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**Please Forward.
Address correction requested.**

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* * * *

Current openings exist for deputies in all positions, please contact the appropriate officer or seneschal if you are interested.



2. Using dry leather (8 oz., Veg. Tanned). The result seems to be somewhat faster hardening, but also a lot more curling, distortion, etc. From these experiments, it seems clear that one could make scale or lamellar by taking your scrap, soaking it, boiling it 20-40 seconds, pressing it between two boards to make sure it hardens flat, then cutting out the individual lamellae or scales.



3. Shaping the leather (8 oz., Veg. Tanned): It occurred to me that one could take advantage of the shrinking produced by boiling. One of the problems I have had in making bazubands and greaves is the difficulty of making the portion that covers elbow or knee sufficiently convex. This is basically done by stretching the middle part of it. Shrinking the edge should have the same effect. In making things such as knees and elbows out of hardened leather, one problem is that it is hard to stretch the leather enough to get the piece as convex as you would like it. It occurred to me that boiling could help with this problem.

The technique works as follows:

- 1 First cut out an oval piece of leather, soak it thoroughly.
- 2 Then stretch it over a small bowl to give it a somewhat convex shape (more details on how you do this available if people are interested).
- 3 Then stick a pin through the middle of it, with the head on the convex side.
- 4 Then lower the piece slowly into boiling water, holding it by a pair of pliers gripping the pin (do you have an easier way of constructing a handle in the middle of a piece of leather?), and steadying it with a large spoon.

The idea is to hold it for about 10 seconds with just the outside periphery of the piece (which is the bottom, since you have it convex side up) in the boiling water, then lower it for another 10 seconds so the area intermediate between the edge and the center is also under the boiling water, then finally submerge the whole piece for another twenty seconds. The result is that the periphery has boiled for about 40 seconds, the intermediate area for about 30, and the middle for about 20. The longer you boil it the more it shrinks, so you have just shrunk the periphery relative the center, which makes the piece more convex—also thicker and harder.

- Now you put it back over your bowl (or a smaller bowl if it fitted well over the old one before boiling).
- Let it cool. I have now done this several times successfully. One piece I also successfully waxed—the others are still drying.

I think waxing is necessary if you are using 8 ounce leather and the piece is supposed to be an elbow. 8 ounce leather boiled for only 20 seconds (the center of the piece) is not hard enough for me to trust it to protect the point of my elbow. Such leather is both boiled and waxed.

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leather by boiling. I haven't tried it myself.

J. Experimentation:

Experimentation is a good idea, since what we seem to be dealing with is a range of "hardnesses" imparted by the various treatments used:

Somewhat Stiffened	Caused by simply soaking in water and drying. (Examples: Most things that have been merely tooled, but not much else. For those unfamiliar with the tanning process, this is simply reversing the 'Staking' process. When leather is tanned and is in the process of drying, it must be worked or 'staked' to prevent it from drying stiff. The amount of staking, to some extent, determines the final softness. Soaking the leather and letting it dry reverses the process.)
Stiffened	A quick soaking in water and baked. (Examples: Armor that's been sweated into and dried in the sun)
Hardened/Polymerized	Soaked for a LONG time in water and baked dry. (Example: Cuir Bouilli as Balderik and Waterer have been describing it.)(This *may* also include the attempts that have been soaked with oil and baked hard in the sun).
Totally Polymerized	Boiled in Water until it shrivels and shrinks. (Example: Diarmuit's wrist brace experiment)

<Diarmuit> I went home and began to experiment with a variety of things. The first batch of experimentation was with a variety of peices of leather, each sewn to a shaped frame (a wooden dowel) and the dipping them into water at a rolling boil, and holding them there for 60 seconds. (For the precision fiends out there, while I'm not certain about the elevation of Tulsa, Oklahoma, but I'm close enough to sea level that my 3 minute eggs take about 3 minutes to cook). Afterwards, I let them sit for 24 hours.

The results were about what I expected. The 8-10 oz Veg. Tanned Cowhide turned dark brown, shrank and hardened. The 5-7 oz Veg. Tanned Cowhide turned black, shrank a LOT, and hardened. The 2-4 oz Calfskin turned dark brown, and shrank to fit beautifully. The 5-8 oz Latigo Cowhide had no noticeable changes at all. Elkhide (tanning method unknown, but probably oil "tanned") Darkened slightly, and only stiffened VERY slightly. The Latigo calfskin, Horsehide and Buckskin had the same results as the Elkhide.

Heartened by the success of this, I took an old tooled wrist band (10 oz Cow hide), wrapped it around a bottle and dropped it in the boiling water for 2 min. Most of the tooling vanished, but it is currently harder than anything I've yet made. My second experiment was to take tooled leather (8-10 oz Cowhide) soak it down, hammer it to shape on a peice of wood and to stick it into an oven at 225 degrees. It darkened slightly, only part of it shriveled, and the rest looked like a 2-3 mm thick Bat-a-rang (However the tooling remained intact :)).

<Balderick> Your differing results with the different weights of veg-tanned leather probably reflect the greater amount of time required to heat thicker pieces of leather...

<Cariodoc> 1. Using leather (8 oz., Veg. Tanned) that had been soaked for several hours: If you boil it for 20 seconds, it shrinks to about 7/8 the original size in Both directions, becoming correspondingly thicker. It also hardens a little. The result is comparable in strength to wax hardened 8 ounce leather. If you press it between two flat surfaces for ten minutes or so after boiling it ends up flat—the curling at the edges is negligible.

If you boil it for 40 seconds or more the shrinkage is more substantial (to about 2/3 the original dimension) and the hardening (and associated thickening) much greater. Pressing it still gives you a flat piece. If you boil it for 40 seconds, it shrinks to about 2/3 the original size in both directions, thickens to about the equivalent of 16 oz leather, and becomes quite hard—oddly enough, the complete hardening process seems to take several hours after cooling. The final result is comparable to 16 oz wax hardened leather. Boiling for more than 40 seconds results in very little additional shrinkage, some additional hardening.

Seneschal's Report

9/26/97

The first issue: Whew, finally here! Let's get down to business:

On September 25th I met with Dame Catriona nic Duibh of Moray (Monica Spence, East Kingdom Deputy Seneschal for New Groups) and submitted all of the Broken Bridge incipency paperwork. Various snafu's had kept us from filing prior to then. A summary review seems to indicate that the paperwork is probably in order, but further analysis and consultation with the East Kingdom Seneschalate and Their Majesties will be needed before we get official incipency status. Keep your fingers crossed!

We've gained several new folks in the Canton recently, some of whom attend colleges scattered throughout the province. A warm welcome to them all. This gives us some potential opportunities to open up some more spaces for SCA use. Currently there are at least two groups of folks working on finding an indoor fighting space for the winter. I've been assured by the appropriate provincial officials that there is indeed interest in procuring a space for provincial use. We've begun the negotiation process at one college already. More information will be available as this project develops.

Many thanks to all canton members who pitched in at the recent Barleycorn event. By my count there were at least five of us working at least two shifts each in that kitchen throughout the event. The autocrat, kitchen staff, and members of the Canton of Northpass conveyed their personal thanks.

We currently have several efforts underway to stock the canton Iron and Gold keys. Clearly we need to be in a position to garb and armor up some of our newer members.

I've procured some great fabric remnants recently, several in some very nice velvets, in fact. We also have at least two leather hides and several sets of tools. A few dates this month have been set aside to work on some of this, please review the activity calendar. If you happen to be in need of loaner garb or armor please be sure to be present; even if materials are not available at the time, it is important that we get your measurements & requirements on file so future projects and workshops can be planned around actual needs.

As this newsletter will go out to a wider audience than just Broken Bridge, any others who have time to come to these workshops to lend a hand, teach (PLEASE!) or just be sociable are very welcome. Also, no donation of materials or finished goods will be spurned, even if some repair is required.

Due to vagaries of chance and the sometime SCA'dian penchant for being footloose, there are always new folks moving in and out of the canton. I highly encourage anyone who knows of new SCA folks in Brooklyn to share the insert we've included in this issue, both so we can welcome them and so we can share future issues with them.

Yours in Society,

Ben of Broken Bridge

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		①	②	③ Brewing 7:30	④	⑤
⑥ Sit & Spin 7:30	⑦	⑧	⑨	⑩	⑪	⑫
⑬ Broken Bridge Commons & Garb Fitting 7:30	⑭	⑮	⑯	⑰	⑱ Useful U (Whyt Whey)	⑲ Picnic in the Park
⑳ Heraldry 7:30	㉑	㉒	㉓ Barnes & Noble Demo (Whyt Whey)	㉔	㉕	㉖
㉗ Stitch & Bitch 7:30	㉘	㉙	㉚	㉛		

O C T O B E R Events 1997

whilst it can be embossed easily to allow designs and artwork generally to be applied to the surface of the leather. It possesses strange thermal properties and one disadvantage is that wet, vegetable tanned leather begins to shrink above 75 degrees C and so lose its shape. Never- the less this property has been widely exploited. The moulding of this type of leather was known in Saxon times in Britain, and during the Middle Ages both here and on the continent of Europe it was extensively practiced. Chaucer, in the fourteenth century makes frequent reference to the peculiar form of moulded leather known as *cuir bouilli*. After thorough softening in water at ordinary temperatures, the leather can be formed or moulded into the most remarkable shaped which on drying retain a fair degree of permanence. The wet-moulded leather shape can be set more permanently by drying under a moderate heat, the skilful choice of temperature determining the degree of rigidity obtained. A quicker process which produces extremely hard and rigid articles is to dip the moulded shape into boiling water for about 20-120 sec, a practice which gave rise to the name *cuir bouilli*. Such a process involves the partial melting of the aggregates of fixed tannin in the leather: near 100 degrees C these become plastic and can be made to flow and redistribute throughout the fibre network. On cooling, the latter becomes embedded in what is virtually a tough three-dimensional polymer network or resin, not unlike the more modern materials made by condensing formaldehyde with substances like phenol, urea, or melamine (e.g. Bakelite and the aminoplastics)."

<Diarmuid> IF I read this correctly, and I would *love* to entertain discussion that I am not, then in order to make something of "Cuir Bouilli" I can place my wet leather on or around its form when wet and either heat it until it shrinks (say in my oven: since 75C is about 167), or emerse said form into boiling water (100C = 212F) until it shrivels into plastic hardness. I wish to specify this since I, at least, try to *avoid* having my heat treated leather shrivel up into a plastic mass because it's more difficult to manage.

<Balderik> As Reed says, the choice of temperature determines the degree of hardness. I think the trick is to not heat it to the point of 'shrivelling'. At this point, I think the finished product will start being too brittle to be useful for armour. I think the trick is to stay right around the 75C mark so that the leather is on the verge of shrinking, so you get the hardness without the shrivelling. I hardened my armour plates by the soaking/baking process. They were quite hard *before* I waxed them, but had remained true to their molded shape (ie. not shrivelled).

The dipping in boiling water probably requires a bit more practice to get the duration just right so that the leather hardens without shrivelling. NOTE: When heating the leather, do NOT touch the leather to any hot metal (Since using heated tooling materials is how book leather is embossed). Sitting it on newspaper works just fine to stop the heat though. John Waterer's Leather and the Warrior has a complete chapter on Cuir Bouilli, and its history.

F. Hammering:

Hammering dampened veg-tanned leather will harden it up alot. This is why sole leather is harder than belt stock. It has been compressed between rollers. The old fashioned method (in the recent past at least), was to hammer the leather you were going to use for shoe soles.

G. Wax: See Section 2. (in next issue)

H. Sun Burning:

I have recently discovered that leaving leather out under the Summer Oklahoma sun will burn it hard as well. However, see discussion under OIL (section 3).

I. Tooling the Hardening leather:

<Jackalope...> Also - When you say that you feel the examples you've seen of historical cuir boilli can't have been totally polymerized due to their degree of tooling - might it have been possible to actually do the tooling after the shrinkage, but while the leather is still wet?

<Diarmuid> While I am fairly confident in that statement, I have some thoughts that it might be possible to place formed leather in a press to do the tooling, even if simply soaked and baked dry (since tooling takes so long). It might be possible to do this as well when "overcooking" the

B. Hot Water Soaking:

The hotter the water you soak it in, the harder it will be when it dries. However, each bit of leather has its own point at which the water is TOO hot, and will be cooked by it. If this happens, your best bet is to keep it hot, and stretch it out on a form and let it dry.

It becomes very hard and brittle, but that's the penalty for over ambition. I tend to get it about as hot as I can stand to put my hand into, and maybe a trifle hotter, but as long as it doesn't burn me, I assume it shouldn't burn the leather. <Kendra of HollyOak> Reed goes into detail about the physical/chemical makeup of leather and the effects of wetting/heating. Leather which is simply soaked in room temperature water and then shaped and dried gets harder (not that hard) and retains its form. The hotter the water, the more structural changes you get which results in harder leather. Experiment with scraps to find the right temperature.

C. Boiling Water Soaking:

If you decide that you WANT to place your leather into BOILING water, and be warned that many people consider this a patently STUPID thing to do, you will want to be prepared to have your leather shrink and harden very quickly.



I would advise actually placing the whole form you are working with and keeping it in the boiling water for not more than about 2 minutes. What this does is to cause chemicals in the leather to liquefy and polymerize (see later discussion below) until it shrivels into plastic hardness. I wish to specify this since I, at least, try to *avoid* having my heat treated leather shrivel up into a plastic mass because it's more difficult to manage.

DO NOT dip leather in BOILING water — UNLESS you know what you are doing!

D. A Variation on C:

If you take cold formed leather and while it is still on the form and pour REALLY hot water over it, letting it drain off (say fresh from a coffee maker), it will scald the surface of the leather and harden the outer layer without altering the inner layers at all. By the time the water's soaked the rest of the leather, it has been cooled (by having to heat the leather) sufficiently that the temperature's dropped back down to the 120-140F range.

E. Baking:

According to J.W. Waterer, Cuir Bouilli is made by soaking *vegetable tanned* leather in water until it is thoroughly water logged, then molding it to form and drying it in a constant temperature of 50C (or 122F). Baking the wet leather can make it even harder, say in an oven, but you run the risk of steam scalding it and making it shrink (as per C, though see below).

Play with scrap pieces until you get the temperature about what you feel is just right, and then bake your pieces, tied to the forms with string, stitched, or nailed in place. Reed goes into a bit of detail about the structural/chemical changes involved, and why it must be vegetable tanned leather. The key factor is the heating, and the presence of water may play a part. As far as I can remember, neither author mentions the use of wax or oil. Unfortunately, neither author mentions anything about the basis for these descriptions. Since cuir bouilli was still in use until fairly recent times, these descriptions may be based on methods of the recent past which they assume to be carry overs from medieval methods.

Page 79: "Some of the properties of vegetable tanned leather have already been mentioned. If the tannage is sufficiently long, the leather tends to be full, with a round and generous handle: i.e., it is a filling tannage. It shows high resistance to perspiration fluids (accounting for its use in various parts of shoe construction, e.g. the insole),

Broken Bridge Activity Calendar

October 1997

- 10/3 Brewing Workshop:** (First Fridays, call to confirm, 7:30pm) at 190 Ocean Parkway (between Abelmale Rd & Church Avenues), Brooklyn, NY. Take the F train to Church Avenue station, walk down Church (past "Rite Aid") to Ocean Parkway, turn left. Please call Ben Rivera at (718)436-6278 for additional directions. Crash space is available on a limited basis, please call ahead if you require crash space, and please bring your bedroll.
- 10/6 Sit & Spin - Hands-on Spinning Workshop:** (7:30pm) at 85 Eastern Parkway, apt 1G (bell #06), Brooklyn, NY. Take the 2/3 train to Eastern Parkway station, walk up and over the hill. Please call Pacita Prasarn at (718)857-4732 for additional directions.
- 10/13 Garb Fitting:** (7:30pm) at 85 Eastern Parkway, apt 1G (bell #06), Brooklyn, NY. Take the 2/3 train to Eastern Parkway station, walk up and over the hill. Measurements will be taken for canton Gold Key, and there will be a discussion of period cloths & styles, published patterns (and suggested yardage for cloth & trim), in preparation for the Stitch & Bitch on 10/27. Bring swatches of cloths and trims, if you have them (just ask for swatches at a fabric store when you see a cloth you might like to wear, and keep track of where you got them), and pictures/sketches of ideas for styles. You don't have to sew to borrow garb. Please call Criss Ittermann at (718)436-6278 for additional directions/information.
- 10/13 Commons Meeting:** (8:30pm) at 85 Eastern Parkway, apt 1G (bell #06), Brooklyn, NY. Take the 2/3 train to Eastern Parkway station, walk up and over the hill. Please call Pacita Prasarn at (718)857-4732 for additional directions.
- 10/19 Prospect Park Picnic:** (11:00am-?) at Prospect Park, bbq area near the 9th Street (Prospect Park West side of park). Bring armor, food, feast gear, table cloths, garb, etc. There are bathrooms nearby to change if necessary. Our Knight Marshal will be available, so we can have fighting demos for the mundanes. Please contact Criss Ittermann at 718-436-6278 for more information or directions. This activity may be cancelled if the temperature is below 40 deg. F or if it is raining.
- 10/20 Heraldry:** (7:30pm) at 85 Eastern Parkway, apt 1G (bell #06), Brooklyn, NY. Take the 2/3 train to Eastern Parkway station, walk up and over the hill. Please call Daniel Myers at (718)857-4732 for additional directions.
- 10/27 Stitch & Bitch - Hands-on Sewing Workshop:** (7:00pm) at 190 Ocean Parkway (between Abelmale Rd & Church Avenues), Brooklyn, NY. Take the F train to Church Avenue station, walk down Church (past "Rite Aid") to Ocean Parkway, turn left. If you have them, bring equipment, cloth, trim, patterns, etc. to make your own garb (attend Garb Fitting on 10/13 for material list suggestions), or help make Gold Key items with our materials while learning to design & sew garb. Participants will get priority when choosing from our Gold Key for loans, and will be able to make garments for our Gold Key in their own size and style. Please call Criss Ittermann at (718)436-6278 for additional directions/information. Crash space is available on a limited basis, please call ahead if you require crash space, and please bring your bedroll.

Attention:

This is a courtesy issue, and an attempt to mail to all members of Ostgardr. Our database is old, so in order to conserve postage & paper, the Incipient Canton of the Broken Bridge requests that all members send address confirmations if they wish to receive future issues of *Water Under the Bridge*. Please fill out the following form and mail it to:

Database Update
c/o Criss Ittermann
190 Ocean Parkway
Brooklyn, NY 11218

or call and leave a clear, loud message on the answering machine at (718)436-6278, 9am to 10pm.

We will soon be clearing out our database and discontinuing mailings to non-registered Ostgardr members. If you are interested in attending meetings and workshops in Broken Bridge, or receiving articles of interest to SCA'dians, we urge you to notify us in a timely manner.

Note: if you know of anyone who joined Ostgardr in the last two years, or is newly joining, their name may not be on our mailing list. Please let them know about *Water Under the Bridge* and give them a photocopy of the form below so they may receive our newsletter.

Thanks,
Criss

.....

New Member Confirmation Correction

Mundane Name _____
Society Name _____
Address _____

Phone _____

email address _____
Interests _____

Skills _____

Do you have spare gear/garb/fighting equipment? The canton has much storage space, and many new members who are as yet unequipped. Enclose a note regarding what you have, and what conditions you would be willing to part with or loan stuff under.

Would you be interested in an Adobe Acrobat version of our newsletter (email rather than paper & postage) when available?

Compiled by Diarmuid Ui Dhuinn (I. Marc Carlson/IMC@vax2.UTulsa.Edu), based on discussions and material from the *rec.org.sca* newsgroup.

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Cuir-bouilli

(Part I of II)

Cuir-bouilli (From the Oxford English Dictionary, 2d Ed.):

Forms: 4_5 quir-, quyr- boilly, -boily, -boily, -boile, -boyl(l)e, quere- boly, qwyrbolle, coerbuille, -boyle, 6 Sc. cur-, corbul_e. [F., lit. _boiled leather.'] Leather boiled or soaked in hot water, and, when soft, moulded or pressed into any required form; on becoming dry and hard it retains the form given to it, and offers considerable resistance to cuts, blows, etc.

The word was in common English use from 14th to 16th c., after which it is not found till modern times, when it appears as borrowed from modern French.

1375 *Barbour Bruce* xii. 22 *On his basnet hye he bar Ane hat off qwyrbolle.*

1386 *Chaucer Sir Thopas* 164 *Hise lambeux were of quyrboilly [v.r. quereboly].*

1400 *Mandeville (Roxb.)* xxvi. 123 *ai hafe platez made of coerbuille.* 1413 *Lydg. Pilgr. Sowle* iv. xxx.

(1483) 80 *A feyned hede formed of playstred clothe other of coerboyle.*

1513 *Douglas ?neis* v. vii. 77 *Thair harnes_thaim semyt for to be Of curbule corvyne sevin gret oxin hydys.*

1880 *C. G. Leland Minor Arts* i. 1 *Solid or pressed work, known as cuir bouilli, in which leather after having been boiled and macerated, or rendered perfectly soft, is moulded, stamped, or otherwise worked into form.*

1. How do I make Cuir Bouilli?

There are a number of suggestions for how to do this, and none of the following discussions are any more authoritative than any of the others. Essentially it arguably requires the proper sort of leather, carefully applied heat, and possibly some form of liquid. The final answer, is for you to use the method that *you* think is more appropriate, based on your final goals.

There is a great deal of confusion about the term "cuir bouilli" in the literature about leather. Some sources seem to think that it was shaped/hardened with wax, others by wetting, shaping, and drying. The best sources seem to be R. Reed and Waterer (R. Reed, *Ancient Skins, Parchments, and Leathers*; J. W. Waterer, *Leather Craftsmanship*; and J. W. Waterer, *Leather and the Warrior*) who seem to agree that cuir bouilli was formed by wetting and drying.

I would like to stress something that is often insufficiently stated, if stated at all, during the various descriptions of leatherwork in general, and in this case, specifically of the various ways to make Cuir Bouilli. Since we are dealing with an organic substance, and I refer to "organic" in more than its merely having once been alive, each piece is unique and will handle differently.

Two otherwise similar bits of leather can react quite differently. What this means is that you can do *everything* described hereafter perfectly and still have your project fail, or at least come out with a finished product that is not up to what you had hoped. Don't be discouraged. Leather hardening is not always a "cut and dried" science when dealing with the levels of technology we are working with.

A. Simple Soaking:

The first, and the easiest, is to soak the leather in cold water (as long as you want to, suggestions range from 15 minutes to 12 hours or longer) then form it and let it dry. This may not seem all that great, but if you've seen a vambrace after it's been sweated into after a summer, you know it can harden up quite a bit. If you tool the leather while it is wet, you will make it even harder (See F). Soaking leather to make it harder is really more appropriate for Vegetable tanned leather.