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**CRAFTS AND
CRAFTSMEN
IN THE MIDDLE
AGES**



MUNICÍPIO DE
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AFONSINA

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A traditional craft: leatherworking (15th–16th centuries)

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Abstract

This article provides an overview of the work regarding the transformation of hides into leather and the techniques used to work the leather in the Iberian Peninsula, with particular reference to the Crown of Castile during the 15th and 16th centuries. After assessing the available historical sources, this article analyzes the processes and techniques of leather extraction and trade, as well as the processes of tanning, dyeing and beating, and concludes with an explanation of the main crafts in the sector and some of the techniques and working tools that were used.

Keywords: Leather, Hides, Handicrafts, Work.

The leather industry was one of the most important productive sectors in the cities in the late Middle Ages and the Modern Age. The laborious process of transforming animal hides into leather, as well as the numerous trades that were carried out in this field, from footwear and garments to artistic and decorative leather tapestries and leather bottles, justify the extent that these crafts reached in urban and rural centers, making the leather sector the second in terms of the number of workers, crafts and workshops.

In the written documentation on these crafts and activities, the municipal ordinances stand out – legislative texts issued by urban governments that focused largely on the trade in hides and leather. In Italy, the Veneto Statutes studied by Franco Brunello stand out, providing indications on tanning, beating and dyeing the leather (BRUNELLO, 1977, 1991). In Castile, the ordinances from cities such as Seville, Écija, Béjar, Ávila, Toledo or Córdoba and, in Aragon, of Barcelona, Zaragoza, Valencia and Palma de Mallorca. In the case of Córdoba, the *Libro Primero de Ordenanzas* (1503) contains 122 ordinances, of which 41 (35%) refer to leather crafts such as leather-bottle makers, saddlers and harness makers, and gilt leather tapestry makers (*guadamacileros*).

Notarial protocols are equally remarkable. Those preserved since the 13th century were widely used in the south-eastern regions of France, such as Provence and Burgundy (Marseille, Montpellier, Aix-en-Provence, Avignon, Toulouse, Dijon), in northern and central Italy (Genoa, Florence, Siena, Piacenza), and in some cities of the Crown of Aragon (Barcelona, Valencia, Zaragoza), while in Castile only a few southern cities preserve later records, dating from the second half of the 15th century (Seville, Córdoba, Jerez), or only from the 16th century onwards. Contracts related to the raw materials market (trade in hides, purchases of dyeing or tanning materials) and production processes (prices of tools and workshop utensils, purchase and sale or renting of stores and workshops such as tanneries) stand out (CÓRDOBA, 2017: 11-13).

But the source that provides detailed information on the leather crafts is undoubtedly the technical manuscripts preserved either as independent texts or as part of recipe books of various contents (*Fachliteratur*). The largest number of texts and the greatest amount of details relating to this period are to be found in European documentation centers such as the Bibliothèque Nationale in Paris, the British Library in London, the Vatican Library in Rome, and the Nationale, Laurenziana and Riccardiana Libraries in Florence. Of particular importance are the *Manuscrito de Bologna* (dating from the 15th century and kept in the library of the Convent of San Salvatore in Bologna), and the *Plictho dell'arte dei tintori* by Gioanventura Rosetti (published in Venice in 1548), which mainly refer to the dyeing and tanning processes with alum (MERRIFIELD, 1967; EDELSTEIN and BORGHETTY, 1969; CÓRDOBA, 2001-2002). In the Iberian Peninsula, the *Libro de los Oficios* from the Monasterio de Nuestra Señora de Guadalupe (1503), which includes two ordinances or notices on shoemaking and leatherworking (CÓRDOBA, 2007), and ms. H490 from the Library of the *École de Médecine de Montpellier*, a Castilian text dated from the

second half of the 15th century, which contains 9 recipes for dyeing leather red, green, blue and yellow (CÓRDOBA, 2005).

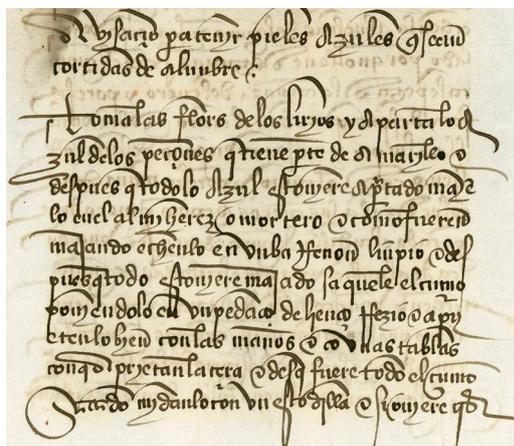


Fig. 1. Recipe for dyeing blue leather. Leatherworking Ordinances from the *Libro de los Oficios* from the Monasterio de Guadalupe (f. 237r).

Other important graphic evidence comes from medieval miniatures and engravings, such as the *Hausbuch der Mendelschen*, a collection of 15th-century engravings from the German Empire, or Jost Ammon's *Libro de los Oficios*, dating from the mid-16th century, whose engravings depict technical crafts.

6 And, of course, the evidence provided by the archaeological record, which is proving increasingly relevant regarding the medieval period. In the case of al-Andalus, the remains of tanneries found in Granada (Secano de la Alhambra, Puerta del Carbón, Calle Colcha) stand out (TORRES BALBÁS, 1935; MALPICA, 1995); Málaga, where the artifacts located in the Plaza de las Flores, integrated in the homonymous Hotel, are of great interest; and Estepona, in whose Andalusian suburb Antonia Martín Escarcena documented in 2016 an installation comprising six rectangular basins (*piletas*) and four circular pits (*noques*) (135-140 cm in diameter) built through layers of brick laid on a basin (*alcadafe*) that served as the bottom (NAVARRO *et al.*, 2020: 124-127). In the Christian territories of the Peninsula, seven medieval tanneries have been excavated in the Puebla del Valle neighborhood of Zamora (Calle Zapatería, of Santo Tomás and Mengue in Zamora) (VILLANUEVA *et al.*, 2011), and in several sites in the city of Toledo (MAQUEDANO and BARRIO, 2003); and, in Catalonia, the 16th-17th century tannery of Molí de Codina, in Tárrega, and the contemporary tannery of Can Ginebreda, Granollers, stand out. In other European countries, examples have been documented in Savona (Italy) and Troyes (France) (MANNONI and GIANNICCHEDDA, 2004; DEBORDE *et al.*, 2002).

These complexes are very diverse in terms of plans and elements, but share as common features the fact that they are located near watercourses, have centralized floor plans organized around a paved courtyard and multiple tanks for the treatment of hides.

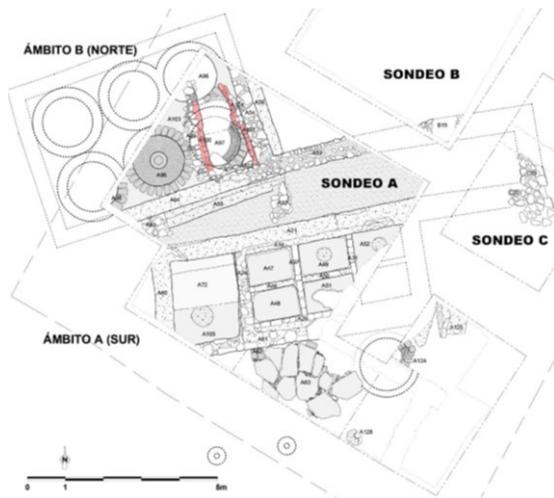


Fig. 2. Plan of the tannery in the Andalusian suburb of Estepona, consisting of six rectangular basins [piletas] and four circular tanks [noques]. Antonia Martín Escarcena (2016).

Shell mills have been found in some of these tanneries (Ávila, Toledo, Can Ginebrada in Granollers), lime deposits, remains of tanning agents or alum, colorants or grease, tools used in the leatherwork, which have been added to documentary evidence such as the ordinances of the shell mill of the Monastery of Guadalupe (CÓRDOBA, 2007). Also noteworthy from a material point of view are the footwear samples preserved in European museums such as the Museum of London or the Cluny Museum in Paris (GREW *et al.*, 1988; MONTEBAULT, 2016). Similarly, old leather goods (ruffs, belts, furniture) and gilt leather tapestries (*guadameciles*) from the 15th and 16th centuries have been preserved in collections held at the Palacio de Viana in Córdoba or the Museo de la Piel in Vic. The value of the ethnological evidence still available in the North African tanneries of Fez and Tetouan should also be noted.

These sources together have not only provided a sufficient approximation to leatherworking in the late medieval and Renaissance periods, but have also made it possible to determine the main production processes carried out, as well as the crafts that performed them and the working techniques used. The process of converting animal hides (a brittle and putrid material) into leather (a durable and multifunctional material) consisted of three main phases: riverside preliminary work for tanning; the tanning itself, carried out with vegetable tannin or alum; and bating, a set of dyeing and greasing operations applied to the final finishing of the leather.

From the slaughterhouse to the tannery. The work on the riverside

The skin/hide is the membranous, elastic and resistant tegument that covers the animal's body. It is made up of three parts: the *epidermis* (the animal's hair), the *dermis* or *corium* (an intermediate area of collagen fibers), and the *hypodermis* (an internal area of fat that binds the flesh to the skin); only the *corium* is used for leather production. It is divided into areas of varying importance: the most valuable is the *closed* (*cerrada*) area, the central part of the animal's back, where the fibers are stronger and thicker, because on the flanks, thin flanks and sides, the skin is thinner and weaker, while the head, neck, legs and tail have less extension and poorer quality (CÓRDOBA, 1990: 156–7, 2018: 250).

The hides used for leather came from animals slaughtered in butcheries or caught in the bush. The most important domestic animals were bovines (oxen, cows and calves), ovines (ewes and lambs) and caprines (roe deer, goats and kids). But practically all the species that

populated the Mediterranean forest were exploited for their hides, from the bear, the deer, the fallow deer and the mountain goat, to the rabbit, the wolf, the fox, the genet, the mink and the wildcat (CÓRDOBA, 1990: 158–9, 2020: 166–9).

Because of their greater thickness and strength, bovine hides were used to make shoe soles and utilized in work requiring strength; sheep and goat hides, more ductile and thinner — in the form of cordovans, sheepskin, kidskin or morocco leather — were used to make clothing and everyday objects; the hides of wild animals, almost always tanned with their fur, were mainly used for manufacturing leather goods. The hides gave rise to intense commercial traffic, largely by the butchers and tanners themselves, who circulated them not only in nearby areas (it is clear that most of the hides used in each city came from its immediate territorial environment), but also along far-reaching trade routes (DELORT, 1978; CÓRDOBA, 2018: 259–66, 2020: 155–162).

The first of these operations was carried out by the butchers themselves or by professional skinners and consisted of separating the meat from the tegument, which would be used to make leather. The skinning process was delicate and had to be carried out without cutting or damaging the hides. The *Libro de los Oficios* states that the hides were to be purchased from butchers with claws/hooves, tails and horns, and were to be examined to ensure that there were no cuts on the hips, loins and flanks. After skinning, they were to be dried in the open air, without exposing them directly to the sun in summer, with only a bit of exposure in winter, with the help of ashes or clay if they had a lot of moisture or blood, as the moist areas dried better that way. Manuscripts such as that of Bologna and the Hispanic ordinances of Écija and Murcia state that it is forbidden to expose freshly skinned hides to the sun. Freshly skinned hides were taken to the tanneries to prevent them from deteriorating, and spreading rock salt on their surface could delay the onset of putrefaction for weeks or even months (CÓRDOBA, 2007: 53, 2020: 162–6).



Fig. 3: Sacrifice and flaying of a lamb. Spanish-Hebrew manuscript (14th century).

The term *tannery* derives from the verb *to tan*, which means to prepare (hides or skins) to preserve them by means of the vegetable tannin used in tanning. A common feature was the occupation of an urban location conditioned by the necessary proximity to water sources and watercourses (which justifies the emergence of "tannery streams (*riberas*)" in places like Madrid or Guimarães) and the generation of foul smells and abundant waste (dirty water from tanning, remains of hair and meat from the skinning and stripping process, blood and fat from the soaking process), therefore it was customary to locate them outside the

intramural area and away from the most inhabited areas of each city/town, to avoid inconvenience to the local population (CÓRDOBA, 2018. 252).

Inside the tanneries there were stone tanks (*pelambres*) and circular basins [*noques*]. In the *tanks* the piles of hides received the lime treatment before the dehairing process; there were a variable number of tanks in each tannery (from 2-3 to 19-20) in order to transfer the hides from the soft soak baths to the hard soak baths, in which they were immersed during the liming process. The *basins* (*noques*) were brick or stone tanks, circular in shape and built into the ground, where the hides were tanned with vegetable tannin. Equally important were the pots, vessels and sinks where the hides were rinsed, the soaking mixtures were fermented or the tanning and dyeing substances were stored (CÓRDOBA, 2003: 142).



Fig. 4. Tanks or *pelambres* (rectangular deposits dyed white by the action of lime) and basins or *noques* (circular deposits) in the tanneries of Chouara in Fez. (<https://www.alamy.es/foto-marruecos-fez-teneria-chouara-28322344.html>).



Fig. 5. Tanner performing dehairing of a hide (Hausbuch der Mendelschen, 15th century, f. 92r) (<https://www.tfcg.ca/old-occupation-tanner>).

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First, the hide was subjected to *soaking* [*remojo*] in clean water so that its fibers could absorb as much water as they had contained during the animal's life and to remove any remains of dirt adhering to its surface. In the case of hides intended for vegetable tanning, the operation was usually repeated twice; in the case of hides meant for alum tanning, the operation was done only once for 4-5 days and the water was substituted on a daily basis "so that the blood and slime would come out" (TORRAS I RIBÉ, 1991: 275; CÓRDOBA, 2007: 53). After soaking, the hypodermis was *stripped* (*descarnado*) or removed using a blunt *stripping knife* (*teja*) by stretching the hide over the stripping bench (CÓRDOBA, 2007: 54).

This was followed by the *liming* or *dehairing* process [*apelambrado*]. Once cleaned and still moist and supple, the hide was immersed in *pelambres* (rectangular tanks) in lime water baths, where it had to rest for a given period of time, subjected to the action of a lime that softened the epidermis, thus facilitating the dehairing process. The treatment could be carried out using alternative agents, such as ash, which did not produce good results in vegetable tanning but could be used in alum tanning (CÓRDOBA, 2001–2002: 176). Once immersion in low resistance used baths had begun, and then moving on to fresh baths so that the lime action gradually acquired intensity, the time of immersion in lime (*apelambradas*) varied greatly, as it depended on the thickness and nature of each hide, as well as the season and climatic conditions of the place where the process was carried out. In Córdoba, the bovine hides remained in the rectangular tank (*pelambre*) for 40 days in summer (from May to September) and 50 days in winter (from October to April), the first eight days in the mixture used; in Guadalupe, the bovine hides were subjected to liming during the summer months, to prevent the tanners from shortening the process, because they could not stand the cold water, and it is indicated that the hides remained in the tank for eight weeks and had to be lifted twice a week. For hides tanned with alum, two weeks were enough (CÓRDOBA, 2003: 138, 2007: 54–55).

Once the hides were removed from the rectangular tanks, they were *dehaired* (*depiladas*). The *Libro de los Oficios* refers that, after being removed from the lime bath and drained, the hides were placed on a wooden log and dehaired with a double-handled, blunt-edged blade; the Rosetti's *Plictho* mentions the following: "skin them on the easel with the side of the knife and not with the cutting edge" (CÓRDOBA, 2007: 55).



Fig. 6. Dyeing of yellow hides by rubbing (Chouara Tanneries in Fez)

The hides were then washed again and treated to open up the fibers and completely remove all traces of hair and lime that could impair the tanning process by weakening the fibers and making them rough to the touch. This process consisted of a treatment based on a mixture of water and alum, or more often by applying bird droppings (chicken, pigeon), dog excrement, or vegetable matter (figs, barley, rye, ash bark). The most commonly used bath was based on the fermentation of bran, the bacterial action of which removed the lime, dissolved the albuminous matter, loosened the skin and facilitated the absorption of tannin or alum during tanning. The operation is referred to as "giving bran" (*dar afrechos*) in the Castilian ordinances. For this purpose, the *Manuscrito de Bolonia* recommends using a mixture of wheat and salt, and Rosetti's *Plictho* mentions wheat and alum (CÓRDOBA, 2007: 56).

The tanning process

The method used to tan hides that did not retain hair was based on the use of vegetable tannin by immersing them in a solution of water and crushed vegetable matter, which acted slowly but thoroughly. The most commonly used barks were those of holm oak and cork oak, sumac, myrtle, laurel, mastic and coriaria. The leaves and branches of these tannic shrubs were ground in the tanneries themselves using an animal traction mill (*tahuna* mill or *tahona*), in which a beast of burden turned the wheel on a potter's wheel to reduce the material to powder. The bark mill ordinances in the *Libro de los Oficios* of the Guadalupe Monastery reflect this work in detail (CÓRDOBA, 2007: 56).

The process was carried out in the circular basins [*noques*] on the base of which a layer of tanning material was spread, on which the first hide was placed, and then the hides and layers of bark were placed alternately on top of each other, until a thicker layer of bark was placed on top; then the circular basin was closed with thick stones, straw mats or boards. The hides were first bathed into used mixtures, and then successively transferred to fresher and more resistant ones, so as to ensure complete penetration of the tannin into the internal tissue (CÓRDOBA, 2003: 140).

The length of tanning in the circular basins varied greatly, depending on the hide's thickness, the tanning agent, the time of year (ambient temperature), the nature of the water, the use for which the hide was intended, and other conditioning factors. In general, the length of tanning was very long for the thicker skins. The Ordinances of Córdoba stipulate that bovine hides tanned with myrtle should remain in the *first seat* (*primer asiento* or used mixture) for four months; in the second (fresh mixture) for three months, and in the third (also with a fresh mixture) for a further three months, so that ten months were needed to complete the tanning process. On the other hand, if the tanning was carried out with bark or cork, whose tannic properties were stronger than those of myrtle, they only had to stay three months in the first (used) mixture and one in the second (fresh herbal) mixture, with the treatment extending to only four months. Thin skins (goat or sheep) were usually kept in the circular tanks for one or two months (CÓRDOBA, 1990: 178).

Mineral or alum tanning was applied in cases where the tanned hides had to retain the animal's hair. The most common tanning formula mixed alum, salt, flour, egg and olive oil. The *Manuscrito de Bolonia* recommends the use of two ounces of rock alum, two eggs beaten with the whites and yolks, a handful of flour, salt for each pound of meat, olive oil enough to season a stew and hot water; Rosetti's *Plictho* mentions flour, rock alum, raw salt, olive oil and egg yolk; and the *Libro de los Oficios* refers alum, salt, eggs and olive oil or flour. The inclusion of alum and salt is justified by their tanning, astringent and bactericidal effect, while flour, eggs and olive oil are essential to soften and smooth the leather, which would otherwise be brittle and rough to the touch. Tanning with alum had to be carried out under certain conditions, in April and May, or September and October, in order to avoid extreme temperatures (CÓRDOBA, 2001–2002: 178–9).

Leather dyeing and beating

Once the tanning process was completed, a set of operations began to beat the leather, in order to rehydrate it by lubrication and thus obtain: the desired flexibility, shine and touch; its maximum mechanical properties of resistance and malleability; a product easy to work, by pressing, pounding and beating; and to color it in different shades by applying coloring substances.

The dyeing of the leather was carried out in four stages: preparation of the hide, application of the mordant to fix the dye, application of the dye to obtain the color, and final drying and beating. In the case of vegetable-tanned hides, they were again moistened in a vat of water or in a used tanning solution. Some hides were beaten to open the fibers to better absorb the mordant, or treated with oil or tallow to better absorb the dye. The first treatment consisted of applying the mordant to promote the penetration and fixation of the dye and to activate color vividness. The mordants used were alum and sumac, the former for dyeing hides in yellow and red and the latter for black leather. After applying the mordant, the hides had to be thoroughly washed and rinsed before receiving the dye.

The coloring substances used were similar to those used to dye fabrics. Among the vegetable dyes — which were by far the most numerous group —, saffron (*Crocus sativus*) was used for yellow and orange tones; weld (*Reseda luteola*) for yellow; old fustic (*Morus tinctoria*) for orange skins; barberries (*Berberis vulgaris*) for yellow and green; mulberries (*Rubus ulmifolius*) for yellow and green; wild madder (*Rubia peregrina*) for red or orange; indigo (*Indigofera tinctoria*) for blue, or green if mixed with weld; and litmus seeds (*Chrozophora tinctoria*) for violet. Among the dyes of animal origin, oak gall (*Quercus robur*), a dye halfway between the animal and vegetable kingdoms, as it comes from the excrescence formed on the leaves of oak trees by the bite of an insect and the laying of eggs; and among the mineral dyes, vitriol for dyeing black. In addition to these basic materials, complementary substances such as vinegar, saffron and alum were used to transform the coloration. The dyes were usually applied dissolved in hot or cold water, by dipping the hide in the bath or rubbing it externally by hand or using brushes or cloths. After applying the mordant or after receiving the dye (even between the different layers of dye), the hides were left to dry in the shade, in places without direct exposure to the sun or excessive wind, as contact with these elements during drying excessively hardened the hide (CÓRDOBA, 2022).



Fig. 7. Tanner smoothing the skin for parchment with the help of the fleshing knife (Jost Amman, 16th century) (<https://www.reprodart.com/a/amman-jost/the-tanner.html>).

Finally, after being tanned, dyed and dried, the skins were subjected to a finishing process that had two objectives: to lubricate the skin to make it more flexible, shiny and lustrous, and to polish it to make it more flexible and supple. The first objective was achieved via the use of olive oil, vinegar or citrus juice, which made the surface shiny and the color more intense.

The main treatments applied during the leather beating process can be divided into two groups: those aimed at breaking and making the leather more flexible by beating, stretching, treading and scraping in order to improve its mechanical properties; and those aimed at oiling and softening the leather by rubbing its surface with fat or other materials. Some skins were scraped with the *estira* or *fleshing knife* (a copper instrument in the shape of a circular blade), others were beaten and broken with a *bujadera* or *palm and arm board* (wooden instruments for beating the skin), the *remanadera* or *graining-board* (an instrument made of rollers to beat the skin) or simply by beating them on stones. According to the *Libro de los Oficios*, cattle hides for soles were broken "by giving them many blows on some rough stones", before being broken again with the hands, feet and the fleshing knife. Almost all

hides for leather goods had to be burnished and slicked with the help of *paletes* or burnishers and *rehortas* or slickers, metal instruments that had the same purpose as those mentioned above (CÓRDOBA, 2007: 60).



Fig. 8. Shoemaker hammering the sole of a shoe on a last. Ashlar masonry in the chancel of the Seville Cathedral (15th century). (Photo: E. Cabrera).

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Regarding the operations involved in greasing the skins, they were usually greased with tallow or pig fat applied to a previously heated or *flamed* (*aflamadas*) hides, opened by the heat of the fire. The *Libro de los Oficios* recommends that bovine hides meant for soles, after being broken, should be treated with hot tallow and flamed over the flames; cordovan hides, after being scraped and broken, with hot tallow on the grain and tepid tallow on the meat, before being washed in clean water and dried in the shade. This treatment was also applied to leather goods: the hides meant for manufacturing sheepskin coats, after being tanned with alum, flour and salt, were given pig's tallow, and were left to dry in the sun. The use of grease and tallow to grease the skins was so common that, in Catalan, the tanners were called *assaonadors* or *sain* (tallow) applicators (CÓRDOBA, 2007: 61).

The last operation consisted in *appelar* or *polishing* the leather to obtain a smoother, shinier surface using a scourer to polish or greasing the hide, used to open the pores, absorb the fat better and make the hide more flexible. There was also the process of *bruñir* or *burnishing*, which consisted in rubbing the surface with the help of stones or glass and the juice of pomegranates, oranges or lemons, to give it a shine.

Leather crafts and trades

The hides resulting from the above operations were used by various craftsmen to make garments for work or domestic use and garments such as coats and sheepskin coats. These crafts/trades can be divided into three main groups. The first group comprises those who transformed the hides into leather; in this group are the tanners, who tanned the hide to make leather without the animal's skin; the skinners, who tanned it while preserving the skin; and the leather tanners, who dyed, tanned and greased the hides. Secondly, those who made objects for everyday use, which included shoemakers, who made shoes, as well as menders who repaired them; strap and belt makers, who made straps, belts and bags; leather

bottle makers, who made wineskins (goatskin containers for oil and wine) and saddlers, who made saddles, and harness makers who made harnesses for riders. Finally, there were the trades dedicated to developing artistic applications for the leather used in ornamentation (embossed cordovans, gilt leather tapestries (*guadameciles*) decorated with paintings and gold and silver leaf).

They all used common tools and working techniques, which have largely remained in use to this day. Among the most frequent operations were *recorte* or trimming, carried out with crescent-shaped blades (*tranchetes* or skiving knives) and scrapers, thick-toothed, triangular files (*escofinas* or rasps), *leznas* or awls for opening holes. *Costura* or stitching to join different pieces of leather, usually done with special needles, saddler thimbles and two-ply stitching, sometimes with tow or hemp thread, sometimes with leather strap. *Encorado* or leather-covering, which consists of joining pieces of leather together or on a base, using animal glues or *engrudos* (gluey paste) made from pieces of the hides themselves. The *Libro de los Oficios* of the Guadalupe Monastery explains how the wineskins should be made at certain times of the year, by scraping the meat and salting the skin for eight days, then smoking it for two months during the dry season, between March and May, and finally gluing it with pitch from the Sierra de Segura, if possible mixed with a third of pitch from Ávila; while the regulations of the leather bottle makers of Seville and Écija require the use of pitch from the Sierra de Segura in Jaén. Equally important working techniques were the *moldeado* or molding, to shape wet leather pieces in wooden molds or lasts. The *repujado* or goffering, which consisted of shaping scenes in bas-relief when the leather was damp by exerting pressure on the back of the leather. And the *estampado* or stamping, which was achieved by applying metal stamps with various designs to the damp leather so that the leather would retain the desired shape once dried.

In short, documentation and other sources of information dating back to the 15th and 16th centuries reveal the techniques and working procedures of a sector that was not only extraordinarily important in that period — as it was essential for the production of everyday objects —, but also provided an industrial outlet for a raw material that was very common in nature, obtained daily from the slaughter of cattle and hunting in the mountains, such as animal hides transformed into leather. This industry became the second productive sector in most of the urban centers of that time, and many of its tools, techniques and trades lasted well into the 20th century, making leather crafts authentic traditional trades in the productive works of the Iberian Peninsula.

Bibliography

- BRUNELLO, Franco (1977). *Concia e tintura delle pelli nel Veneto dal XIII al XVI secolo*. Vicenza: Neri Pozza.
- BRUNELLO, Franco (1991). *Storia del cuoio e dell'arte conciaria*. Venecia: La Fenice.
- CÓRDOBA, Ricardo (1990). *La Industria Medieval de Córdoba*. Córdoba: Caja Provincial.
- CÓRDOBA, Ricardo (2001–2002). Cuatro textos de literatura técnica medieval sobre trabajo del cuero, *Meridies. Revista de Historia Medieval*, 5–6, 171–204.
- CÓRDOBA, Ricardo (2003). Técnicas de curtido y zurrado del cuero en Aragón y Castilla a fines de la Edad Media. Estudio comparativo, in RODRÍGUEZ, Salvador Claramunt (ed.) (2003). *XVII Congreso de Historia de la Corona de Aragón: El món urbà a la Corona d'Aragó del 1137 als decrets de Nova Planta*, Vol. 2. Barcelona: Universitat, 134–145.
- CÓRDOBA, Ricardo (2005). Un recetario técnico castellano del siglo XV: el manuscrito H-490 de la Facultad de Medicina de Montpellier, *En la España Medieval*, 28, 7–48.
- CÓRDOBA, Ricardo (2007). El contenido técnico industrial del Libro de los Oficios en el marco de los ordenamientos corporativos y de los recetarios bajomedievales, in CABANES, M. L. (ed.) (2007). *El Libro de los Oficios del Monasterio de Nuestra Señora de Guadalupe*, Vol. 2. Madrid: Ministerio de Cultura, 32-71.
- CÓRDOBA, Ricardo (2017). *Los oficios medievales. Tecnología, producción, trabajo*. Madrid: Síntesis.
- CÓRDOBA, Ricardo (2018). Las materias primas de origen animal y su empleo en la actividad productiva hispana a fines de la Edad Media, in SABATÉ, F. (ed.) (2018). *Els animals a l'edat mitjana. XXI Curs d'Estiu Comtat d'Urgell*. Lleida: Pagès, 93–109.
- CÓRDOBA, Ricardo (2020). Los carniceros y el negocio de la piel en el reino de Córdoba a fines de la Edad Media (1460-1520), in VERNA, C., VICTOR, S. (eds.) (2020). *Los carniceros y sus oficios (España-Francia, siglos XIII-XV)*. Valencia: Universitat, 153–177.
- CÓRDOBA, Ricardo (2022). The Dyeing of Hides in Two Castilian Recipe Books from the Late Fifteenth Century, in CÓRDOBA, R., LÓPEZ, J. (eds.) (2022). *Technical Knowledge in Europe (13th–16th centuries)*. Cambridge: Cambridge Scholar Publishing, 83–104.
- DEBORDE, Gilles, MONTEBAULT, Véronique, YVINEC, Jean-Herbé (2002). Les ateliers de tanneurs de la rue du Moulinet à Troyes (Aube), in AUDOUIN- ROUZEAU, F., BEYRIESÉD, S. (eds.) (2002). *Le Travail du Cuir de la Préhistoire à nos jours. XXIIe rencontres internationales d'archéologue et d'histoire d'Antibes*. Antibes: Éditions APDCA, 283–314.
- DELORT, Robert (1978). *Le commerce des fourrures en Occident à la fin du moyen âge (vers 1300-vers 1450)*. Rome: École Française de Rome.
- EDELSTEIN, Sidney M., BORGHETTY, Hector C. (eds.) (1969). *The Plictho of Gioanventura Rosetti. Instructions of the Art of the Dyer*. Cambridge MA: MIT.
- GREW, Francis, DE NEERGARD, Margrethe, MITFORD, Susan (1988). *Shoes and Pattens. Medieval Finds from Excavations in London*. Londres: The London Museum.
- MALPICA, Antonio (1995). El río Darro y la ciudad medieval de Granada: las tenerías del puente del Carbón, *Al-Qantara*, 16, 83–106.
- MANNONI, Tommaso, GIANNICHECKDA, Enrico (2004). *Arqueología de la Producción*. Barcelona: Ariel.

MAQUEDANO, Bienvenido, BARRIO, Carlos (2003). Las tenerías de la ciudad de Toledo, in CÓRDOBA, R. (ed.) (2003). *Mil años de trabajo del cuero. Actas II del Simposium de Historia de las Técnicas*. Córdoba: Litopress, 271–290.

MERRIFIELD, Mary P. (ed.) (1967). *Original treatises dating from the Twelfth to the Eighteenth Centuries on the Arts of Painting*. New York: Dover.

MONTEBAULT, Véronique (2016). *Chaussures et travail de la peau du XIe au début du XVIe siècle dans les centres urbains de France septentrionale*. Thèse du Doctorat direction Anne Nissen. Paris: Université Paris 1 Panthéon-Sorbonne.

NAVARRO, Ildelfonso, PÉREZ, Alejandro, TOMASSETTI, José María, MARTÍN, Ma Antonia, SUÁREZ, José (2020). Arquitectura doméstica y artesanal en el arrabal andalusí de Estepona (Málaga), in DELGADO, M. (ed.) (2020). *Más allá de las murallas: contribución al estudio de las dinámicas urbanas en el sur de al-Andalus*. Madrid: La Ergástula, 117–136.

TORRAS I RIBÉ, Josep M. (1991). *Curtidores y Tenerías en Cataluña. Organización de un oficio preindustrial (siglos XIV-XIX)*. Vic: Colomer Munmany.

TORRES BALBÁS, Leopoldo (1935). Tenería en el Secano de la Alhambra de Granada, *Al-Andalus*, 3, 434-437.

VILLANUEVA, Olatz, PALOMINO, Ángel Luis, SANTAMARÍA, José Enrique (2011). *El trabajo del cuero en la Castilla medieval. Las curtidurías de Zamora*. Valladolid: Castilla ediciones.