

## Stradivari's Violins, Market Economy and Contemporary Lutherie



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**ABSTRACT:** Antonio Stradivari's violins are considered the best for aesthetics and sound. All the best violinists in the world would love to play one of those gorgeous instruments, but the Market problem is that there are now only 500 Stradivarius left in the world; not all of them are in good condition, and they are not eternal. Moreover, they are few and costly. The aim of contemporary Lutherie should be to produce violins (and other stringed instruments) with the same characteristics as the great Cremona's master but at reasonable prices. After 300 years, we could also aspire to produce better instruments than Stradivari. Using modern scientific instruments, we can understand every aspect of the construction technique of the great Stradivarius. Using the technology available today, we should be able to do even better.

**KEYWORDS:** Stradivari, economy, lutherie, violin, Santa Cecilia

### I. INTRODUCTION

Building violins of the same level as Stradivarius has already been possible; several experiments have shown that the sound quality of the Stradivari is attainable and comparable to instruments of a few excellent contemporary luthiers. The challenge now is to spread their knowledge in the schools of the new generations of luthiers, overcoming the instinctive jealousy of knowledge.

### II. METHOD

First of all, we will observe the situation of the violin market on the international market; then, we will see what the results have been achieved so far in the comparison between Stradivari violins and others made by contemporary luthiers. Then we will understand why violinists prefer Stradivarius and not modern instruments, since the sound can be the same or even better. We will see how much the narration of the mass media weighs against reality. We will observe why Stradivari violins should not be considered immutable models; historical, musical, and acoustic reasons have determined the modification of violins over time. These reasons still exist and call for an even more performing violin model. Rome's Santa Cecilia Conservatory of Music founded in 2011 a Lutherie course that is reaching this goal. We will present the result of an experiment conducted by the Lutherie Laboratory of the State Conservatory of Music in Rome, the new model of the Santa Cecilia violin.

### III. RESULTS

Gold today is worth 55.58 euros per gram. In comparison, a Stradivari violin reaches 50 thousand euros per gram (a Stradivari viola was auctioned in June 2014 by Sotheby's and Ingles & Hayday in New York for 45 million euros dollars). With this simple calculation, we can no longer define the Violin as "just two pieces of wood, a coat of paint, and half a cup of glue." The economic interests, not only for a few experts but also for the mass media, are enormous. The musical instrument market is often out of the interest of the financial police in several wealthy nations who currently prefer to oversee graphic works of art (paintings, statues, antique prints). For this reason, investing money in buying and selling musical instruments becomes very interesting since it offers very high annual interest rates. The proof is that the fake industry has existed for centuries that exploit inexperienced customers.

Stradivari's violins are considered the best in the world<sup>1</sup>. The Stradivarius sound was the focus of a Massachusetts Institute of Technology study. The study, cited by Phys.org, indicates that that magnificent sound depends on the length of the harmonic "f" holes. Furthermore, the presence on the wood of an unknown substance may have determined the timbre of the sound.

The high cost of Stradivarius violins is not the only reason that has prompted many experts to try to reproduce those same characteristics in modern instruments. Contemporary luthiers live an existential drama that pushes them towards an unattainable goal: to equal their perfection. For these reasons, modern luthiers often copy Stradivari and often fail. But not all of them.

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Three different double-blind experiments conducted from 2012 onwards in Indianapolis, Paris, and New York have shown that experts and audiences have appreciated the sound of modern instruments more than the great Italian luthiers of the past, including Stradivari<sup>2</sup>. The modern violins involved in the experiments were built by some of the best living contemporary luthiers in the world, but the result remains.

Why do violinists prefer Stradivarius and not contemporary instruments, since the sound can be the same or even better? Are these artists obliged to conform to a must in the international concert world? Yes. If a concert player promises to perform with a real Stradivari, the Concert Societies invite him more easily because the audience will surely be more numerous. That's most important: fill empty seats and maximize the gain that evening, of course, due to good advertisement highlighting the true star of the evening: not the concert player but the instrument, a Stradivarius.

The confirmation comes from shrieking newspapers that attract the attention of the public; it is so sad to notice how much more often the name of the instrument is mentioned at the soloist's expense:

*The "Stradivari" in a concert that touches the strings of the soul<sup>3</sup>*

*Young Spanish star will play 320-year-old Stradivarius cello at Philharmonic Novosibirsk State Orchestra<sup>4</sup>*

*Totenberg's stolen Stradivarius in concert<sup>5</sup>*

*A Stradivarius cello from 1725 is invited to a Pianos Folies concert<sup>6</sup>*

*Stolen 'Ames' Stradivarius violin returns to the stage<sup>7</sup>*

*Stradivarius violin worth \$16M to be played at Rosza Centre tonight<sup>8</sup>*

The mass media often offers contradictory and inaccurate articles. It is contradictory that some say that Stradivari's Secret remains unsolved. At the same time, other articles announce that they have revealed it for a series of always different reasons (the recipe of the varnish, the treatment of the wood, the mineral-based substrate, the geometry of the project, the length of sound holes, and so on):

*The secret of the most famous violins? A bath, say researchers on the hunt for Stradivarius mystique<sup>9</sup>*

*The Secret of The Stradivarius Is (Partly) In the Wood<sup>10</sup>*

*Stradivari's secret could be 'brutal' woodworm treatment<sup>11</sup>*

*Stradivari's secret could be a drop of fungicide<sup>12</sup>*

*A Violin's Warm, Mellow Sound Comes from Its Varnish<sup>13</sup>*

*The secret of sound of Stradivarius violins is covered in secret preservative<sup>14</sup>*

*The secret of the Stradivarius would lie in small imperfections<sup>15</sup>*

*Stradivarius: Unsurpassed Artisan or Just Lucky?<sup>16</sup>*

We want to repeat what all true lutherie experts have known for some time but prefer not to shout it from the rooftops: the Secret of Stradivarius does not exist, at least not anymore.

As we have already explained in our recent article on *Educational Alternative<sup>17</sup>*, the studies dealt with over the years by many experts have discovered not only every aspect of the Lutherie but also specifically the most overlooked aspects of Antonio Stradivari's work.

Let us refer to the rich bibliography given in that article for the exhaustive list of 19 works cited only by example. Still, I think it would not suffice for ten more pages to indicate the army of genuine experts who have examined these arguments over the centuries.

However, Simone Fernando Sacconi wrote his book *The 'Secrets' of Stradivarius<sup>18</sup>* where we read: "The title of the book reads ... in the plural the word 'Secrets' which, usually associated with the singular of the name of Stradivari, is believed to measure the greatness of the Cremonese luthier. We, therefore, wanted to demythologize the refusal to reduce art to the material conception of a secret, which ultimately implies disclosure of the same, in this case, a recipe, a type of cuisine, or a pharmacy, if it is around paint above all who enjoyed popular imagination".

Continuing to look for Stradivari's Secret has two different reasons. For experts, it is just a desire to waste time and drain resources. For journalists, it is just an opportunity to create tabloid articles to shout at the solution of the secret and then deny and reconfirm it.

Stradivari's violins should not be considered immutable models. Historical, musical, and acoustic reasons have determined the modification of violins over time. These reasons still exist today and call for an even more performing violin model:

The Sound of the Venues. In the Baroque era, chamber music was conceived for a performance in a room. Occasionally it was possible to perform such concerts in larger ballrooms. However, history has changed them in structure and size. The Vienna

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Musikverein Golden Hall was one of the largest concert halls conceived in the 19th century. Nowadays, however, modern concert halls have reached gigantic dimensions, such as in China at the Guangzhou Opera House built for 1,800 seats and so on in the USA, France, Germany, Russia, Denmark, Finland, and Japan.

Size and type of the Musical Ensembles. The Violin reached its ultimate dimension in the 16th century, having been initially conceived for small ensembles. In the Baroque period, the violinist was primarily involved in small chamber ensembles where a large mass of sound was not required to be heard. In the Baroque era, even in the case of solo concerts, the violinist could quickly emerge on other string instruments. The maximum sound mass required by a violin was playing a soloistic concert with strings and basso continuo, but it was not a difficult thing to get. In Mozart's time, the first wind instruments (oboes and horns) began to be inserted into the orchestra. Therefore, in the case of solo concerts, the violinist found it more challenging to emerge; the sound volume began to be a problem that was solved with some structural changes that we will see later. The sound of the Violin as a project problem pushed the later baroque luthiers to modify the violins gradually; nowadays, if we directly compare a baroque violin with a classic/modern one, we notice notable and invisible differences. Here are some macroscopic ones: the bridge design and the fingerboard length. But other less visible differences are more important: the angle of the neck, the bridge's height, the fingerboard in different wood types, and a thicker and longer bass bar. The Beethoven violin concerto expanded the orchestra sound mass with many instruments: flute, oboes, clarinets, bassoons, horns, trumpets, and drums. Finally, in the Sibelius or Khachaturian violin concertos, the entire brass band is included with a piccolo, two flutes, two oboes, English horn, two clarinets, two bassoons, four horns, three trumpets, three trombones, tuba and harp and all percussion (timpani, bass drum, snare drum, suspended cymbals, tambourine). At this point, the sonic mass required for a solo violin becomes much more significant, and further modifications are needed.

Another important theme is the way the music is written. The classical writing of music from Bach to Stravinsky in modern times is almost unobtainable; today, composers are looking for new sounds, and their scores increasingly resemble abstract paintings full of sketches, balls, arrows, and scribbles.

## IV. RESULTS

For all these reasons, it is increasingly evident that the present time calls for a violin that meets current needs, more powerful and with a high-quality sound, but at much lower prices than Stradivari.

## V. DISCUSSION

Over the centuries, many luthiers have decided to set themselves higher goals than those of Stradivari because they did not want to limit themselves to imitating him.

The first to try to overtake Stradivari was himself. Visiting the Cremona Violin Museum demonstrates the remarkable study of innovation and research carried out by the great Antonio: at least 12 different forms of Antonio Stradivari's Violin have been found, all certainly made by him looking for the best aesthetic-acoustic performance. While copying the great Master for the common market, many of his contemporaries and successors continued to try to do something better or at least different. The musical needs of the time forced many luthiers not only to build modified instruments (compared to the best original Stradivari model, The Cremonese of 1715 or The Messiah of 1716, both made with the same shape, the PG) but also to significantly modify the instruments of the best luthiers of the past.

At the time of the luthier Jean-Baptiste Vuillaume (1798-1875), it was already evident the work done by generations of luthiers to modernize all the instruments of the great ancient Italian luthiers, including Stradivari, to increase the power of sound given the new interpretative and acoustics needs.

Many master luthiers from Stradivari to today have continued to pursue a sound capable of satisfying the musical need. A non-exhaustive but emblematic list of these innovative luthiers boasts, among others: François Chanot (1788-1825), Johann Georg Stauffer (1778-1853), Félix Savart (1791-1841) with his trapezoidal Violin, Nicholas Sulot (1780-1858) with his Violin from the "wavy" harmonic belly, Thomas Howell (1783-1870), Jean Baptiste Vuillaume (1798-1875) with his Contra-Viola, Thomas Zach (1812-1892) with his Viola-Harp, Alfred Stelzner (1852-1906) with his Violotta with great body and strong sound, Arthur Richardson (1882-1956), Igino Sderci (1884-1983) with his famous Futurist Quartet (Florence, 1947), Carleen Maley Hutchins (1911-2009) that using the researches of the German physicist Ernst Chladni (1756-1827), she made many instruments following various constructive logic; amongst the many, there was a violin with 65 holes in the ribs, closed or opened by plugs. This Hutchins violin was dubbed "The Groviera" in Paris (11th International Congress of Acoustics, 1983), where Hutchins played it by a violinist and removed or moved the caps to show during execution how the sound changed decisively, changing the internal resonances.

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Speaking of the current times: Joseph Curtin (renowned for his studies on the typical color directional tone of string instruments, on the use of alternative composite materials including synthetic materials and carbon fiber, and finally, his experimental model that recalls the Chanot violin-guitar), David L. Rivinus and Marty Kasprzyk.

### VI. OUR VIOLIN

In Rome, at our Santa Cecilia Conservatory, we teach not only to play an instrument but also Lutherie, String Instruments' History, and Technology. Our Lutherie course was founded in 2011 by Massimo de Bonfils (teacher of history and technology of stringed musical instruments), Mauro Fabretti (laboratory teacher), and Massimo De Notti (laboratory assistant). Today, the Santa Cecilia Conservatory is the only 'University-Level' Institute in Italy that organizes a Violin Making Course. We have fifty students from twelve different countries. Over the years, we have also worked for a course in engineering in musical instruments in collaboration, first with the La Sapienza University of Rome and then with the Polytechnic University of Ancona.

Moreover, we promoted several Seminars on Lutherie in Italian Conservatories and Universities. We focus on the next luthiers to provide adequate training and culture. In two thousand sixteen, we also organized the first edition of the Santa Cecilia International Violin Making Competition, where we received more than one hundred instrument participants from twenty-four different nations. In October 2019, we opened our stand at the World Music China Expo in Shanghai



Fig. 1. Massimo de Bonfils and Mauro Fabretti at the Santa Cecilia Conservatory, Rome

Naturally, our course is not concentrated only on classical Lutherie but also on the experimental one. So, Maestro Fabretti designed the new model project, and our staff began to build it following the teacher's special instructions.



Fig. 2 The laboratory with our students



Fig. 3 - Massimo De Notti and Mauro Fabretti in our Laboratory



**Fig. 4. The Santa Cecilia new violin model**

This new Violin is easier to play, powerful, and has better sound quality. It's easier to play because the ergonomic body helps the player in higher positions by pushing down his left shoulder. Moreover, we pulled up the right shoulder to recover the cubage of the sound box. We have a better sound quality because the player can choose, following the repertory to play, if using one or two or three sound posts simultaneously for a richer timbre. We have a more powerful sound because the sound comes out of 4 different harmonic holes. We preferred to use a longer and thicker bass bar for better transmission of acoustic vibrations. We are pleased to say that the International Press has already begun to notice our work starting with the celebrated English review Strad on the printed and digital editions and so on, with articles and news on the main specialized sites in Europe, America, and Asia.

It would be better to directly compare the sound of another violin, perhaps that of a great Italian luthier of the eighteenth century. Our next step will involve our Electronic Music Department in making acoustic measurements. We will compare our Santa Cecilia model with those of two famous violins kept in two different museums in Rome, the "Tuscan" Stradivarius of the Santa Cecilia Academy Museum of Musical Instruments and a David Tecchler violin of the National Museum of Musical Instruments of Santa Croce in Gerusalemme, ever in Rome. The measurement will be done by playing scales, starting on the open string without vibrato and using the same violinist, the same bow, and the same type of string on the violins. We will calculate the power of sound, projection, quantity, and quality of the harmonics. That's the subject of our forthcoming scientific publication.

### **VII. CONCLUSIONS**

It is time to abandon old stories of secrets and scandalous announcements of new bizarre discoveries that reveal the same secrets. Modern Lutherie can produce string instruments of a level equal to or higher than the Stradivarius. This knowledge deserves to be disseminated to provide the musicians of today and tomorrow with instruments capable of playing today's music in today's theatres. The Santa Cecilia Conservatory of Rome participates in this aim by educating a new generation of luthiers.

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International Conference of European Platform for Artistic  
Research in Music – EPARM (Oporto, Portugal, 2018)  
International Conference on Education, Research and  
Development (Elenite, Bulgaria, 2017)  
Italian Cultural Institute (Paris, France, 2017)  
9th International Conference of New Musical Concepts  
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