SITAR MAKING IN INDIA

DOCUMENTATION OF AN APPRENTICESHIP IN THE SHOP OF KARTAR CHAND SHARMA JAN-NOV 1987 • PART 1: INTRODUCTION & OVERVIEW •

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BY JAY SCOTT HACKLEMAN

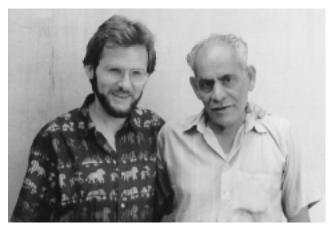
Sitar Making in India One Shop's Tradition

By Jay Scott Hackleman

n 1987 I spent almost a year in India on a grant from the American Institute of Indian Studies (AIIS), a program partly funded by the Smithsonian. The objective of the trip in the words of the proposal was to "perfect skills as an instrument maker through traditional means, and to supply a body of information for other craftsmen through documentation." The name of the proposal was "Musical Instrument Making in India: Documentation of an Appreticeship." I guess this project might not be accurately referred to as an 'apprenticeship.' If it were truly an apprenticeship I would have had to first start by selecting an appropriate instrument maker, and then arrange to be born as his son. But with this singular disadvantage in mind, I endeavored to learn what I may through the means of observation and personal involvement. Personal involvement only possible due to the generosity of my instrument maker guru Kartar Chand.

It was Ravi Shankar who got me to New Delhi and it was pure serendipity that led me to my teacher, the late Kartar Chand Sharma. Serendipity permeates the air of India like incense and the fortunate string of circumstances leading to our meeting could not have put me in a more wonderful position -- allowing me to watch and learn from this skilled, honest, straightforward man, a master of the old tradition, his brother Hari, and their apprentice Kaka (his nickname because his name is Kartar Chand also) in their old and respected shop in Pahar Ganj (Old Delhi).

There were many times I felt that, when leaving my room in New Delhi and hailing a three wheel taxiscooter early each morning, that the scooter was instead a black and yellow time machine, taking me not just to Pahar Ganj but to a small shop that could have just as well been in the 18th century. A shop where instruments are



J. S. Hackleman and Kartar Chand Sharma

built every step of the way with hand tools, by hands taught by their fathers and their fathers before.

On the first day, I showed up soon after dawn with a blank notebook (first of eventually 5) and a little box of Indian 'sweets,' which was the only thing Kartar Chand had requested I bring. I assumed it was like bringing a box of donuts to work or something, so I handed them to him expecting to dig in. But that wasn't the case. The sweets were not just for us. Before we could have any, they were first shared with Vishkarma--the god of the craftsman. Some incense was lit and a few fresh flowers were on hand. After a few pieces were laid in front of the picture of Vishkarma, Kaka was sent for some chai, and then we had our little treats. That was that. The beginning of a long commitment, based only on trust and a reverence for craft and tradition.

In Kartar Chand's shop instruments were only made when someone ordered one, and they were booked many months in advance with orders. Nothing was built on speculation, contracted out, or mass produced. Many



Outside the shop of Kartar Chand /Hari Chand

shops still have a close tie to their village craft roots; the instruments they make are what might be called folk instruments. A few shops, like Kartar Chand's, have been attending to the needs of professional or classical musicians, and thereby have developed a more refined technique. Of course there are many shops which produce mostly with the tourist trade in mind. I hope this article can shed some light on evaluating a good sitar from one that is mostly just decorative, or worse.

Spending the better part of a year in Kartar Chand's shop exposed me to the full gamut of traditional classical musical instrument



Kartar Chand supervising milling of a Tun log. making -- everything from selection of raw materials, seasoning of the different parts, construction of sitar, tambura, dilruba, surbahar -- all manner of repair -- (there was one sitar that had fallen out of a moving car, other one where the neck was bowed a good 2 inches) but my main source of interest and of course the instrument they made the most of, was the sitar -- from basic student sitars to very elaborate professional sitars. What will be covered in these articles will just deal with the sitar -- the process of building as I observed it in the course of my time with Kartar Chand.

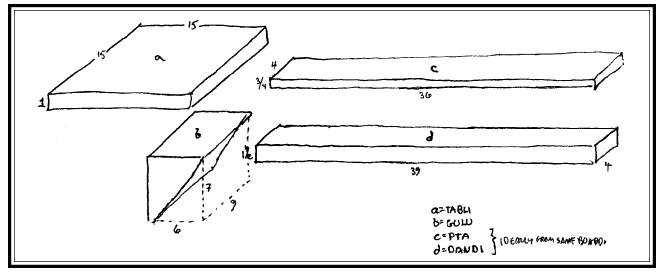
What I want to share in this article is more along the lines of introductory and anecdotal peppered with a little practical information, so as to shed some light on an old tradition of instrument making. I hope that if the opportunity presents itself, I could get into more detail on sitar construction later.

My proposal called for me to apprentice with an instrument maker to 'study this craft where it is still a living tradition,' and to document techniques, tools and raw materials used in the process. With this in mind I accompanied the guru to the huge wholesale lumber yards at the edge of New Delhi, and on his advice and through his contacts, I travelled to Pandharpur, in Maharashtra (way off the beaten path), where the best gourds come from. He also recommended that I spend some time in Calcutta where there are numerous old and respected instrument maker shops, specifically Kanai Lal, Hiren Roy, Naskar, Hemen and Radha Krishna Sharma. Over all I spent two months in Calcutta.

One of the first field trips I took with my teacher was to Kirti Nagar in Delhi, the location of the government timber yards where there are acres of huge logs of tun, teak, and sheeshum. Among all these logs are various small mills, with one of which Kartar Chand had a good working relationship. The wood he works with is Tunwood (Cedrela Toona). Most sitars are made of Tun. It's used in cigar boxes and pencils as well. There are some makers who have been asked to build sitars from teak, but I'll return to that subject later. The logs Kartar Chand chose were of sufficient size for some of the larger components needed for surbahar (a bass sitar) and gentleman's tambura, as well as the usual shop stock for gulus, tablis and *dhandhis*. The illustration at the bottom of the page shows the stock dimensions for sitar. (The illustrations for this article are scanned from my notebooks from India.)



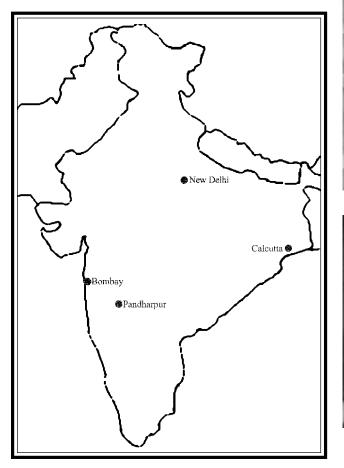
Hari sorting through the shop's supply of seasoned components



Besides the use of Tunwood in the main structure of the instrument, there is also the use of a tumba (gourd) for the resonant body. The consensus among instrument builders is that the best tumbas come from Pandharpur. Pandharpur is a small town, famous for its ancient temple, along the banks of the Bhima River high on the Maharashtra plateau. Kartar Chand arranged the introductions to Ms. Haribau Govind Puli, the tumba merchant from whom he got his gourds, so my wife and I headed for Pandharpur. The character of the climate and the regular flooding of the river after monsoon makes for ideal conditions for growing the kinds of gourds best for these instruments: not too thin and flimsy, or too thick and pulpy, or too dense and heavy. The skin is smooth and symmetrical, with no ridges and a minimum of flaws. Also, the type of gourds from here are of a large size.

Other than Pandharpur, the most important place to visit was Calcutta. Calcutta has most of the really old established shops. I was fortunate to have been able to interview Hiren Roy and his son Himangshu (who have now both passed away), and was very fortunate to spend a lot of time with Murari Adhikari, who is the Kanai Lal builder. It was this shop that built Ravi Shankar's earlier instruments, on which Nodhu Mulik later based the instrument he built for Ravi-ji.

Murari also shed some light on the use of teak in some instruments. He told me that Kanai Lal, a couple of generations ago, had acquired a significant amount of





Gourds in Pandharpur bundled and ready for shipping.



Interviewing Hiren and Himangshu Roy at their shop in Calcutta



At the Kanai Lal shop in Calcutta discussing rudra veena and sitar making with Murari Adhikari.

salvage wood from demolished structures in Calcutta. These were very old buildings made of teak that had seasoned for well over 100 years. Many of the instruments made by this shop over the years were made from this

stash. Murari said it was beautiful old-growth Burma teak, which is quite different from the 'CP teak' found today (CP = centralprovince). The grain was very straight and even, and much lighter than CP teak. The sitar made for Ravi Shankar was made with this salvage wood. He said the usual wood for musical instruments is Tun, but because of the notoriety that instrument and the one Nodhu made acquired, it was assumed by those in the west that all sitars were made of teak. I don't believe Murari has any more of his old teak stash left.

It was fortunate Kartar Chand had me take those trips to Calcutta. Though the traditions are different, there were many similarities between his shop and the shops I observed there. A great deal of valuable information and different perspec-

tives were shared there, for unlike other makers I met in New Delhi, these men in Calcutta, like Kartar Chand, were more willing to share much of their personal insights on instrument making, rather than hide behind the excuse of 'trade secrets.' Upon my return from Calcutta, Kartar and Hari were busy in the building of a surbahar, and getting ready to start on another 'full sitar.' This would be a sitar with a full complement of *taraf* (sympathetic strings), a second



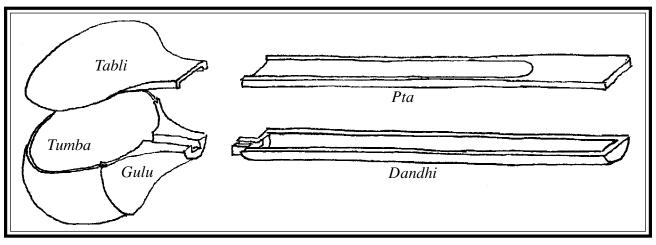
resonating gourd, and full fancy carving and engraving.

By now I had observed the construction of quite a few sitars, and had devised what I felt was a good list of the steps in building a sitar. This would give me a chance to check my notes, and I was looking forward to lending a hand.

Much of this information is more appropriately expressed in terms of principles rather than formulas, and proportions rather than dimensions. It is important to note that there are no drawn plans, no scale drawings, cutaway drawings, templates, or fancy jigs. It's rule of thumb, an oral tradition. There are a few fundamental measurements that the instrument maker knows, and from those measurements he constructs the curves and arches and proportions from his own

tradition. The only drawings were a notebook of reference drawings for the various, more complicated carvings.

I don't intend to cover these steps in any great detail in this article, but they do help to achieve a better understanding of how a sitar is actually built.



Component parts of the sitar with their technical names.

The construction of the sitar generally took place in fourteen steps, divided into two major sections. The first section was from raw materials to where it is all assembled, with no ornamentation or carving. The second section was through inlay and engraving, carving, finish work, and setting up for playing.

- Section 1:
 - 1. shape gulu stage 1
 - 2. cut and shape tumba
 - 3. shape dandi stages 1-6
 - 4. shape gulu stage 2.
 - 5. join and shape gulu/tumba
 - 6. shape tabli stages 1-7
 - 7. join neck and body components stages 1-6

Section 2:

- 8. detailing stage 1
- 9. prep stages 1-5
- 10. detailing stage 2
- 11. detailing stage 3
- 12. prep stages 6-11
- 13. finishing
- 14. fitting out.

The appropriate gourd is selected for the specific instrument in mind. The largest gourds are reserved for gentleman's tambura or surbahar. The initial cuts are made with the 19 1/2" tumba saw (see 'D' in saw illustration).

Sometimes it's necessary to improve a little on what nature provides in the shape of the *tumba*. To do this, after it is cut to the general shape to be used, the



The shaping of the gulu is accomplished two stages after the bugh shape has seasoned for at least 6 months. This shows Hari chiseling the rabbet in the gulu that will receive the tumba. Typical of Step 4



First cut of sitar tumba.



Sitar, gentleman's tambura, and surbahar tumbas, shaped and drying in the sun.

gourd is soaked in a large tub of water for a few hours. It turns almost to the consistency of thick leather. Sticks of Tun or bamboo are then wedged in the appropriate spots to give the *tumba* its desired shape. This is all done by eye, with a few cursory measurements of height and width. They are then set aside to dry hard in the sun.

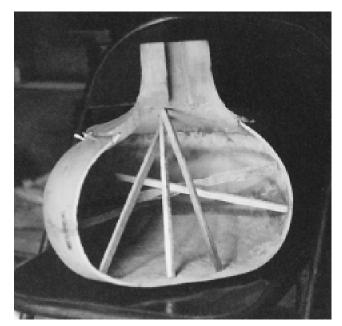
The exact shape of the *tabli* is not predetermined. It is taken from the outside outline of the *tumba* and *gulu* after they have been shaped. This varies from instrument to instrument, yet within certain parameters of dimension and proportion. So, the actual size and shape of the gourd determines the shape and size of an individual instrument.

There is a standard length of 26 1/2" from the *pta/tabli* joint to the *targen* (first nut), but since the shape of the *tabli* is based on the shape of the *tumba* and the exact position of the bridge is based on the shape of the *tabli*, we find that the actual string length varies from instrument to instrument as well.

When it's time to assemble the basic units of the instrument, the tabli, dandi, pta and the combination of the *tumba* and *gulu*, it's a bit of a group effort, because they are using heated up hide glue that sets up quite quickly and they have a lot of elements to put together simultaneously but accurately. The joints are all dry fit ahead of time to assure that everything is going to fit nicely and line up properly, then set out. The glue pot is put on and stirred and made sure that it is of the right consistency. All the binding material is set aside and ready to go and then they take a little break and collect themselves for the assembly project. In the picture below, the glue pot is boiling away and there is the smell of burning Tun wafting through the air (they use all the shavings from the gouging and chiseling to fuel the fire for the glue pot)-- it smelled camphory and cedary like incense. So KC is having a little smoke before he gets down to the business of putting all the pieces together and binding them all.

They start with the *dandi/gulu* joint and clamp it with two screws which remain inside the instrument. This

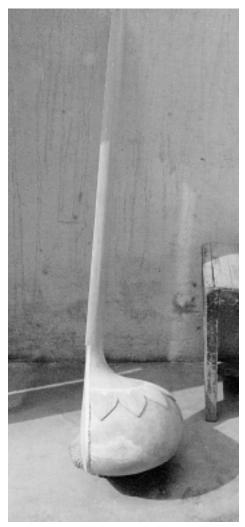




Tumba/Gulu assembly showing braces for shaping *eady* to be removed (typical of Step 5). The gulu is attached to the tumba with hide glue and bamboo nails. The dovetail tenon in the gulu will be cut to fit the dandhis mortise during Step 7.



Tumba, gulu, pta and dandhi, glued and bound. Typical of Step 7, Stage 1



Instrument typical of first parts of Section 2; ready for engraving and carving.

same technique is used in Calcutta, the difference being that in Calcutta the joint is not a dovetail mortise & tenon as in Delhi. The *dandhi/pta* is bound to a straight sheeshum board to minimize any tendency to twist. The *tabli* is glued and a little extra mix of glue and sawdust is applied to the outside of the joint. The whole assembly is then set aside while they proceed with preparing the decorative leaves (that aid in the connection between the *tumba* and *gulu*), *langort* (tailpiece), and whatever celluloid inlay they have decided to use. This ends Section 1 of the building process. Now it's time to move on to Section 2: applying the decorative elements, carving, 'engraving' the celluloid, making the component parts (bridge, tuning pegs, etc.), polishing and setting-up for playing.

The leaves and tailpiece are attached with hide glue and 'nails' made of Tun. The celluloid is inlaid into its positions, glued with a concoction of celluloid shavings melted in alcohol, and secured with bamboo nails. The instrument is then rasped, filed and sanded to its final shape.

Regarding the 'engraving' of the celluloid, it would be more correct to say that it is carved also. Though the decorations are quite intricate, they are not 'engraved,' as one would think of it as in etching, or scrimshaw, but rather gouged into the celluloid with a tiny gouge, customized from grinding the end of a small triangle-shaped file. The result is an intricate relief carving in the celluloid, which is then filled with melted pigmented wax. The wax is scraped away before the carving is done, revealing the design clearly.

The carving, of course, varies with the level of quality of the instrument commissioned. Most of the simpler leaf and *langort* carving is done by eye from memory. The only time I saw KC refer to anything written was when he pulled out his 'ancient' book of carving designs to reference. He laid it next to the sitar he was working on, and simply proceeded to draw the design freehand with a pencil. The sitars at right (a medium fancy and fancy) are carved, engraved, and ready to polish.

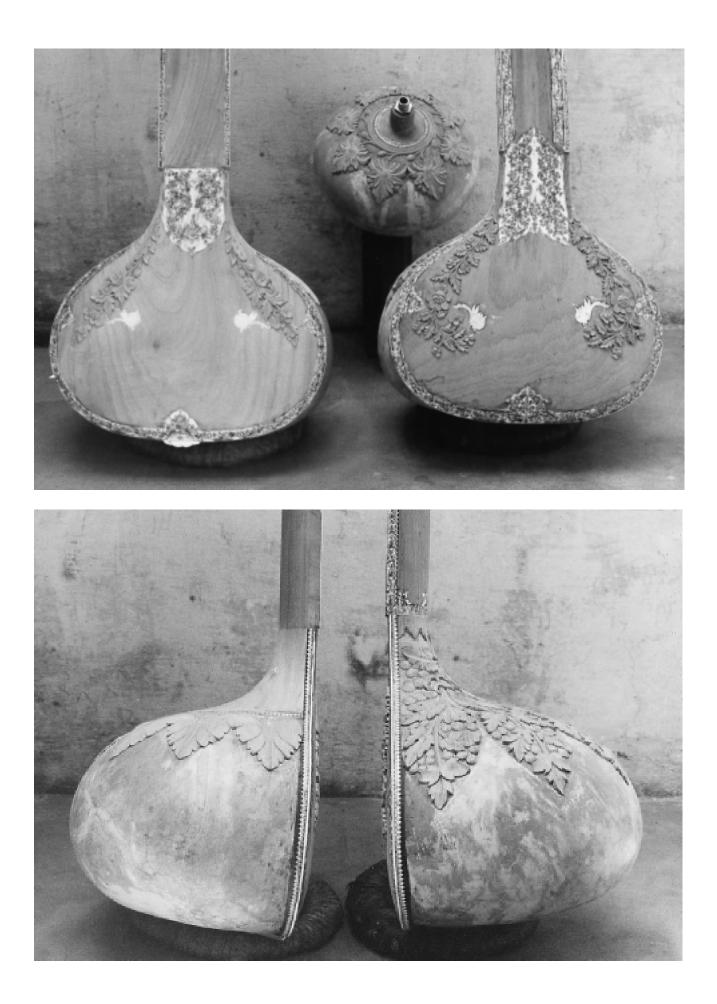




The double-boiler for the glue was an elegant old chai pot heated with Tun scraps.



Kartar Chand's book of carving designs. He graciously allowed me to take tracings of the whole thing. I gave him a clear clean copy of it all, but he still prefered to work from his old book.





Once the carving and celluloid are completed, six steps of wet-scraping, sanding and sealing follow before the instrument is ready for polishing. This procedure is a 'french polish' in shellac, generally accomplished in about 14 steps over the course of three to four days. No

spray-booths here, though I did see evidence that other less qualityminded shops elsewhere were not opposed to quick finishes in lacquer

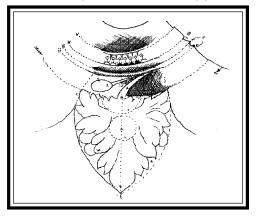
Kartar and Hari had about a dozen formulas for different steps in the finishing process, and numerous recipes based on combinations of nine different pigments and dyes to achieve the colors they used on different instruments.

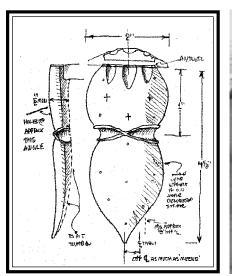
Concurrent with the final stages in the polishing process they were busy making the *koonti* (tuning pegs), *langort* (tailpiece), *jiwari* (bridges), *pardas* (frets), *targen* (nuts), and many other small bone or stag-horn pieces necessary to complete the sitar. If the instrument was to be a fancier sitar, the *langort* would be made of stag-horn and carved with more detail than the plainer Tun tailpieces. A Tun *langort* would have already been affixed to the sitar before the finishing and polishing, whereas a stag-horn one would be applied afterwards. Some shops use a *langort* cast in brass; Kartar Chand did not.

This is also when the second resonating gourd, if specified, would be made. Opinions differ about the acoustic effectiveness of the second gourd. Some feel it is just decorative, a vestige of the ancestor of the sitar, the rudra veena, while others feel that it improves the sound. They are both right. The vast majority of sitars built today use a turned 'bowl' of Tun for the second 'gourd.' Kartar Chand said those have little or no real acoustic effect, and are just decorative. He used an actual gourd, and was of the opinion that if it is proportioned correctly it improves the sound considerably. My own experience over the years bears this out. On a sitar properly set up with a legitimate second gourd, the player is treated to a 'stereo' effect, making the sound appear to be originating from inside his head rather than outside.



Hari working on a second resonating gourd.

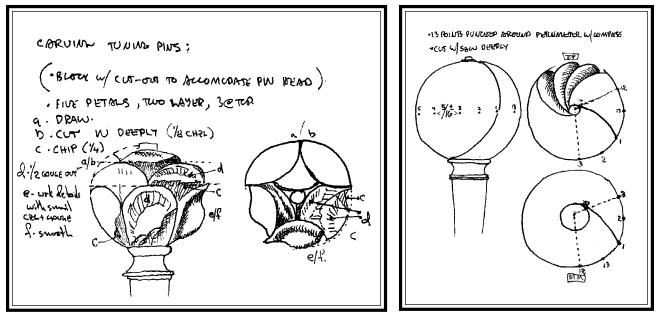




Langort (tailpiece) traditionally made of Tun or stag.



Kaka sanding second resonating gourd.



Blank *koonti* (tuning pegs) are turned on a lathe to KC's specifications and carved in his shop depending on the decoration of the instrument. Made from sheeshum (a type of rosewood), they are not easy to carve. The rose design is for the more deluxe instruments. Their standard carving is a 13-part spiral.

Just as in our terminology--the part of the bridge over which the strings ride is called the saddle, only their word for saddle is *sawari*. Their bridge has a significant difference from ours in that it is wide and slightly curved on the top.

This saddle is filed in a very special way so that it creates a ringing buzz to the strings. But it is much more sophisticated that a simple buzzing. In accentuating the upper harmonic partials, it creates a swelling and enlivening of the sound and in their language the word for 'life' is *jiv*. Somewhere along the way they decided to combine these two words together and formed the word *jiwari--* in other words, a saddle which brings life to the sound. To this day the bridge on a sitar, tambura, surbahar or veena is called a *jiwari*. The word has taken on a double meaning in that it means not only the saddle itself but it means the act of voicing the saddle, so one "does a *jiwari*" to an instrument or "works on the *jiwari*," or an



Kaka with a bouquet of freshly carved tuning pegs.



A sitar ready for fretting and setting-up. Typical of Step 13

instrument has a '*koola'* (*open*) or '*band*' (closed) *jiwari*. So it has a double meaning of working on the sound, as well as working on the saddle. The process of filing or voicing the bridge, "doing the *jiwari*," is beyond the scope of this article now but could be covered at a later time.

On most instruments today the *jiwari* (as well as the other bone parts) is made of camel bone. The *jiwari* on the finer instruments is made from 'stag horn,' *i.e.*, antler of a specific large stag called a *barasinha*, or 12-horn (because of the size of the rack). I was told this material has now become very difficult to acquire because it's also used as an aphrodisiac. My wife brought some moose antler with her when she came to join me in India (I can't imagine what the customs inspector must have thought) and that was used on the *jiwari* of my own sitar. Kartar Chand said it was quite similar to the old *barasinha*, so I was happy to leave him a nice supply.

Once the bridge is completed, the *targen* (nuts) and 5 main *koonti* (tuning pegs) are installed and the upper strings of the instrument are strung and brought up to pitch. At this point the *parda* (frets) are tied on and tuned by ear (see facing page). Once these are positioned satisfactorily, the holes for the remaining *koonti* are drilled.

Some shops have tried to skip this step, and "mass-produce" pre-drilled *dandhis* with bad results. The exact position of the frets varies from instrument to instrument due to the different sized *tabli*. If this variation is not taken into account, the sympathetic tuning pegs collide with the fret ties. This is one of the first things you want to check when evaluating a sitar. Bring it up to pitch (C#), then make sure the frets can be positioned in tune without hitting the *taraf* (sympathetic) tuning pegs.

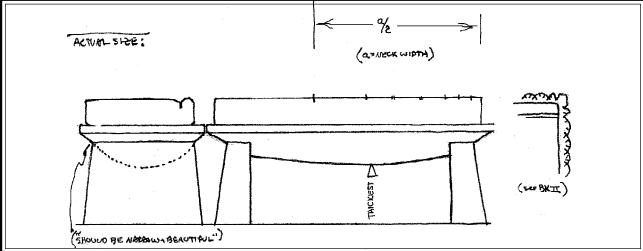
का बारी SAWARI (saddle) JIV (life) जीवाही JIWARI (saddle which gives life to the sound)

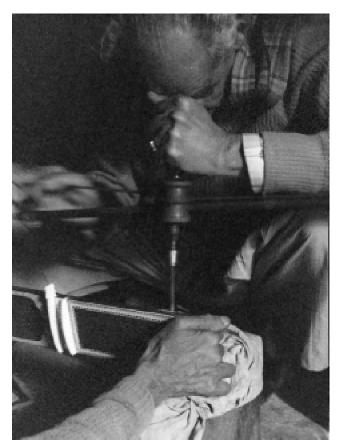


Tools for 'doing the jiwari': Coarse and medium double-cut files, sanding block with 100x sandpaper pack of smokes.

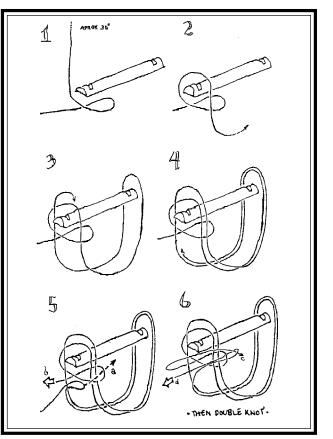


Feet on the bridge of a 'fancy'sitar.





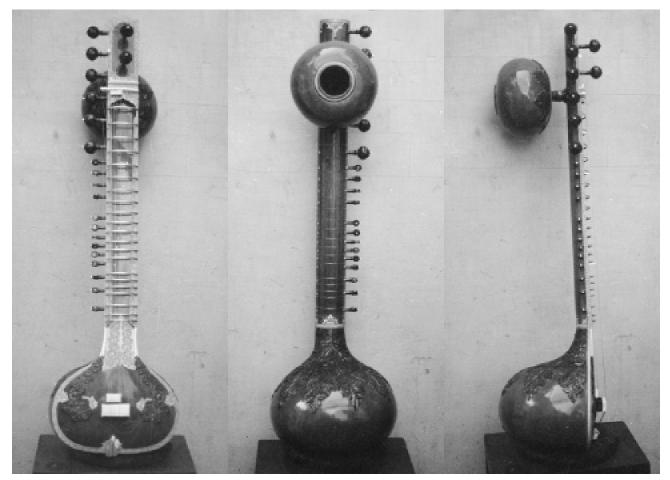
Drilling for the first five tuning pegs using the bow-drill.



How to Tie a Sitar Fret (why it's an oral tradition)



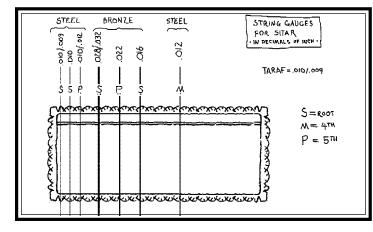
Tying on the parda (frets). Traditionally done with moonga (braided silk string), now usually done in nylon.



Completed 'full fancy' sitar with full complement of taraf (sympathetic strings), second esonating gourd and deluxe carving.

Another clue the frets provide in determining the circumstances under which an instrument has been built is to see how much the *moonga* (ties) have dug into the finish. If there are deep grooves, it usually indicates either the finish is too thick, or that the instrument was assembled too hastily to allow the finish to properly cure.

When finishing and adjusting the instrument for playability it helps if you already know how to play one. Different musical traditions have different styles of playing that actually result in different kinds of instruments. The sitar pictured here is set up in the 'Ravi Shankar' style. There is a certain voicing of the *jiwari*, and it uses bass strings not found in other styles.

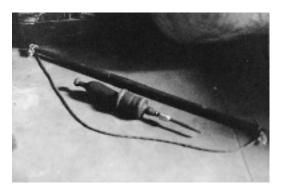




Detail of 'full fancy' showing carving, celluloid engraving and string configuration.

A note about their tools. Many of the tools used in Kartar Chand's shop would be familiar to all of us--chisels, gouges, files, mallets, etc. But there were many tools and jigs they made for themselves, some of which would be unusual to us. These are tools and jigs designed to be used on the floor, and to often be used not with just two appendages (as we limit ourselves just to our hands) but with four. There is more than one reason to leave your shoes at the door.

One tool which caught my attention first was their saw. The handle has an exotic shape, and they seemed to have a different saw for every day of the week. I found out that they often fashioned the handles themselves and had a supply of sheeshum on hand for that purpose. All the saws cut on the pull. It gives you much more control of your actions since they seldom would clamp a piece to cut, and would prefer to simply hold a piece of work in their hand or feet. There was also little or no set to the teeth (except on the *tumba* saw), which I had a hard time getting accustomed to.



Bow Drill. I bought one for myself, and what I found curious was: here is this tool that hasn't changed since Noah used it on his ark -- yet, this was a modern version and the handle was made of plastic.

In all the time I was there the shop was only closed for business on one holiday -- that holiday was *Divali*. The next day when I came to the shop I noticed that all the tools were very deliberately propped up -- some were on shelves and some, such as planes, were standing on their edge against the wall. The box with all of their carving tools in it was open and all the tools were leaning very carefully against the open lid, blade up. There were fresh flowers on the picture of Vishkarma, the god of the craftsman. I asked Kartar Chand why all the tools were arranged in such a peculiar fashion. He looked at me as if the answer should be obvious to me, and said simply, "The tools are resting too."

Yesterday had been a day of rest, so it was important that the tools rest as well. They had used part of their day off to clean and sharpen all the tools the shop.

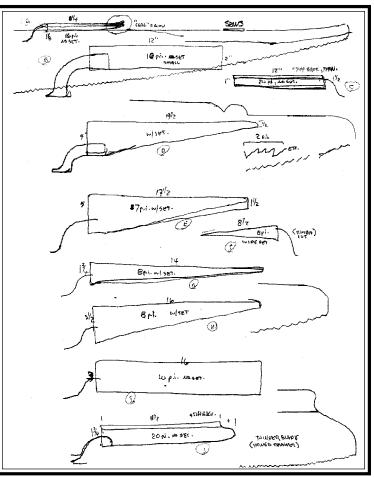


Diagram from Notebook #4 illustrating their saw inventory.



The shop tools "resting" for Divali.

My reason for undertaking this study was to immerse myself in and to observe first hand this traditional way of building instruments, a way which has been a tradition for generations. It's not the only way because every shop has its own style -- this particular shop was a very old shop, and traditional too, so my inspiration was to immerse myself in their particular tradition. In my grant proposal I commented, "There is much 'Yankee Ingenuity' I feel is best left waiting outside the door of the traditional craftsman's shop."

At one point in our stay in New Delhi my wife and I had the honor of having lunch with Ravi Shankar, and he was kind enough to put a little inscription into my notebook which read:

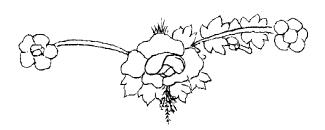
Todays innovation is tomorrow's tradition! I admire people who and enriches the age old traditions; because I report "Todays innovation is tomorrows tradition.

with love & blessings to Scott.

This inscription puzzled me a little. In view of my attitude and inspiration at the time, the last thing I wanted to do was innovate. The last thing on my mind even to this day is innovation. I am still in the process of trying to appreciate, apply and understand the traditional ways, and further perfect my application of traditional skills. But as the years have gone by and I reflected on it all, I came to realize that in a way what you are holding in your hands now is the innovation -- that this body of knowledge is recorded at all, and memorialized into drawings and measurements and speculations on proportions; codified, documented and written down in a notebook as a point of reference rather than only as an oral tradition of strictly eye and hand -- that in itself is an innovation. So perhaps Ravi-ji was on to something all along. And Kartar Chand's willingness to share what he knew and let it stand on its own, opening his door to this American with his notebook and camera, stands as a testament to innovation on his part. An innovation of sharing knowledge rather than hiding it.



Ravi Shankar inscribing my Notebook #1.



During my last week in India, I was to meet Kartar Chand at his shop and walk with him to his home to have dinner with his wife and son. On the way he said he needed to make little detour. He had a mischievous look about him. Going up some very narrow lanes we eventually came to a small shop that just sold pictures of various gurus, gods and goddesses. Among plenty of Krishnas, Lakshmis and Ganeshes he was seeking something different. He searched quickly through stacks of the colorful pictures and finally found what he was looking for, purchased it and exited the shop. He kept his purchase concealed until we were back in the lane, at which point he paused and then kindly, yet ceremoniously and auspiciously, presented me with a picture of Vishkarma, saving "for your own shop back in America." Much later it dawned on me that he had given me this picture of Vishhkarma as if it were my diploma.



My "diploma"