بتهوون

مرکز موسیقی بتهوون شیراز

جلد دوم از مجموعه پنج جلدی فیزیک کارگاهی

فیزیک کارگاهی

جلد دوم

روش

ویگموند چک

با مقدمه دیوید لنگستر برای
چاپ فارسی کتاب

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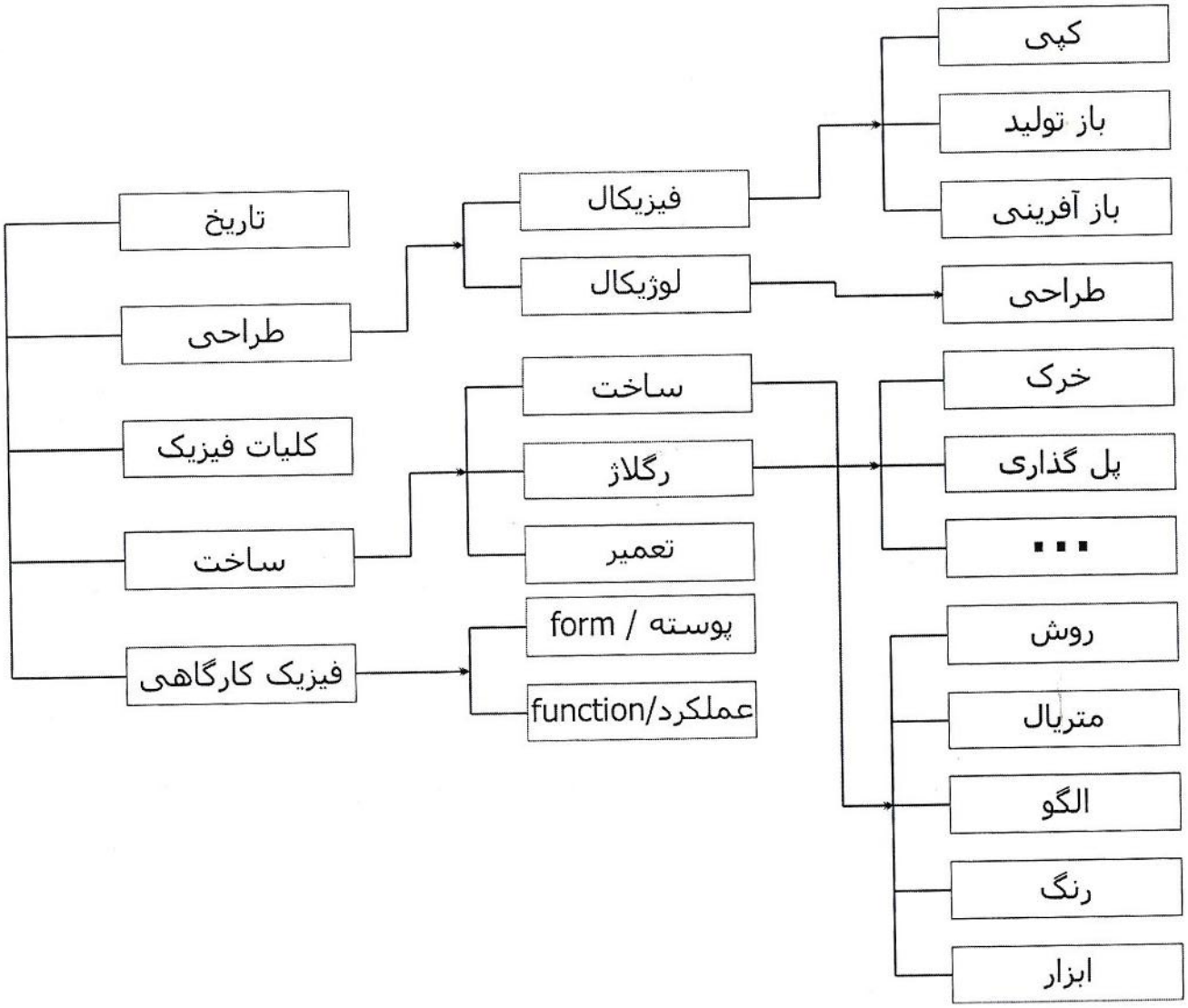
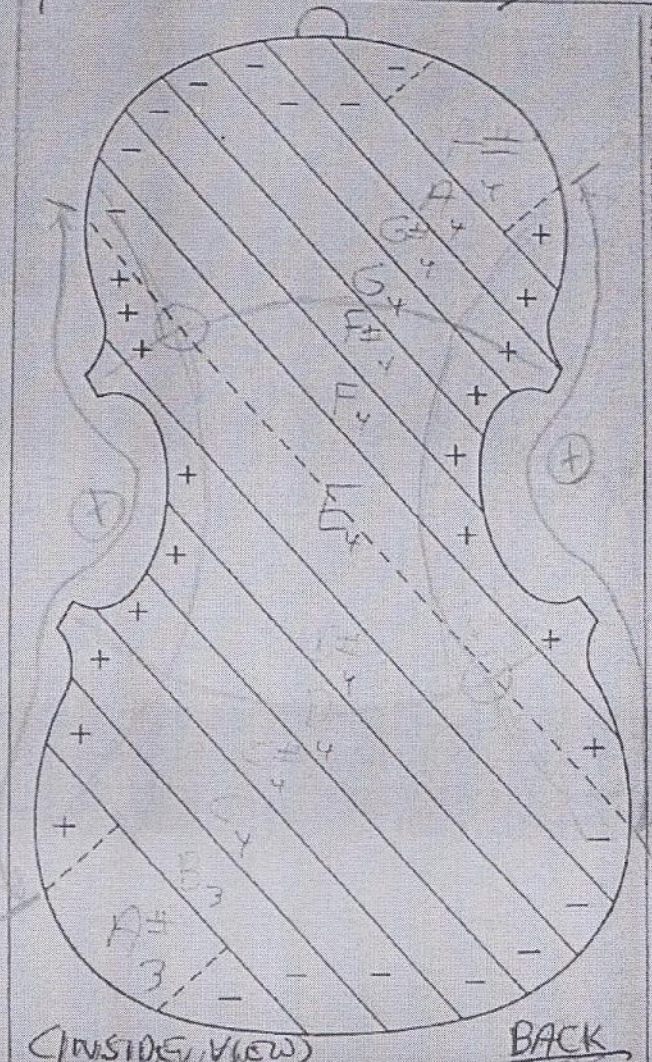
H. GH. KaZaZi

سازسازی



Article Mr. Vigdorchik sent me when I wrote asking him for help:



Figs. 2a, far left, and 2b, left, showing inside views of top and back plates respectively. + and − indicate places where pitch can be raised or lowered.

inside notches of the *f*-holes are sometimes much higher or lower in proportion to the actual design of the *f*-holes. I have carried out many experiments along these lines and I think that the best method is the following: once the top of the instrument is finished and tuned, the *f*-holes cut, and the bass bar attached, one should take a tuning fork, sound it, and move it up and down along the outside part of the top plate at the place where the bass bar is attached, starting at approximately the 195 mm position. The best placement of the bridge will be where the sound of the tuning-fork is clearest (not necessarily loudest) and where the A is exactly at 440 cps (it will alter in pitch with motion up or down). If the *f*-hole notches are proportionally a little higher or lower than this, the difference will not readily be visible. I have used this method in the making of numerous instruments and have found it to be the best possible.

How do you then tune the bridge?

To begin with, the upper part of the bridge is to be tuned to the top plate of the violin; the lower half to the back plate.

1. To tune the top: hold the bridge by its lower part between the thumb and forefinger. To elicit pitches, tap with a hard piece of wood, like that of the end of a knife. Check all parts of the top for uniformity of pitch.

2. To tune the lower part: hold the bridge by its upper part between the thumb and forefinger and follow the same procedure as above.

What is the difference between the tuning system for violins and those of, say, violas and cellos?

Old Italian makers, including Stradivari and Amati, generally tuned their violas one tone lower than their violins. The acoustical systems were always similar to those of their violins. The same holds true for cellos, but they were tuned a major 9th lower than the violins.

What are your theories about varnish?

It is time to forget the theory that varnish can play the main role in the sound of the instrument. After all, the best Italian violins with a good sound do not have much of their original varnish left.

It should be remembered that too much varnish makes the plates too stiff and this will have an ill effect on their vibrations. Also, if the varnish, and especially the ground, is made to be too hard it will have a bad effect on the sound, even if the plates have been tuned properly. In such a case the sound will be a little too glassy: bright but cold, with no richness.

Do you have any closing remarks that you might like to make?

Yes. It is important to realize that none of the old Italian makers had any special equipment. They used only their ears, their feeling for the flexibility of the plates, their eyes, and their touch for the thicknesses. I have simply tried to follow the empirical processes that were passed down from one generation to another. I have recently come to believe that it is possible to teach computer equipment to build nice sounding instruments, but first the system must be taught to the machines.

I am glad to have had the opportunity to give this interview as I have received a vast number of letters, since I published my book, from people who had questions about important details for using this method for tuning the plates of a violin. Some of these people live close to me, have come to visit, and were thus able to obtain first-hand information. In most cases their results were very successful. Others I have had to answer by post, but due to a very tight schedule I prefer not to have to do this. I hope that I have answered some of the questions which people might have. Finally, I hope that the information given here will be helpful to all concerned.

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تصویر صفحه‌ای که مرحوم ویگدورچیک برای آقای لنگستر ارسال کرده‌اند.

Article Mr. Vigdorchik sent to me when I wrote asking for help...:

The Strad (April, 1986), "Micro Chip"

while the other side remains free (Fig. 1). In tuning each pair the pitch is raised by shaving some metal from the clamped side of the sound strip and lowered by removing metal from the free side. The same process is used to tune the sound strips of the violin in a uniform manner. By tapping the sound strip in different places we find out where the pitch is higher or lower. Since the tightest areas are those around the C-bout, this is the equivalent place to that of the metal sound strip; the areas at the upper or lower bouts of the instrument are the free end. Thus, by taking wood from near the C-bout, we will be able to raise the pitch, not only of a specific point in the strip but, also, of the entire strip itself. By taking it from the opposite side, we will lower the pitch (Figs. 2a and 2b).

Are the f-holes already cut before the top plate of the instrument is tuned?

Yes, they are, and without having much of an effect upon the tuning process. If one wants to raise the pitch after the *f*-holes are cut, it is necessary simply to take the wood off from between the ribs and the outer edge of the *f*-hole and the effect will be the same. Everybody, of course, must understand that in this tuning process wood does not have to be removed from the areas where the ribs, corner blocks, and upper and lower blocks will be attached.

I always work on the tuning after I have completely finished the outside of the plates. Then, I try to take extra wood from the inside, but at the same time I am always checking to make sure that I have enough wood left for the tuning. When I come to within a semitone of the final tuning, I start to proceed extremely carefully and, by comparing the thickness, tuning, and flexibility of the plate, I make the final adjustments. Special attention must be given to the tunings of the main sound strip because the upper part of it must be tuned as if it belongs to the upper sound strips, while the lower half is tuned in accordance with the lower sound strips. As one can see in Figs. 41 and 42 of my book, the main sound strip is divided in half by a broken line in relation to the tuning of the entire instrument and its equivalent acoustical parts.

You mentioned that it is possible to raise or lower the entire pitch of a sound strip. How can one fine tune a specific spot on a given strip?

If this is necessary, one should remove wood from the place on the sound strip, either near the C-bout or at the end of the strip, that corresponds to the place on the strip where the tuning is awry. Thus, if the centre of the strip is low, wood should be shaved from the centre of the width of the sound strip near the C-bout etc.

What would occur if wood were to be removed from the middle part of the plate?

Removing wood from the middle portion of the plate would make the pitch lower, not only of local spots, but also of that of the entire fundamental tone of the plate.

Correct placement of the bridge is quite a delicate matter. How does one go about finding the proper spot?

The classical placement of the violin bridge is 195 mm down from the point where the neck is attached to the upper bout. Most makers use this measurement, but it is only an approximation. There are some instruments that have the placement of the bridge a bit higher or lower than this, sometimes up to 5 mm higher or 2 mm lower, depending upon the maker and the model of the instrument. At times, the width of the widest parts of the upper and lower bouts were proportionally different and, thus, the shoulders could be rounder or flatter. Also, many C-bouts were longer or shorter depending upon the maker and model. Stradivari built various models during the different periods of his life and sometimes we find that his *f*-hole notches are 195 mm down from the upper bout, but the best placement of the bridge was 1 or 2 mm lower. So you see, even Stradivari could not always predict exactly the proper placement of the bridge.

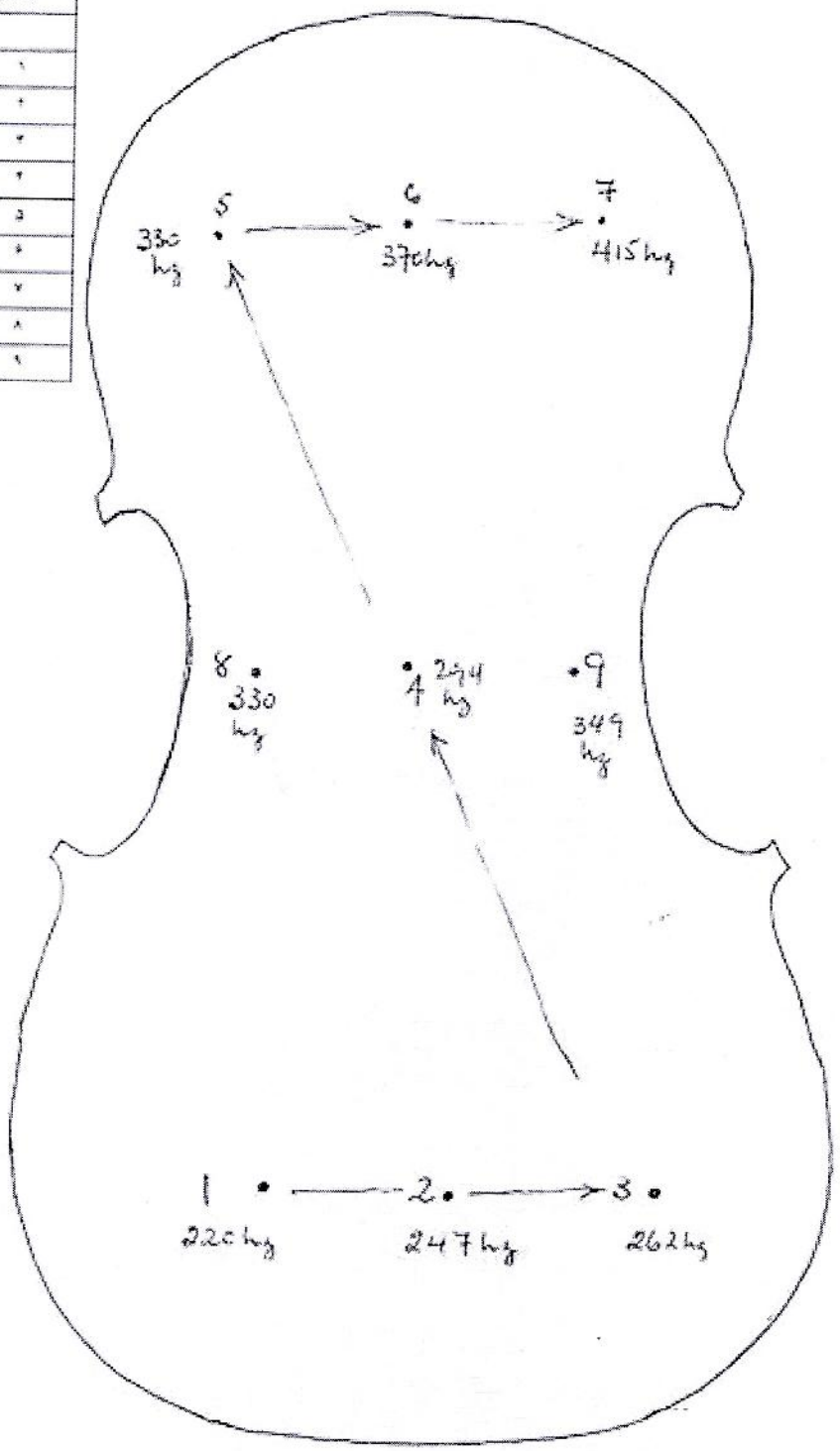
On Guarneri del Gesù's instruments the

(INSIDE VIEW)

TOP

تصویر صفحه‌ای که مرحوم ویگدورچیک برای آقای لنگستر ارسال کرده‌اند.

فرکانس‌های طبیعی صفحات ویژه‌های استراد		
	صفحه رو	صفحه زیر
۱	۲۲۰ هرز	۲۲۷ هرز
۲	۲۲۷ هرز	۲۸۶ هرز
۳	۲۸۶ هرز	۲۹۲ هرز
۴	۲۹۲ هرز	۳۳۰ هرز
۵	۳۳۰ هرز	۳۴۹ هرز
۶	۳۷۰ هرز	۴۱۵ هرز
۷	۴۱۵ هرز	۴۴۰ هرز
۸	۴۴۰ هرز	۴۹۴ هرز
۹	۴۹۴ هرز	۵۱۵ هرز



دست‌خط دنیس یاروفوی و ارایه سیستم آکوستیکی استراد برای صفحات

روش ساخت آکوستیکی توصیف شده در این کتاب هم برای سازندگان جوان که اغلب برای پذیرش تجربه‌ها و ایده های جدید آماده هستند و هم برای سازندگان سنت‌گرا و متبحر ارزشمند خواهد بود. سازندگان ماهری که سیستم مرا امتحان کنند، قادر خواهند بود تا سازهایی را تولید کنند که عمدتا کاربرد کنسرتی و حرفه‌ای خواهند داشت.
ایزاک ویگدورچیک

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