

GUARNERI DEL GESU GUIDED BY THE WOOD

CONCEPTION OF THE VIOLON BASED ON THE OBSERVATION OF THE VIOLINS OF GIUSEPPE GUARNERI DEL GESU

There comes a time in life when the paths you seem to have taken just by chance and unconsciously, eventually look like those of a destiny. This is how I feel today, at least, when I remember what I have been through. Thus, although I had chosen to be a violin maker with the idea of devoting myself only to the making of violins, I spent many years restoring old instruments. If it had not been so, I would not have come to the method which is mine now and which I am going to describe below, after presenting the curious paths I have followed, which can help to understand my current approach to making violins.

As there was no training in France for me, due to my age (I was 19), I turned to Germany, where I was lucky enough to be taken on as an apprentice by Bernhard Franke, Master violin maker in Stuttgart; he understood my passion for this craft and directed my training to restoring instruments : working on instruments marked by different manufacturings and different periods allowed me not to depend on the modern method of making violins and instilled in me an eagerness for searching and investigating new ways. That was how I became interested in the violins of Guarneri del Gesu and how I developed a true fascination for these instruments.

After joining W.E. Hill and Sons' workshop in England, I became even more determined, due to the fact that, on the one hand, I was in contact with the greatest old instruments and, on the other hand, I could improve my knowledge of Guarneri del Gesu's violins. Beyond any understanding, these violins seemed to reach a degree of perfection never equalled so far. I wanted to know why it was so. At that time, there were neither the plans, nor the pictures, nor the books we can easily get now (1). Through significant repairs I was able to discover the inside of these great instruments: marks left by tools allowed me to imagine the different stages in the making process but nothing substantial came out of it and the mystery remained complete. The questions raised, at that time, by my colleagues and I, have not yet been answered.

After 10 years spent in different countries in Europe, I settled in Cordes, a small medieval village in the South of France (my native country on my mother's side). There, I concentrated on the making and the restoring of 17th and 18th century instruments, yet still researching, determined as I was, to find the answers to these questions which kept running through my mind. How is it that those instruments, even though they are played by the best musicians, have such an extraordinary sound? What are the invisible mechanics behind them?

Thirty years of research have led me to the feeling that there might be a logical answer to all my questions. How did Guarneri del Gesu choose his wood and how did he prepare it? Why are these holes with dry-point made on the inside of the back and on the outside of the belly where the bridge is? How did he graduate the belly and the back, as their thicknesses do not seem to correspond to any logics? What was the method he used to glue the neck, the belly, the back onto the ribs?

(1) I would like to mention Peter Biddulph's book; published after the exhibition of Guarneri del Gesu's violins at the Metropolitan Museum of New York in 1994; the measurements and commentaries of my friends John Dilworth and Roger Hargrave have been a most important support in my research.

(2)

First of all, like the other violin makers of my generation, I approached these instruments through their stylistic design. I copied a lot of old instruments. We know now that great violins have not achieved their sounds from ageing. Of course, like good wines, they do get better with time but their qualities were already there at the start. Fond of geometry, I then tried to find an explanation about this sonority in the proportions of the violin, which are the only given data we can observe nowadays. Michaelangelo's sculptures did not become sublime with time.

Meeting and becoming acquainted with great violinists, such as Augustin Dumay, Renaud Capuçon, Laurent Korcia, Sarah Nemtanu, Julien Chauvin or Matthew Trusler, helped me to understand the complexity of the sound of the violin. In the Cordes Music Festival, which I organize every Summer, I also have been able to talk to other violin makers and to composers in residence who were taking part in lectures or training sessions. As a matter of fact, we know that if we change the bridge, the strings, the bow and, above all, the musician, the sound can be changed completely. Consequently, we can admit that no instrument has its own sonority. What a musician wants, it seems to me, is an instrument easy to play, which has a clear sound, which inspires him, which supports his interpretation, which can exteriorize his inner sound. Last Summer, Augustin Dumay talked to me about the mysterious meeting which takes place when the violin maker's "musical dream" corresponds to the musician's "musical dream". That is the reason why comparing the sound of different old or new violins played, concealed behind a curtain in order to avoid influencing the jury, is not relevant to me and has no interest at all.

For about one hundred years, there has been the « modern » violin. The violins from the beginning of the 20th century were made with much rigour and accuracy ; they have aged and yet they do not sound like the great violins. Those by Guarneri del Gesu are misleading : though they have perfect basic geometric proportions, they are all different and apparently they do not obey precise rules in their making. All those which have not been modified throughout the centuries have a fabulous sonority ,which is even better than that of the Stradivarius.

The apparent irregular features of Guarneri del Gesu's instruments made me understand that wood must guide the making of a violin. If his making was mainly guided by the wood he worked on, (wood not being an homogeneous material) then the disparities observed from one instrument to the other could easily be explained. Then, it became quite obvious to me that Guarneri del Gesu was not a "lucky" violin maker, but a very great master who had a deep knowledge of wood and who was able to master it. I have never believed in this theory suggesting that he had to work very quickly in order to make a living. These violins were so different from those of the Cremonese Makers, that during the 19th century it was said that, as all trace of him had been lost during one period of his life, Guarneri del Gesu must have worked in prison, deprived of certain tools necessary in the making of a violin and that it was probably by chance, or due to the age or the varnish if they sounded so good. His « irregular » instruments are, in fact, very precise in the way the wood was used. His violins are not taken from a perfect and unchangeable model shape but, on the contrary, they take their form from the wood. The different samples of heads carved by Guarneri del Gesu at the end of his life (the former ones had been made probably by his own father) were not due to chance or fantasy but were guided by the density of the wood used, which is difficult to achieve.. A whole life is needed to master this art. Similarly for him the rightness of a curve does not depend on aesthetic rules but on the sound it will produce. I have always been surprised, whenever I had the opportunity to hold a Guarnerius del Gesu in my hands, by feeling a kind of current.

In July 2003, thanks to Augustin Dumay, and the close relationship between us, I was able to examine his violin for several days in my workshop. When I take his Guarneri del Gesu I feel in my hands a kind of magnetism, which encourages me to try to understand why these great violins have such energy. I am fairly sure now that the quality of the Guarneri del Gesu violins is not due to the quality of work or of the varnish, though always outstanding, but also to this knowledge of wood and preparation of the wood, which should always be chosen with great care : wood is a living material which you need to understand to be able to make a living instrument - as mentioned in the old saying « wood works ». Guarneri del Gesu, who seems to have gone further than Stradivarius in « listening to wood », was one of the last makers who could master this knowledge and enriched it to perfection. When listening to the wood, to its physical qualities and to the energy it displays, Guarneri del Gesu teaches us that when everything is in harmony at an energetic level, then curves become balanced and the violin becomes a work of art. This is what the great musicians can feel when they speak about this exchange they have with great violins.

Therefore, making a violin does not only consist in carving the wood as well as possible from a defined model, but also in working the wood, following its own quality, density, homogeneity, elasticity, energy, so that "life" is given to the violin. What is essential in a violin cannot be seen. Due to the influence of our industrial civilization, this knowledge has been lost, little by little; thus modern instrument-making has concentrated on details which are sometimes superficial, forgetting the importance of the wood and simply considering old violins as works of art. There is nothing irrational in the making of the violin. In fact, it is a

question of blending a great number of parameters which are not necessarily obvious. Guarneri del Gesu, with very simple but ingenious procedures, has improved the sound of the violin. Guided by this discovery, I oriented my research, in order to have a greater understanding of the wood and Guarneri del Gesu's method in making.

Today, the answers I have found have led me to a new approach of making violins, based on a long and studious analysis on the Guarnerius del Gesu which I would like to share with all the musicians or the violin makers who are fascinated and puzzled by the power and the beauty of sound of Guarneri del Gesu's violins.

THIRTY YEARS ARE NECESSARY IN ORDER TO JUDGE THE QUALITY OF THE WOOD INSIDE THE TREE.

For many years, I have been choosing my wood directly from the forest. Dendrochronology has reinforced my choice: we know that Guarneri del Gesu did not use very old wood and that he probably treated it. To work with the best woods possible, you must not let it dry for too long, otherwise the wood slowly dies, losing a little bit of its energy every year.

One main element, among other criteria, for choosing the right tree and which needs a long training, is feeling the energy which is in the tree; the stronger the energy is, the more alive your tree is and the better wood you will get. The first trees I selected were far from being perfect. It is now, through experience, that I am able to choose the right wood for my work. After thirty years, you manage to guess the quality of the wood inside the tree. It takes a long time to become acquainted with the forest, to learn how to love it, to respect it, to acknowledge its slow rhythm, without which the violin could not exist. In fact, the energy of a tree depends on its location. We know that the earth is composed of a superficial layer, the earth's crust and then of a magma in fusion inside. When the earth rotates, the magma turns less quickly than the earth's crust: it creates frictions which produce a kind of electricity, the magnetic waves. The waves run all over the earth and in some places, have more magnetic points. Migrating birds, such as swallows, for example, find their way thanks to these waves. The most « energetic » trees are found in those places. We can also observe that any tree is polarized. The lower part of the roots is polarized negatively while the upper part, the foliage, is positively polarized. It is this principle which makes the sap rise to feed the tree. It has been observed that if a wire is placed in the upper branches of a tree and then connected to the earth, the tree will wither (2). This polarization which is more or less powerful, influences the molecular composition of the tree.

The violin begins when the tree is cut. Guarneri del Gesu's violins, at close inspection, reveal largely open pores in the wood. The moment of felling the tree determines the opening of the pores. Contrary to what is generally admitted, I do not cut the tree in winter. When it is cold, the tree protects itself and its pores are closed: it is then dense and at rest. It is not possible to make an instrument with a half-asleep tree with closed pores! I cut it in summer. At that time, wood is full of energy, its pores are dilated, it fully vibrates. The wood will be treated later on. The experiences I made on old wood cut in winter were unsuccessful. On the contrary, I have had much better results with the wood I use now and I achieve incredible stability. Once the tree has been found, it needs to be cut at the right moon, at the right time. It is a great moment when the tree, very often more than one hundred years old, is going to die to be born again with another form. When the tree is down, I look for the part of the trunk where all the energy is concentrated. In the same way that you find trees more energetic than others, energy is not the same everywhere along the trunk. It is only in this part that I will be able to make a few violins. In the book *Le parfait luthier*, written by the abbot Sibire, N. Lupot's confidant, we can read a passage about the differences of quality found in one tree:

: « Le côté du midi est le plus mûr et le plus riche en qualité. Cette qualité dégénère en raison de l'écart ; et si les côtés du levant et du couchant, qui participent plus ou moins à sa vertu ne sont pas sans valeur, celui du nord, qui est totalement privé de cette communication, est le moindre de tous... Dans ce côté du midi, où il y a plus de déchets à cause de la résine qui s'y loge par cases, il faut chercher ensuite les parties moyennes, situées à une certaine distance de la racine, du sommet et du cœur ; parce que, près du tronc, le bois est plus gras, plus compact, et pompe plus de fraîcheur ; que, près de la cime, il est grillé, calciné par le soleil et qu'à côté de la sève ascendante, il est plus aqueux, plus vert que dans le voisinage de l'écorce, un luthier ne s'y trompe pas : veut-il extraire la partie superfine, il sait très bien où la trouver. »

I have noticed that energy circulates more intensively in the wood which is just below the bark and which, in the belly of the

violin, is found in the middle. That is one of the reasons for making the top in two parts instead of one. If you consider all these criteria, you must realize that only a very few violins can be made from only one tree.

(2) *B. legrais et G Altenbach « Santé et cosmo-tellurisme » Editions Dangles 1984*

(3) « The South side is more mature and richer in quality. This quality weakens when getting away from it, and if the sides corresponding to sunrise and sunset still contribute to its virtue and are meaningful, the North side is the weakest of all... In the South side where there is more waste as there is more resin in the gaps, you then have to search the common parts, located at a certain distance from the root, the top and the heart. Since near the trunk, the wood is thicker, denser and sucks more humidity that near the top, it is roasted, burnt by the sun and that near the rising sap, it is more aqueous, greener than near the crust, a violin maker can never be wrong should he extract the ultra thin part, he knows where to get it pretty well. »

J. Gallay « Les luthiers Italiens » Académie des bibliophiles 1869

IT IS NECESSARY TO CONSIDER THE TOP AND THE BACK AS TWO DIFFERENT ENTITIES

In order to preserve and fix the energy in the wood, I do not cut the trunk immediately after choosing it. I let it “ripen”. This chemical change in the wood is very important. It is part of its treatment. Yet, it has to be controlled, otherwise the wood may turn blue and this makes it lose its physical quality, its elasticity. This delicate operation requires a lot of attention and experience. The darker strips of wood visible on Guarneri del Gesù’s tops made me think of this fermenting process. When the wood is ready, I saw it into small quarter-cut boards which will be used for the top, the back, the neck and the ribs. At this stage, it is necessary to consider the top and the back as two different entities which require two different woods.

The top, in spruce, works as a membrane, whereas the back, in maple, works as a spring. This is the reason why I approach the arching of the top from the outside and the back from the inside. Two things have always puzzled me concerning Guarneri del Gesù’s tops and backs. On the one hand, it is the bad quality of the centre joints and on the other hand the deformation which appears with the time at the level of the sound post. Another detail is that the body of the violin is twisted and the ribs deformed. These phenomena are never to be seen on more recent violins. Having in mind the idea that Guarneri del Gesù was a great master and very rigorous, I think that what is taken nowadays as a fault could be the result of a method. I can deduce from this that he probably treated and tightened the wood with a cable once the joint had been glued. This cable goes through the holes of the small pins which help to position the top and the back on the ribs. We will see later that they have other uses too. Though he used a waterproof glue for the joints, which could not be dissolved in water; it was then in the bath or when put under strain that the joint could become unglued in some points. I often had to glue the joint again on my own violins: this is one of the reasons for choosing a back in one piece. Today I have found a modern glue which is reliable. Regarding the deformation at the sound post level, I think that the wood (after many years) tends to go back to its original shape. After positioning the top and the back on the ribs, with the help of small pins which fit into the lower and upper blocks, I cut the spruce board bigger than the ribs’ shape and I carve the outside arching of the top higher and a bit rounder than the final arching. I maintain it at a thickness of 4.5 mm. I cut the maple board into the shape of the violin, as I did for the top, and I start with the inner arching lower than the final arching. I graduate from the outside with 6.5 mm in the middle and then I slowly diminish the thickness down to 4 mm towards the edges. At the beginning, the top and back archings are made from the same drawing, the top being higher than the back.

The next operation, in order to stabilize the wood, consists in soaking the belly, back, ribs, and neck in a container full of water and herbal plants, which all have a specific use : hardening, stiffening and stabilizing the wood, dilating the pores, removing the resin, treating against worms. The wood must remain in this bath for about 48 hours. Once taken out of the bath, the top must be compressed, to harden the wood. To do this, I insert a cable into the two holes of the pins, as well as into the two counter blocks in maple, which I place under the top. In one of them, I adjust a peg in order to fix the cable strain. It is on the energy point of the belly where the pressure must be applied, on the central joint, between 190 and 198 mms from the top of the belly, outside the arching. It can vary by several millimetres, depending on the wood. In fact, it is the energy of the wood which leads to this point.

Therefore, I think that having standardized the belly stop at 195 mms is a mistake. This point is the basic point for drawing the f-holes and it sets the bridge position. It is where the resonance chamber receives the vibrations of the strings. At this precise place, I insert a small stick with a sharp tip; this mark can be seen on all Guarneri del Gesu's tops, the bridge being centered from this point and not from the f-holes. Then the cable which goes over the stick must be strained. This allows the arching to be lower, the strain depending on the stiffness of the spruce. It is the stiffness of the wood which then defines the height of the final arching. Then the top must be left for several days to dry. The wire tightener allows me to canalize the wood energy in a central strip, like a spine. It allows a greater resistance to the strings' pressure. The back, in maple, must be strained immediately after the bath. I insert a cable through the holes of the pins but this time the counter blocks are outside the back, since I tighten from inside. I look for the precise point to set the short stick, which will help the straining. This point is located on the axis between 180 and 190 mm from the base of the back. Here again, the location can vary by several millimetres, depending on the quality of the maple. At this precise point, a small conical hole must be drilled, the sharp end of which is perceptible from the outside of the back, a hole that is visible inside and outside Guarneri del Gesu's violins. It then must be filled; it is a very important mark for the other operations in the making. Drying is the same as for the top. This method is quite close to that of bow making. Bow makers listen to their sticks, since their rigidity is essential for the quality of their bows. Right at the beginning of the making, they test the resistance of the stick*. This technique allows us to feel the resistance of the maple and spruce.

**English method used in the workshop of W.E.Hill & Sons, which consists of shaping the wood by planing the stick, while under the tension on the cable.*

FIXING THE TOP IS FIXED ONTO THE VIOLIN, PUTTING THE EMPHASIS ON THE CENTRAL STRIP

When the wood has been well stabilized after having been shaped, treated and stabilized, I work on the thickness of the belly and the back still considering them as two different entities.

The belly :

Once the outside arching is finished and the f-holes cut, I graduate the belly from the inside. The note produced by the belly, when it is tapped, is one of the easiest methods to make the wood « talk ». This note, being the result of the shape, together with the density and the elasticity of the wood, slightly varies according to the quality of the wood. It can no longer be heard when the belly is glued onto the ribs, but at this stage in the making, it is a precious guide. The classical method, which consists in holding the top at the third of its width at ear level and tapping it with the other hand, never satisfied me. As a matter of fact, I think that this way of making the wood sound, at this stage of its making, does not correspond to any vibratory mode of the belly. After many experiences, I have found a method which gives good results. With the help of two metallic screws of 2 mms in diameter, which go through the small holes of the pins at the top and at the bottom of the belly, I fix the latter onto metal blocks (having the same width as the wooden ones) which are then fixed onto a metallic frame. Thus, I have found, somehow the way that the top is fixed onto the violin, putting the emphasis on the central strip (see picture n°1). Once the belly is fixed, I tap, with the tip of my finger, the mark left by the point of the stick when I put pressure on the belly. The note, generally an E, must be clear and precise. To obtain it, all the parts of the belly must give the same note. Then I tap them with my fingernail, which allows me to hear the precise note hit in a given area. I tune each part which has been tested, removing wood from the inside of the belly when necessary. If we believe that Guarneri del Gesu was very strict, we must admit that the asymetry of his f-holes had a very precise purpose and modified a parameter. I have noticed that if the note of the belly is too high, I can make it lower by removing wood from the lower part of the f-holes. However, if it is too low, it is in the higher part of the f-holes where I must take off wood. I believe that Guarneri del Gesu modified the f-holes, in order to find a better balance of the belly. It happens quite often to me that, due to a non homogeneous wood, my f-holes are not symmetrical. Here again, wood is the guide.

The back :

Once the inner arching of the back is finished, I fix it, like the belly, onto the same metal frame. This time, I tap on the mark, left on the outside by the interior pinhole, which is used to position the stick when putting the tension on the back. It is quite obvious now why this hole needs to go through the wood. At this place, the back must give the note “G” as clear and as precise as the “E” has to be on the belly. To achieve this, I tap, with my finger nail, and then I remove some wood, in order to find the note “G” everywhere, but this time the wood is removed from the outside of the back. To achieve a good sound, I believe that there is not one ideal thickness for the belly and the back; the most important thing is the overall balance. (see picture n°2)

WHICH METHOD DID GUARNERI DEL GESU USE TO GLUE THE BELLY AND THE BACK ONTO THE RIBS?

Which method did Guarneri del Gesu use to glue the belly and the back onto the ribs? As I mentioned earlier on, when we observe the body of his violins, we can see that it is twisted (one feature difficult to achieve when copying). The ribs are warped. This warp occurs when glueing the belly and the back after straining them. The marks made by the outline of the ribs on the belly and the back, at the beginning of the making, in some places no longer correspond to the ribs when they are glued. So, it is obvious that the belly and the back were not glued on the ribs with the form inside, otherwise this warping would not occur.

All these observations have led me to think that the belly and the back were glued at the same time onto the ribs, after taking out the inside form, in order to balance all the strains due to the warping brought about by the top and the back; this is very important for the sound.

To get closer to this method, I have imagined an outside form which allows me to position the ribs and the neck when I glue them. Once the ribs are made using the Cremona method (inside form), I mark on the ribs the axis of the violin (a mark which can be seen on Guarneri del Gesu’s violins). Once the inner form is removed, I glue the neck and fix it with three nails as Guarneri del Gesu did. I position the ribs in the outside form with the help of 7 sticks (of course, smaller in diameter than the button hole and f-holes), matching up the respective axis. (See picture n°3)

I then position, with small pins, the belly and the back onto the ribs, with the help of a thread fixed to a small cylindrical peg, located in the peg box under the top nut (the print of this peg is visible in the rare original necks) (4) and at the other end, fixed to the axis of the outside form. The thread, stretched over the axis of a special bridge, thus allows a more precise positioning of the neck. If he did not glue the neck as we do now, it is not because he did not know this technique but it was with a precise purpose in mind. The metal link between the neck and the body made by the nails, is, I think, very important for the sound. In fact, when I tape the top of the head of a neck fixed by nails, the whole violin starts vibrating, which is not the case with a modern neck. Hence, another meaningful detail is that the upper rib is not cut. Once the neck and the ribs are well fixed with wedges in the outside form; the four small pins (two for the belly and two for the back) allow me to very quickly position the top and the back after I have put some glue on the ribs. Guarneri del Gesu may have used a kind of “*octopus*” to glue everything: on the belly side, 12 straps are hooked onto a ring with a tightening system, go round the violin and are hooked to another ring on the back. I have conceived this device, as we can find no marks in the workshops at that time of belly clamps which are used nowadays (see diagram). The system of straps comes from an old practice for glueing stringed instruments. It is possible to remove the violin very quickly from this dismantled form and to press the places of the six blocks, using metallic pincers with springs. Proceeding this way, glueing requires little time and the glue remains warm for assembling. Nowadays I use modern clamps and it does not take much longer.

(4) Simone F.Sacconi “ *The secrets of Stradivarius*”.1989

Once the violin is closed, I shape the edge of the belly and the back, following the shape of the ribs. After deepening the double groove made with the purfling cutter, I glue the purfling. Then, I hollow the channel and finish the edges and the arching. The fact that Guarneri del Gesu’s violins are not varnished under the fingerboard means that he varnished after the fingerboard had been

glued. It made me think, as he left nothing to chance, that an important step must have taken place between the violin being almost finished and being varnished. It was most probably a question of finishing the balancing and harmonising of the wood tensions, taking into consideration all these parameters. Once the arching of the harmonized belly has been determined, I glue the fingerboard and finish the graduation of the thickness of the back from the outside. The whole of the violin should be balanced. That is the reason why the thickness can only be achieved once the violin is closed. Which explains the apparent incoherence in the thicknesses of Guarneri del Gesu's violins, when we measure them without considering the violin as a whole. It is the only way of achieving a perfect balance.

I have hitherto tackled, without giving it full development, the description of the most important steps in my way of making violins. My method, which is quite far away from what is usually conceived in terms of making violins and which may even surprise some of my colleagues, can only be understood if we consider, as I did, that Guarnerius del Gesu was a great master who was very strict where his craft was concerned.

As for myself, before finding this method, the sound and the beauty of Guarneri del Gesu's violins moved me so deeply that I had a feeling of inaccessibility and of a great frustration for not being born in the "right age," the violin being the instrument of the string quartet which needs most attention, in order to produce a satisfying sound.

Those feelings have vanished nowadays as, even though my method is very long, not easy to apply and requires a long training, it is an exciting, fascinating and stimulating one which changes the making of each violin into a unique adventure, where a true meeting with the wood takes place. In the past, I made copies of Guarneri del Gesu's violins, reproducing their defects artificially, without however understanding them. Today, through this new method, I work with the most accurate precision possible and I realize that these warps are natural and inevitable. This helps to understand why a copy of a Guarneri del Gesu will never sound like the original. Today, the sound of my instruments is completely different.

Thus, like the violin player who must be receptive and « listen » to his violin, the violin maker must be receptive and « listen » to the wood. The intelligence and the curiosity of today's violin players have contributed to our better understanding of how a violin « works ». I hope this article will help to understand Guarneri del Gesu's work and will, to a certain extent, improve contemporary instrument making.

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