

## SECTION 4: THE WORK OF THE LACQUERER (*nurishi*)

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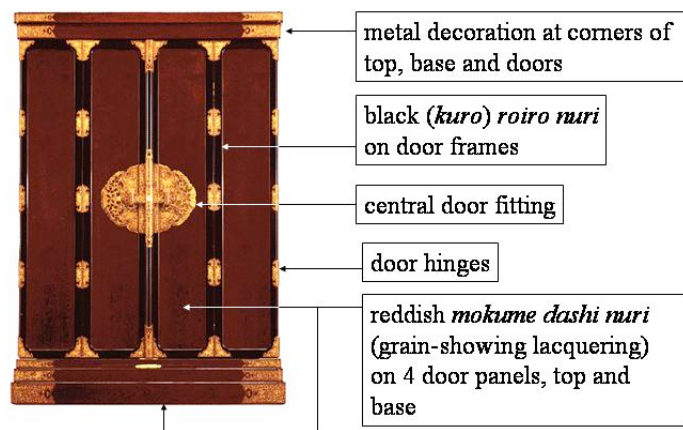
## REFERENCES and ACKNOWLEDGEMENTS

### INTRODUCTION:

In our discussion of traditional Japanese craftsmanship using *butsudan* making as an example, we have now covered the three wood working skills: making the body of the *butsudan* (*kiji*), making the Buddha canopy (*kuuden*) and making the carvings (*choukoku*). We will now move on to the lacquering skills. The first of these, lacquering itself will be discussed in this section. In part five, we will cover lacquer and gold picture making (*makie*).

In this section of the website as in the previous ones, our aim is to pass on what we have learned about the craftsmanship while also conveying something of the artisans' personalities and predicaments.

As we can see from the flow chart in the general introduction to this website, lacquering (*nuri*) is the 4<sup>th</sup> stage in *butsudan* production. After all the woodwork is finished, the pieces are sent to the lacquering artisan (*nurishi*) who coats them with lacquer (*urushi*) using various techniques depending on the taste and budget of the customer. All visible surfaces will be covered. *Urushi* is applied very thinly, so thinly in fact that 100 layers would be about 3mm thick. In general, though, the *butsudan nurishi* applies only two to five layers. It will then either be left as such or will form the foundation for gold leaf (*kinpaku*) or gold powder (*kinpun*). Since there is never any gilding on the outside surfaces of a *butsudan*, we often see lacquering in its full glory when looking at a closed *butsudan*. Two styles, which are commonly used in making a Hikone *butsudan*, are that of lacquering in plain black (*kuro nuri*) or, alternatively, using a clear lacquer so that the grain of the wood base shows through clearly (*mokume dashi nuri*). When put together, these two techniques can accentuate each other, creating a strikingly beautiful product.



*Nuri* photo 01: *butsudan* showing two lacquering styles [photo courtesy of Eirakuya (kk)] (see Kan photo 03)

In describing this part of *butsudan* manufacture, we are going to look at the workshop of *nurishi* Akimichi Teiji, his son Keiichi and nephew, Tsuji Yasuo. They are

interesting not only for their positive attitude to the economic situation, as seen from their encouragement of younger artisans and their diversification away from purely *butsudan* related work, but also because of the high quality of their techniques. Teiji, says, "Among the *butsudan* artisans, the lacquerer does the hardest work, because the process has so many complicated procedures and because a lot of space is needed." However, there might be another reason. With the physical processes of woodworking, which we have already studied, success or failure can be determined and corrected immediately. Conversely, lacquering is largely a chemical process, where the outcome depends on the quality of the raw materials, the weather and even, as Teiji says, his "mental condition." Sometimes it can take hours or even days to see the end result. By that time it may be difficult to trace the cause of any fault. This is especially the case with Japanese craftsmen who tend not to keep written records. Many of the techniques are used without the artisans really knowing why. And since Japanese apprentices traditionally learn as much by example as by verbal instruction, just the fact that "it works" is meant to be enough.

Therefore, before going on, let us look at some of the pitfalls experienced by both the apprentice, and the qualified artisan.

a) As anyone who has ever painted a door knows, vertical surfaces can present problems. Even small ones like drawers sides have to be done carefully. "I always tell my son that you can paint the bottom surface thickly," says Teiji, "but in the case of the side surface, if you lacquer thickly, the *urushi* will drip down and pool in the corners. So Keiichi has to grind the surface flat, but some of the undercoating is showing through, so he'll have to fill the cracks before re-lacquering. After several failures," sighs Teiji, "he will understand."

b) In addition, if an apprentice is doing the work, the standard may not be up to scratch. The wholesaler might check it during the assembly process and send it back saying, "I'm not satisfied with the finish. It has to be done again."

c) There are also occasional cases when something put in the drying chamber (*muro*) for two or three days does not dry. In that case there is no other choice but to remove the lacquer by applying thinner. "This problem happens when lacquer has some oily element in it," explains Teiji. "Usually brushes for lacquering are dipped in rapeseed oil after use so that they don't become hard. When they are used, the rapeseed oil is squeezed out and rinsed well in lacquer and then used. But when this isn't done enough, the brushes will have some oil left in them and the problem happens. It is rare, but even I have this problem once in a while."

d) "And once," he continues, "as a young artisan, I had to coat a children's ceremonial float (*mikoshi*). I applied hardener (formalin) onto the base coating, without diluting it and it became too hard and was difficult to grind. So apprentices aren't the only ones who can have troubles."



Teiji as a young artisan  
lacquering a door

*Nuri photo 02: A young artisan [photo courtesy  
of Hikone *butsudan jigyou kyoudou kumiai* (*kumiai*)]*

Furthermore, there is another potential drawback or even a serious hazard to working in the lacquering industry: *urushi* allergy. It can be experienced when the *urushi* is first applied or even half a century later during repair, when the old lacquer is ground away. Young artisans are the most likely to experience it, and although gradually they can become immune, it has been known for an apprentice to give up the work because the effects were so debilitating. The skin becomes itchy and a little puffy, but of course scratching must be avoided. It is most likely to be felt on the tender parts of the skin such as the inside of the arm, the face and the top of the hand. One artisan complained rather graphically, “When I was a beginner during working, if I went to the toilet even that part could get a reaction. And after finishing work, if I washed my hair in the bath, the scalp would react too. My master told me, ‘if you drink a little *urushi* you’ll get used to it.’ So I tried, but it wasn’t effective at all. If a young lacquerer gets married, the young wife can have a reaction too. Some people experience *urushi* allergy a little even after they’ve been working with it for years.”

As has been mentioned in the website introduction, the Hikone *Butsudan* Cooperative Association (*kumiai*) works diligently to promote the industry, both by encouraging young people to become apprentices and by giving prospective customers a chance to understand what is involved in *butsudan* making. In this capacity they operate an “Experience Corner” for the general public when they put on their yearly exhibition. However, until recently they have avoided anything to do with lacquering, for fear of unsuspecting people suddenly being afflicted with the allergy. Since both lacquering (*nuri*) and lacquer picture drawing (*makie*) use *urushi*, they were omitted from the range of “experiences” offered to the public. Of late, however, they have been included, but not without adequate warnings. Customers value the opportunity to watch and participate in all *butsudan*-making processes.

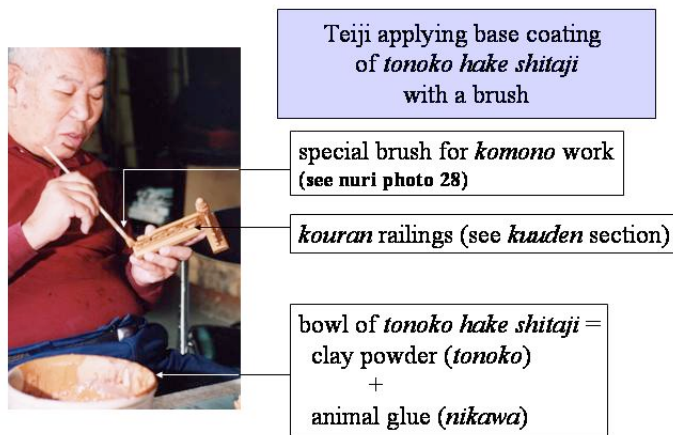
Historically speaking, lacquering is in an interesting situation because over the years, a lot of artisans who started as lacquerers expanded into manufacturing. Furthermore many still do both jobs. This is not so much the case with the other artisans and it has come about for two reasons. One is that all parts of the *butsudan* pass through the lacquerer’s hands. First, he receives all the wooden components, *kiji*, *kuuden* and



*choukoku*. After treatment he passes them on to whichever artisan comes next, the gilder (*kinpakuoshi shi* and *fundame shi*), the picture artisan (*makie shi*) or the metalworker (*kanagu shi*). Thus the lacquerer is ideally placed to liaise with all six other artisans and hence to expand into manufacturing. The second reason concerns the cleaning process (*sentaku*). A *butsudan* in need of cleaning and repair will often be returned to the *nurishi*, who can actually do most of the work. Cleaning can be done on the gold, lacquer and metalwork at the same time. Minor repairs to the woodwork fall into the same category as the lacquerers' wood preparation. Following this, the major job will be re-lacquering the whole *butsudan*. Then, acting again as coordinator, the *nurishi* simply organizes any necessary gilding and *makie* to be re-done. So it is with both of the Akimichi businesses.

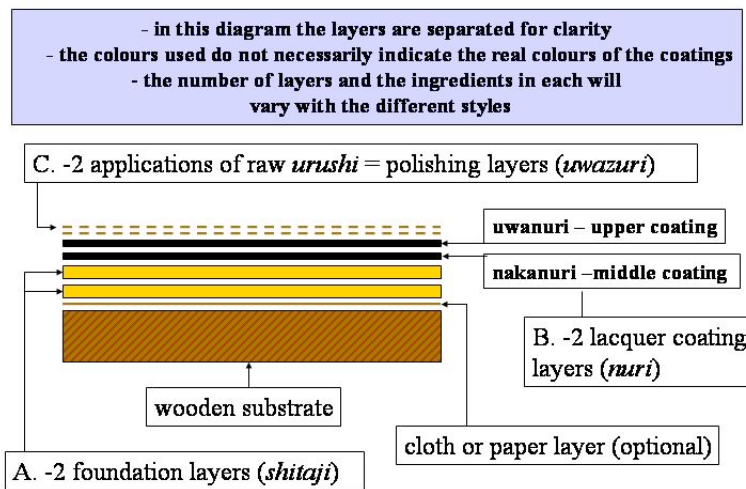
Teiji's father established the workshop, Akimichi Nurishiten, between Taisho 10 and 11 [1921-22]. Since then they have developed a reputation for the high level of their lacquering skills. Also, in their capacity as a manufacturer, Akimichi Butsudanten, they take pride in using only top quality materials to make *dentouteiki kougei hin* (DKH: see intro) *butsudan*. Teiji says, "Some makers use low quality materials on hidden parts. But I use top quality *hinoki* for all the main pieces. Only the insides of the drawers are made of a lesser quality wood." He repeats emphatically, "And I never use plywood!" In any case, without doubt lacquering is hard, requiring considerable skill, stamina and concentration.

The complete job for a high quality DKH item takes two months, working six days a week. It is significant that in the past, with only two holidays a month, this workshop often toiled until midnight or even 2:00am. Those were the halcyon days, more than 20 years ago, when *butsudan* were in great demand and the backlog of jobs could be many months. "Now," as Teiji explains sadly, "the stopping time depends more on the 'stream of work'. For example if I start lacquering four doors, I must work until they are finished, because by the next day the colour of the lacquer will be slightly altered. Then the work depends on the specific qualities of my technique on that day, I mean the sensitivity of my touch, for example pressure, speed, feeling or mood or hunger..." Teiji, who is 65 years old, says, "These days, I do only grinding or coarse sanding. I let my son or nephew do the delicate polishing. Polishing is difficult when we don't have enough natural oil in our hands. My father used to eat meat the night before the polishing day. I think it doesn't make any difference. Anyway polishing is hard, tiresome labour." These days, he prefers to work on the small pieces (*komono*).



*Nuri* photo 03: Teiji working on small pieces (*komono*)

Before going on to look at style, tools, materials, and finally the whole lacquering process, let us consider exactly what the word “lacquering” means. We talk about lacquer as a coating material, or *urushi* in Japanese. We can also talk about lacquer as a style of coating, meaning the whole process. In Japanese that is *nuri*. Actually the application of the *urushi* coating is only a part of the whole lacquering process. From *nuri* figure 1, we can see how the layers accumulate in the stages described below.



*Nuri* figure 01: lacquering process

a) The foundation or base stage (*shitaji*) consists of two or three layers and actually accounts for the majority of the total thickness, up to about 2mm of the total 3mm. Before any filling layers are applied, an optional layer of cloth or paper may be put on high quality products or on a large area where it is deemed necessary to prevent warping.

b) The lacquering stage (*nuri*) is where the coating material (*urushi*) is applied. In the Akimichi workshop, they use 2 layers. This is common practice for *butsudan*

production. For all lacquering styles, the total thickness might be 1mm but where it is polished, as in *roiro* finishing, some of this might be lost.

c) The final polishing stage (*uwazuri*) is where raw *urushi* is applied several times and then polished. The number of layers can vary and the total addition to the thickness is negligible.

Either wet or dry grinding or polishing takes place between most of the above coatings. Now, with this overview in mind let us discuss style and then the tools of the trade.

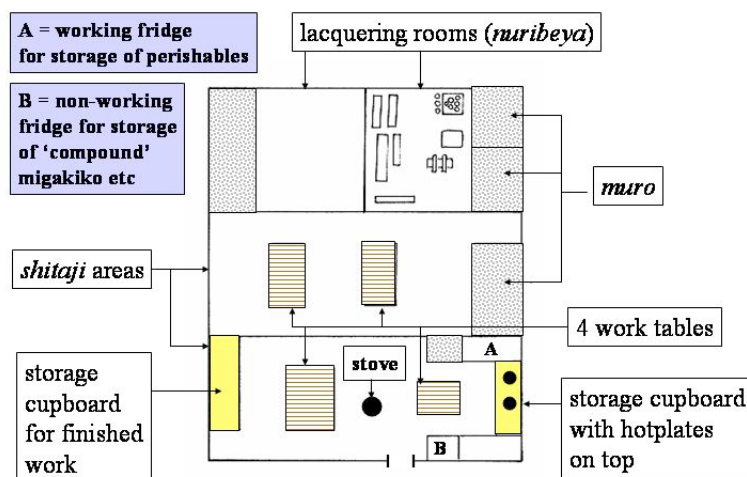
#### 4.1 STYLE:

Of the lacquering (*nuri*) styles we are going to talk about, the ultimate skill is said to be required for a black, highly polished finish (*kuro roiro* lacquering). Another popular *nuri* technique in Hikone is to show off the beautiful grain of such woods as *keyaki* by coating it with a clear lacquer. We will also touch on the *nashiji nuri* technique where the surface is made to look like the skin of a Japanese pear (*nashi*). Sometimes the surface is left unpolished (*tatenuri*) and on occasion, as a special procedure, it is prepared so that the grain texture is apparent under the gilding layer (*mehajiki*).

Naturally, over the years, each workshop will perfect its own special styles. One of these, introduced by Teiji's father, was that of not putting metalwork on the corners of the top and base of the *butsudan* (cf *Nuri* photo 01 and *choukoku* photo 09). The metal decorations, which are a feature of Hikone *butsudan*, have two functions. One is purely decorative and the other is to cover the inferior lacquering skills of the craftsmen. Where joins in the wood base have not been prepared properly (*warikokuso*), cracks can appear in the lacquer years later. Teiji explains, "In some Hikone *butsudan* they don't do good lacquering where it doesn't show. In Kyoto there are only a few *butsudan* makers and they are more like artists than artisans. So only a few are made there. The rest are produced in Hikone. For Kyoto style *butsudan* made in Hikone, the lacquering is done very meticulously everywhere, not just in the visible places. For the *butsudan* we make here, we follow the usual technique of Kyoto *butsudan*, as established by my father, and we do not put metal fittings on the corners. Other lacquerers put them on but we don't. So we don't put any on the doors either. If there is metal on the top and base, there should be some on the four front doors for balance."

#### 4.2 EQUIPMENT:

Like those of the artisans we have already discussed, the Akimichi workshop consists of workbenches littered with tools and materials, storage cabinets and stacks of oddly shaped pieces of wood in various stages of lacquering. However, functionally it is clearly divided into two parts.



Nuri figure 02: layout of Akimichi workshop

There is a large working space where things can be left lying around, doors and windows can remain open and people can come and go. This is the *shitaji* area where the first stage of preparation work and the last stage of polishing are done. In this place there is no worry about dust. Anything sticking to the damp, newly coated surfaces can be sanded off.



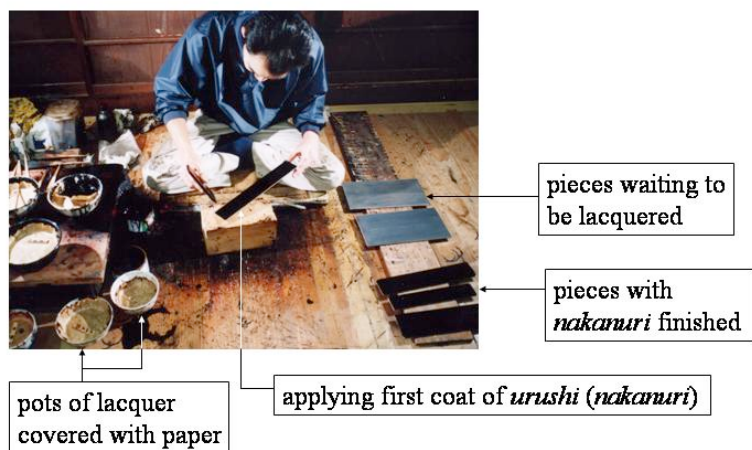
doors with a beautiful grain will have grain-showing lacquering

water grinding the frame with whetstone

Teiji's son, Keiichi doing base making on door frame

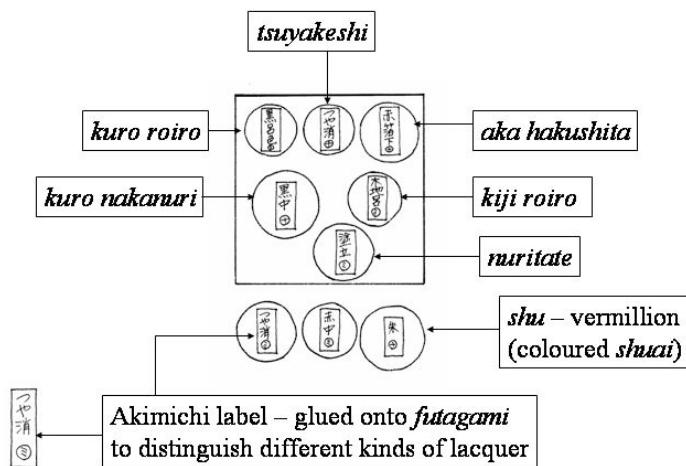
Nuri photo 04: Keiichi working in the *shitaji* area

On the other hand, the middle stage, the application of lacquer, must be done in a totally dust-free environment. Consequently there is another area (*nuribeya*), further subdivided into two and closed off to all but the artisans. Here, the word “dust” sends the craftsmen’s blood pressure spiralling. Here, the *nurishi* sits cross-legged on the floor surrounded by *butsudan* components waiting for treatment laid neatly out on battens, brush and spatula cleaning equipment and bowls of different kinds of *urushi*.

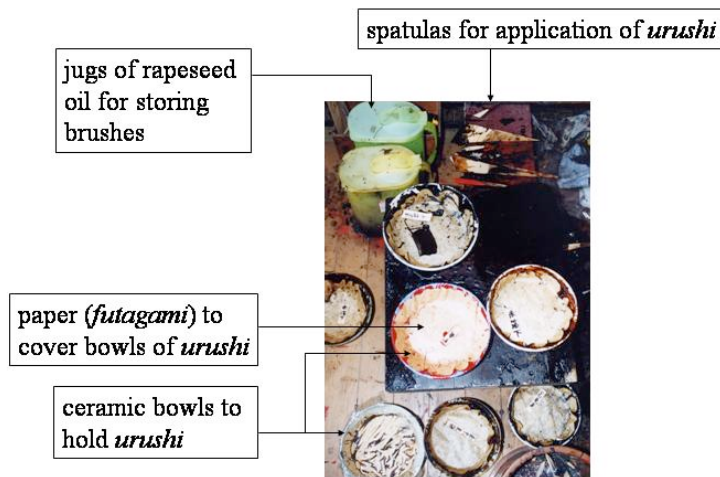


*Nuri photo 05: Teiji's nephew, Tsuji Yasuo, working in nuribeya*

Each pottery bowl, covered by a lid made of special paper (*futagami*), is about 12 to 13cm in diameter. The kind of *urushi* is written on a label on the lid. The name of the seller is also marked, so *urushi* from different companies will not be combined. The lacquers are all mixed and ready to use. They all contain some slow drying element (*osokuchi urushi*) so they will not harden in the two weeks or so before they are used.

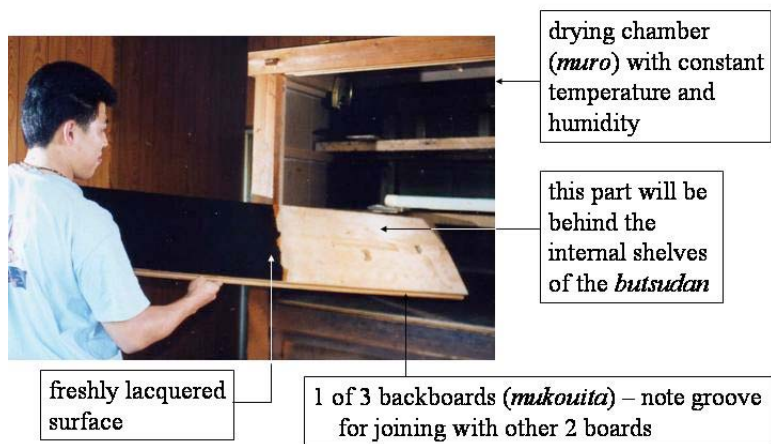


*Nuri figure 03: pots of lacquer (for meanings - see section on types of lacquer)*



*Nuri* photo 06: pots of lacquer

When the lacquering is finished and the coatings are completely dry, the third and final stage of polishing is carried out once again in the *shitaji* area. But before that, to stop any risk of dust getting onto them, as soon as the lacquer coating has been applied, the pieces are put into a drying chamber (*muro*) by direct access from the *nuribeya*. This chamber, which has a constant temperature and humidity, will be considered first.



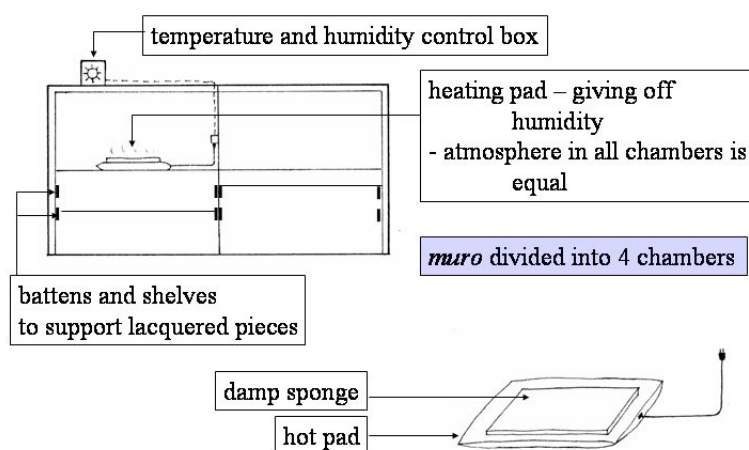
*Nuri* photo 07: putting a board into the *muro*

As will be discussed later, it is a curious fact that *urushi* hardens or “dries” by chemical changes taking place in the film, which require moisture. If the humidity is too low, the *urushi* may never lose its tackiness. If the humidity is too high, it will dry too quickly and the surface will wrinkle. Thus there is a fine balance between the qualities of the coating materials themselves and the conditions under which they are “dried.” The *muro* is at least part of the solution. The Akimichi workshop has two lacquering rooms, each with its own *muro*, and there is another one off the *shitaji*



area. All *muro* are subdivided both horizontally and vertically, where flexibility of sizing is important to accommodate large or small pieces with maximum efficiency of atmospheric control. For example, one *muro* consists of four compartments each measuring 140cm (deep) x 94cm (high) x 185cm (long) with sliding doors. Battens on the walls allow for the installation of moveable crosspieces to hold the drying components.

The equipment to make the *muro* humid consists simply of a flexible electric pad with a sponge sheet laid on top. The sponge is wetted, wrung out and put on the heating pad. Then the pad is placed on the floor of the *muro* and plugged in. The moisture coming from below the drying pieces is regulated by the temperature control box, which is situated on top of the *muro*. The temperature controls the rate of evaporation from the wet sponge and thus the humidity. Therefore, if it is set for 70%, the pad will heat up just enough to make the water evaporate from the sponge and create the right humidity. The condition of the *muro* is always kept at the same temperature and humidity, ideally 25-30 degrees C and 80-85% humidity. It is never switched off.

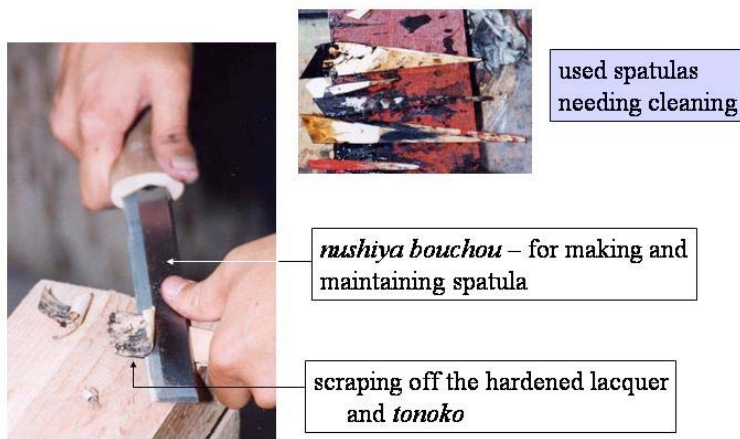


*Nuri* figure 04: equipment to control the humidity in the drying chamber (*muro*)

In the following section, we will first describe the *nurishi's* tools and then explain the materials, divided according to the processes in which they are used.

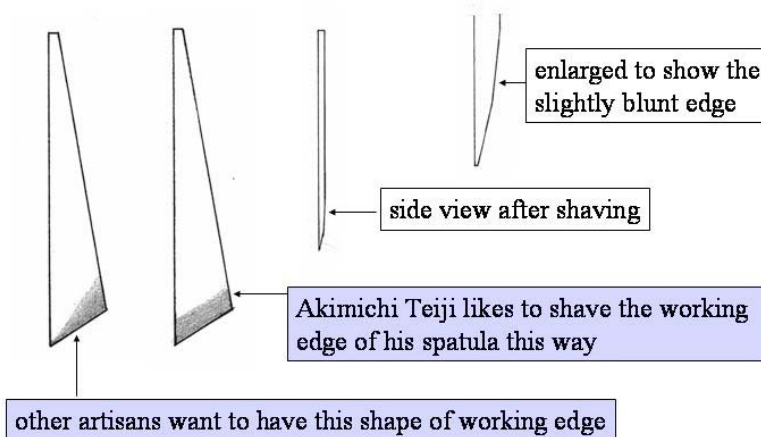
### 4.3 TOOLS:

1. **Lacquerer's knife** (*nushiya bouchou*): The *nushiya bouchou* is a knife for making and maintaining spatulas as well as for cutting the polishing and grinding materials such as charcoal. This tool will be used each time lacquering work is done. Old hardened lacquer must be scraped off the spatula that will be pared down to sharpen it before it is used again.



*Nuri* photo 08: Keiichi cleaning a spatula

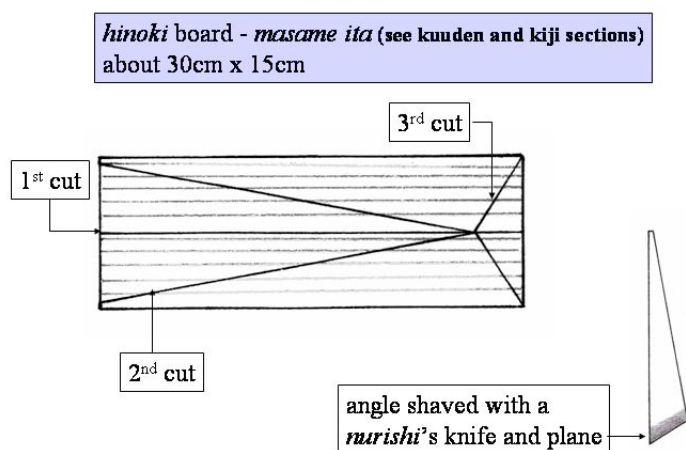
2. **Spatula** (*hera*): The wooden spatula (*hera*) is used to spread lacquer onto the substrate. Making spatulas is where the beginner starts. “When a new apprentice comes to my workshop,” says Teiji, “I give him the knife and a piece of *hinoki*. I let him make spatulas to suit himself. He will gradually learn, by himself, what width or angle of the blade are good for him.” The size of the spatula varies according to the size of the piece of wood being treated. For the angle of the working edge, each artisan shaves the wood to a different angle according to what suits him.



*Nuri* figure 05: ways of shaving the angle of the  
spatula

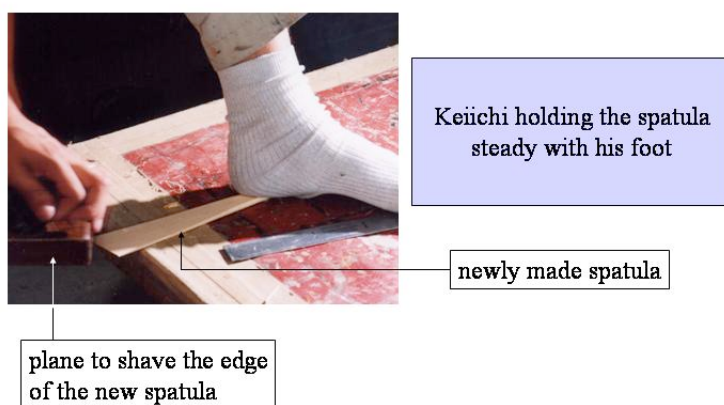
To make a spatula, the lacquerer buys a piece of cypress (*hinoki*), which instead of being sawn, has been split with a hatchet so that it has a straight grain (*masame ita*) (see *kiji* and *kuuden* sections). The *hera* is used with moist materials, so if it is not made of *masame ita*, it will warp easily and cannot be used on flat surfaces. The spatula is made as follows, using a saw and the *nushiya bouchou*:





*Nuri* figure 06: making a spatula

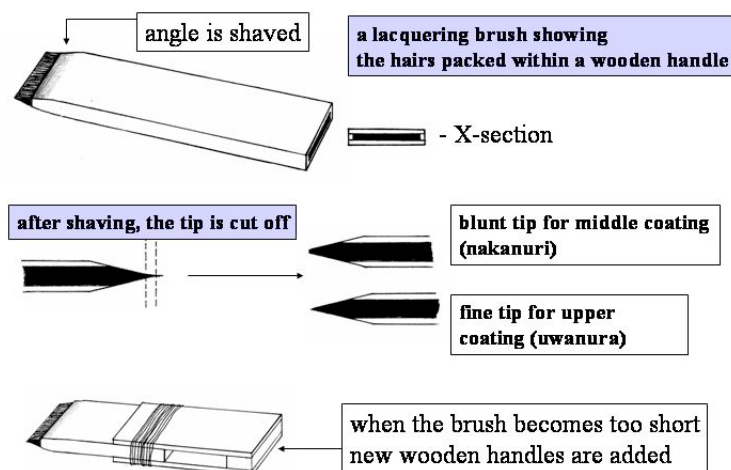
- The longest edge is cut parallel to the grain. If it is cut the wrong way, the tip of the spatula will break easily and be difficult to use.
- The triangular shape is made using two more cuts with a saw.
- The narrow edge of the triangular piece of board is planed to make the working edge thin.
- With the *nushiya bouchou* and a plane, the working edge is shaved and trimmed to get the sharp edge favoured by each individual artisan.



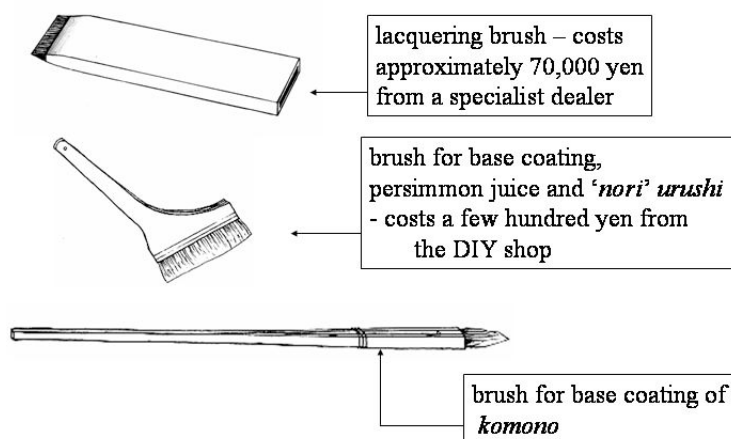
*Nuri* photo 09: shaving a newly made spatula (*hera*)

3. **Brushes** (*hake*): Brushes are made with human hair packed between pieces of wood. It must be natural hair, thick and straight. The wood is shaved with a lacquerer's knife to angle it and trim the hair to a point. Then the point is sliced off. The length of hair is about 0.5cm. The brush for the middle lacquering stage (*naka nuri*) is blunter than for the final coating (*uwanuri*). Some say baby's hair is best for a small sized brush for *uwanuri*. The shape of the handle can also vary. For lacquering small items, where flexibility is required to get into grooves, bamboo strips are used

for the handle instead of wood. The width of brush is from 0.6cm (2 *bu*) to 6.0 cm (2 *sun*), as is the handle. Teiji's nephew, Tsuji Yasuo, says, "For many years we haven't bought a brush so I don't exactly know the price of one. But perhaps a 1*sun* brush would cost about 30,000 yen. We are using the ones my uncle bought. When a brush becomes short after being pared (shaved) down for many years, we put it between two pieces of wood and bind it with wire to make it longer and we continue using it."



Nuri figure 07 (a): making a brush

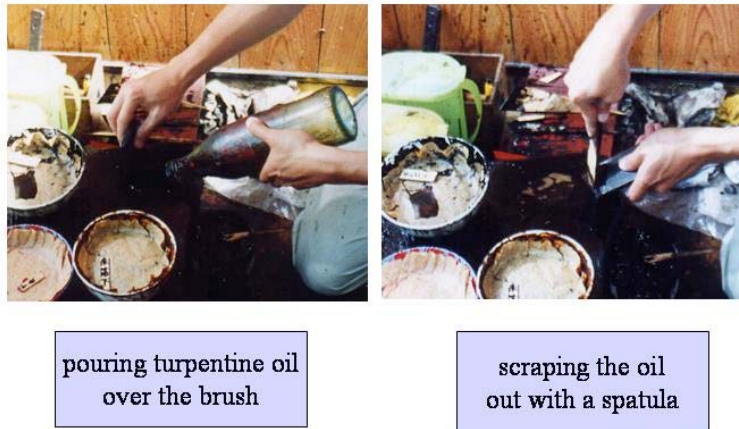


Nuri photo 07 (b): types of brushes (not in proportion)

However, clearly the cost of the brush is related to its size and the skill of the maker. Another artisan says, "We can't get high quality brushes any more because the skilled makers have died. Good quality brushes are made in Izumi, the old name for the southern part of Osaka. The price for 1 brush of that type is from 70 to 100,000 yen or even up to 300,000 yen. But we can use this one brush for decades."

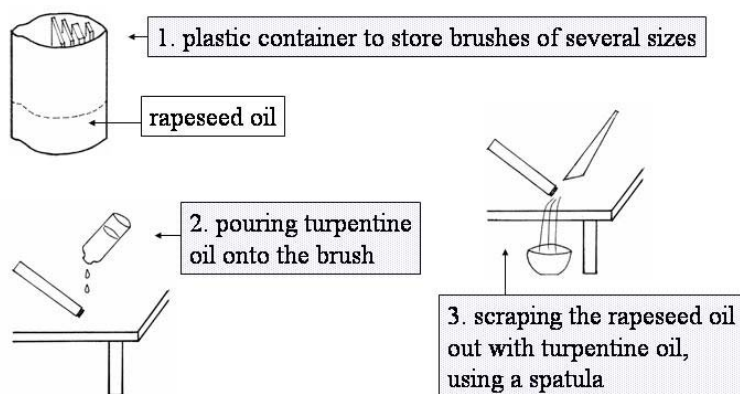
"Lacquering brushes are one of the most precious properties of a *nurishi*," says Yasuo, "so we look after them." When he is about to start work, first he cleans the brushes repeatedly by pouring on turpentine oil. Then at the corner of his working

table, he scrapes the oil out of the brushes with a spatula into a container below the table.

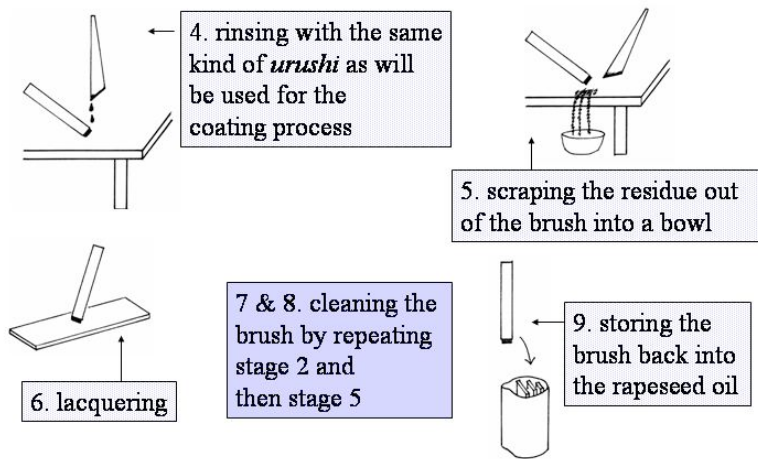


*Nuri* photo 10: getting ready for lacquering

After he finishes the work he cleans the brushes again and stores them in a container of rapeseed oil.



*Nuri* figure 08 (a): care of brushes and preparation for lacquering



**Nuri figure 08 (b): preparation and cleaning up after lacquering**

**4. Turpentine oil:** Turpentine oil is a distillation of the sap from the bark of conifers such as *sugi*, *hinoki* and pine. The volatile liquid, in the oil form, can be used as a solvent for *urushi*, to clean brushes and spatulas.

**5. Paper:** There are two main types of paper in common use for lacquering. Firstly, “lid paper” (*futagami*) is used to make the circular lids for the *urushi* storage containers. One roll of paper, 80cm wide, which can be bought from the *urushi* seller costs 3,000 yen and lasts for about 10 years.

Secondly, the Japanese paper, which is used for wood adjustment in stage A, is Echizen *washi*, produced in Ishikawa prefecture. It is hand-made, thin and very durable, and thus excellent for treating cracks and joins. “We have so much,” says Teiji pointing to rolls of paper stacked up on a shelf, “but if we use all of it I don’t know where I can get more these days. I don’t know if they are still making this kind of paper. But I can use paper from a ledger book.”

#### **4.4 MATERIALS:**

Although some overlap exists, materials are divided into three categories. Grinding and polishing materials are used in all three stages of lacquering from base making through coating to polishing, so they will be discussed first. Next we discuss adhesives and binding materials, as well as fillers because they are used in the base making processes (*shitaji*). Finally, we discuss in detail various other aspects of *urushi* as a coating material, such as collection, refining and function.

##### **4.4.1 Materials for grinding and polishing:** (the stages referred to can be found in Nuri fig.24)

In the old days, charcoal of different textures would have been used for all grinding and polishing purposes, except in the very finest polishing processes, where deer antler powder (*tsunoko*), or just fingertips were used. Below, we will outline these traditional products, including some of the drawbacks to them. Then we will mention their modern replacements. These materials are used for all three stages of lacquering.

a) Sandpaper is the modern material for stage A: base making (*shitaji*): Sandpapers are waterproof and are numbered in inverse order according to coarseness: the higher the number, the finer the grade. They are used for grinding (sanding) in the base coating processes.

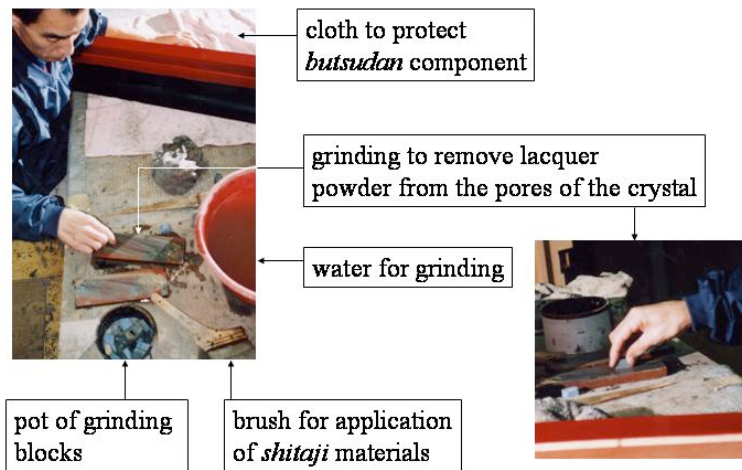
b) Charcoal is the traditional material for grinding after stage B: lacquering with *urushi*: “We used to grind with charcoal,” says Teiji, “but about ten years ago we couldn’t buy it anymore. And anyway, there were problems. Even with a bucket full of charcoal pieces, only half are useful. The others will be too small or break easily.”

However there are some occasions when he still prefers charcoal, especially for grinding the surfaces before gold leafing and also sometimes for high-level *roiro* finishing. Charcoal comes in two grades: coarse (Shizuoka) and fine (*roiro*). After cutting the charcoal block, he uses water and a whetstone to make it smoother and then it is good for polishing. On the other hand, he can also use charcoal powder applied with a damp cloth.

Teiji uses Shizuoka (Suruga) charcoal, which is coarse, for the finishing processes before gold leafing. Less often, he uses finer quality *roiro* charcoal for *roiro* finishing. The charcoal is made from the Snowbell tree (Chishakake) or *hou* (see *kuuden* section). “Those trees have a fine grain,” explains Teiji, “and they tend to grow slowly, so the charcoal doesn’t break so easily into small pieces. Fine grains don’t leave marks on the lacquer surface when they are used. However the finest grade of *roiro* charcoal used for the finishing cracks and breaks very easily. When I cut the pieces with a *nushiya bouchou*, about half of them will break and be useless. The pieces must be big enough to hold. When we use the fine powder of *roiro* charcoal in the polishing process (*douzuri*), we use it with a slightly dampened flannel.”

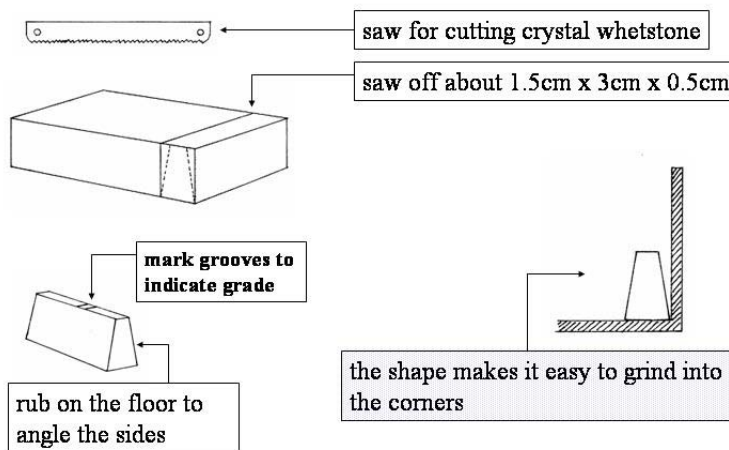
Consequently, with all these problems, it is easy to see why, when crystal whetstone (*toishi*) came onto the market about 10 years ago, it was deemed preferable.

c) Whetstone (*toishi*) is the modern replacement for charcoal (used for grinding after stage B: the lacquering stage with *urushi*): The crystal whetstone (*toishi*) comes in different grades - 400 (coarsest) - 600 - 800 - 1000 - 1500 - 2000 – 3000 (finest). Every artisan uses these grades to suit their skills and their purposes. For example, Teiji says, “I use 2000 for *roiro* grinding, while young apprentices use 1500 and then they use 2000. They do two separate processes.” While using the *toishi*, the pores become loaded with powder from the material being ground, so it is dipped in water and rubbed on another grinding stone to remove the powder.



Nuri photo 11: Yasuo cleaning crystal whetstone

To prepare the whetstone for grinding, Teiji cuts it with a saw into blocks about 1.5cm x 1.5cm x 3cm and then rubs it against the cement floor to make the trapezoid shape which makes polishing into right angled corners most effective. Then he marks the surface of the crystal whetstone, with a groove to show what grade it is; thus two grooves show it to be grade 2000, which is the finest he uses. “Young apprentices,” he adds as if the good old ways are dying, “write the numbers ‘1’ or ‘2’.”



Nuri figure 09: making a crystal whetstone

d) *Tsunoko* is the traditional material for stage 3, final *roiro* polishing: Deer antler powder (*tsunoko*) was originally used for the final polishing processes. However about 10 years ago it became hard to get. However, Teiji says, “When we couldn’t get antler powder, we used tooth powder instead. Any very fine powder can be used because we use *tsunoko* to remove oil from the lacquered surface.” Although it is expensive, he thinks it is still available.



e) *Migakiko* is the modern replacement for *tsunoko*: *Migakiko* or *roiro* polishing powder is used these days instead of *tsunoko*. It is used to remove the excess *urushi* from the *uwazuri* process. It is easier to use than *tsunoko* and much less expensive.

f) ‘Compound’ is the modern replacement for *tonoko* (see filling materials): It consists of a paste with particles of different sizes. The compound in a can is a little coarser than that in a tube. It is used for the polishing (*douzuri*) process, which literally means “putting charcoal paste on a flannel and rubbing the lacquer.” Thus it is for giving lustre. It is applied with a dry cloth.

g) Hard cotton is both the traditional and modern material for stage A: base application of raw *urushi* (*shitazuri*) and stage 3: finishing coating of raw *urushi* and polishing (*uwazuri*). If soft untreated cotton is used for *shitazuri* and *uwazuri*, it will leave fine lint on the lacquer, so hardened cotton is better. Teiji breaks off a piece and makes it into a ball and rubs the surface. “In the past,” he says, “I bought cotton wool (*wata*) from a truck-driving peddler from Aichi prefecture and asked a cotton wool dealer of Echigawa town (in Shiga pref) to process it. I sent several *kan* (1 *kan* = 3.75 kg) of *wata* to the shop and I was surprised with the high processing cost of 400,000 yen. I’m still using that *wata*. The outside of it looked fine, but the inside was no good (*gomi wata*), so I couldn’t use it. My father used to buy cotton removed from second hand *futons*, which he got from a nearby rag dealer. He put the cotton in the used bathwater for one night, which made it hard, and dried it the next day and made the cloths. He sometimes put the cotton, which was removed from the *futon*, over the roof in the rain and made it hard. He didn’t use persimmon tannin or *funori*, like we do now.” “Hardened” cotton can be prepared in two ways depending on the desired “hardness” of the final product:

Firstly, persimmon juice-hardened cotton is used for the *shitazuri* process in base making. Hard cotton for *shitazuri* is *futon wata* or raw cotton which has been flattened, teased and seeds removed, dipped in diluted persimmon tannin and dried. It has no lint, but is too hard for *uwazuri*.

Secondly, *funori*-hardened cotton is used in the *uwazuri* process. When *funori* seaweed is boiled in water, the extract is sticky and forms an agar or jelly. This can then be diluted and used as glue. Hard cotton for *uwazuri* is *futon wata*, which has been dipped in diluted *funori* extract and then dried. It is still a little soft and some lint remains. But it doesn’t leave marks (*wata ashi*) during the application process.

#### 4.4.2 Materials for base making:

In the following recipes for base-making materials, we have used the information from the Akimichi workshop. The mixtures may vary between artisans and an exact recipe is difficult to come by since the artisans work by feel based on years of experience rather than by measure when they are mixing ingredients. Also, mixtures may differ according to quality of raw materials and weather. The situation is made more confusing by the fact that individual artisans have their own special names for the same mixtures.

a) Adhesives and binding materials:

i) *nikawa* is boiled hide of cow, deer or other animal. The liquor becomes solid at room temperature. Gelatine is the main constituent. Teiji, having a little grumble about the inferiority of modern day products, says “In the past animal glue (*nikawa*) was strong and sticky enough so we used only 18% of *nikawa* in the winter season. In the summer season we used to have to put in a little less water or more *nikawa* to make it thicker and prevent it from flaking off during the grinding process. But today’s *nikawa* is not strong enough, so even in winter I put less water and 20% *nikawa*. Also, in summer, we apply formalin liquid to the *shitaji* coating after drying, to prevent it from coming off when sanded. I learned it this way and I still do it.”

ii) rice glue is powdered (uncooked) rice + water, boiled until it reaches the consistency of a dumpling.

iii) “*nori*” or “*nori*” *urushi* is 3 parts rice glue (*nori*) + 1 part raw (*ki*) *urushi*, mixed with a spatula

iv) *sokkui* is cooked rice mixed with water then kneaded. It is not used any more because it takes too much time and effort to make.

b) Filling materials:

i) *tonoko* is ground powder of whetstone made of clay, slate or stone. The particles are very fine, like face powder. This can be used as a grinding powder, or when mixed with other materials, as a filler. It is sold in a block, so it has to be pulverized before use.

ii) *jinoko* is a mixture of rather coarse *tonoko*, diatomaceous soil and other kinds of sand. It is sold in a powder form.

iii) *tonoko hera shitaji* [thick base coating (*shitaji*) applied with spatula (*hera*)] is 4 parts *tonoko* + 1 part *nikawa* + water and a little pine soot (for colour). The *tonoko* and water are put into a ceramic pot and heated until they reach the consistency of mud, then *nikawa* is mixed in. It is applied with a spatula.

iv) *tonoko hake shitaji* [thin base coating (*shitaji*) applied with brush (*hake*)] is *tonoko hera shitaji* + water to make it thinner. It is made even thinner in winter. After mixing it is strained to remove particles

v) *jinoko shitaji* is 9 parts *tonoko hake shitaji* + 1 part *jinoko* + a little *nikawa*

vi) *kataji* is 4 parts *tonoko* + 1 part Chinese *ki urushi*. This is mixed to the consistency of soft chocolate before application. The exact ratio is by feel and varies between artisans. *Kataji* is used to fill any holes or imperfections such as might appear during the lacquering process. “Care must be taken,” explains Keiichi, “because if you put in too little *ki urushi* the dried *kataji* will flake off in the grinding process.”





*tonoko* comes in block form, so  
it must be pulverized before use

new spatulas

*Nuri photo 12: Keiichi pounding *tonoko**  
(1<sup>st</sup> stage of making *kataji*)



*tonoko* + water  
↓  
must be mixed to the  
consistency of mud

*Nuri photo 13: mixing *tonoko* with water*  
(2<sup>nd</sup> stage of making *kataji*)



*kataji* is used for  
wood adjustment –  
to heighten the effect  
of the wood grain  
(see Nuri photos 24 & 25 )

*tonoko* (4)  
+  
*ki urushi* (1)  
↓  
mixed to the consistency  
of soft chocolate

*Nuri photo 14: Keiichi mixing *kataji**  
(3<sup>rd</sup> stage of making *kataji*)

vii) *kokuso* is 1 part “*nori*” *urushi* + 1.5 parts *keyaki* sawdust. “For *kokuso* in my father's time,” says Teiji, “we used to use lint from inside kimono sleeves in addition to the sawdust.”

viii) *hachime* is 5 parts *tonoko* + 1 part rice glue + little water. This is to make the grain pattern clearer in transparent (*mokume dashi*) lacquering showing the wood grain..

c) Others:

i) formalin is 5ml of formalin is diluted with 300ml of water. It is used to harden the *tonoko* base coat. After drying, the spatula base coating can easily be damaged during water grinding, but formalin makes the surface hard enough to withstand the rubbing. It is especially important in summer, but Akimichi's workshop uses it both in summer and winter. Half a bottle cap of formalin will be diluted with half a bowl of water. “It is dilute but effective,” says Teiji.

ii) Persimmon juice is used as a base making material only in the case of transparent lacquering showing the grain, where it brings out the grain. It is also used to harden cotton.

iii) India ink is pine soot made from kneading roots and resin + animal glue (*nikawa*)

#### 4.4.3 LACQUER (*urushi*): AS A COATING MATERIAL

Lacquer-ware and lacquer work are an important part of Japanese culture. Yet what is Japanese *urushi*? According to an NHK survey, when asked where raw lacquer (*ki urushi*) comes from, most people did not know that only 1% is produced in Japan, while the other 99% comes from abroad, mainly from China, but also from Vietnam and Burma etc. Even by the end of Meiji Period, about 80 % of raw lacquer was imported from China.

The Akimichi workshop sometimes buys the pure Japanese product, but they always mix it; they never use it in its pure form. Keiichi says that Japanese *urushi* has more durability and gloss than Chinese *urushi*. Teiji adds, “In the bubble period, a 4kg tub of pure Japanese *urushi* cost as much as 300,000 yen. I bought 200,000 yen tubs twice over a period of time. In the period when the lacquering fee was higher, I used to mix this pure Japanese *urushi* with so called “made in Japan: *seslime urushi*” which is a mixture of Japanese and imported *urushi*. Now the price of pure Japanese made *urushi* is decreasing a little. I guess it is because lacquerers did not buy it because it was too expensive. We have used Chinese *urushi* for as long as I can remember and today I think the percentage of pure Japanese *urushi* has become lower than before.” “The greater the proportion of Japanese lacquer in the *urushi* mixture, the better the final product will be. If someone gave me an order for 100% Japanese lacquering,” says Keiichi with a smile, “I'd do it if they pay for it.”

The method of gathering lacquer is more or less the same in all countries, although the shape of the tools and the method of scoring the trees may vary. In any case, we will be looking at the Japanese situation.

## A. Gathering lacquer:

### a) Traditional method of gathering *urushi* - The “living” way:

This process, which took from three to four years, was typical of the Edo and Meiji periods in Japan. In the Edo period, many clans promoted the growing of *urushi* trees. They administered the plantations and planned the process of collecting *urushi* by the “living” method. The amount of *urushi* which could be collected in a year was small. However, a side income could be expected from by-products of the *urushi* trees (*Rhus* or *Sumac* families), such as candles made out of the thick wax layer surrounding the seed.

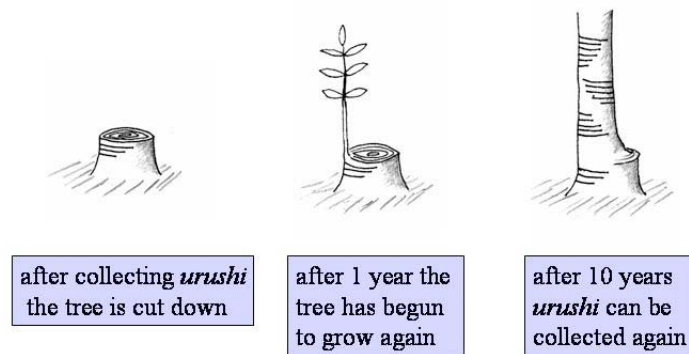
*The “living”-scoring process is as follows:*

1<sup>st</sup> year - from 10-12 deep scores (*hengaki*) were made on the whole tree. The *urushi* oozed out and was collected.  
2<sup>nd</sup> year - the tree was allowed to rest,  
3<sup>rd</sup> year - other *hengaki* scores were made and more sap was collected,  
4<sup>th</sup> year - deeper scoring (*urame gaki*) and final “stopping” scoring (*tome gaki*) were carried out and from then on no more *urushi* could be collected from the gouges. Then the tree was cut down and the remaining limited amounts of *urushi* could be collected from branches (*eda gaki*) and small scratches in the tiny branches (*seslime gaki*). This finished the process.

The four processes were carried out from July to Sept every year, which was the period when the trees were most active and thus secreted the most *urushi* sap. This period was between rice planting and harvesting so they did this work as a side job. But in this “living” method, the three to four year plan had to be strictly adhered to and the income from the by-products was small. So the “killing” method, which was more efficient and had a higher payoff per year, was adopted. Notably, the ‘living’ method is still carried out in China and Taiwan.

### b) The modern “killing” method of gathering *urushi*:

The “killing”-scoring method (*koroshi gaki ho*) of collecting *urushi* sap begins mid June and ends late November. Following a set pattern, trees that are about 10 years old are scored and sap is collected. In November the trees are cut down. The following year, new young trees sprout from the base and when the new trees are 10 years old the pattern will be repeated.

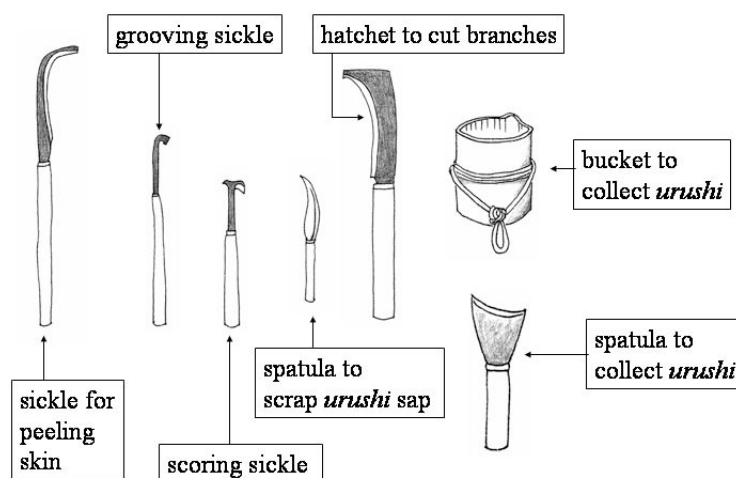


*Nuri* figure 10: cycle of *urushi* gathering (the killing method)

Each year, in late autumn or early spring, a manager visits the mountainous areas where there are 10-year old *urushi* plantations. He assesses the quality of the trees and offers the owner a certain price. Then he divides the trees amongst the scoring workers (*kakiko*) who make plans (*yamadate*) to do the scoring and collect the sap.

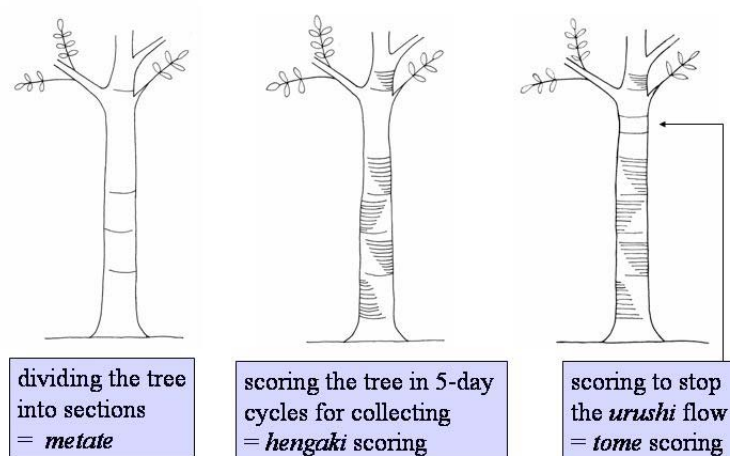
The number of trees per person per season depends on the circumstances of the place. Generally speaking, 400 trees are standard for 1 person for the whole season. One worker divides his trees into four parts and one of the portions (about 100 trees) is his working quota for one day. Thus it takes four days to complete his cycle and on the 5<sup>th</sup> day (day 1 of the next cycle) he starts again. So one tree is scored once every “five” days.

The “killing”-scoring process is as follows:



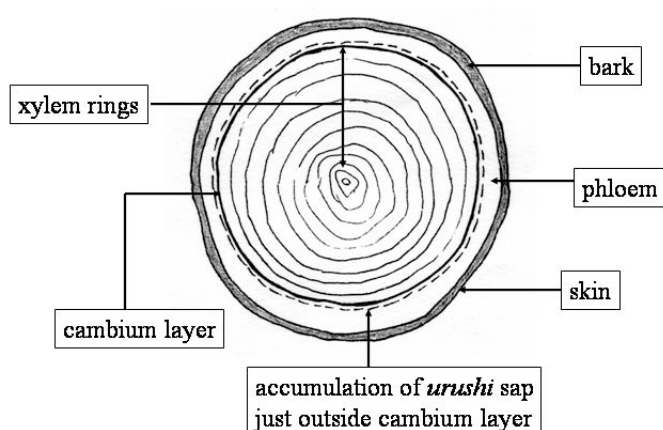
*Nuri* figure 11: tools for *urushi* gathering

1. The bark surface is smoothed using a “skin-peeling sickle” (*kawa hagi kama*).
2. Marks are made (*metate*) with a grooving sickle (*kaki kama*) to divide the tree into sections. No sap is taken from these scores. Usually for 1 tree, about 10 horizontal lines are made about 20-30 cm apart. This finishes the preparation. Some say that this *metate* activates the secretion processes in the tree.
3. The main work of sap taking is to make horizontal scores about 5mm apart, between the *metate* scores, working up or down the tree. This horizontal scoring (*hengaki*) can be divided into 3 periods from June to November. The three kinds of *urushi* taken from these horizontal scores are called *hen urushi* and their uses are discussed later.



*Nuri* figure 12: tree scoring

There are certain rules for when scoring can be done. During the day while the trees carry out photosynthesis and sap builds up, no scoring is done. Furthermore, on rainy days water could enter the tree through the scores, possibly killing it, so again, it is too risky. If the trees are scored on two consecutive days they will be weakened and production will stop or they become prone to disease. So they have to be left for at least three or four days, and scored once every four or five days on average. Workers say, “If you score the trees too often, you can’t get so much *urushi* and if you don’t score them often enough, you can’t get so much either.” Since sap production is a physiological process, naturally timing is important and the quantity of secretion is small. Some workers say that in the olden times people cut *urushi* trees and squeezed the sap out.



Nuri figure 13: cross section of a 20-year old tree trunk

A 10-year old tree is about 10m high, 15cm in diameter. One tree yields about 200g of *urushi*. The scoring and gathering of *urushi* is done before dawn and after dusk on the mountain slopes. Therefore collecting sap from more than 100 trees a day is very rigorous work.

For a short video clip of *urushi* collecting please visit the following web site:  
[http://www.isei.or.jp/Lacquer\\_Museum/urushi\\_lacquer.html](http://www.isei.or.jp/Lacquer_Museum/urushi_lacquer.html).

It is interesting to calculate the output that the *urushi* worker could expect in one season. It helps to explain why Japanese *urushi* is so expensive.

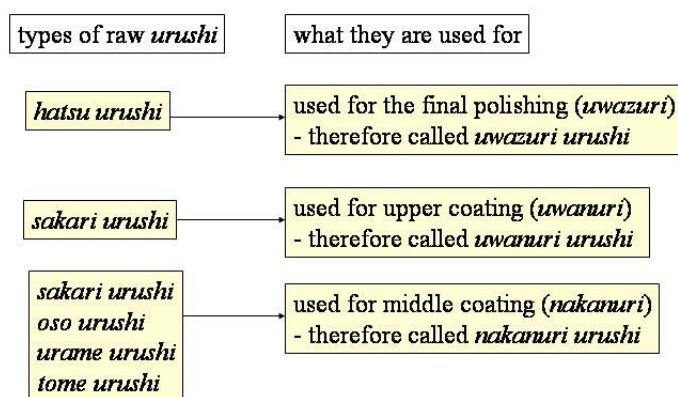
- The working period is 180 days (– an average of 30 days off for rain) = 150 days.
- The working cycle is five days therefore there are 30 days for scoring the tree and collecting *urushi*.
- Every five days, about ten new scores can be made = 300 scores per tree.
- From each score 0.6 – 0.7ml of sap can be collected.
- For 300 scores, the average yield is 200ml per tree per season.

Thus, at the end of the maturing period of about 10 years, the trees are most active and most sap can be collected from June to November. The worker can collect an average of 200ml (grams) per tree for each working season; so 400 trees will yield 80kg. Thus, according to Nagase (1986, p76) if 1 kg were worth 20,000 yen the person would receive 1,600,000 yen and if 1 kg were worth 30,000 yen he could receive 2,400,000 yen. However the work is lonely and laborious, with the collectors havinv a solitary life facing the trees and nature every day. Recently the *urushi*-taking workers are becoming fewer and finding successors is becoming a serious problem.

From the above description, we can see that *urushi* collected at different times in the season will have slightly different properties and thus slightly different uses. Let us now look at this aspect before going on to the treatment of *urushi* sap.

### c) Classification of *urushi* by the season when it's collected:

*Urushi* collected from mid-June to mid-July is a good adhesive or polish. That collected during the rest of the season is used as a coating material. The following classification is by season and by collection methods used, which in turn are determined by the season. The uses to which the different kinds are put will be decided by the quality of the *urushi* material. For example, since *sakari urushi* is the highest quality, it is used for the final coating (*uwazuri*). The following flow chart outlines this on a superficial level. More information will be added as we go along.



Nuri figure 14: flow chart showing characteristics of collection and ultimate use for Japanese *urushi*

1. ***Hatsu urushi*** is *urushi* taken from mid June to mid July, is called “early” (*hatsu*) *urushi*. In its pure Japanese form, after fermentation, it is called *kijoumi urushi*. It includes a lot of water and can be dried quickly, so is suitable for use as an adhesive. More importantly for *butsudan* production, it can also be used as a polish, especially for the finishing process of *uwazuri*.

The term *uwazuri* is not to be confused with “*Uwazuri Urushi*,” a brand name, which is top quality *ki urushi* also used for the upper coating and polishing process (*uwazuri*) in the highly polished *roiro* finishing process. However, its production area is not stated on the packaging. Keiichi thinks it is a mixture of Japanese and Chinese *ki urushi*. “The more Japanese *urushi* there is,” he says, “the higher the price will be.” “Sometimes a new different type of *uwazuri urushi* comes on the market,” adds Teiji. “The *urushi* seller asks me to use it because it is good quality. However, it is no different from other *uwazuri urushi* after all. When I want to buy lacquer, I choose a dealer I trust rather than a type of lacquer.”

2. ***Sakari urushi*** is *urushi* taken from mid July to late August is called “prime” (*sakari*) *urushi*. Because of its high content of urushiol, the main element of the sap, it is sticky and dries rather slowly. By the refining processes of mixing (*nayashi*) and / or dehydration (*kurome*), it is given various properties, which make it more suitable to be used as a coating material. From his own experience, Teiji says, “I’m not sure whether the quality of *urushi* is different depending on the period of



gathering it. But I think the *urushi* gathered in summer is better, but maybe the difference is not very big.” *Sakari urushi* may be used for both middle coating (*nakanuri*) and upper coating (*uwanuri*).

3. ***Oso urushi*** is *urushi* gathered from late August to late September is called “late” (*oso*) *urushi*.

4. ***Urame* and *tome urushi*** are the names of *urushi* taken after this season, before the end of November, depending on the process of gathering.

Firstly, collecting *urame urushi* entails making deeper grooves in the trees. In the autumn season, the tree bark becomes hard and cannot be scored with the usual scoring knife (*kaki gama*) alone. Therefore the grooves on the surface of the bark are made with a stronger knife (*eguri*) first and then another score is made inside the main groove with a *kaki gama*. The grooves are thus deeper. The quality is a little lower than *sakari urushi* so after *nayashi* and *kurome* it becomes *nakanuri* (middle coating) *urushi*.

The next process involves making the grooves to stop the whole gathering process. The *urushi* from these grooves is called “stopping” (*tome*) *urushi*. Two lines are scored completely around the tree. Because of these two scores the *urushi* secretion cannot move down the tree (through the phloem) so it will stop. *Tome kaki* scoring is deeper than normal *hengaki* scoring.

5. ***Eda* and *seshime urushi*** - The following two processes of collecting *eda* and *seshime urushi* are no longer done because they are considered too laborious and time consuming. However, since they are interesting, we will look at them briefly. In the old days, when no more *urushi* could be collected from the trunk and winter set in, the tree was cut down and the gathering processes moved to the villages. The trunk was cut into 1m lengths and all the branches were removed. Bundles of 20 branches were put into a pond or river for about 1 week. Then they were taken into the house and warmed beside the sunken hibachi (*irori*) or in a room with a stove. Then *urushi* could easily be extracted from the branches. Generally this kind of *urushi*, taken from scratches on the big branches, was called branch (*eda*) *urushi*. Because of its low quality, *eda urushi* was used as base coating (*shitanuri*) *urushi*. The *urushi* from the scratches on the small branches was scraped off with a spatula and called *seshime urushi*. However today *eda* and *seshime urushi* are no longer gathered. Instead imported *urushi* is called “*seshime*” *urushi*.

“*Seshime urushi*” is a brand name for low quality raw lacquer (*ki urushi*), which is produced in China. It is used in the base making processes to make *kataji* (*tonoko* + *ki urushi*) and “*nori*” (rice glue + *ki urushi*) (see recipes section). A 200g tube would cost about 2,800 yen. Another artisan says, “Chinese *urushi* often includes some bits of bark; they are added intentionally to increase the weight, so we have the bother of straining the *urushi* before starting, so it takes more time and effort.”

Another kind, which is labelled “made in Japan *Seshime urushi*,” is in fact a mixture of Chinese and Japanese raw *urushi*. The label simply means that the contents were mixed in Japan. A 100g tube costs 6-7,000 yen, making it as expensive as high quality pure Japanese raw *urushi* used for the finishing processes (*uwazuri*). Teiji says, “If I



order *urushi* from the *urushi* shop asking for 30% Japanese, the shop will mix it for me.”

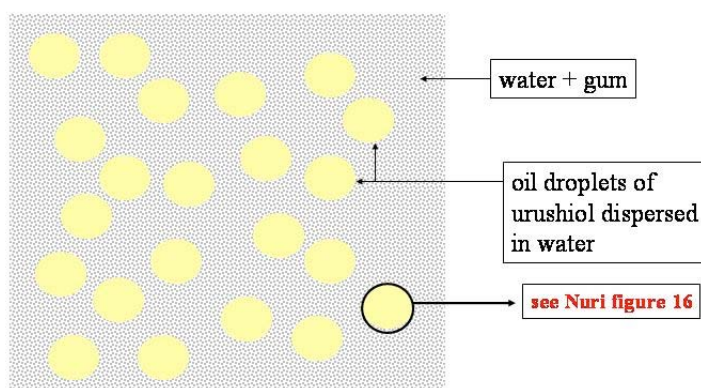
Next we will consider the refining processes whereby the freshly collected sap (*arami urushi*) is modified by fermentation and filtering to form raw lacquer (*ki urushi*), and then further refined by mixing and dehydration to make refined *urushi*.

## B. Refining lacquer:

CAVEAT: The technical details of *urushi* refining, especially those concerning the chemical changes from sap to refined lacquer, can be confusing. As non-experts we have done our best to present the information correctly. We have also included what we hope will be useful references. However, since this is “work in progress” we would be grateful for suggestions, additions and corrections. Please use the email addresses given on the opening page.

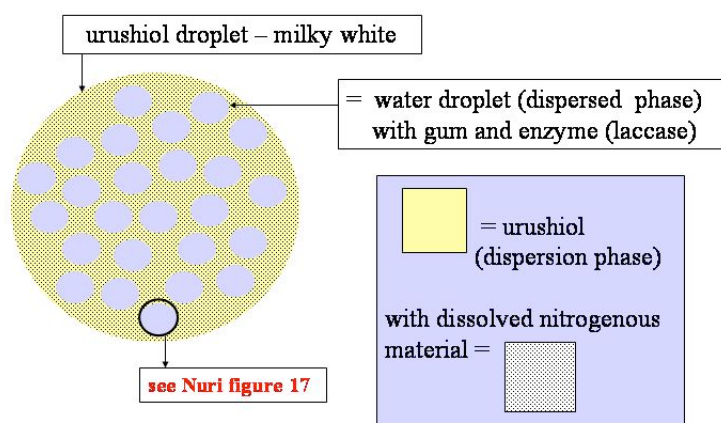
### a) Converting sap (*arami urushi*) to raw lacquer (*ki urushi*):

The term *urushi* sap refers to the freshly collected, untreated sap (*arami urushi*) from trunks of trees belonging to the *Rhus* (or *Sumac*) family, especially for our purposes, the Japanese *Rhus verniciflua*. Its milky white opaque colour shows it to be an emulsion. In fact it is a double emulsion. On the one hand, oily droplets of urushiol are dispersed in water containing gum. The gum acts as an emulsifier, keeping the urushiol droplets from touching and coalescing.



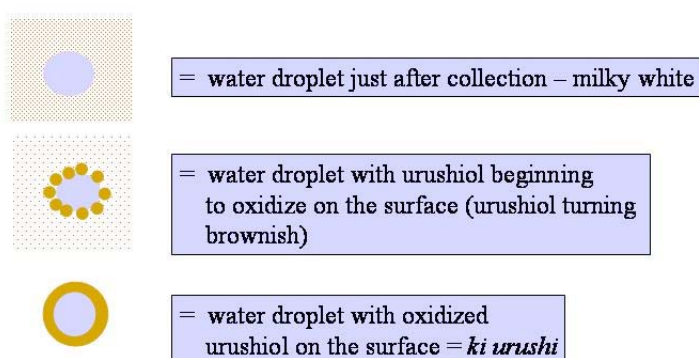
**Nuri figure 15: diagrammatic representation of milky white urushiol emulsion (oil in water emulsion)**

Additionally, each urushiol droplet is an emulsion of water in oil. In this case the water, which contains gum and the enzyme laccase (laccerase) is dispersed in the oily urushiol. The laccase will help bring about the changes from the liquid sap to the solid lacquer coat. There is also nitrogenous material present in the urushiol droplet. Again the gum and nitrogenous material keep the water droplets dispersed in the urushiol droplet.



**Nuri figure 16: diagrammatic representation of urushiol emulsion (water in oil)**

Because the fresh sap includes so much water (27-50% depending on the time of collection) it cannot be used as such. Therefore *urushi* workers take the freshly gathered sap home, put it in tubs and leave it in cool places under the floorboards to ripen (ferment). Every day they lift the paper lid off the tubs and remove the fermentation foam. Although this only takes a few minutes it is important that the sap is continually exposed to air. Over time, the amount of foam becomes less and the colour changes from milky white to brownish.

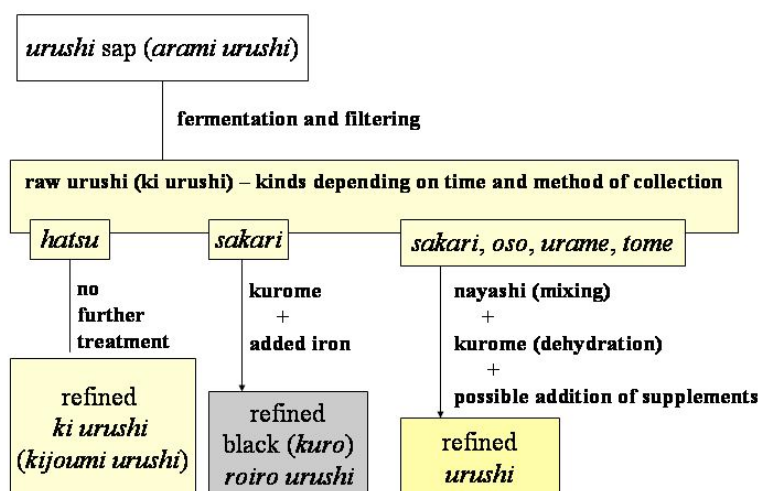


**Nuri figure 17: diagrammatic representation of water particle with oxidized urushiol on the surface – fermentation process**

This process takes about 1 month and the mature product is called raw (*ki*) *urushi*. With the water content reduced to around 30% (Kumanotani, p.156), it is approaching a single emulsion. After filtering out the bits of bark and insects, which got in during collecting, the job of the *urushi* workers is finished. Interestingly, it is said that when the tub holding *urushi* has ants in it, in the middle of the night bubbles will come out and the *urushi* will flood the floor where it is stored.

### b) Converting raw lacquer (*ki urushi*) to refined *urushi*:

In *Nuri* figures 15, 16, and 17 we saw how the milky white double emulsion of *urushi* sap is converted into *ki urushi* by fermentation, and how a certain amount of dehydration (from about 50% to about 30%) takes place. The following flow chart, *Nuri* figure 18, shows how the different kinds of *ki urushi* are used depending on when and how they were gathered.



*Nuri* figure 18: flow chart: refining of *urushi*

*Kijoumi urushi* is a high quality refined *ki urushi* made by filtering and fermenting *urushi* sap which has been collected in the early period between mid June and mid July (*hatsu urushi*). It still includes a lot of water and can dry quickly so it is used for the final polishing (*uwazuri*) process without further treatment. Although it can also be used as a base coat with *tonoko*, usually a cheaper imported product called “*seslime*” is used. Japanese *ki urushi* costs around four times as much as Chinese *ki urushi*, which is lighter and not such good quality. “*Seshime*” is not to be confused with *seslime urushi*, which used to be collected from cut branches (see above).

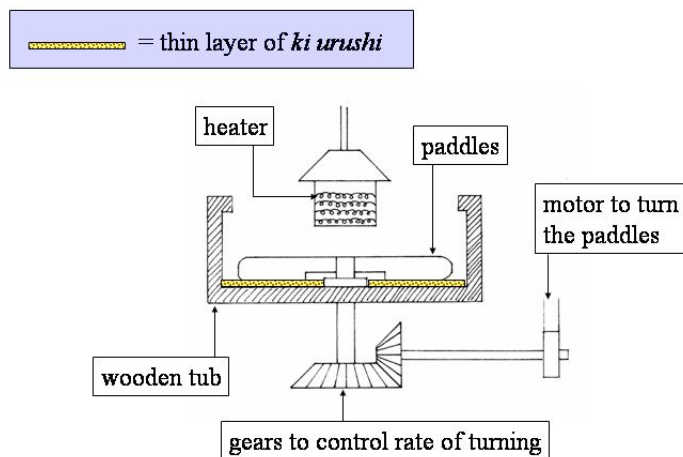
After fermentation and filtering, *ki urushi*, which was collected in other seasons, may now be classified as refined *ki urushi*. It will be converted into refined *urushi* to be used as a coating material by the processes of *nayashi* and / or *kurome*. Further, supplements such as colouring materials or oil may be added.

### c) Processes for production of refined *urushi*:

#### *NAYASHI*:

The purpose of the *nayashi* process is to mix and combine the chemical constituents of *urushi* thoroughly and distribute them evenly throughout. The *ki urushi* is put into an agitation tub in the centre of which is an iron shaft with two wooden or plastic paddles. The paddles are close to the base of the tub so there is only a thin layer of *urushi* below them. They are rotated about 60 times a minute for about 1.5 hours. The result is that the molecules are broken into smaller components; they are moved

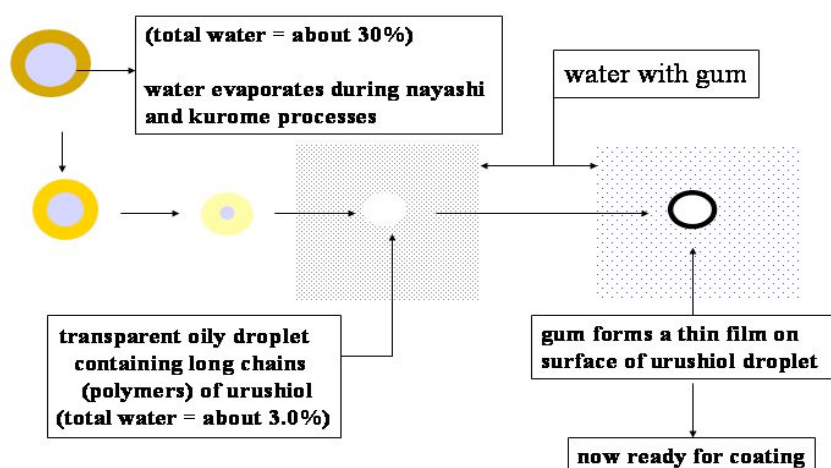
around and rejoin in new chemical configurations, which make it easy for the urushiol molecules to form into long chains (polymers). If *nayashi* continues for too long it is not good because the gum constituents absorb too much water and become lumpy. The result of the process is to give the final lacquer-coated surface depth and lustre. However even after *nayashi*, the *urushi* still includes a lot of water.



Nuri figure 19: refining equipment

#### KUROME:

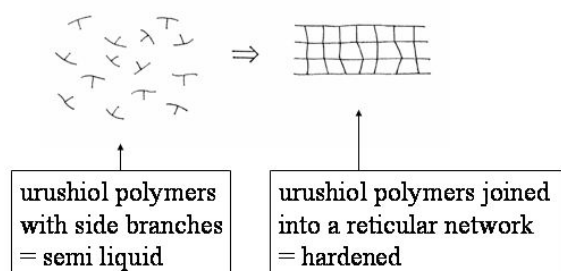
The next process is *kurome* where the *urushi* is further dehydrated. The water must be removed at a carefully controlled temperature between 40 and 45° C, while continuing the agitation, until the consistency of the *urushi* becomes suitable for its use as a coating material and the drying time of the final product is adjusted. Chemically, the *kurome* process is very complex, but to describe it simply, as in Nuri figure 20, the *ki urushi* loses water slowly, and gradually it becomes transparent.



Nuri figure 20: diagrammatic representation of changes during *kurome*

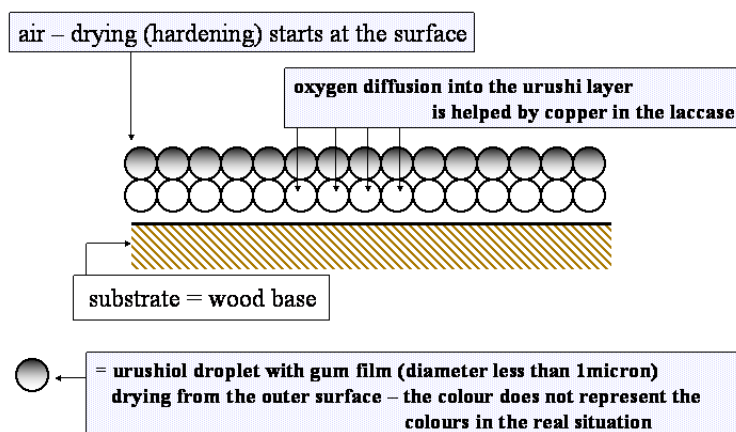
Water moves out of the urushiol droplet and the molecules inside form long chains (urushiol polymerisation). The liquid thickens and changes from a double emulsion into a single one. The process is stopped when the water content is about 3.0% (reduced from around 30%) traditionally measured by feel and experience. At the same time, a thin film of gum forms on the surface of the urushiol droplet, making it an ideal coating material. Also, supplementary agents such as pigments or oil (see later section) may be added at different stages depending on the required result. (FN.1)

When the semi-liquid *urushi*, is painted onto a substrate, the molecules make cross-linkage to form a reticular network and the coating hardens. For this to happen, the enzyme laccase (laccerase) is necessary to oxidize the urushiol and make the cross linkages that form it into a resilient coating.



*Nuri* figure 21: reticular network of urushiol polymers

Copper, an important constituent of laccase, picks up oxygen in the outer air and moves it into the film to oxidize the urushiol. In other words copper acts as an oxygen carrier. However as the coating hardens from the outside, it becomes more and more difficult for the oxygen to penetrate deeply. Moisture in the air allows the oxygen to diffuse more easily. That is why *urushi* hardens or “dries” in a humid environment.

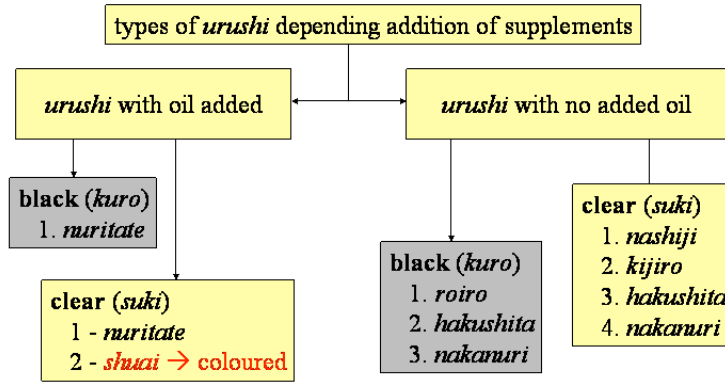


*Nuri* figure 22: diagrammatic representation of *urushi* layer hardening

From the beginning of the spring rainy season to the end of the June / July rainy season, lacquered surfaces tend to dry too quickly and become wrinkled. “Generally speaking,” explains one *nurishi*, “drying should take longer than lacquering. So we try to lacquer before the holidays.” (FN.2)

To summarize then, most *urushi* (except *hatsu urushi*) goes through the processes of *nayashi* and / or *kurome* and is made into coating material. The final product is called refined (*seisei*) *urushi*. It is finally strained a second time, to remove impurities using a filter press or a centrifuge. The viscosity of the *urushi* is decreased, by heating in order to make straining easier. A copper water bath similar to a double boiler, called “*yukan*” or “*yusen*” is used for this. The contents are stirred while heating the water bath and cotton is torn up and thrown into it. This cotton absorbs impurities in the *urushi* and is then separated from it by a centrifuge.

In the final analysis, transparent, refined (*seisei*) *urushi* may be divided into clear (*suki*) *urushi*, which has nothing added or black (*kuro*) *urushi* with iron included. Further, both of these may be subdivided as to whether or not oil has been put in. For our *butsudan* purposes, *urushi* with added oil is only used for the unpolished (*tatenuri*) finish and for some kinds of coloured (*iro*) *urushi*. For most other purposes oil is not added. The flow chart below summarizes the kinds of *urushi* produced from this clear product after it has been refined. Please note that we are only discussing the types commonly used by the Akimichi workshop. For other types, please refer to the sources given in the references at the end of this section.



Nuri figure 23: types of *urushi* which can be made after refining and addition of supplements

### C. Kinds of lacquer:

As shown in the figures throughout this website we can see that, for *butsudan* purposes, lacquer is divided into clear lacquer with and without added oil and black lacquer with and without added oil. We will now look at these individually.

#### a) Clear (*suki*) *urushi*:

i) **Clear *urushi* without added oil**: the following kinds are important for *butsudan* lacquering.

*Nashiji urushi* is made from the highest quality Japanese summer type (*sakari*) *urushi*, which has the highest transparency. It is processed by *nayashi* and *kurome* to make it more transparent and a little *shiou* can be added to increase the transparency even further. This is used for *roiro* lacquering with *nashiji* or for *makie* processes (see section five).

*Kiji roiro (kiji)* *urushi* is a transparent *urushi* refined from good quality *ki urushi*. It has the same qualities as *nashiji urushi*. It is mainly used for lacquering which allows the wood grain to show through (*mokume dashi nuri*). It is also used as a base for making coloured (*iro*) *urushi* by adding pigments or dyes. The dried coated surface becomes waxy looking and lustrous through grinding and polishing.

*Suki hakushita urushi* is used for the preparation lacquering before the gold, silver or tin leafing.

*Suki nakanuri urushi* is used for transparent or coloured *urushi* for the middle coating of lacquer (*nakanuri*). It is made from imported *urushi* refined in Japan. To make this *urushi* even cheaper, natural resins are mixed in so as to increase its volume.

ii) **Clear *urushi* with added oil**: there are two kinds commonly used for *butsudan*.



*Shuai urushi* is made from transparent *urushi* by adding some vegetable oil. Then pigments can be added to get coloured (*iro*) *urushi*. Usually pigments are powders of stone and shells and therefore tend not to mix easily with the *urushi*. Therefore, the *nayashi* process is carried out rather longer to obtain lustre, and drying oil is mixed in to give good blending qualities. It can be used for red *tatenuri* lacquering. Less commonly it is used for *tatenuri mokume dashi* lacquering and even for the final coating before gold leafing. Yasuo says, "In the past my uncle used to colour this with cinnabar himself. Now I order the *shu urushi* ready made from the *urushi* seller."

*Suki nuritate urushi* uses lacquer, which has good transparency and is mixed with various supplementary agents (such as perilla oil). It is used for transparent lacquering that is not polished (*tatenuri*) and for various kinds of coloured lacquer.

## **b) Black (*kuro*) *urushi*:**

### **General:**

The most important quality of *urushi* is said to be the incomparable black colour of *kuro urushi*, which is expressed in Japanese as "*shikkoku*" meaning "*urushi* black." They say that however black a dye is, it cannot match *shikkoku* when compared in sunlight. Although accounts of the actual process vary (perhaps purposely), generally *ki urushi* is mixed with hydrated iron either during or before the refining processes. It may be left to sit over night with refining taking place the next day. The colour is acquired by the oxidation of iron in *urushiol*. However, in many cases the source of iron, such as iron filings from making sewing needles or sharpening saws, and the refining methods are said to be makers' secrets.

i) **Black *urushi* without added oil:** there are three important kinds for *butsudan* making.

*Kuro roiro urushi* is the very best quality lacquer and is made from *sakari ki urushi*, collected in the mid summer period. In this case *ki urushi* is mixed with iron powder and finished with the *kurome* process only. *Nayashi* is not carried out. When refined, a lacquer with no lustre and little stickiness is obtained. After application and *roiro* finishing, the lacquer ware product acquires unparalleled *shikkoku*.

*Kuro hakushita urushi*, made by refining *ki urushi* of middle or low quality, is used as a coating under gold, silver or tin leaf so as to help the leaf to stick to the lacquer.

*Kuro nakanuri urushi* is mainly used for the middle, or sometimes the base coating in the lacquering process. Imported *urushi* may be used. Alternatively quick drying *ki urushi* of middle or low quality (*urame*) may be refined and natural resins (such as cashew) added to increase volume to make it cheaper. (FN.3)

ii) **Black *urushi* with added oil:**

*Kuro nuritate urushi* is an oil containing lacquer used for *tatenuri* lacquering.

## **c) Supplementary agents:**



Supplementary agents may be added according to the final product required. However the following agents are not used for finishes which will be ground or polished, such as raw lacquer, *kijiro urushi* and *kuro roiro urushi*.

i) Drying oils: Oils such as perilla oil and linseed oil react with oxygen and make the *urushi* solidify, thus promoting drying.

ii) Supplements to increase bulk: Natural resins such as pine resin and cashew, and synthetic resins such as phenolic resins may be used to add bulk to cheaper forms of *urushi*. Other substances such as glycerine, millet jelly, honey etc. are used to increase the quantity and to make the surface shiny and clear after drying.

iii) Pigments to make coloured (*iro*) *urushi*: To make yellow *urushi*, *shiou* (*sekiou*), which contains arsenic sulphide, or a broth made by boiling gardenia fruits can be used as a yellow pigment (see *komono* lacquering). To make red (*shu*) *urushi*, the pigment cinnabar (*shu*) is mixed with the lacquer using a spatula and the colour is checked as it dries (it will dry darker) on clear glass or plastic. There are several kinds of cinnabar, which give slightly different colours. *Arai shu* is vermilion and *hon shu* is a true red.

iv) Slow drying agent: *Osokuchi urushi* is a slow drying lacquer. It is made by adding water to the *ki urushi* (100g water to 1kg *ki urushi*) during the *kurome* processing stage. When it boils, water and urushiol evaporate thus making the final product dry more slowly. (FN.4)

*Osokuchi urushi* is mainly used in the rainy season when the humidity is high and therefore the lacquer may dry too quickly and wrinkle. It is added to other *urushi* according to the feel and atmospheric conditions. Yasuo says, "I put one or two spatulas of *osokuchi* into a 400g can of *urushi* and strain it, in order to mix it. Then I put one streak onto a plain wooden board using a brush and write the kind of *urushi* beside it. After drying it for 24 hours in the *muro*, I examine it in the morning and if it has dried too quickly and the lacquer surface has shrunk into wrinkles, I will put one more spatula of *osokuchi*. If the lacquer surface has dried beautifully and with good lustre, I will use it. However, if it hasn't dried because of too much *osokuchi*, I will turn up the humidity in the *muro*. Usually the humidity is 70%. I can make it up to 80%. If I make the humidity too much higher, the *urushi* will dry too quickly. The surface will shrink and wrinkle as before, so we have to be careful. Before adding *osokuchi* I always check the humidity monitor in the lacquering room. If it is over 80% I will put 3 spatulas of *osokuchi* from the beginning. The temperature is room temperature."

#### D. Storage of lacquer:

Generally speaking, cool dark places with little temperature variation are desirable for storage. Urushiol, the main component of *urushi*, turns black in contact with metal. Therefore wooden, (e.g. cedar) or plastic containers must be used for storage. After putting *urushi* in a tub, the surface is covered with *futagami* (paper lids treated with persimmon juice etc) to shut out the air. Strips of bamboo formed into circles are used as springs to fix the *futagami* against the tub. Teiji says, "In the past we used to keep *uwuazuri urushi* (*ki urushi*) in tubs, which were not airtight, under the floorboards to

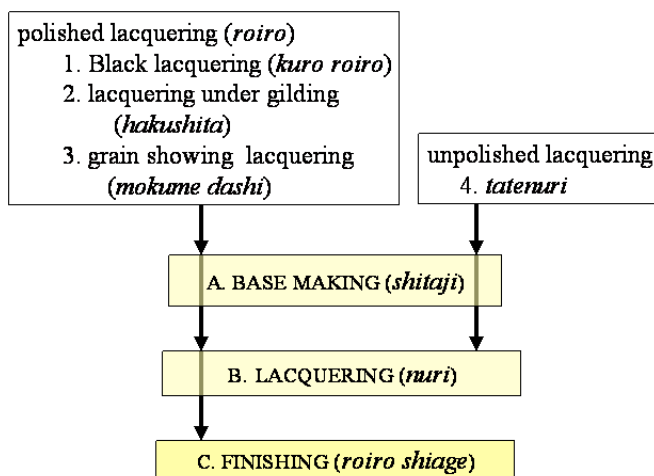
preserve it. It was said that moist, cool places were good for *urushi*, so we used to keep it there. Today we keep it in the refrigerator, even though it is contained in airtight tubs. Because it is raw and easily changes quality, we don't take a chance. Other *urushi*, which has been treated and stabilized with heat is put in a cardboard or plastic (not metal) tub and kept in an ordinary cupboard at room temperature." Yasuo does not actually know in what way *urushi* changes or deteriorates over time when it is not kept properly. "It is expensive," he says, "so we look after it and use it within its lifetime. *Urushi* which is six months old, can be used by adding a quick drying agent and then straining it. Old *urushi* tends to dry more slowly."

Now that we have discussed the equipment and tools used in lacquering, as well as the materials themselves, let us move on to the actual lacquering processes.

## E. Uses of lacquer:

### Styles of lacquering:

We are now ready to look at the two basic styles of lacquering that are commonly found in *butsudan* making – *roiro nuri* and *tate nuri*. From the following flow chart we can see the three stages of lacquering: base making (*shitaji*), lacquer coating (*nuri*) and finishing (*roiro shiage*). We can also see the types of lacquering which are most commonly used on Hikone *butsudan* by the Akimichi workshop.



Nuri figure 24: stages and style of lacquering

The first three styles shown in the diagram are the *roiro* or highly polished styles. They are black (*kuro*), under gilding (*hakushita*) and transparent, showing the grain (*mokume dashi*) *nuri*. The fourth style is unpolished (*tate*) *nuri*.

1. ***Kuro roiro nuri***: Black (*kuro*) lacquering is the most sophisticated and technically difficult of all the types because there are no clever techniques to hide lack of skill. It produces a surface both smooth and lustrous. Famous in Kyoto, it has spread amongst the better artisans in Hikone. On high-level *butsudan* it will be found on the doors and doorframes, the outside surfaces of the *kiji*, the inner shelves,

drawers and sometimes the pillars. Lacquer pictures (*makie*) or gilding may be put on top, and the success of these will partly be determined by the skilfulness of the *roiro* finish. This will be discussed in detail below.

2. ***Hakushita urushi nuri***: Under gilding (*hakushita*) lacquering is put on the insides of the *butsudan* wherever gilding will be done, mainly the back and sidewalls, the insides of the doors and sometimes the pillars. Although *hakushita* literally means “under gold leaf”, this term has been expanded by the artisans to include lacquer under gold powder (see section 6: gilding). As indicated above, any imperfections in the lacquer finishing will tend to show through the very thin layer of gold, so great skill is necessary. Since the stages are more or less the same as *kuro roiro* lacquering, just the differences of *hakushita* polishing will be detailed. Another technique called *mehajiki*, where the texture of the wood grain shows through the gold leaf, will be mentioned briefly at the end.

3. ***Mokume dashi nuri***: Lacquer showing the grain (*mokume dashi nuri*) is where solid or veneered wood with a beautiful grain is covered with a clear lacquer so that the grain shows through (see *nuri* photo 1). This is popular on the outsides of doors, vertical surfaces of the top (*kamidaiwa*) and base (*shimodaiwa*) of the *butsudan* and the internal shelves (see *kiji* section). It has different *shitaji* processes from the other *roiro* styles because of the need to accentuate the grain, but the lacquering and final polishing processes are the same.

4. ***Tatenuri***: Unlike the three styles above, *tatenuri* has no final polishing and on careful inspection tiny imperfections are visible in the surface lacquer. Generally (though not necessarily), this process is slightly cheaper than the polished styles (*roiro nuri*). It should be remembered that when a person decides to buy a *butsudan* they can chose to emphasize certain parts of it. They can decide to spend more on lacquering and less on carvings, for example. By and large, though, lacquering is one of the more expensive of the *butsudan* making procedures. It may be around 25% of the total cost, where the lacquerer is also the producer and thus pays himself less, as in the Akimichi case. Otherwise it could be much higher if the producer has to assign the lacquering to a specialist artisan (see: Tradition and Recession: Strategies for Coping with Economic Change in a Japanese Craft Industry, in *Ritsimeikan Journal of Asia Pacific Studies*, Vol. 10; p 116)

As can also be seen in *Nuri* figure 24, for *butsudan* production the total lacquering process is divided into 3 stages:

### **Stages of lacquering:**

A. The **base making stage** (*shitaji*) means preparation of the wood, such as filling holes and cracks, sealing and covering resin spots, and making the surface smooth. In the case of *mokume dashi nuri*, it also involves enhancing the grain to take full advantage of its beauty.

B. **Lacquer coating** (*nuri*) entails the application of two layers of *urushi*: middle (*nananuri*) layer and upper (*uwanuri*) layer, with grinding in between. (The artisans classify the base making processes as *shitanuri*).

C. The **finishing phase** (*roiro shiage*) consists of several applications of raw *urushi* with polishing between each one to maximize the lustre.

Of the three stages of lacquering, it is the base making or preparation stage (*shitaji*) that shows the greatest variation. Over the years, each artisan's workshop will have developed special styles and techniques. However for all skilled lacquerers, there is one basic rule to a successful end product. As one artisan says, "The quality of lacquering and the price of the *butsudan* will be decided by how much time and labour is spent for *shitaji*. We can make a beautiful finished product only by doing the invisible processes well."

We will now look at these stages in detail. The first step in the base-making stage is quite similar for all types of lacquering so it will be discussed first.

#### **4.5 TECHNICAL PROCESSES (LACQUERING):**

##### **INTRODUCTION:**

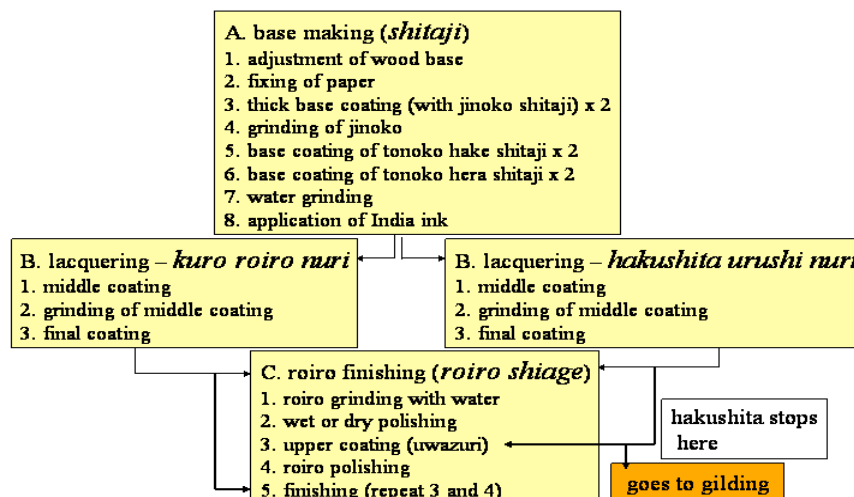
As mentioned above, *roiro* lacquering includes lacquer which shows the grain (*mokume dashi*), black (*kuro roiro*), and "under gold leaf" (*hakushita*). *Roiro* is the highest quality of lacquering.

These styles can be used in any combination on a Hikone *butsudan*. For example the vertical surfaces of the shelves, base and top, and the outside door panels could be worked in *mokume dashi nuri* (see nuri photo 01). The door and drawer frames, pillars and the outer sidewalls could have *kuro roiro nuri*. Finally, the insides of the doors and walls will probably be gilded, so might have *hakushita nuri*. Two less commonly used, but still interesting methods to be mentioned briefly at the end, are *nashiji*, which looks like a pear skin, and *mehajiki*, which shows the grain texture of the wood beneath the gilding.

The following description is divided according to style.

##### **4.5.1 *Roiro nuri* processes for *kuro roiro* (1) and *hakushita* (2):**

*Roiro* finishing (see flow chart *Nuri* fig.24) is the most expensive technique because it requires the most labour. Since *kuro roiro* is considered the most difficult of all, it will be considered here and others will be mentioned where they differ. The following is the description of the process used by the Akimichi workshop for their usual high quality *butsudan*. The summary flow chart below outlines the basic steps in this style of lacquering.



Nuri figure 25: *roiro* lacquering processes

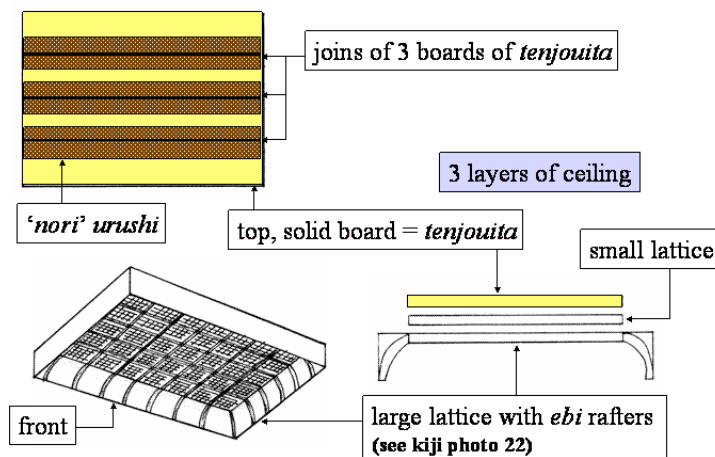
#### (4.5.1.A) BASE-MAKING STAGE (*shitaji*):

##### 1. Adjustment of wooden boards:

This step is very similar for all types of lacquering, so it will be dealt with only once. Any significant differences will be mentioned where applicable.

Before any of the filling materials are applied to smooth the irregularities in the grain, cracks and joints must be dealt with. We will start with a description of these adjustment techniques because they are more or less the same for all styles of lacquering and vary more according to where on the *butsudan* they are being done than on the style of the final finish.

Ceilings, as can be seen in the *kiji* section of this website (*kiji* photo 22) and also from the diagram below, are made of three sections. The innermost layer, visible if you look up inside the *butsudan*, is a coarse lattice (*kumiko*) curving downwards at the edges. On top of this there is a fine flat lattice with the smaller squares evident through the larger ones. Finally above this, there is a flat board (*tenjouita*), made of strips of wood.



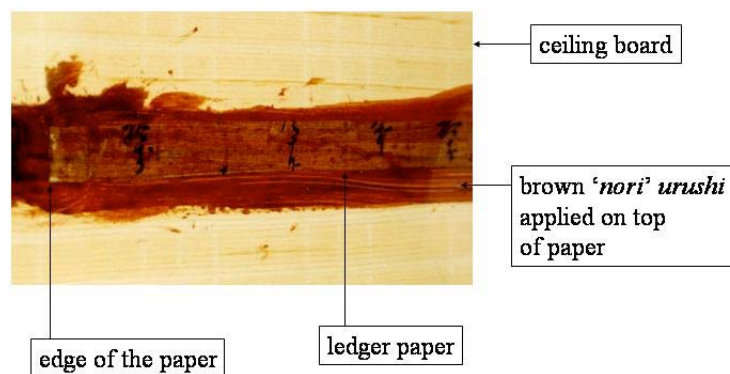
*Nuri* figure 26: three layers of ceiling and treatment

The inside surface of the *tenjouita*, where these strips abut will be treated in the following way.

a) To make the join invisible, a paste mixture (“*nori*” *urushi*) is worked into the joint line, with a spatula, to a width of about 3cm. If the join is difficult to see, it is marked with a felt pen.

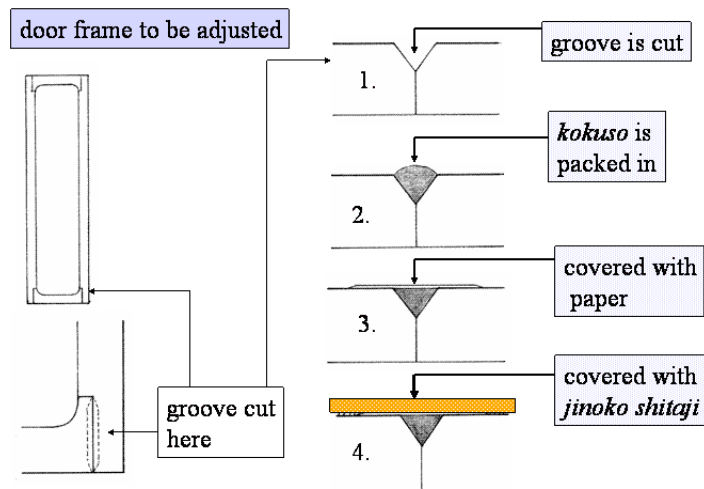
b) Japanese paper (*washi*) or ledger-book paper, 2cm wide, is applied over the top to completely hide the join.

c) Then on top of the *washi*, another layer of “*nori*” is applied and is allowed to dry for about a day.



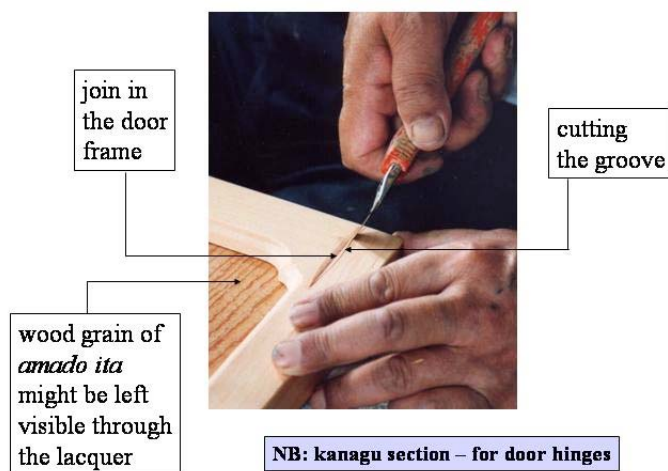
*Nuri* photo 15: wood adjustment on ceiling board

Because the *tenjouita* is up inside the *butsudan* and completely invisible from the outside, the style described above is used to cover the joins. It is also used to cover nail or peg holes in drawers. However for high quality *roiro* finished products, a slightly different method (*warikokuso*) is used. Teiji says, “In our workshop in the case of *roiro* lacquering we always do *warikokuso*. Whether to do this or not is up to the artisan. In cases when they don’t do it, the coated lacquer occasionally cracks. If the wood hasn’t been seasoned long enough, cracks can appear within a few years.”



Nuri figure 27: process of warikokuso

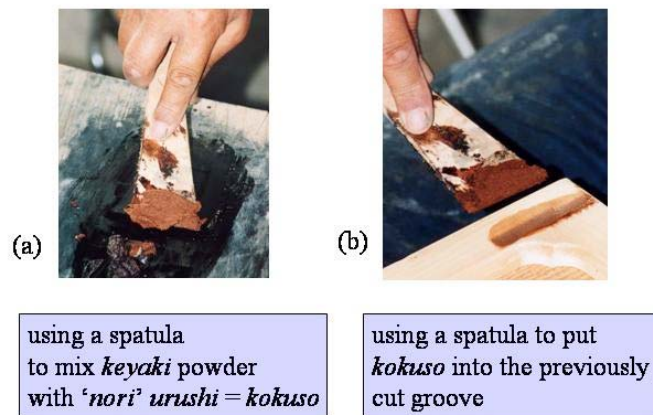
When he is doing *roiro* work, he makes an oval cut to widen and deepen the groove. “First I make a curved groove surrounding the join,” he explains. “For a door frame the groove width is about 5mm and depth about 3mm.”



Nuri photo 16: warikokuso - stage 1

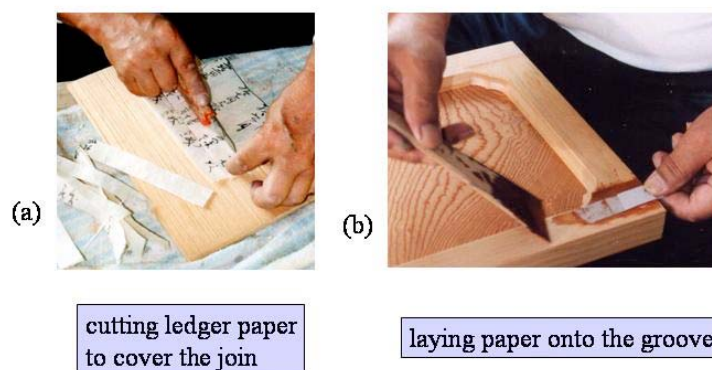
“Then I add zelkova sawdust to the “*nori*” *urushi* to make *kokuso* and heap it into the groove with a spatula and leave it proud, to dry for about a week. If I filled it flat it would shrink and make a depression as it dries.”





Nuri photo 17 (a) & (b): *warikokuso* - stage 2

“Then I shave off the extra and cover it with Echizen *washi* and put *jinoko hake shitaji* over the top.”



Nuri photo 18 (a) & (b): *warikokuso* - stage 3

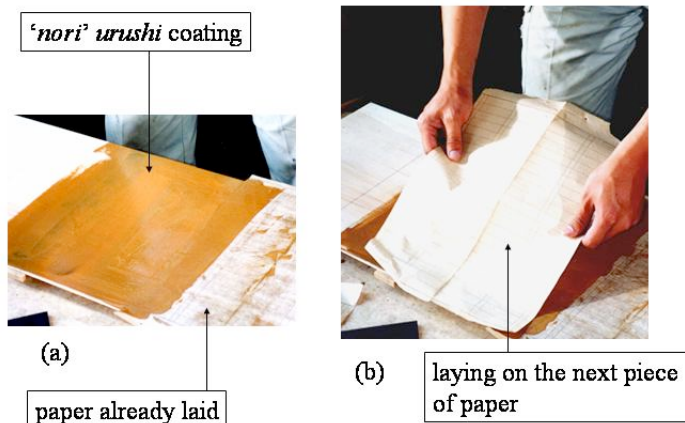
When all of the above adjustments have been made, the surface is ground using a whetstone, and then it goes to the next stage, which varies according to the final style of finish required.

## 2. Fixing cloth or paper:

This process is optional and depends on the quality of the finished product and the budget and taste of the customer and the maker. Paper or cloth is put over the whole board especially in the case of large flat areas such as back or sideboards, which could shrink when lacquer is applied. This is done on very high quality *butsudan* or where weak materials like cedar or plywood have been used. “We only use paper,” explains

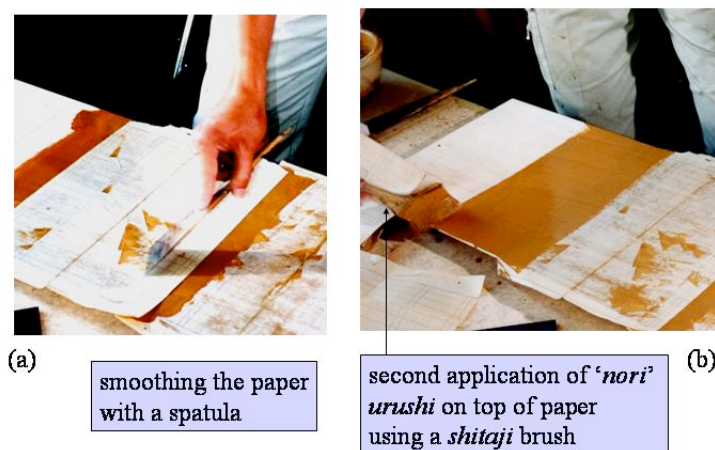
Teiji. “We never use cloth, but in my father’s time they used hemp gauze.” The following description is for the present day Akimichi method.

1. First one coat of “*nori*” *urushi* (rice glue + *ki urushi*) is spread on the board. Then the paper is laid on.



*Nuri* photo 19 (a) & (b): applying paper - stage 1

2. A spatula is used, working from the centre outwards to press out any air bubbles. The “*nori*” *urushi* seeps into the pores of the paper and the wood. Then more “*nori*” *urushi* is used to cover the paper.



*Nuri* photo 20 (a) & (b): applying paper - stage 2

3. When it is dry, it will be sanded using a whetstone. If there are any overlaps of the paper, they will become invisible and will be smoothed out with the layers of lacquer.

3. **Application of thick base coating (with *jinoko shitaji*):** this is done twice.

*Jinoko shitaji*, is a mixture of *tonoko hake shitaji*, thickened with about 10% *jinoko* and a little *nikawa*. This is applied with a spatula on the places that have to be completely flat. This includes back or sideboards where gold leaf will be applied and places where pictures (*makie*) will be painted, such as drawer fronts. First it is spread on and allowed to dry for 10 minutes. Then this is repeated. “We apply this kind of *shitaji*,” explains Teiji, “to make the surface flatter and better for gilding. *Jinoko* is coarser than *tonoko*. It includes various sizes of particles. I think it includes some sand, but I don’t know exactly what it’s made of. We sift *jinoko* and throw the bigger particles away.”

#### 4. Grinding of *jinoko*:

After the second coat has been dried for 10 minutes it is ground with water using a whetstone. Excess water and sediment are removed quickly and carefully.

#### 5. Application of base coating of *tonoko hake shitaji* (= *hakeji*): This is done twice.

The *tonoko* mixture is applied with a brush and allowed to dry for 10-20 minutes and then applied again. In some workshops it will be ground with a whetstone, but Teiji does not find this necessary.

#### 6. Application of base coating of *tonoko hera shitaji* (= *heraji*): This is done twice.

After the brush coating, a slightly thicker mixture is applied using a spatula. Again it is dried for 10-20 minutes, dry ground, applied again and then dry ground lightly again.

**7. Water grinding:** Then, using water and a little formalin, the previous coating is ground with a whetstone. The formalin is to prevent the *heraji* coming off during grinding. It is Teiji’s method learned from his father. Excess water is removed and then ground again, using whetstone grade 1500. Then the pieces are dried naturally for about 4 hours.

**8. Application of India ink:** Finally a mixture of *nikawa* and pine soot is applied over the whole surface. The purpose is to hide the beige colour of the *heraji*. It is then dry ground with abrasive paper grade 150. This finishes the base making process and it continues with the lacquer coating process.

#### (4.5.1.B) LACQUER COATING (nuri):

The following description includes the processes for both *kuro roiro nuri* and *hakushita urushi nuri*.

“There are different grades of *kuro roiro urushi*,” says Yasuo. “For instance, when I compare *urushi* which costs 8,000 yen a can and one which costs 10,000 yen I don’t see any difference when I actually work with it. Also there is little difference with the finish, with such a minor difference in price. But when the product contains more Japanese *urushi*, the finish is different, the finish is good.”

#### 1. Application of middle lacquer coating (*nakanuri*):

*Nakanuri urushi* is applied with a brush, at the rate of 25-30g per 30 sq cm of surface. The colour should closely match that which will be used for the upper coat (*uwanuri*). Thus in the case of *kuro roiro*, black lacquer (*kuro nakanuri urushi*) (JIS 3) is used. (FN.4) For *hakushita roiro*, reddish lacquer (*aka nakanuri urushi*) is applied.



Yasuo cleaning the board after pine soot application



with a brush, *nakanuri urushi* is applied by making a streak down the middle of the board

### *Nuri* photo 21: application of middle coating.1



Yasuo spreads the *urushi* sideways across the board



then he smooths it up and down to cover the board

### *Nuri* photo 22: application of middle coating.2

After a single application, it goes into the *muro* for 24 hours. “The lacquer gets dry in about 24 hours,” explains Keiichi, “and we take the pieces out and let them stand. In *roiro* lacquering, we leave them from 1 week to 10 days. If we leave them too much longer, the *urushi* coating gets too hard and difficult to grind. If left for too little time, it doesn’t get hard enough and when we grind, marks are left behind by the charcoal (*sumi ashi*).” Keiichi describes this while putting powdered charcoal on a cloth and grinding a pole, as in the next stage.

## 2. Grinding of the middle coating:

Water grinding of the middle coating (*naka togi*) using Suruga charcoal and crystal whetstone is done next. First the surface of charcoal or crystal whetstone is made flat by grinding it on the whetstone (*toishi*). Then the lacquered surface is ground in circles where possible or up and down on narrow places. As Keiichi works, the pores of the grinding material get clogged with lacquer, so it is rubbed on another whetstone to remove the lacquer (see *nuri* photo 11).

“For *makie* pictures to be done,” explains Keiichi as he works, “we have to make the lacquered surface perfect, which means to grind it evenly and to make it very shiny. They (the *makieshi*) can apply *makie* on both polished (*roiro*) finishing and unpolished (*tate*) lacquering. For high quality *butsudan*, we make the coated surface very lustrous. It is easier for the *makie* artisan to do a good picture.”

### 3. Application of final lacquer coating (*uwanuri*):

For the upper lacquer coating (*uwanuri*), *kuro roiro urushi* (JIS 2) is applied with a brush. For *hakushita nuri*, aka *hakushita urushi* is used. After drying in the *muro*, the pieces will again be allowed to stand.

#### (4.5.1.C) ROIRO FINISHING PHASE (*roiro shiage*):

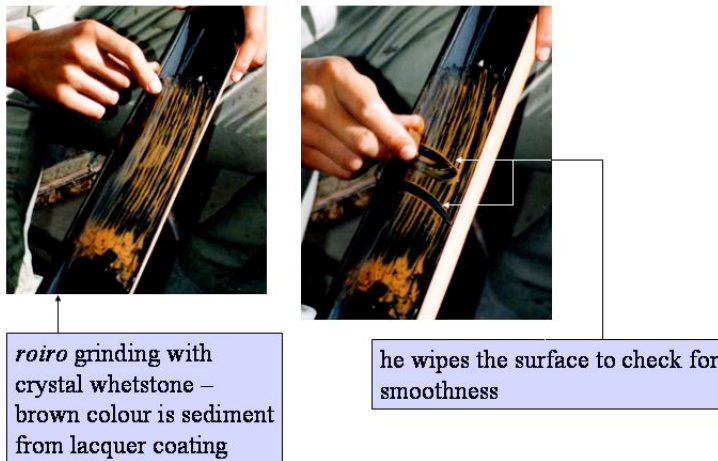
This description applies to *kuro roiro nuri* except where indicated. *Hakushita nuri* stops after stage 4.

#### 1. *Roiro* water grinding (*roiro togi*):

The next stage is coarse *roiro* grinding. “We water grind the surface with crystal whetstone grade 2000,” says Teiji’s nephew, Yasuo. “I grind the lacquer surface and then grind on the whetstone to remove the lacquer dust which has become embedded in the crystal.”

Teiji explains further, “When we grind the surface of the *urushi*, it becomes cloudy although at first, just after being dried it had some lustre. We grind as if scraping a thin skin off the surface, to make the surface of the *urushi* lacquering totally even. If we don’t grind evenly, the *urushi* surface will not become lustrous when it’s polished. We remove the dots or brush marks by grinding. The dots are where lacquer heaps up like tiny pinpoints or maybe they are specks of dust. The areas where the lacquer is thicker will be evened out to match the thinner areas.” After grinding, the surface becomes cloudy and it is easy to see the unevenness of the surface, because the untouched, depressed parts are still shiny.

“To gauge my progress during grinding,” continues Teiji, “I wipe the surface with my finger or a cloth. I make sure that no shining part remains and I grind until the whole surface becomes cloudy.



Nuri photo 23: roiro grinding

When we grind near the edge, we have to be careful not to take off the lacquering on the edges or the undercoat becomes visible and looks paler. This is a difficult thing to do, so we use a piece of crystal no wider than the surface. When we grind wider surfaces, we use a circular motion; when we grind narrow surfaces, the motion becomes more elliptical.

Traditionally artisans used Suruga charcoal first, because it had bigger particles, followed by *roiro* charcoal, which was finer. Nowadays crystal is used. Teiji says, “I use 2000 for *roiro* grinding, while many young apprentices carry out two separate processes, using 1500 and then 2000.

For *hakushita nuri*, Teiji prefers Shizuoka charcoal for rough grinding of pre-gold leafing (*suriage*) finishing and then crystal grade 800 for the finishing, but he thinks young apprentices use only crystal.

## 2. Polishing (*douzuri*)

For *hakushita urushi nuri* finishing (*suriage*) Keiichi uses powdered *roiro* charcoal on a damp cloth. Then, when he polishes the surface with his hand, the lustre comes out.

For *kuro roiro nuri* finishing, the lacquered piece is dry polished with “compound” on a flannel. It gives lustre to the lacquer. Traditionally the piece was left 2-3 hours in the night dew to enhance the effect, but this seems not to be an important part of the Akimichi method. Until about 10 years ago, *tonoko* was used for polishing instead of “compound.”

## 3. Upper coating with raw *urushi* and polishing:

In the next process, raw (*ki*) *urushi*, also called *uwazuri urushi*, is applied thinly with a cotton wool ball or spatula. Immediately afterwards, it is rubbed vigorously with *funori*-hardened cotton, leaving just a little *urushi* on the surface.



Keiichi puts dark brown *ki urushi* on with a spatula and then rubs it in a circular motion with a hardened cotton pad. “This can be polished up to a very shiny surface,” he explains as he works. “If the *urushi* is too thick it cannot be polished well. But first it has to dry in the *muro* for 24 hours.”

If the piece is destined for gilding, the process ends here. *Ki urushi*, called *suri urushi*, is applied only on high quality items (see gilding section 6). Keiichi makes an upper coating with raw *urushi* once without polishing and it goes to the gilder without further finishing. This prepares the surface for the gold. Although gold can be applied to an unpolished surface, the result is smoother with the *roiro* finish. Since there is no unevenness in the lacquering, the gold does not become streaky over time.

#### 4. **Roiro polishing:** [for *kuro roiro* finishing]

“The next day we wipe the surface to remove any excess *urushi*,” continues Keiichi. “Rapeseed oil is applied to the hand or flannel and used to wipe the lacquer. Then we put deer antler powder (*tsunoko*), or these days *roiro* polishing powder (*migaki ko*) onto the hand and wipe the rapeseed oil off. When you wipe with rapeseed oil or *tsunoko* the first time, you can use a dry flannel; but the second time we must use our hand. We mainly use the tips of the fingers and sometimes the heel and inner side of the hand, and wipe with a circular motion. What part of the hand is used is decided according to each artisan’s preference. Nowadays, for this process, we use *migaki ko* instead of *tsunoko*. We began to use this about 10 years ago.”

#### 5. **Finishing:** For *kuro roiro nuri*, stages 3 and 4 are repeated.

Then *uwazuri urushi* is applied again and dried again. Next day the rapeseed oil process is repeated. In other words, the *uwazuri* and *roiro* polishing processes are done twice, but the hand is always used to remove the excess *urushi* and polish it the second time.

“There are two kinds of *roiro migaki ko*, a very fine beige one and a slightly less fine cream-coloured one,” explains Keiichi. “We put them in a small dish. I apply rapeseed oil using the tips of my fingers. Then the powder is put on the fingers (or hand) and it is rubbed. Which powder is used is up to the artisan. I use beige first and only use cream for marks and excess oil. First of all we dip our fingertips into the beige powder and rub the lacquered surface to remove the oil. The particles are so fine that it doesn’t make any sound.” He wiped his fingers on his trousers and dipped them and rubbed again and he repeated it several times. “*Roiro* polishing is done with an apron on because the hands are continuously wiped to remove the excess powder and oil.” Through this rubbing procedure, the upper surface of *uwazuri urushi* is removed and only an extremely thin and flat layer remains. This makes the lacquer surface extremely flat and shiny. If Keiichi rubs too hard, all the *uwazuri urushi* will be taken off and the lacquer layer will be revealed again. It will be dull. Therefore skill and experience are required to know exactly how much to do.

“Next I repeat the process using the cream-coloured powder, to remove any remaining rapeseed oil. The particles are a little coarser so it makes a slight sound. Putting on too much powder is not good, because the surface becomes dull and the



final coat will lose lustre. In other words using this powder we can easily (too easily) take away *uwazuri urushi*.”

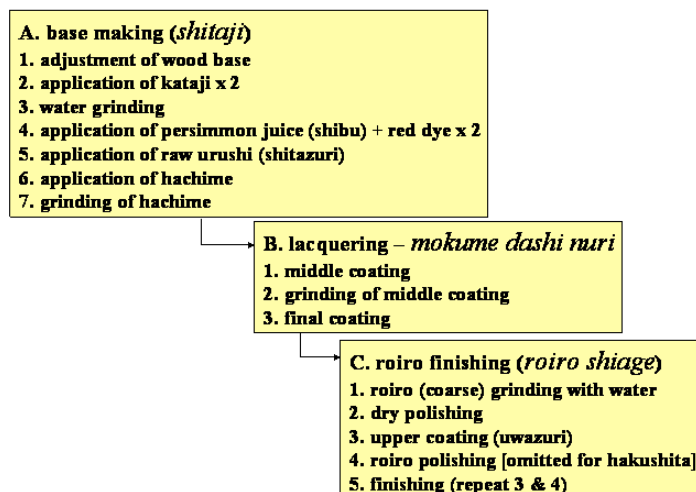
The *urushi* applied in the *uwazuri* process cannot be polished unless it is dried thoroughly. Marks left by the *wata* (*wata ashi*) in the *ki urushi* are easy to remove with the stickiness of rapeseed oil. Using the heel of the hand or the fingertips, applying pressure and rubbing hard, the *wata ashi* are rubbed away. “Over the years my fingerprints have been rubbed off, like this,” says Teiji showing us his fingers. “Unless rapeseed oil is applied, the friction is too much and it produces heat and damages the product.” With too much oil, the surface is too slippery and there is no friction.

This finishes the *roiro* processes for *kuro* and *hakushita* lacquering. *Mokume dashi nuri* is very similar for the lacquering and finishing processes. However the *shitaji* processes are a little different, so we will look at those next.

#### 4.5.2 *Roiro nuri* processes for *mokume dashi* (3):

Having discussed the basic *roiro* technique, we will now look at how *mokume dashi* lacquering (see flow chart fig.24) varies. The differences are mainly in the *shitaji* process and the type of *urushi* used in the *nuri* stage. The aim is to emphasize the beautiful wood grain. To repeat, it is most commonly found on the base, top and outside door panels, where the reddish tinge contrasts nicely with the black doorframes. When first done, the colour should be very dark because it lightens in time to show the grain to best advantage (see *nuri* photo 01). If it is too light to start with it becomes insipid looking after a while. *Mokume dashi nuri* is also found inside the *butsudan* on the fronts of the main shelves (*sandan*).

The summary flow chart below outlines the stages in *mokume dashi nuri*.

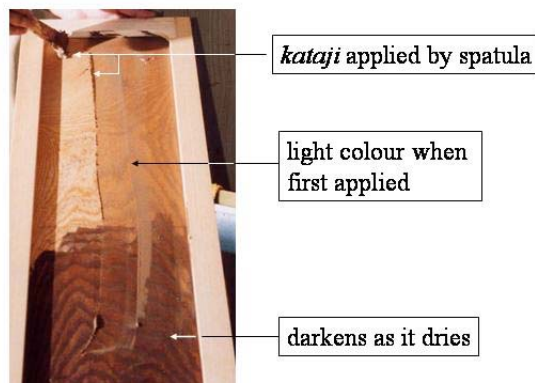


*Nuri* figure 28: *mokume dashi* lacquering processes

##### (4.5.2.A) BASE MAKING STAGE (*shitaji*):

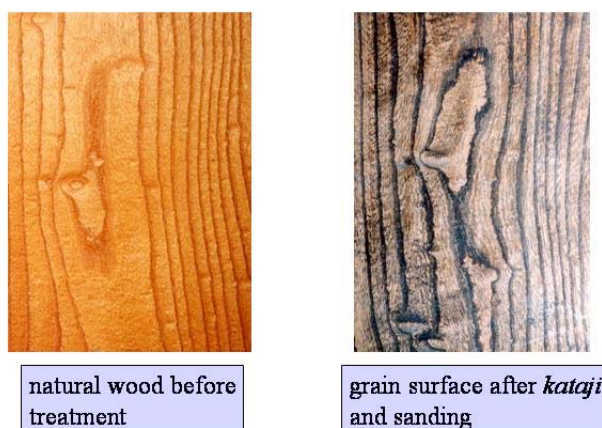
1. **Wood adjustment:** as described above.
2. **Application of *kataji*:** This is done twice.

Taking a zelkova (*keyaki*) door panel as an example, *kataji* [raw *urushi* + *tonoko* + water] is applied onto the plain, beautifully grained wood surface with a spatula. It is then dried naturally for 1-2 weeks. There is no need to use the *muro*, because there is enough water in the mixture to promote the drying. The colour darkens in contact with the air and brings out the grain.



*Nuri* photo 24: base making for *mokume dashi* lacquering process

The mixture is applied as a streak down the length of the board with a spatula and then spread sideways across the board. Later it will be sanded with abrasive paper and will take on a greyish tinge.



*Nuri* photo 25: colour change with application of *kataji*

When it is thoroughly dry, a second layer of *kataji* is applied with a spatula and left for another week or two. These two layers are very thin and act as sealers and fillers as well as grain enhancers.

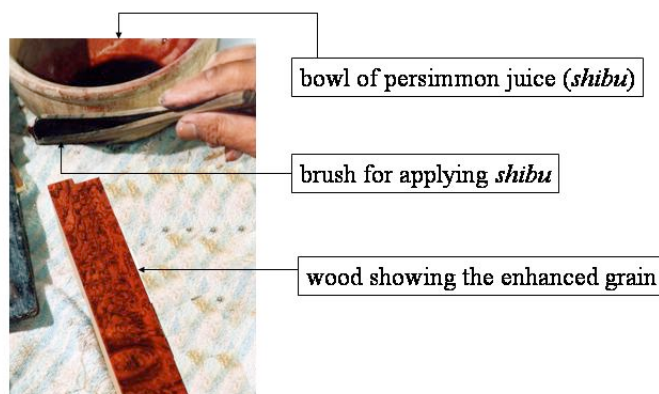
In some workshops, plain *tonoko shitaji*, which does not contain raw *urushi*, is used. However in these cases, care must be taken in the next process that the second coat is not ground off. The Akimichi method of using two thick spatula coatings of *kataji* is more expensive, but the finished product is much better and they can ask a higher price for it.

### 3. Water grinding:

After the second coat of *kataji* is thoroughly dry, it is ground using water and a whetstone (*toishi*) of grade 600. Then it is dried for 24 hours.

### 4. Application of persimmon juice (tannin) (*shibu*) with red dye: This is done twice.

Persimmon juice (tannin), mixed with scarlet powder, is applied with a brush twice. After the first application, it is dried for 1 to 2 hours. After the second, it is dried for about 12 hours. The scarlet powder is to give colour and brings out the grain better than other colourings. The persimmon juice is to waterproof the board and prevent it from absorbing the lacquer in the next process.



*Nuri photo 26: application of shibu*

### 5. Application of lower coating (*shitazuri*):

*Shitazuri* is the application of transparent raw *urushi*. Keiichi takes some cotton hardened with persimmon juice and makes a swab with it. "I apply the raw *urushi* thinly, rubbing it hard as if to rub it in," he explains. But of course the persimmon juice will prevent it penetrating. After excess *urushi* is wiped away, it is dried in the *muro* for 24 hours. The purpose of this is to fix the red coloured wood grain and make it stand out.

## 6. Application of *hachime*:

*Hachime* is a mixture of *tonoko* and rice glue mixed with a little water. It is applied with a spatula and rubbed in and then allowed to dry for 12 hours. Again, the purpose of this stage is to make the grain pattern clearer.

## 7. Grinding of *hachime*:

When it is dry, the excess sediment is sanded off lightly with sandpaper of grade 280 to make it very smooth. "If it is too hard, it will not be possible to sand it off with abrasive paper," explains Teiji. "If too much is taken away, then there is no point in doing it in the first place. So it has to be done carefully."

### (4.5.2.B) LACQUER COATING (*nuri*):

The following processes differ from *kuro roiro nuri* and *hakushita urushi nuri* only in the type of *urushi* applied.

#### 1. Application of middle lacquer coating (*nakanuri*):

For *mokume dashi nuri*, transparent red middle coating lacquer (*aka naka nuri urushi*) (JIS 3) is applied very thinly with a brush. Using a brush is difficult because any thicker streaks left behind can darken and cause banding after a while, even though it is sanded completely flat. Application with a spatula is easier, but not so satisfactory. Afterwards it is dried in the *muro* for 24 hours.

#### 2. Grinding of middle coating:

After coming out of the *muro*, the surface is ground as flat as possible using crystal whetstone and / or Suruga charcoal.

#### 3. Application of final lacquer coating (*uwanuri*):

For finish lacquering, transparent (*suki*) *roiro urushi* (*kijiro urushi* - JIS 2) is applied by brush. Then it is dried in the *muro* for 24hrs.

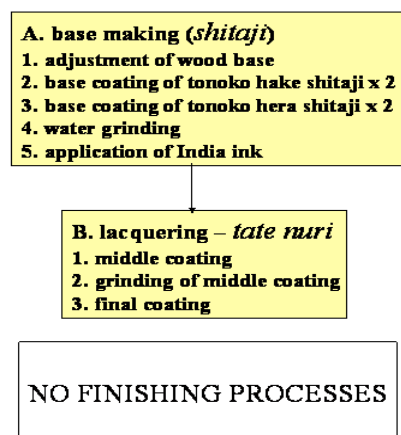
### (4.5.2.C) ROIRO FINISHING PHASE (*roiro shiage*):

This process is exactly the same as for *kuro roiro nuri*. Therefore we will move directly on to *tatenuri* processes.

## 4.5.3 *Tatenuri* processes for unpolished lacquering (4):

*Tatenuri* lacquering, as mentioned before (see flow chart fig. 24), is the process where no final polishing is done. As can be seen from the flow chart *Nuri* figure 23, *nuritake urushi* has added oil and can also be coloured, usually black, red or yellow (see C.c supplementary agents). From the flow diagram below, it is easy to see that the *shitaji* procedures are similar to *roiro* and the lacquering stages are the same. To complete

our understanding, we will cover a few points made by the artisans in the Akimichi workshop about this style of finish.



Nuri figure 29: tate lacquering processes

#### (4.5.3.A) BASE MAKING (*shitaji*):

1. **Adjustment of wooden base:** This is the same as in the previous processes.

2. **Application of base coating with *tonoko hake shitaji*:** This is done twice

Using a brush, *tonoko hake shitaji* is applied twice. Although it dries quickly, especially on a warm day, it is best left for about 4 hours before the second coat. After that it is ground with a whetstone.

3. **Application of base coating with *tonoko hera shitaji*:** This is done twice

Using a spatula, slightly thicker *tonoko hera shitaji* is applied twice. After the first application it is dried for 10-20 minutes and then ground lightly using *toishi* without water. After the second coat it is dried for longer, about 5 hrs, then dry ground with whetstone.

As always, the finished product is no better than the preparation. About *tatenuri* Teiji says, “If the base coating is not stable, in other words if it’s not hard enough, it can easily come off when I grind it. If you apply the lacquer on top of only the brush coating (*hake shitaji*), any unevenness will show through (such as knots, grain etc). So after applying the brush coating twice, we dry grind and apply spatula (*hera shitaji*).”

#### 4. **Water grinding:**

After the second coating of *tonoko hera shitaji*, water with formalin is applied and allowed to dry for 1 hour. “Then we water grind, in a circular motion with whetstone and let it dry,” says Teiji. “We apply water to the frame with a brush and rub it down. Then we scrape off the sediment and extra water with the spatula and then use a damp

cloth to remove the last bits of water, especially from the difficult places such as inside corners of the frame. Then we let it dry for about 5 hours.”

### **5. Application of India ink:**

“We apply pine soot mixed with diluted animal glue (*nikawa*),” continues Teiji, “and after drying, we dry grind it with sandpaper grades 150 -280. And that finishes base making (*shitaji*).”

#### **(4.5.3.B) LACQUER COATING (*nuri*):**

##### **1. Application of middle coating (*nakanuri*):**

For *nakanuri*, *kuro nakanuri urushi* (JIS 3) is applied with a brush and dried in the *muro* for 24 hours. Then it is left to stand for 2-3 days.

##### **2. Grinding of middle coating:**

After drying, the surface is water ground with crystal whetstone grade 600. This is called middle grinding (*naka togi*).

##### **3. Application of final coating (*uwanuri*):**

Finally *nuritate urushi* (JIS 4) is applied with a brush. When it has been dried in the *muro* for 24 hours and left to stand for about 1 week the process is finished. This style is often used for the drawer boxes. In that case there is only one layer of *nuritate urushi* because there has to be room for the drawers to slide in and out. “The drawer goes back and forth, so there should not be too many layers of lacquer or it would be worn anyway.”

For this *tatenuri* style, nothing further is done.

#### **4.5.4 Other types of lacquering:**

Now that we have finished studying the main types of lacquering done by the Akimichi workshop, we will touch briefly on two other styles that are of interest.

##### **1. NASHIJI ROIRO LACQUERING:**

This is a *roiro* process so the stages are the same as in *kuro roiro nuri*. The only difference is that, after the base work is finished and before the first coating of lacquer is applied, tin powder (*nashiji ko*) is sprinkled over the surface, using scattering pipes (see *makie* section) made from locally collected reeds. The resultant texture is reminiscent of the skin of Japanese pear (*nashi*). This work is done by special order only.

##### **2. MEHAJIKI LACQUERING:**

This is a style of gilding where the texture of the wood grain shows through the gold. It is commonly found on the insides of the door panels, which are visible when the

*butsudan* is fully open and where the grain is often especially beautiful. “For this finishing, the amount of lacquer to be applied is difficult to decide,” explains Teiji. “Too much or too little are both bad. Too much and the grain disappears; too little and the grain is too obvious and lacks sophistication. We have to use just the right amount. Some lacquerers often call me or visit me to ask me to teach them this method.” Because of the uncertainty, this technique is most often used for high quality *butsudan*, which will command a high price.

The processes involved are variations on those discussed above:

a) **Base making:** They do not use *shitaji*. They apply diluted *nikawa* liquid with pine soot twice.

b) **Lacquer coating:** “We apply *kuro roiro urushi* in the lacquering stage,” says Teiji. “After drying we grind the surface lightly with 1500 crystal to remove the brush marks.”

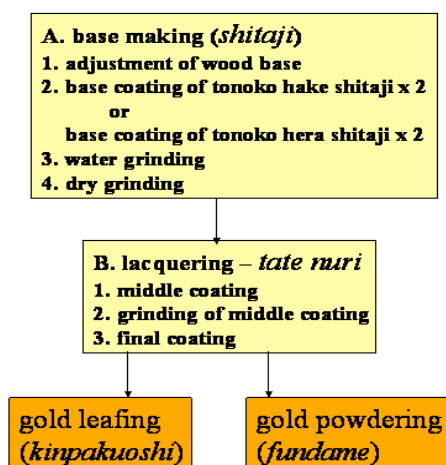
c) **Finishing** (on high quality products): “We put *uwazuri urushi* twice and it goes to the gold leafer. Most of the items we do in our workshop,” he continues, “will be finished using *jika fun* technique, so we do the process as I mentioned above. Our works are traditional handicraft works so we cannot do a careless job. It takes a lot of time but we are paid well for the work and time spent.”

The *mehajiki* gilding, itself, is done in two ways. With the *jika fun* technique, the surface is finished only with gold powder (*fun*). It is more expensive than the other technique, *nugui haku*, because it needs a larger amount of gold. In *nugui haku*, gold leaf (*haku*) is put over the whole surface of the board and gold powder (*fun*) is put in the places where the leaf is broken. *Kinpaku* is so thin that it breaks easily, and even more easily while being pressed over the irregular surface grain.

#### 4.5.5 *Komono* lacquering:

That ends our examination of the lacquering styles and processes used for the body (*kiji*) of a Hikone *butsudan*. However, as mentioned before there are some other parts, such as carvings, *kuuden*, small pillars, and *shouji* and ceiling lattices, which require slightly different techniques, skills and even temperament. In this case the aim is not to cover large surfaces with a perfectly flat, unblemished coating, but rather to finish small pieces with as little loss of detail as possible. Some artisans like Akimichi Teiji, can do both, but generally these “small things” (*komono*) are done by specialists. The flow chart in *Nuri* figure 30 outlines the processes used.

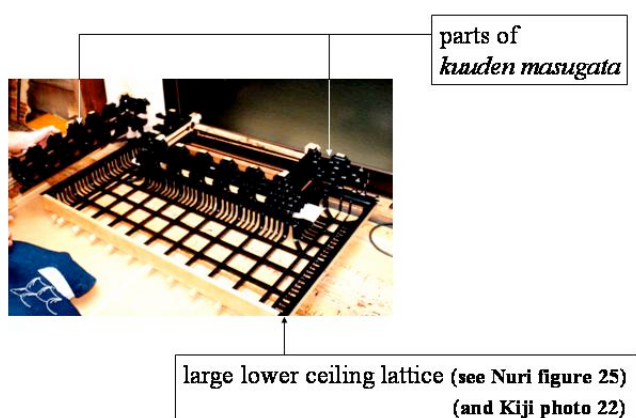




*Nuri figure 30: komono lacquering processes*

One *nurishi*, who works on big items says, “Lacquering on small curved surfaces takes time and needs another technique. It uses a brush with long thin bristles and it takes a different skill.”

*Komono nurishi*, Nakajima Seisaku explains, “Ordinary lacquerers who do big things don’t like small things. It’s fiddly and requires spiritual concentration. For the *kuuden*, for example, I have to do each layer of the *masugata* separately (see *kuuden* section). I take apart all the pieces that can be separated and lacquer them one by one. Then I send the bits back to the maker (*toiya*) who sends them on to the next stage of gilding with powder (*fun*) or leaf (*haku*).”



*Nuri photo 27: lacquered komono*

For his techniques, to get into all the nooks and crannies, he requires various kinds of brushes: flat and pointed, wide and narrow, long and short bristles (see *nuri* fig. 07). Cleaning them takes time and is hard work, so when he starts he wants to complete the work in one go. After he finishes, he washes each brush with rapeseed oil or

linseed oil. A few weeks later when he begins again, he has to clean them off in turpentine. One important characteristic of *hakushita urushi* (JIS 3) is that it has no oil in it. Leaf or powder will discolour with the oil. Thus it is especially important to make sure all the oil is removed.

“If the lacquer dries onto the brush it will become hard,” he says. “I can clean the hardened brushes in kerosene, but they are delicate and easily damaged and their condition will be different. Also the contaminated *urushi* will be different. When I begin work in the morning, the brush has some dust on it. I can clean it in kerosene but it’s impossible to get all the lint and dust out. I use it anyway and gradually the lint and dust come out with the *nakanuri*. I use the brush for *nakanuri*, which I can rub down using Suruga charcoal. Later if I use it for *uwanuri*, it will be softened and easy to use and have no lint left.”

He is very unhappy at the idea of anyone (us for example) actually going into his lacquering room (*nuribeya*). He himself passes through the door quickly so the dust and bugs will not enter, and once inside he keeps his movements down to a minimum. Also when leaving at night he turns out the light before opening the door. “In the case of lacquering four doors,” he explains, “other lacquerers have to finish the job at one sitting, otherwise, if the weather is different, the drying time will make a subtle difference in the colour. In my case, the case of *komono* or carvings, my problems are different. I don’t mind if the colour is different, because the pieces will be covered with leaf or powder. My problem is dust. After *roiro* lacquering other lacquerers will polish,” he continues, “so they won’t be very worried about dust. But with *komono* lacquering, I can’t polish it, so any speck of dust is bad. Also the weather is a problem for me. I must be careful about it, especially in this humid season. If it is humid, the *urushi* will dry too quickly and the surface will wrinkle. So if thunder suddenly begins, I worry about continuing. So I can’t decide ahead of time, what day I will do the work. I see the weather in the morning and decide the schedule. And if the weather is good, I can work through the night to take advantage of it. Other lacquerers don’t care so much as I do, but I tend to care. I usually try to do one set of *komono* a month. But if the *toiya* is in a hurry I can do it in 20 days. A deadline makes me work faster.”

The *nuribeya* has several thermostats on the wall to measure temp and humidity. He also has a dehumidifier. When putting things into the *muro* he opens and closes the door as quickly as possible to prevent any changes in the atmosphere. The pieces in the *muro* are propped up with pins so if both sides are lacquered, none of the lacquered surfaces come into contact with anything else. He turns them over frequently so that the wet, heavy lacquer will not curtain, using a brush to remove the excess, which is dragging down.

#### (4.5.5.A) BASE MAKING (*shitaji*):

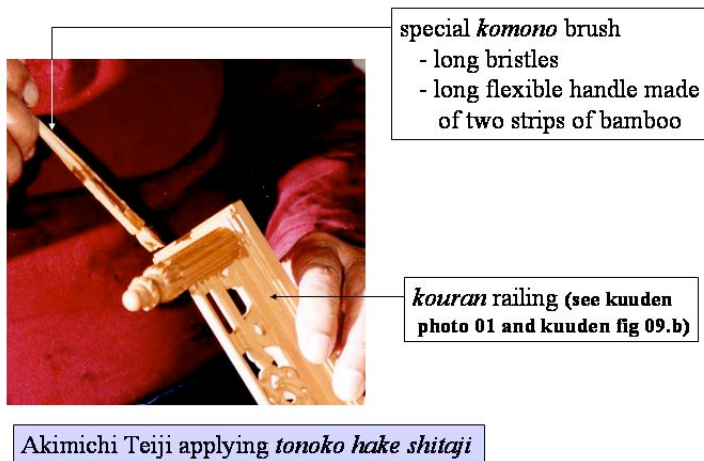
##### 1. Adjustment of wooden base:

On *butsudan komono*, the first thing he does is use sandpaper to make sure all the splinters and rough places are removed. Then he does *kokusobori* in the joints. After digging a groove, as has already been described (see 4.4.3 (E): stages of lacquering), he paints the area and the whole surface with a thin coating of *urushi* to prevent the

moisture from the filler (*tonoko shitaji*) going into the wood. When the space is filled and the mounded top is shaved off, he covers it with paper. Sometimes he puts the paper on with “*nori*” *urushi* (*ki urushi* + *nori*); sometimes he uses *sabi* (*kataji*) (*ki urushi* + *tonoko*), instead. He does this on frames of carvings, *kuuden* gables, any front or side joints, but not on any joints on the back or underneath. Also it isn’t done on carvings because too much detail would be lost. If there are any ridges of paper or cloth that could show through the lacquer layers, he gradates them down by shaving them.

## 2. Application of *tonoko shitaji*:

Seisaku does *tonoko shitaji* with a brush on carvings and very small pieces. The brush is narrow and pointed to get into all the intricate parts where a wider brush or spatula cannot be used. It is done quickly and carefully, twice. Sometimes India ink is added.



Nuri photo 28: base making for *komono*

He uses a spatula on any flat surfaces. He does this twice and dries it in the *muro* between times.

## 3. Water grinding:

In the case of *komono nuri* grinding, where neither charcoal nor whetstone would be effective, waterproof abrasive papers are used. “For example,” says Seisaku, “for uneven surfaces of the carvings such as curves or openings, we make a roll with a piece of sandpaper and use it to sand in the opening. The finest sandpaper is used rolled up to sand into the holes and details of the carved parts. Where possible, flatter parts are done with a ‘finish’ whetstone.” Then excess water and sediment are removed with a brush or spatula and the piece is dried for about 3 hours.

## 4. Dry grinding:

Finally Seisaku removes rough places with dry sandpaper or a whetstone on larger areas.

#### **(4.5.5.B) LACQUER COATING (*nuri*):**

##### **1. Application of middle lacquer coating (*nakanuri*):**

He uses *aka hakushita* or *kuro hakushita* (JIS 3) *urushi*, depending on the colour of the upper layers. Although some artisans apply this thinly, Seisaku finds it more successful to apply quite a lot of *urushi* in the first place. He uses a soft brush for curved places, a stiffer brush for flat places and a fine brush with long bristles to get into holes. Then he goes over the surface jabbing it with the bristle tips to spread and remove the excess *urushi*. Finally he goes over it again with a flat, short bristled brush to remove the lacquer that has run down into the grooves. He has to be careful not to lose any of the detail by letting the grooves fill up. He pushes the outer edges of the brush into the slanted surfaces for the clouds, to keep the grooves from filling up. He uses a 3cm wide strip of whale baleen to scrape the excess off the edges. Then the pieces are dried in the *muro* for 24 hours.

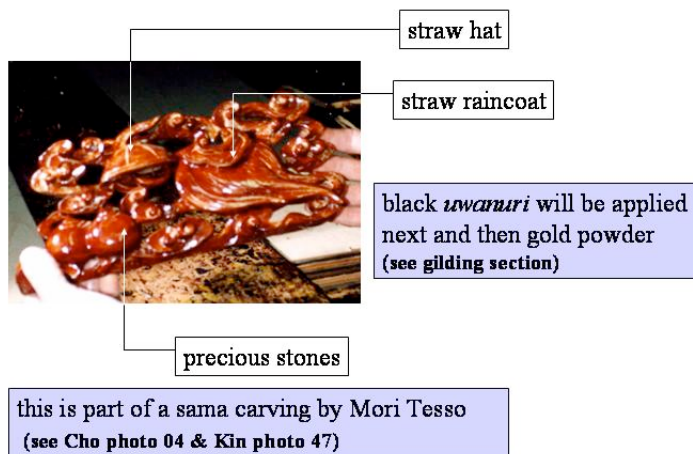
##### **2. Grinding of middle coating:**

After drying, if there is any dust or lint on the lacquer coating, Seisaku flicks it off with a sharpened quill pen. Alternatively, he sands small patches with fine, hard abrasive paper (*taisui* paper) which he uses dry instead wet, as it is supposed to be used. He never grinds such surfaces all over, using wet Suruga charcoal only on flat surfaces.

##### **3. Application of final lacquer coating (*uwanuri*):**

Seisaku does not do *roiro* finishing because these pieces are going to be gilded either with leaf or powder. Sometimes the *toiya* tells him whether it will be powder (*fun*) or leaf (*haku*). In general he likes to use matt (*tsuyakeshi*: see gilding section) *hakushita urushi* for powder (*fun*) finishing which has a silkier look than leaf. For the shinier finish of leafing, he uses black or red *hakushita urushi* that are smooth. “However, the two techniques are not so different in the skill required,” he says. “If the artisan puts leaf on a matt surface, the adhesive layer of *urushi* (*oshi urushi*) which helps the leaf to stick goes into the uneven matt surface and the leaf might look rough, but only under the microscope. So I think it doesn’t make much difference,” he adds. “On the small items it doesn’t show. The underneath coat is more important with leaf which is shiny, than with powder which is silky anyway.”

Sometimes it is practical to change the colours of the lacquer layers. For example with black *uwanuri* on top of red *nakanuri* he can see if he has missed any places (see gilding section). Then the powder artisan (*fundame shi*), who uses *oshi urushi* coloured red with *bengara* as an adhesive, can see exactly what he is doing.



*Nuri* photo 29: carving coated with red *nakanuri*

Occasionally the *toiya* will ask for the final lacquer coating to be yellow. This is helpful where the gilder is not so skilled, so any imperfections would be masked by the yellow colour under the gold. Also sometimes during assembly, some bits of gold can be knocked off. Again, this would not show.

After being in the *muro* for 2 days Seisaku sends the pieces back to the *toiya* who will then send them on to the leafer (*kinpakuoshi shi*) or the powderer (*fundame shi*).

#### 4.6 CLEANING and REPAIR (*sentaku*):

So far we have given a fairly comprehensive description of the lacquerer's craft. However there is one more point that must be mentioned before we finish: cleaning. These days, as the cleaning and repair process (*sentaku*) is becoming an increasingly important part of the *nurishi*'s income, we cannot finish without a brief description of how it is done. The *butsudan* business, for both producers and craftsmen, is more than a lifetime job. It spans several generations. In fact most of the companies and workshops making Hikone *butsudan* of the DKH level (see introduction) came into being in the Meiji or Taisho period. Therefore when a person needs to have their *butsudan* cleaned, perhaps 30-50 years after purchase, they may well be able to take it back to the original maker or lacquerer. For photos of *sentaku* please see section 1: the work of the cabinet-maker (*kijishi*).

However this is not always the case. Sometimes lacquerers are given repair jobs for which they know nothing of the background. If the quality of the original materials and workmanship is not good, repair work can be no better. Problems arise under the following conditions:

1. If the original lacquer was not real *urushi* (for example it might be a by-product of the cashew tree) then the Akimichi workshop will have difficulties because they use only real lacquer. Putting this on top of cashew will be troublesome.
2. The wood base might be an inferior material such as plywood or even hardboard.

3. Concerning the workmanship, perhaps specks of dust have been trapped beneath the previous coatings or perhaps previous repairs have been somewhat inferior.

In cases like these Teiji says, “high level repair techniques wouldn’t improve it, so we do the minimum, perhaps *tatenuri* instead of *roiro* finishing.”

Teiji points rather excitedly at the *butsudan* they are working on at the moment. “We found the date of *sentaku* on the underneath of one of the boards. It’s not always written. The date is Showa 38 (1963), May 10<sup>th</sup>. So this is the second time. In my workshop we don’t write the date of *sentaku*. However, my father said that 30 years from new to *sentaku* is ideal because after 30 years you don’t have to use a concentrated solution of hot water and caustic soda,” explains Teiji. “The longer you leave it, the more soda you need and then the gold will come off. So if it’s after only 30 years, you just need re-lacquering and not re-gilding.”

In the *sentaku* process, first the nails or pegs are removed and the holes are filled. Then water is heated in a big cauldron 60 to 70cm in diameter and caustic soda is dissolved in the water. The temperature is relatively high, about 60° C. Next the water is poured over each dismantled piece, one by one. The dirt from the surface comes off while the lacquer stays on. Then the pieces are rinsed in cold water and dried in the shade for 2 days. Strong sunlight is bad but the wind outdoors is good.

The next process is repair (*tsukuroi*). *Kataji* is put in the places where the lacquer or wooden base is damaged, for example by scratches. It can stick on the surface of the *urushi* because it is mixture of *ki urushi* and *tonoko*. In the case of heavy damage, such as deep grooves, after the first layer of *kataji* is dried and dry-ground, *kataji* is applied again. “We sometimes apply it several times until the *kataji* is the same level as the original lacquer surface,” says Teiji. “We can’t grind down the old lacquer to match the damaged surface.” When the last *kataji* is dry, base grinding with water is done and then lacquer coatings are applied to the whole surface. If any wooden parts have been badly eaten by insects or rodents, the whole part will have to be replaced. On the parts where leaf is gone, *uwazuri urushi* is applied to prepare the surface for new leaf.

To see how *sentaku* fits into the daily schedule of a *nurishi*, we will end this section of the website with an overview of the artisan’s workload, which could in turn give an indication of what the future holds for them. Let us look at what might be happening in the workshop within a day. Actually their labour can be divided into two streams. As Akimichi Butsudanten, they are manufacturers, receiving orders and allocating the jobs to the other six artisans involved in the production process. As Akimichi Nurishiten, they work as artisans, that is, as lacquerers. Also overlapping with these two, there is the important task of cleaning (*sentaku*) which provides a steady income in these times of reduced popularity of *butsudan*. In the workshop we see evidence of this everywhere.

#### 4.7 THE ARTISAN’S WORKLOAD:

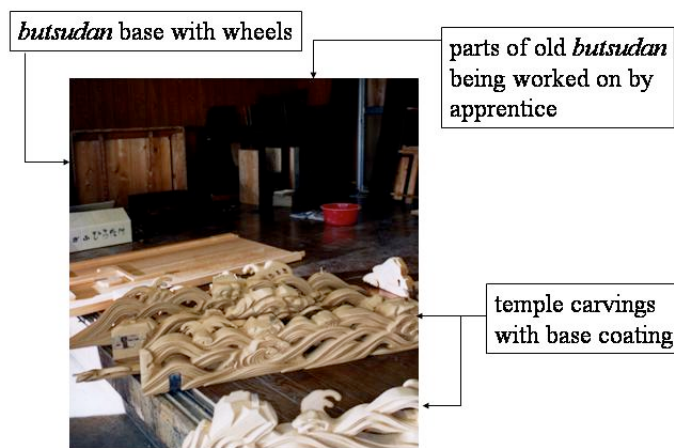
a) A new apprentice has been given the components of a complete *butsudan*. He will carry out all the stages of lacquering and thus learn the techniques for high quality

items (DKH). This is one aspect that distinguishes the Akimichi family: in all the years we studied them, they almost always had an apprentice in training.

b) For a DKH *butsudan* which has been ordered from Akimichi Butsudanten by a local customer, the *kiji*, *kuuden* and *choukoku* work are finished and have been returned for lacquering before going on to *makie*, gilding and metalwork.

c) There is another new *butsudan* of about middle quality, for which the maker has requested the highest level of lacquering from Akimichi Nurishiten.

d) They are carrying out *sentaku* on a full sized temple *shumidan* and *kuuden*, so there are huge beams lying around, with the creamy coloured base coatings already done. For many artisans, expanding their work to include temples and religious equipment, such as parade floats (*mikoshi*), is a way of facing the future.



Nuri photo 30: temple *sentaku*

e) There is also a small *butsudan*, which has come from Kyoto for *sentaku* and to have a small set of shelves made to go underneath. Surprisingly, Teiji's nephew, Tsuji Yasuo, rather than the owner, is deciding which parts to lacquer and which to leave as bare wood.

f) Keiichi is making new drawers for another *butsudan*, which has come in for *sentaku*.

g) Occasionally the Akimichi workshop does non-*butsudan* jobs. Today, a customer wants repairs on a triple-layered *bento* box which had been her grandmother's. Keiichi says it will cost about 30,000 yen. She is happy with that.

## CONCLUSION:

Buying a new traditionally produced *dentouteki kougei hin* (DKH – see general introduction) *butsudan*, like the ones we are describing in this website, is an expensive proposition. We have seen them priced from 8 - 30 million yen, depending



on the size and the level of each individual craft. As mentioned earlier, lacquering can cost upward of 25% of that. *Sentaku* can cost 10% of the original price, so even that is not embarked upon lightly. Therefore it is important to treat the *butsudan* carefully. Since it is the lacquering (and gilding) which are most likely to be damaged, people generally put on gloves before touching the *butsudan* and they dust it very gently with a special cloth. They may even keep the inner *shouji* closed as much as possible. In any case, along with a house and a car, it is one of the major investments made by a Japanese family, but if well cared for it will last for generations.

One artisan explains, “A high quality expensive *butsudan*, after a few years of bad treatment, can be damaged. On the other hand, some customers who have bought a much less expensive one, maybe 2 or 3 million yen, but take care of it, will find that even after five years it’s still as good as new. You can keep lacquered goods beautiful with appropriate treatment, even after more than four decades.”

#### FOOTNOTES:

FN.1: These days the processes of *nayashi* and *kurome* are often carried out at the same time. For *nayashi*, in the past a large oval tub was placed on a slant to face the sun and the *ki urushi* was put in. Then, using a boat paddle, it was spread over the floor of the tub.

FN.2: Exactly why Hikone should have become famous for *butsudan* production has often been pondered. Its samurai tradition, its proximity to the cultural centre of Kyoto and its good location in a humid area have all been proposed as possible reasons. However, as has been indicated throughout this section, humidity is unlikely to be a positive advantage. Rather, too much humidity is worse than too little. This will be discussed further in our forthcoming book.

FN.3: Natural cashew is an oily black liquid, from the cashew nut shell, with chemical properties similar to urushiol. It can be refined into cashew varnish. It is not as expensive as real *urushi*. Although many traditional artisans would disagree, some say that it is just as durable as real lacquer and easier to work with because of its drying properties.

FN.4: *Ki urushi* processed with the normal *kurome* process is called *hayakuchi* because it hardens quickly. The *urushi* maker adds a little *osokuchi urushi* to *hayakuchi* to make the “normal” product.

FN.5: JIS means Japanese Industrial Standard. It is a system for grading the quality of some materials. JIS grade 1 is the highest quality with least additives.

#### REFERENCES and ACKNOWLEDGEMENTS:

Nagase Kiusuke. 1986. “*Urushi no Hon*” [*Urushi Book*]. Kenseisha: Tokyo, p 68 – 87, p115 – 119, p 121, p119 –128, p 131 – 132.

Komatsu Taishuu and Katou Hiroshi. 1997. *Shitsugeihin no Kanshou Kisochishiki* [Fundamentals for the Appreciation of Lacquer Art]. Shibundou: p126-130.

Kumanotani Jun. 1985. The Chemistry of Oriental lacquer (*Rhus Verniciflua*) in Urushi: Urushi Study Group: June 10-27, Tokyo, p243-251.

Kenjo Toshiko. 1985. Scientific Approach to Traditional Lacquer Art in Urushi: Urushi Study Group: June 10-27, Tokyo, p155-162.

Nomura Hiroaki. 1977. "Hikone *butsudan* no rekishi to enkaku" [History and Changes of Hikone *Butsudan*]. In Tanaka Hisao (ed). *Nihon no dentou butsudan shuu* [Collection of Japanese Traditional *Butsudan*], Shoueï Shuppan Corporation: Tokyo, p 54-58.

Eades, Nishiyama, Yanase. 2002. Tradition and Recession: Strategies for Coping with Economic Change in a Japanese Craft Industry in *Ritsumeikan Journal of Asia Pacific Studies*, Beppu, Japan, p 116.

*Butsudan* photo 01 is by courtesy of Eirakuya (KK), Hikone, Shiga Prefecture. [URL: <http://www.eirakuya.com>] [email: [eirakuya@mx.biwa.ne.jp](mailto:eirakuya@mx.biwa.ne.jp)]

*Butsudan* photo 02 is by courtesy of Hikone *Butsudan* jigyou kyoudou kumiai.

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