

JOHN KUNAKA, MBIRA MAKER

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The late John Kunaka of Nyamweda, Zimbabwe, was a remarkable man. Nicknamed "Maridzambira" for his virtuosity as an mbira (pronounced mm-bee-ra, with slightly rolled "r") player, he was also a skilled blacksmith and carpenter. For his ability to combine his knowledge in all these fields he quickly gained a reputation as a master maker of mbira dzavadzimu ("mbira of the ancestors"), an ancient ritual instrument among the Shona people.¹ Kunaka's instruments were in great demand in the urban areas of Harare and Highfields, as well as in the villages of Mondoro, Zimbabwe.

I first met John Kunaka in 1971 when the mbira players with whom I was studying, members of the famed group Mhuri yekwaRwizi, commissioned him to make a set of instruments for their ensemble. Sometime after the first order was completed, I approached Kunaka for a second order of instruments, and he kindly consented to allow me to observe and to photograph the process of instrument making. This article describes Kunaka's craft, from the felling of a tree for an mbira soundboard to the final test of the instrument in performance. It documents the great care given to the tuning of the mbira. In addition, I hope that the article will have practical value: interested readers should be able to build their own instruments from the information provided here and learn to play several traditional mbira compositions from the available literature on the subject.²

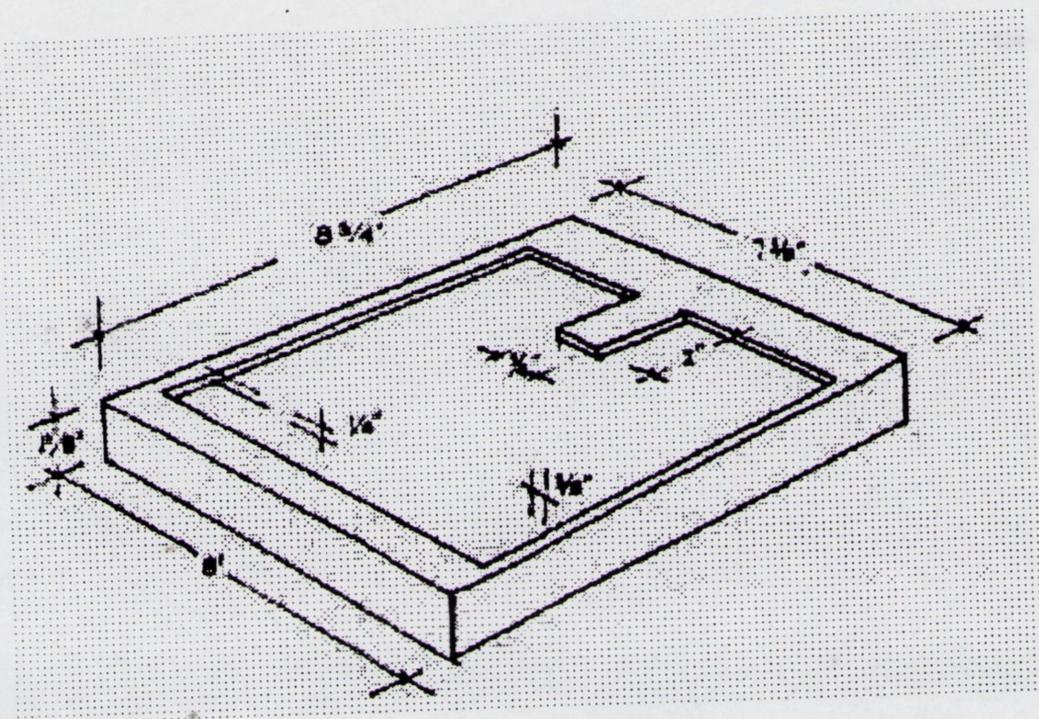


1. JOHN KUNAKA HOLDS A COMPLETED MBIRA

To begin work on the mbira, John Kunaka took me a short distance from his village in Mondoro to a wooded area. After we walked for a while, he pointed to a large tree and indicated that it was his choice as material for the mbira soundboard. The tree was a hardwood called mubvaropa in Shona, literally, "You came from blood." Its technical name is *pterocarpis angolensis*, more commonly known as muninga or simply "bloodwood" because of its peculiar red sap. Kunaka said that his second and third choices for the soundboard were, respectively, the local woods *murira nyenze* and *mukamba*.

After chopping down the mubvaropa tree, Kunaka and several assistants moved its trunk back to his village in several large pieces (5' long and 10" in diameter). There he chopped a piece 1 1/2' long and split it lengthwise. Seating himself on one of the larger logs, Kunaka held the half section vertically on his lap and shaved off its roughly splintered surface with the ax. Then he switched to an adz, a smaller ax-like tool with a blade at a right angle to the handle. As Kunaka continued to whittle down the piece of wood, he related that his mother's brother had taught him how to make mbira ten years ago. Kunaka now surpassed his uncle in mbira making because he had the better tools, acquired while working for European carpenters several years before.

After Chiseling with the adz, Kunaka measured the piece. It was 9" wide, 2" thick and 18" long. He scratched the desired dimensions for the soundboard on the rough surface of the wood and, using a hand saw, sawed across the grain, cutting a piece 8 3/4" long. The front and back surfaces were shaved with a steel jack plane until the board was 1 1/8" thick. Taking new measurements, Kunaka carefully planed the sides of the board until it was a trapezoid: 7 3/8" wide at the top and 8" wide at the base. He rounded off the board's edges slightly and smoothed its back surface for the second time. Turning the soundboard over, Kunaka drew an outline for the inner walls of the mbira: 1 1/8" below the top, 1" from the bottom, and 3/8" from both sides. The section within these lines was hollowed out with the adz and a hammer and chisel to a depth of approximately 1/4", except for a vertical rectangular piece (2" long and 3/4" wide) in the upper middle of the soundboard. This eventually supported the soundboard's bridge.

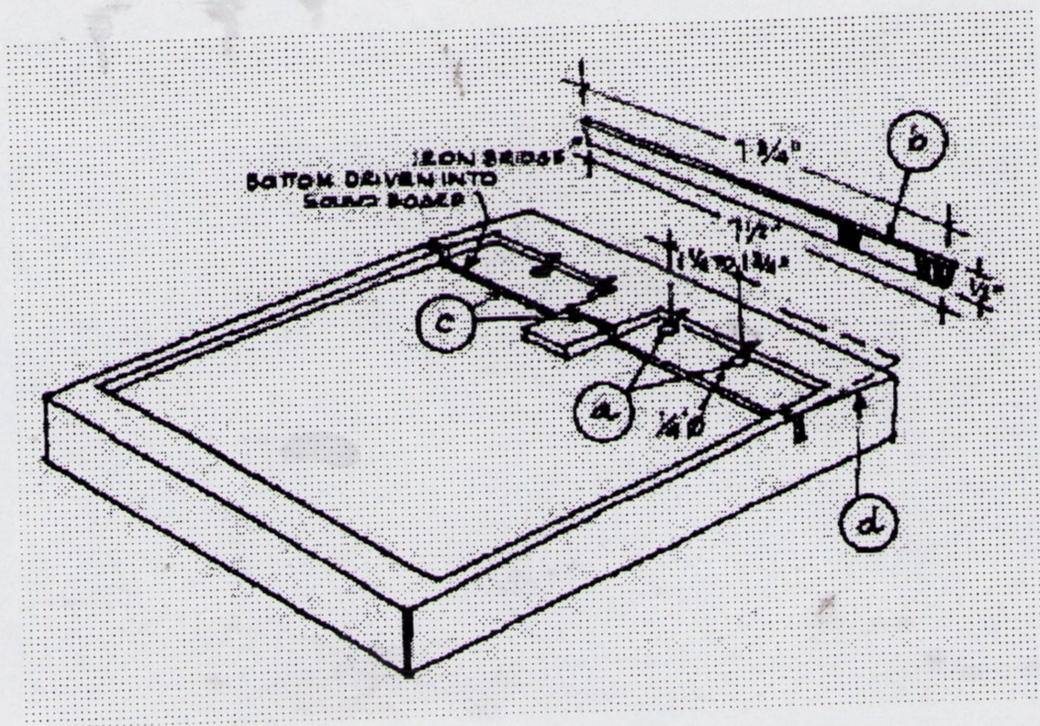


2. SOUNDBOARD DIMENSIONS

After finishing the job, Kunaka pointed to the soundboard's sidewalls and called them *mupendero*, and he used the word *mutanda* to refer to the rectangular portion left uncarved in the hollowed section. The whole process from chopping the tree trunk into manageable pieces to hollowing the soundboard took only two and one-half hours. Kunaka said that the soundboard should be left to dry for one or two weeks before continuing the job because the wood was green. If the mbira keys were mounted on the soundboard in its present condition, they would loosen later when the soundboard dried. He also explained that when he could afford it, he preferred to use kiln-dried wood from a lumber store for the soundboards, saving time and labor.

The Bridge and Restraining Mechanism for the Keys

At John Kunaka's invitation, I returned to his village a week later. By this time, the soundboard had turned reddish, and Kunaka had glued the wood where it had cracked in several places. Continuing the project, he prepared the mbira for the mechanism that holds the keys in place. Using a hand drill with a 1/4" bit, Kunaka placed four holes approximately 1 3/4" apart just below the soundboard's upper wall (fig. 3a). Next he fashioned a bridge, cutting a piece of scrap iron 1/8" thick, 1/2" wide, and 7 3/4" long at the top (Fig 3b).



3. BRIDGE AND HOLES FOR EYEBOLTS

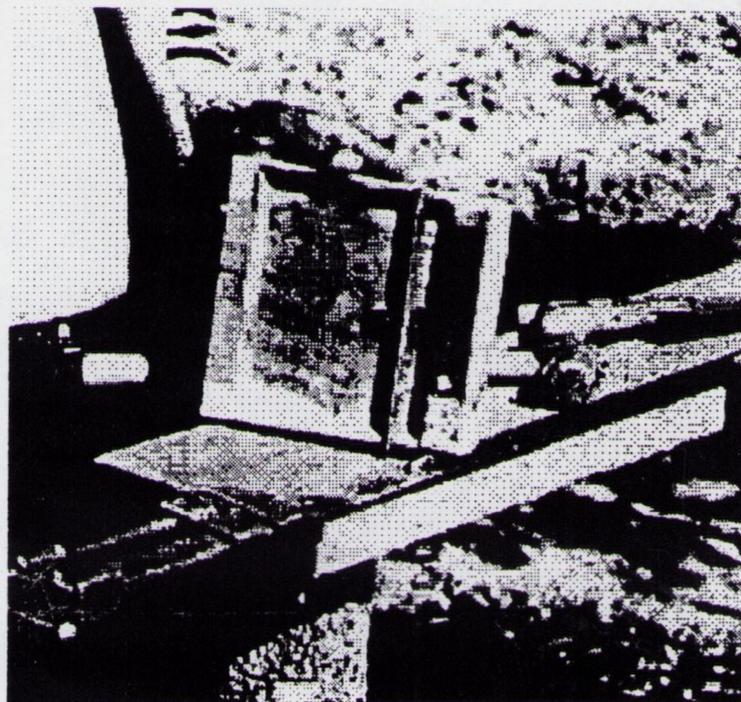
After straightening the piece in a vice, he filed its sides and edges, removing all rust. Placing the shiny bridge across the soundboard 1" below the top wall, Kunaka hammered it softly to leave an impression in the wood. Then he sawed a shallow cut along the groove and hammered the iron bridge gently into it so that it rested in place 1/16" higher than the soundboard's side walls (Figs. 4, 3c). Using the plane again, Kunaka shaved the soundboard above the top wall, causing it to slope back slightly (Figs. 3d, 19d).

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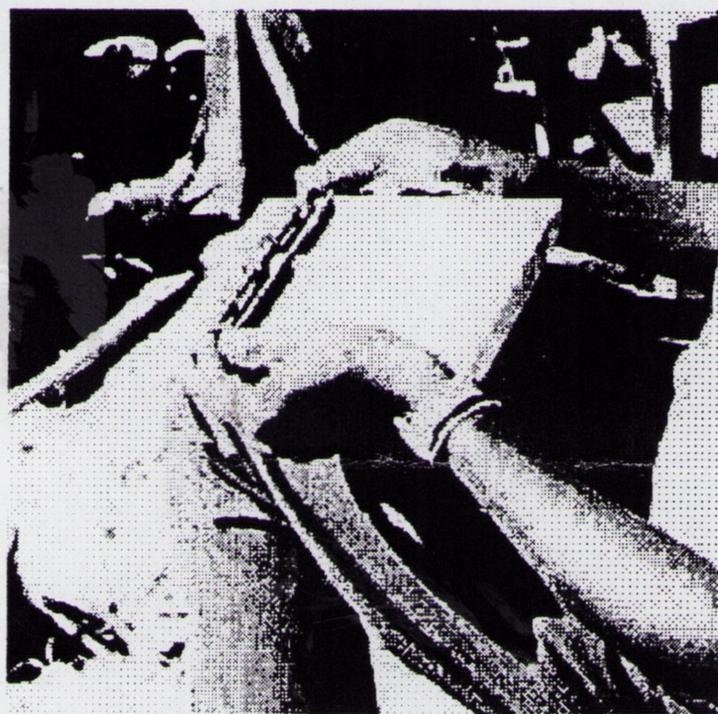
Returning to the restraining mechanism, Kunaka placed four eyebolts (whose shafts were slightly under 1/4" in diameter) into the hot coals of his home-made forge. Fishing them out of the fire one at a time, he held the shaft of the bolt gently with pliers, so as not to damage the threads, and hammered the round head on its side to flatten it. When he had finished, the eyebolts were 2 1/8" long with elongated eyes. Before inserting the eyebolts, Kunaka cut a vertical notch (Fig. 3a) adjacent to the holes in the soundboard to take the flattened part of the eyebolts. He reheated the eyebolts and pushed them into the holes drilled in the soundboard, causing the wood to smoke and sizzle. After the bolts had cooled off, Kunaka turned the soundboard over and added washers and hex nuts to the threaded shafts.

Kunaka next worked on the cross bar that holds the keys in place over the bridge. He filed the rust off an iron rod (1/4" in diameter, 8" in length) and hammered it flat, top and bottom. He then notched both ends of the bar, striking them gently over the edge of the anvil, and inserted the cross bar through the eyes of the bolts (Fig. 5).

According to Kunaka, the use of eyebolts for the restraining mechanism was his own innovation. In the more traditional method, mbira makers bound the keys over the bridge by wrapping wire around the cross bar, pulling the wire through the holes on the soundboard, and knotting it from behind. Kunaka considered his new method to be more efficient; a section of the keyboard can be loosened or tightened to tune a particular key simply by turning one of the bolt nuts with a ratchet, rather than rebinding the restraining mechanism.



4. A METAL BRIDGE IS EMBEDDED IN THE HOLLOWED SURFACE OF THE SOUNDBOARD



5. THE CROSS BAR RESTRAINING MECHANISM FOR THE KEYS

The Mbira Keys

While Shona mbira makers at one time made their keys of iron smelted from natural ore, contemporary mbira makers have found more convenient sources of metal.³ Kunaka, for example, purchased the raw material for the keys at the Salisbury Scrap Dealers. After experimenting over the years with different materials (ranging from 5" and 6" nails to steel wire), he favored steel rod, the kind often used to reinforce concrete at construction sites, for its durability as well as for its sound quality. A powerful mbira player, Kunaka sometimes broke keys made of other materials during intense performances at religious ceremonies. In fact, he forged extremely stiff keys for his own instrument from the strongest material he was able to acquire, the steel from an axle of an abandoned automobile. For others, Kunaka normally used steel rod of four diameters:

1/4" for keys B1-2 (see Fig. 6 for designation of key manuals); 7/32" for keys B3-5, L1-5; 3/16" for keys B6-7, L6, R1-3; 5/32" for keys R4-9

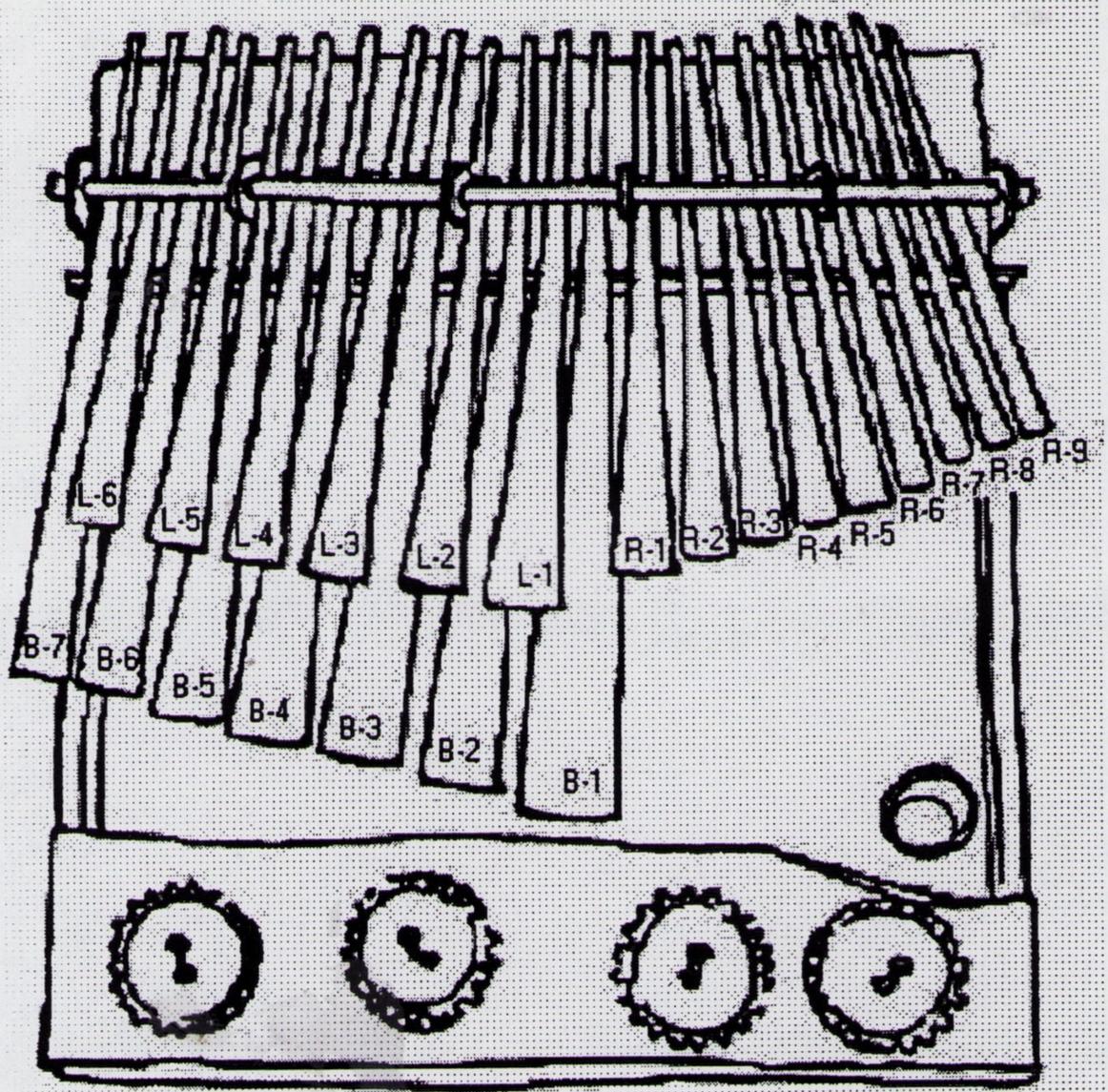
Figure 6 - FRONT VIEW OF FINISHED MBIRA

KEY DIMENSIONS (WIDTH OF PLAYING END AND LENGTH, MEASURED FROM BRIDGE, IN INCHES):

B1-7: $\frac{3}{4} \times 4 \frac{5}{16}$, $\frac{3}{4} \times 4 \frac{3}{16}$, $\frac{3}{4} \times 4 \frac{1}{16}$, $\frac{21}{32} \times 3 \frac{15}{16}$, $\frac{5}{8} \times 3 \frac{13}{16}$, $\frac{5}{8} \times 3 \frac{5}{8}$, $\frac{1}{2} \times 3 \frac{3}{8}$

L1-6: $\frac{11}{16} \times 3$, $\frac{19}{32} \times 2 \frac{3}{4}$, $\frac{5}{8} \times 2 \frac{5}{8}$, $\frac{9}{16} \times 2 \frac{9}{16}$, $\frac{9}{16} \times 2 \frac{3}{8}$, $\frac{15}{32} \times 2 \frac{1}{4}$

R1-9: $\frac{9}{16} \times 2 \frac{11}{16}$, $\frac{7}{16} \times 2 \frac{5}{8}$, $\frac{13}{32} \times 2 \frac{3}{8}$, $\frac{3}{8} \times 2 \frac{1}{4}$, $\frac{11}{32} \times 2 \frac{1}{8}$, $\frac{11}{32} \times 2$, $\frac{5}{16} \times 1 \frac{7}{8}$, $\frac{11}{32} \times 1 \frac{1}{4}$



The keys were made in three stages. In the first stage, Kunaka forged all of them in his homemade furnace. The keys produced from this initial run were only approximations of the sizes and shapes they ultimately assumed, and no attention was paid to tuning. In the second stage, Kunaka shaped these keys further by cold-forging them. He also added each key to the soundboard to test its sound and subjected it to an intricate tuning procedure. When all the keys were well in tune, he removed them from the soundboard and filed them until they had a finished appearance. In the third stage, Kunaka cold-forged the keys for the final reshaping and adjusted them on the soundboard for the fine tuning.

Stage I

Beginning work on the mbira keys, Kunaka pulled an 11" strand of rusted, twisted rod from a tangled pile of scrap metal and straightened it out. Then he brought several hot coals from the kitchen to start the coals in his homemade forge. The forge was very cleverly constructed. A bicycle wheel with a handle was attached to several pulleys that turned a fan blade inside a large cylindrical can (Fig. 7). A metal hose extended from the can through the base of a cement fireplace. Thus, as one of the mbira players visiting with us turned the bicycle wheel, he forced a rush of air through the metal hose and fanned the hot coals red hot. Kunaka set one end of the steel rod into the hot coals and rested the other over a piece of wood. When the tip of the rod turned red, he removed it from the fire and hammered it on his anvil.

Kunaka shaped the rod in several stages. He flattened one side first, pounding from the free end toward the held end. Then he turned it over, gradually reshaping it into a bar. Finally, he concentrated his strokes on the free end until it flared out, assuming a spatulate shape. Seen from above, the flare of the key decreased from the playing end toward the bar-shaped tail (this rests over the bridge of the mbira). Seen from the side, the key was thinnest at the playing end and gradually thickened toward the tail.



7. KUNAKA'S HOMEMADE FORGE

After shaping the first key for several minutes, Kunaka cut it from the length of rod he had been holding. Then he continued hammering the key, alternately pounding the spatulate surface to achieve an even flare and squaring its tail portion. To make the metal more pliable, he occasionally put the key back in the hot coals. All twenty-two keys for the mbira were fashioned in this manner. At this point, they were bluish-black from their initial forging, simply rough approximations of their final shape and dimensions.

While Kunaka worked at his forge, a number of young mbira players gathered near by. Among them was Kunaka's nephew, who performed some twenty feet behind Kunaka's work space, hoping to receive an informal lesson from the master player. Although Kunaka seemed totally absorbed in the task at hand, he occasionally exclaimed "Achhh!," set aside his tools, and walked over to his nephew to correct a mistake he had heard.

Stage II

In the second stage of making keys, Kunaka set all the unfinished ones side by side on the ground in an order corresponding to their layout on the mbira, and cut off the tip of each spatulate end with a pair of tin snips (Fig. 8). Then he cold-forged the key (i.e., shaped it without heating it in his furnace), pounding the spatulate section flatter and squaring its tail section further. As he hammered each key with its new straight playing end and tapered its sides, it assumed a somewhat triangular shape. Kunaka also bent the keys slightly at the point where the spatulate and tail section met so that all within a particular manual assumed the same angle of reflection over the bridge. This facilitated the playing technique of the instrument.

After the initial reshaping, sound and pitch were tested by inserting each key between the cross bar and the bridge on the soundboard (Fig. 9). Tightening the nuts of the nearest eyebolts to hold the key securely within the restraining mechanism, Kunaka struck the playing end. If he felt the pitch was too sharp, he removed the key and flattened its spatulate portion to lower its pitch. If he felt it was too low, he removed it and cut a sliver from its tip. (After snipping the tips of the keys, he always hammered the spatulate end a little, either to compensate for having raised the pitch too much or to smooth the playing end from the burrs created by the cutting.) For the most part, during the second stage of key making, Kunaka accomplished the tuning by methods just described rather than by adjusting the position of the keys over the bridge.

In tuning, Kunaka was principally concerned with the fundamental pitches rather than the overtones. The only exception was key B1, the lowest note on the mbira. It was forged to have "two voices," the fundamental pitch and an overtone, a fifth or a third, two octaves above the fundamental. Either overtone "helped the music," but Kunaka preferred the fifth. He distinguished the tuned overtones produced by key B1 from the incidental overtones produced from other keys, which he did not regard as helping the music and simply ignored (see Figure 10 for the tuning of Kunaka's mbira).⁴



8. CUTTING OFF THE SPATULATE TIP OF AN UNFINISHED KEY



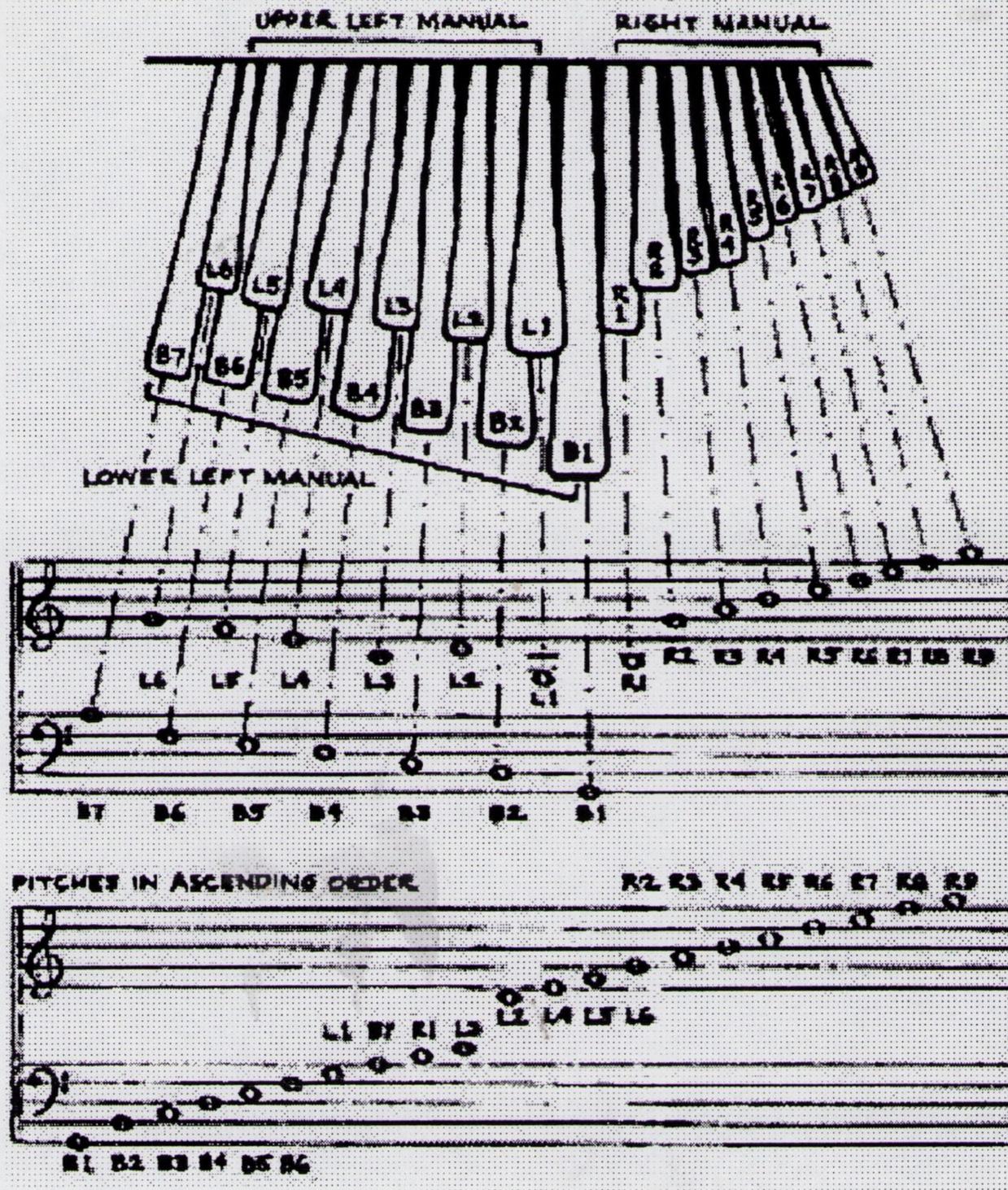
9. THE UNFINISHED KEY B-1 IS MOUNTED IN THE RESTRAINING MECHANISM

Figure 10 - TUNING PLAN FOR MBIRA DZAVADZIMU, ILLUSTRATING THE RANGE OF PITCHES. THE PRECISE PITCHES CAN DIFFER CONSIDERABLY FROM ONE INSTRUMENT TO ANOTHER. KUNAKA'S TUNING IN CYCLES PER SECOND:

B1-B7: 113, 147, 155, 175, 194, 212, 269

L1-L6: 234, 353, 313, 392, 431, 473

R1-R9: 291, 469, 525, 583, 628, 693, 778, 860, 910

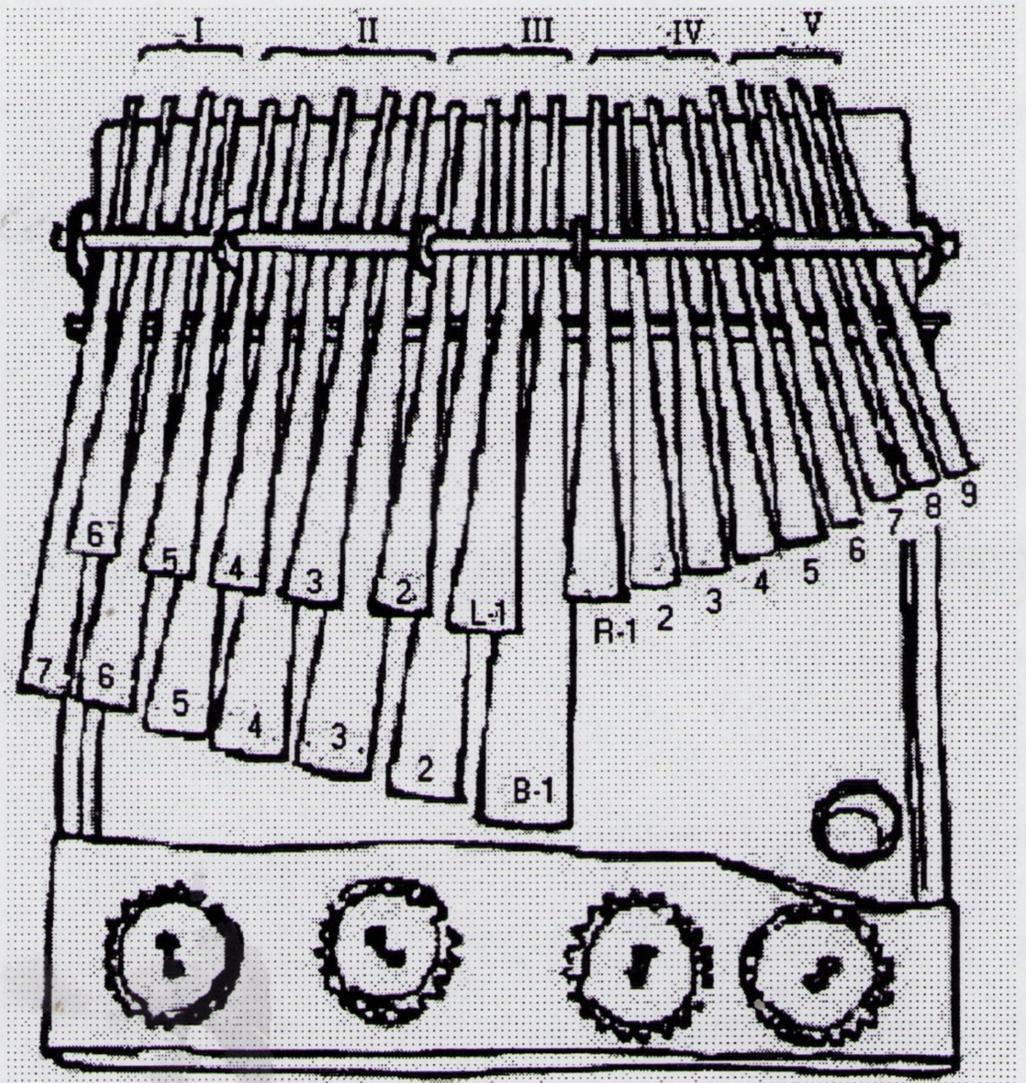


As a result of years of experience, Kunaka had become an expert in making mbira keys. He knew the precise combination of factors (length of key, thickness, taper, weight, etc.) that produced a key with the required pitch in the proper position within the arrangement. The extent of his skill was demonstrated on one occasion when I brought him an mbira with a broken key. Running his finger up and down the keyboard, Kunaka listened for the gap in the sequence and within fifteen minutes fashioned a new key from a piece of steel rod. It fit perfectly within the key arrangement and produced precisely the necessary pitch.

7d 12

Figure 11

During stage two, Kunaka fitted the unfinished keys on the soundboard and tuned them in an order that was related to the sections divided by the the eyebolts within the restraining mechanism (Fig. 11). Kunaka worked this way from the center of the instrument out toward both sides. Beginning with key B1, he added the keys of section III to the instrument, alternating between the adjacent keys on the lower and upper manuals, working from right to left. He continued in the same manner with those for section II. Then he switched to section IV and keys R1-5 from left to right.



At this point Kunaka made a hinge for the free end of the crossbar at the right side of the restraining mechanism (Fig. 12). Cutting a small rectangular piece of sheet metal (2 1/2" x 3/4"), he punched a 1/4" hole in one end and a small nail-sized hole in the other (Fig. 20e) Bending it horizontally around the right side of the soundboard, he hooked one end of the hinge over to the back of the soundboard. This enabled Kunaka to add the keys in section V. After another hinge was made for the left keys in section I were added, the keyboard was complete (Fig 13).

While for the most part, Kunaka proceeded across the soundboard, mounting and tuning keys that were adjacent to on another, he occasionally departed from this approach. Several times on the left side of the instrument, he tuned two adjacent keys on the bass manual and then added the one in between them on the upper left manual. Other times, when removing a whole section and remounting them, he added the outer keys in the section (i.e., the one just to the left and right of a pair of eyebolts) and filled in the middle keys. Kunaka used these approaches too facilitate remounting the keys that were somewhat crowded between the eyebolts.

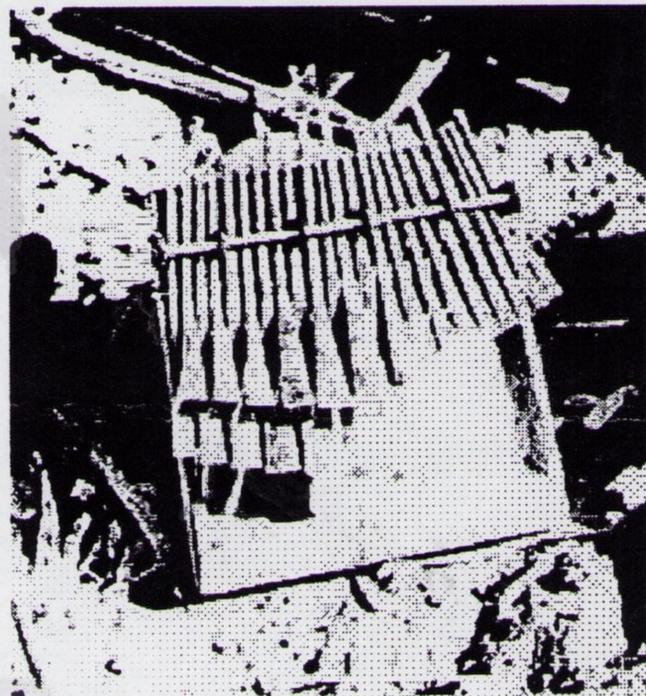
During the process of tuning, Kunaka took time to correct minor problems that arose because of earlier miscalculations. For example, he had flattened one key too much, and although it produced the correct pitch, it was too wide and crowded the others within a section; the key was removed and trimmed. When the tail of another key proved to be too thick, preventing the cross bar from resting evenly on all keys in a section, it was hammered flatter until it conformed to the height of the others. At one point Kunaka, noticing that the bridge had become somewhat wobbly from the pressure exerted by the restraining mechanism, stabilized it by cutting a thin strip of sheet metal and wedging it between the bridge and the wall of the shallow groove in which the bridge rested.

Occasionally, the craftsman twisted the ends of keys on a particular manual with pliers so they formed a straight line, as required by playing technique (Fig. 14). He also tapped them slightly from side to side with a dull chisel to space them evenly over the bridge (Fig. 15).

One of the aspects of mbira making that became very clear in observing John Kunaka at work was the great care and sensitivity given to tuning. Kunaka tested the tuning of the new keys in every possible way as he mounted them on the soundboard. He struck keys individually and evaluated their pitch and quality without reference to a model. In addition, he compared the pitch of keys on the new mbira to the pitch of corresponding keys on his own model instrument (Fig. 16). Using a third method, he compared the pitch of individual keys to that of their neighbors on the same or adjacent manuals, checking the intervals created by these keys from left to right and vice versa. Similarly, he compared sequences of keys to the corresponding sequences on his model mbira. In a fifth method, he compared the pitches of the newly made keys to their octave counterparts on the



12. A HINGE IS POSITIONED ON THE LEFT SIDE OF THE RESTRAINING MECHANISM



13. A COMPLETE SET OF UNFINISHED KEYS IS TUNED AND MOUNTED ON THE SOUNDBOARD



14. THE ENDS OF THE KEYS ARE ADJUSTED SO THAT THEY

a 1 1/2 7

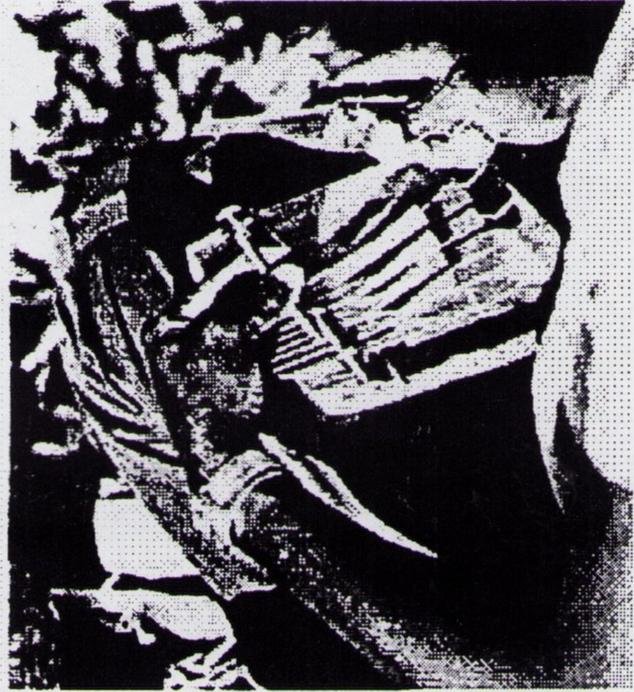
soundboard. Sixth, he compared keys and octave apart on the new instrument to corresponding keys an octave apart on the new model.

Finally, at various stages of the instrument's construction (i.e., with three to five sections of keys intact on the soundboard), Kunaka tested the mbira's overall tuning by playing a traditional composition on the new mbira both by itself and in duet with another musician playing Kunaka's instrument. At times Kunaka actually played the two mbira simultaneously by himself. Balancing them on his lap with great skill, he played the left-hand part of a piece on the new instrument together with the right-hand part of the piece on the model. Then he switched the places of the instruments and tried the piece again. During such performances, minor tuning adjustments were made until the two instruments sounded like one.

Throughout the mbira-making process, then, Kunaka used a combination of approaches to test tuning. If he was dissatisfied with the pitch of a particular key, he removed it from the soundboard and cold-forged it. He sometimes checked the tuning of a key as many as six times. That Kunaka tuned the mbira more by relying on his own sense of the correct pitch of the new keys than by checking them against his model is no small testimony to his expertise, developed over ten years of mbira building. Altogether, during stage two, Kunaka subjected the keys 111 tuning checks.

After all the keys were mounted and tuned to Kunaka's satisfaction, a metal straight edge and a sharp blade were used to etch a line across the tail sections, which hung over the top of the soundboard. He then removed each key and chopped off the extraneous metal at the line. He also slightly reshaped the spatulate portions of particular keys, cutting a sliver from their tips with the tin snips. After removing all the keys he placed a spare unfinished key between the bridge and the cross bar to hold the restraining mechanism in place.

14. THE ENDS OF THE KEYS ARE ADJUSTED SO THAT THEY FORM A STRAIGHT LINE ON EACH MANUAL



15. FINISHED KEYS ARE ADJUSTED ON THE SOUNDBOARD SO THAT THERE IS AMPLE SPACE BETWEEN THEM



16. THE NEW MBIRA'S TUNING IS TESTED AGAINST A MODEL MBIRA

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Stage III

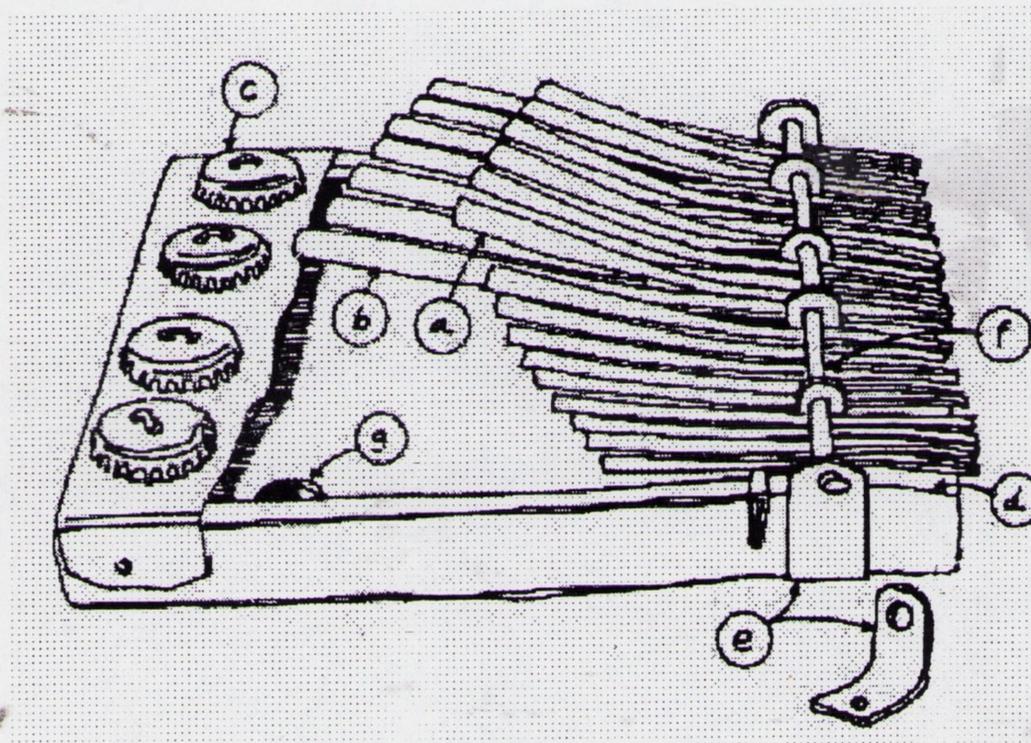
Proceeding to the third and final stage of key making, Kunaka put each key into a vise and filed its front, back and sides, removing the bluish-black glaze acquired during the earlier forging process. He concentrated his efforts on the top surface and sides. Then he rounded off the tops of the playing ends of the spatulate portions. The finished keys were then a shiny light gray, with a slightly textured surface.

Next, Kunaka subject the keys to a final reshaping process (Fig. 17). He filed down the points of the triangular base of the spatulate ends and slightly chamfered the tops of the tails. Some keys were hammered to square off their tail sections further or to bend the keys at the point where the tails and spatulate portions are joined, increasing their angle of reflection over the bridge (Fig. 18). He also hammered the tail of each key gently as it hung an inch over the edge of the anvil, bending the key slightly and giving it a slight "s" shape. The curvature in the tail caused it to rise up from the soundboard and bind back against the cross bar, increasing the key's tension within the restraining mechanism (Fig. 19f).



17. EACH KEY IS RESHAPED

19. SIDE VIEW OF FINISHED MBIRA



18. A FINISHED KEY IS BENT AT THE POINT WHERE THE TAIL AND THE SPATULATE PORTION MEET

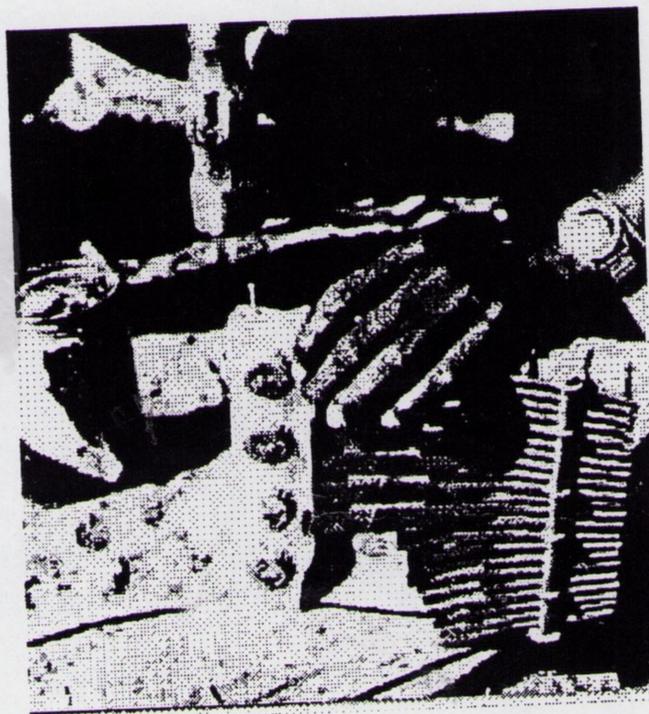
To mount the finished keys on the soundboard, Kunaka placed key B1 on the instrument and alternated between adding keys to the left and bass manuals, working his way from the center to the left side of the mbira. Then he proceeded along the right manual, working his way from key R1 through R9. He occasionally pushed the spatulate portions down with a dull chisel and a hammer, lowering their angle of reflection over the bridge, adjusting the keys into an even row for playing. He also shifted the keys slightly from side to side, leaving 1/16" - 1/4" space between them as they rested over the bridge.

During the final stage, Kunaka retuned the instrument more quickly than before, relying heavily on his model mbira at first. As he placed each new key in the restraining mechanism, he tuned its pitch to the corresponding key on his own instrument by tapping it backward over the bridge to sharpen its pitch, or forward over the bridge to flatten its pitch, rather than by removing it from the soundboard and cold-forging it. Kunaka departed from this practice only when he discovered that the pitch of one of the bass keys was far too low for its position within the key arrangement. In this instance, he removed it and cut a sliver from its tip to raise its pitch. In addition to comparison with his model, Kunaka tuned the mbira by the various methods employed during the second stage of key making.

At one point, he struck one of the bass keys especially hard and he explained to me with pride, "It is just like a spring because of the fire" (i.e., the original forging process). As Kunaka made the final adjustments, he secured the keys in place on the soundboard, both by tightening the eyebolts and by increasing the curvature of the tails of particular keys that remained loose within the restraining mechanism. When Kunaka finished his tuning checks and tightened the eyebolts for the last time, he called his nephew over to play his model instrument in duet with the new mbira. After several minutes of playing, checking the overall tuning within the context of the piece, he proclaimed the keys to be finished.

The Buzzing Mechanism and Finger Hole

Kunaka completed the mbira by adding a finger hole and a mechanism for producing a buzzing effect that is an integral part of the sound of the instrument. While shells traditionally provided this function, in more recent times soda bottle caps have become convenient substitutes. Kunaka cut a rectangular piece of tin approximately 2" wide and fitted it across the middle of the plate and punched a corresponding set of holes in four bottle caps. The caps were attached to the plate with very fine wire, and it was nailed to the soundboard (Fig. 20).



20. THE BOTTLE-TOP BUZZING MECHANISM IS NAILED TO THE SOUNDBOARD

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