: Unknown
Dimensions: 39 x 44 x 10 cm
Inventory Number: 2024/8/7

304



305

306

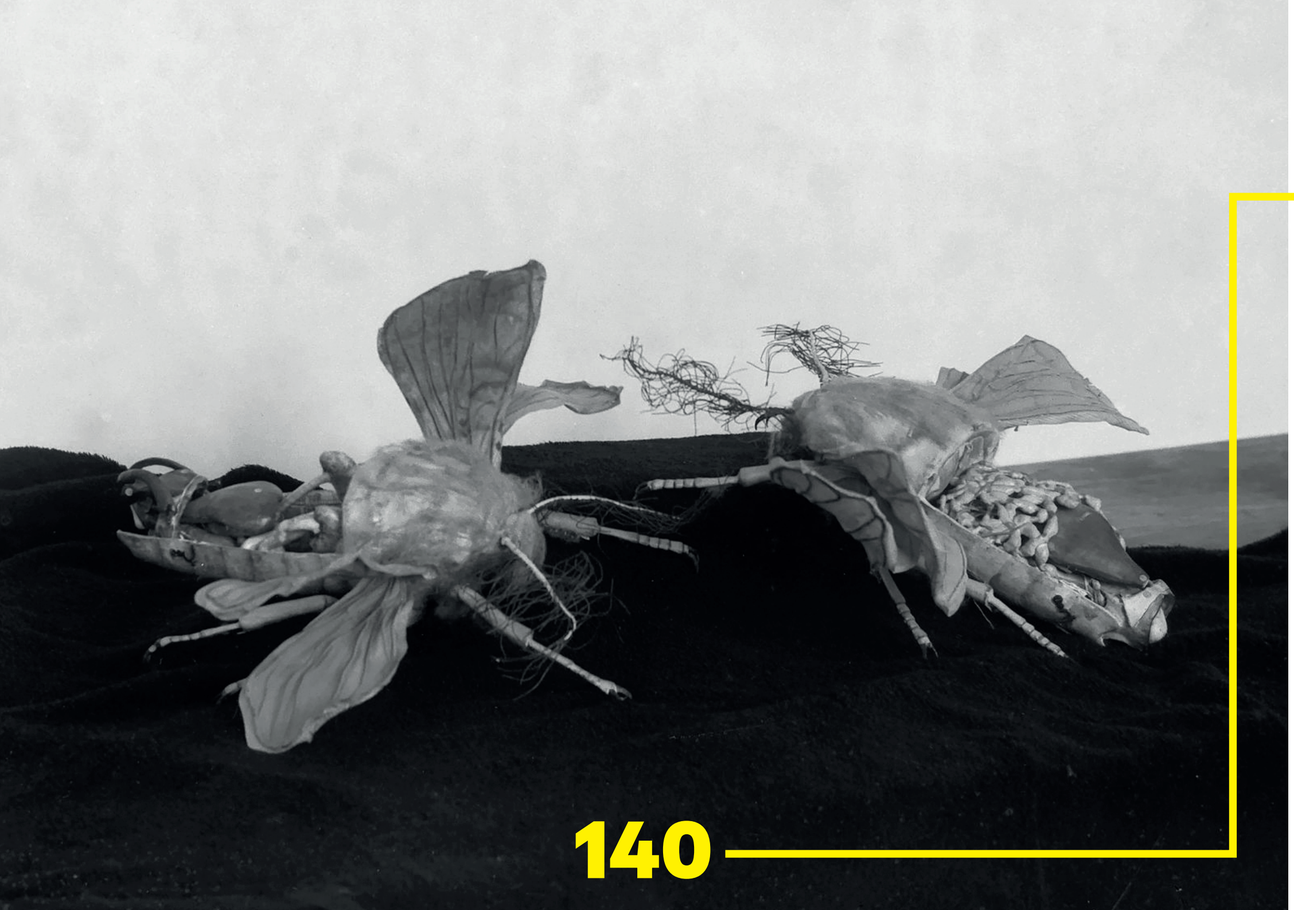
307

304 Box for cinematographic material
Manufacturer: Comisaría de la Seda
Year: 1926-1941
Dimensions: 39 x 62 x 48 cm
Inventory Number: 2024/8/3-1

305 Darkroom lamp
Manufacturer: Rhaco
Year: Early 20th century
Dimensions: 11 x 17 x 7.5 cm
Inventory Number: 2024/8/11

306 Stereo camera case
Brand/Model: Richard Jules/'Le Verascope n°2'
Year: Around 1910
Dimensions: 11 x 17 x 7.5 cm
Inventory Number: 2024/11/3-2

307 Box of photographic plates
Brand/Model: The Imperial Dry Plate Co, Ltd.
Year: Around 1900
Dimensions: 2 x 7 x 5 cm
Inventory Number: 2024/8/12



140

Models
and Scale Replicas

Among all the educational resources available to the Sericulture Staion for its training and outreach efforts, its impressive collection of scale models and reproductions stands out due to their significance and uniqueness.

From its founding in 1892, the centre already possessed large-scale representations of the *Bombyx mori* silkworm and moths, as well as models of mulberry flowers and fruit. Over time, the centre acquired or created smaller-scale models of the various tools and materials necessary for rational rearing according to the most advanced scientific techniques.

Many of these models were commissioned from some of the most prestigious workshops and laboratories of the time, such as Doctor Auzoux Tableau in Paris.

In addition to their remarkable fidelity, the grandeur of some of these anatomical models from the late 19th and early 20th centuries lies in their original design, with cross-sectional segmentations that allowed the extraction and handling of internal organs and tissues. This design enabled students and interested parties to experience something very similar to dissection classes.

These pieces, made of papier-mâché and coated with a fine layer of plaster, were hand-painted by the workshop's artists, who added finishing touches with egg tempera, giving the completed works a brilliant sheen.

The exaggerated size of the models made it easy to examine small details, while the painted colours were often more realistic than those of specimens preserved in alcohol, which tended to fade.

The centre also had models and reproductions from other influential figures, such as Émile Deyrolle, a notable French naturalist and entomologist of the late 19th century. Among his workshop's creations were representations of the diseased silkworm (affected by pebrine) and models of the nervous systems of the silkworm larva, pupa, and moth.

The centre itself also created miniature models of some of the materials used in its experimental rearing practices, such as traditional *andanas* (the frames for rearing larvae) or those used for feeding larvae directly on mulberry branches.

The Sericulture Station also had miniatures of steam-stifling facilities, both domestic and industrial models, as well as structures traditionally used in the Huerta of Murcia, like those for drying hijuela or *tartanas*.

These pieces were not only used in the practical sericulture courses organised by the Station (both at the centre and externally) but were also displayed in the centre's educational museum and at exhibition stands during the annual conferences and exhibitions attended by its staff.

In 1916, the Sericulture Station began trials with rearing systems using *andanas* designed for feeding silkworm larvae directly on mulberry branches.

Image of experimental rearing at the Sericulture Station with a reformed Cavallo *andana*.

308

308 Scale Model of Barraca *Andana*
Manufacturer: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 20 x 30 x 33
Inventory No.: 2024/6/2-2 (1994/1/19)

309

309 Scale Model of Cavallo *Andana*
Manufacturer: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: -
Inventory No.: 2024/6/2-5

310

310 Scale Model of Bonoris *Andana*
Manufacturer: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 16 x 59 x 24
Inventory No.: 2024/6/2-1 (1994/1/19)

311

311 Scale Model of Friulano *Andana*
Manufacturer: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 31 x 38 x 17
Inventory No.: 2024/6/2-3 (1994/1/19)

312

312 Scale Model of Lombardo *Andana*
Manufacturer: Sericulture Station of Murcia
Year: First half of the 20th century
Dimensions: 24 x 20 x 9.5
Inventory No.: 2024/6/2-4 (1994/1/19)

The traditional chairs from the Huerta of Murcia, made from mulberry wood with esparto grass seats, were used during the rearing seasons to support two types of structures outside the huts: those for drying hijuela and the less recommended *tartanas*.

Tartanas in the Sun Outside the House

Structure for Drying Hijuela

A traditional rearing structure used in the Huerta of Murcia, designed to bring the zarzos (silkworm rearing beds) outside during daylight hours.

Each zarzo, loaded with silkworm larvae, would be placed on two chairs, covered with sheets, blankets, or retaleras (protective fabric covers), and left out under the sun until nightfall. At night, the zarzos would be brought back inside to the workshops.

This practice, aimed at stressing the silkworms to encourage increased leaf consumption (believed to boost productivity), was one of the methods the Sericulture Station sought to eliminate. The stress caused by the sudden temperature changes was detrimental to the larvae, weakening them and making them more susceptible to infections and diseases—contrary to popular belief.

313

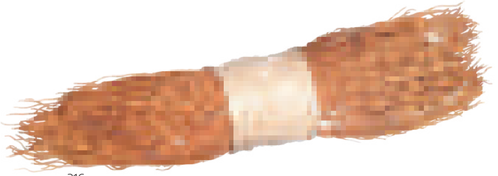
314

Tartana

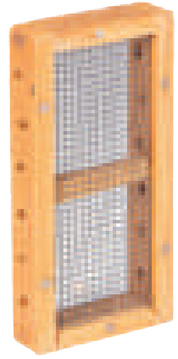
313 Reproduction of Traditional Chair from Huerta
Manufacturer: Sericulture Station of Murcia
Year: Early 20th century
Dimensions: 22 x 12 x 10.3 cm
Inventory No.: 2024/6/13

314 Retalera
Manufacturer: Unknown
Year: Unknown
Dimensions: 82.5 x 56 cm
Inventory No.: 2024/6/16 (1994/1/19)

315



316



317

318

315 Model of Seed Incubator
Manufacturer: Sericulture Station of Murcia
Year: Third quarter of the 20th century
Dimensions: 20 x 10 x 9 cm
Inventory No.: 2024/6/10-1

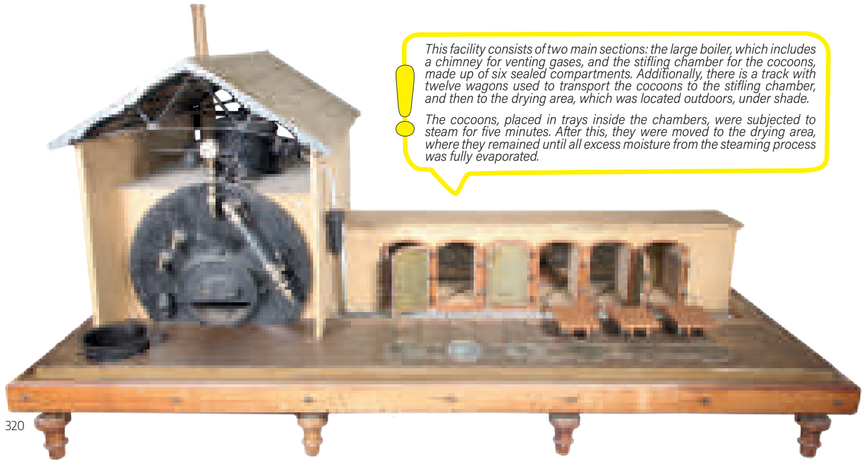
316 Reproduction of Plant Brush for Cocoon Beating
Manufacturer: Sericulture Station of Murcia
Year: Mid 20th century
Dimensions: 22 x 6 x 6 cm
Inventory No.: 2024/6/5

317 Miniature Reproduction of a *Zarzo* with Metal Mesh Base
Manufacturer: Sericulture Station of Murcia
Year: Mid 20th century
Dimensions: 8.5 x 4 x 1 cm
Inventory No.: 2024/6/4 (1994/1/19)

318 Miniature Reproduction of a Spade for Worm Reworking and Sorting
Manufacturer: Sericulture Station of Murcia
Year: Mid 20th century
Dimensions: 1 x 6.8 x 11 cm
Inventory No.: 2024/6/12 (1994/1/19)

319

Steam-stifling facility of the Sericulture Station in La Alberca (1916)



320

This facility consists of two main sections: the large boiler, which includes a chimney for venting gases, and the stifling chamber for the cocoons, made up of six sealed compartments. Additionally, there is a track with twelve wagons used to transport the cocoons to the stifling chamber, and then to the drying area, which was located outdoors, under shade.

The cocoons, placed in trays inside the chambers, were subjected to steam for five minutes. After this, they were moved to the drying area, where they remained until all excess moisture from the steaming process was fully evaporated.

319 Reduced-scale reproduction of a domestic cauldron for cocoon stifling
Manufacturer: Unknown
Year: Early 20th century
Dimensions: 18 x 22.5 x 22.5 cm
Inventory number: 2024/6/17-1

320 Model of an industrial steam stifling facility
Manufacturer: Unknown
Year: 1915
Dimensions: 60 x 152 x 103 cm
Inventory number: 2024/6/1 (1994/1/35)

321

322

323

321 Model of the nervous system of the *Bombyx mori* larva
Manufacturer: Emile Deyroll
Year: Circa 1900
Dimensions: 61 x 20 x 15 cm
Inventory number: 2024/6/14-2 (1994/1/15)

322 Model of the nervous system of the *Bombyx mori* pupa
Manufacturer: Emile Deyroll
Year: Circa 1900
Dimensions: 53 x 20 x 15 cm
Inventory number: 2024/6/14-3 (1994/1/15)

323 Model of the nervous system of the *Bombyx mori* moth
Manufacturer: Emile Deyroll
Year: Circa 1900
Dimensions: 51 x 20 x 15 cm
Inventory number: 2024/6/14-1 (1994/1/15)

The *Bombyx mori* larva consists of the head and a total of 12 clearly defined segments (or rings): the first 3 form the thorax, while the remaining 9 make up the abdomen. The small lateral spots are the stigmas, openings through which the larva breathes. The second and third segments do not have stigmas, as this is where the wings will develop once the larva transforms into a moth.

324

324 Model of the *Bombyx mori* Silkworm
Manufacturer: Doctor Auzoux Tableau
Year: Late 19th century
Dimensions: 15 x 75 x 10 cm
Inventory number: 2024/6/9 (1994/1/14)

The silkworm has three pairs of true legs (ending in claws), which it uses to hold onto the mulberry leaves, and these legs remain after it transforms into a moth. The remaining five pairs are false legs/ prolegs, which function as suction cups to help the silkworm cling to surfaces.

325

325 Model of *Bombyx mori* Silkworm
Manufacturer: Darder Naturalista
Year: Early 20th Century
Dimensions: 20 x 124 x 25
Inventory Number: 2024/6/8 (1994/1/18)

Pebrine was characterised by the appearance of black spots on the larva's skin. In many cases, the silkworm did not die from this condition but instead transformed into a moth, passing the disease on to the eggs. Infected silkworms produced little silk, and the quality was very poor.

326

326 Model of *Bombyx mori* silkworm infected with pebrine
Manufacturer: Les Fils d'Emile Deyrolle
Year: Early 20th century
Dimensions: 11 x 57 x 32
Inventory number: 2024/6/7 (1994/1/17)

327 Model of the head of the *Bombyx mori* larva
Manufacturer: Workshop of Doctor Auzoux Tableau
Year: 1915
Dimensions: 19 x 15 x 17
Inventory number: 2024/6/3 (1994/1/14)

The silkworm has a total of 12 eyes (6 on each side of the head) that enable it to detect light and its intensity, although not shapes or colours.

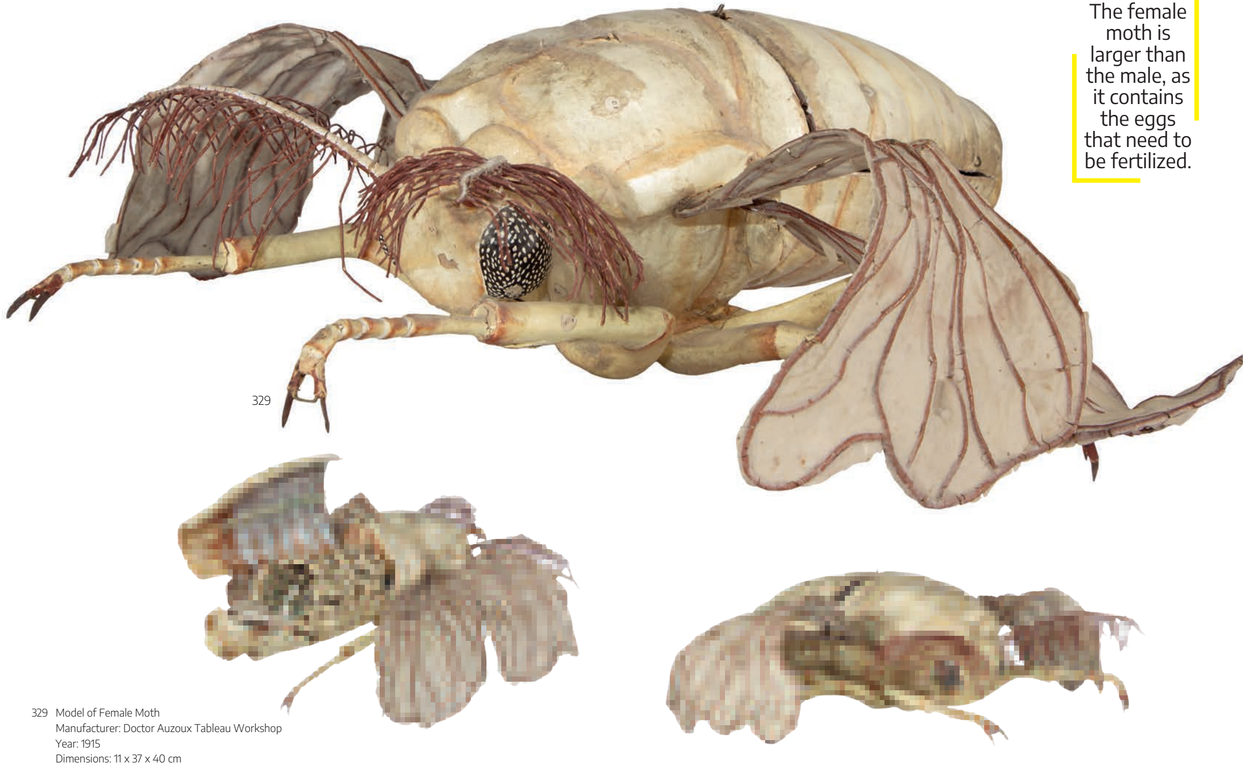
327

The *Bombyx mori* moth is unique in that it does not have a mouth, as it does not eat or drink during its 15-day lifespan. Its sole purpose during this time is reproduction.

328

328 Model of Male Moth
Manufacturer: Doctor Auzoux Tableau Workshop
Year: 1915
Dimensions: 10 x 29 x 39 cm
Inventory No: 2024/6/11-2 (1994/1/16)

The female moth is larger than the male, as it contains the eggs that need to be fertilized.



329

329 Model of Female Moth
Manufacturer: Doctor Auzoux Tableau Workshop
Year: 1915
Dimensions: 11 x 37 x 40 cm
Inventory No: 2024/6/11-1 (1994/1/16)

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ENTITIES

Murcian Institute for Agrarian and Environmental Research and Development (IMIDA).
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Murcia City Council.
Science and Water Museum of Murcia.
Fundación Integra Digital.
Peña huertana La Seda.
Bullas Town Council.
Centro de visitantes La Luz.
Alcantarilla Town Council.
Ethnological Museum of the Huerta.
Directorate-General for Heritage, Regional Ministry of Economy, Finance, European Funds and Digital Transformation of the Region of Murcia.

The work carried out by the Sericulture Station of Murcia over its 84-year history, focusing on research and teaching in the rearing of silkworms and the cultivation and pruning of mulberry trees, has led to the preservation of a significant collection of objects that today form part of our historical, scientific and cultural heritage.

This publication, part of the European ARACNE project, aims to bring to the public's attention a large part of the instruments, machinery, materials and documents used by the staff of the Sericulture Station of Murcia (the predecessor of the current IMIDA) in the various laboratories and pavilions that made up this leading research centre.

This inventory compiles these heritage objects, classified into 13 categories and accompanied by an information sheet that includes the name or type of object, manufacturer and/or brand and model, serial number, year, dimensions and current inventory number (2024). Where applicable, for those that had one, the original inventory number (1994/-/-) has also been included.

Many of these items, unknown to the public, helped lay the foundations of scientific knowledge regarding the silkworm and establish the most advanced rearing techniques, which were based on an exhaustive selection of the eggs and a thorough disinfection of the premises or rearing rooms.

All this work was done with the aim of eradicating the hereditary and infectious diseases which, since the mid-18th century, had been causing mass deaths of silkworms in rearing facilities across Europe and an increasing abandonment of the industry by silk producers. The Sericulture Station of Murcia is the result of the protectionist measures of a state which, for much of the 20th century, allocated vast amounts of resources to maintaining this important rural domestic industry, the main source of income for thousands of families for centuries.

May this work serve to capture the importance and influence that silkworm rearing and the sale of their cocoons or 'capillos' have had on society, particularly in the agricultural region of Murcia, whose agricultural landscape has, for centuries, been dominated by the white and the black mulberry trees, whose leaves are the sole food source for this insect.

May its publication also serve as a token of gratitude and recognition to the directors and staff of the centre who fought tirelessly in defence of the interests of the silkworm farmers and our silk industry, and whose work has facilitated the development of the ARACNE project in the Region of Murcia. Special recognition goes to Felipe González Marín and his son, Felipe C. González Marín.

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