The Rediscovery of A Long Lost Resin

From a short note in a varnish publication from the 18th century, a possible clue to unraveling the mystery of classic Italian varnishes.

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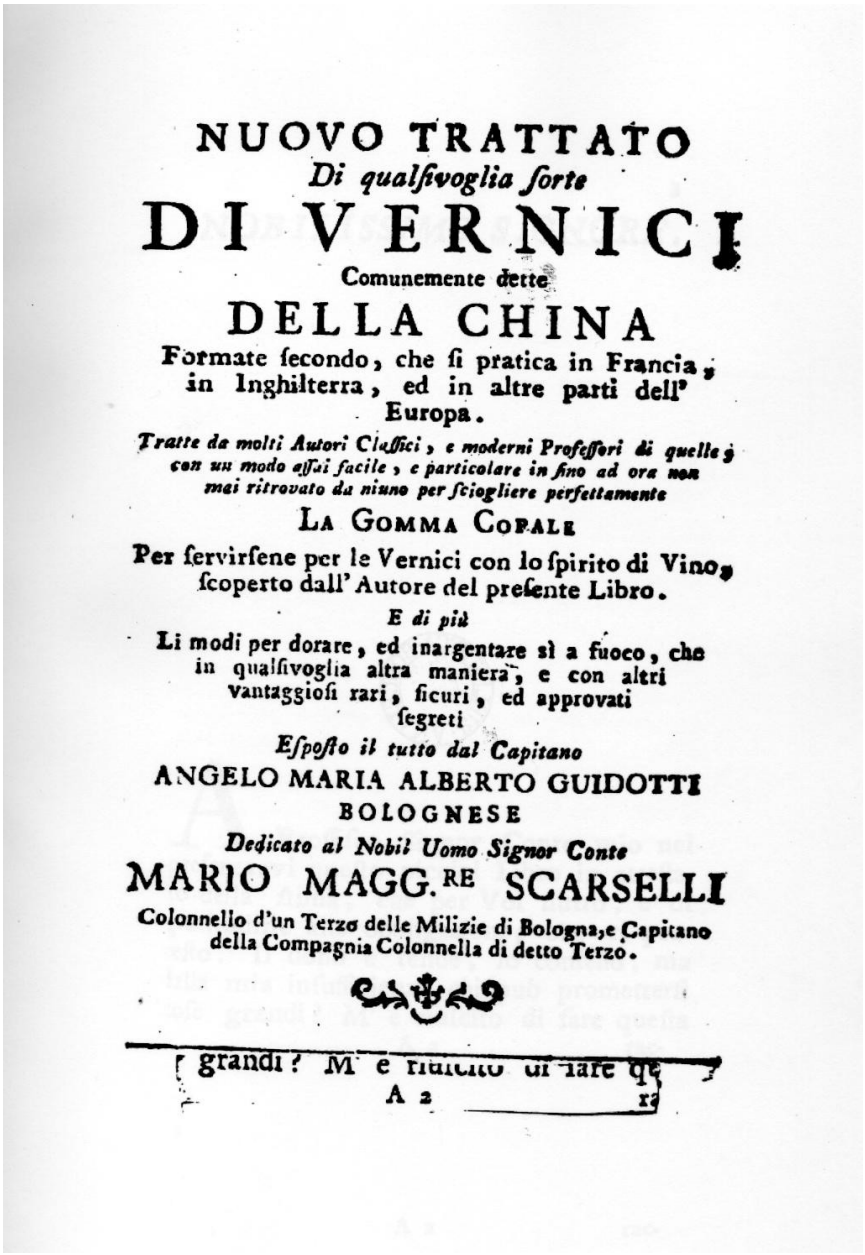
Translated by Sigurd Lombardi



NUOVO TRATTATO
Di qualſivoglia ſorte
DI VERNICI
Comunemente dette
DELLA CHINA
Formate ſecondo, che ſi pratica in Francia, in Inghilterra, ed in altre parti dell' Europa.
Tratte da molti Autori Claſſici, e moderni Profeſſori di quelle, con un modo aſſai facile, e particolare in fino ad ora non mai ritrovato da niuno per ſciogliere perfettamente
LA GOMMA COPALE
Per ſervirſene per le Vernici con lo ſpirito di Vino, ſcoperto dall' Autore del preſente Libro.
E di più
Li modi per dorare, ed inargentare sì a fuoco, che in qualſivoglia altra maniera, e con altri vantaggioſi rari, ſicuri, ed approvati ſegreti
Eſpoſto il tutto dal Capitano
ANGELO MARIA ALBERTO GUIDOTTI
BOLOGNESE
Dedicato al Nobil Uomo Signor Conte
MARIO MAGG.RE SCARSELLI
Colonnello d'un Terzo delle Milizie di Bologna, e Capitano della Compagnia Colonnella di detto Terzo.

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Introduction

In February 2011 Roberto Del Gratta brought a passage from an 18th century publication with this elaborate title to the attention of the other co-authors.

> "*Nuovo trattato di qualsivoglia sorte di vernici comunemente dette della China formate secondo, che si pratica in Francia, in Inghilterra, ed in altre parti dell'Europa. Tratte da molti autori classici, e moderni professori di quelle, con un modo assai facile, e particolare in sino ad ora non mai ritrovato da niuno per sciogliere perfettamente la gomma copale per servirsene per le vernici con lo spirito di vino, scoperto dall'autore del presente libro. E di più li modi per dorare, ed inargentare sì a fuoco, che i qualsivoglia altra maniera, e con altri vantaggiosi, rari, sicuri, ed approvati segreti. Esposto il tutto dal* ***Capitano Angelo Maria Alberto Guidotti bolognese dedicato al Nobil Uomo Signor Conte Mario Magg.re Scarselli*** *colonnello d'un terzo delle milizie di Bologna, e capitano della compagnia Colonnello di detto terzo.*"

The work of Captain Angelo Guidotti includes numerous varnish recipes, chapters dedicated to gilding metals, and the production and use of various substances with "advantageous, rare, assured, and approved secrets." It also includes the preparation of ointments and balms for

pharmaceutical purposes, and to top it all off cooking recipes. The book is within the public domain and can be accessed on the internet.

All in all the treatise is similar in form and content to many other contemporary treatises such as *"Trattato sopra la vernice detta comunemente cinese"* (Treatise on the varnish commonly called Chinese), by Don Filippo Bonanni of the Company of Jesus, first published in 1713. These works collect and attempt to encode recipes and ancient knowledge within images often limiting authors to printing copies of recipes used by apothecaries, or even copying recipes by hand.

Our search began when Mr. Gratta came across this interesting, is the following section found on page 17 (the italics are our own):

> "The rest of us in Italy, and *especially in Lombardy,* have a *resin so beautiful,* that other than its virtues as a balm, has a *beautiful transparency;* at the beginning it is viscous, and later becomes *hard like the other perfect resins.* The resin comes from certain *pouches* that are produced by *young elms*, and as time passes, in the month of July it becomes tough and darkens in a way that makes it difficult to liquefy. The resin, or gum incorporated with others, besides its *luster,* transmits its *hardness*."

Apart from this brief section, there are no other observations or notes on this resin within the varnish recipes listed throughout the rest of the treatise.

Authors that have written about varnish preparation for musical instruments, (e.g. Zemitis, Corbara, Tolbeque, Watin and Carletti,[1]) never mention a resin like this nor with characteristics resembling those described. Vice versa, the bibliographic search for terms such as “essence of elm”, “elm balsam” and the equivalent in Italian, French and German, produced numerous citations, but nothing correlating to varnish recipes or preparations useful to lutherie.

And yet it’s difficult to believe, if not impossible, that a resin with these characteristics found “especially in Lombardy”, capable of transmitting hardness and luster to myriad other gums and resins, didn’t tickle the curiosity or ingenuity of instrument makers of the same age in the same region that were confirming an uncontested supremacy in the quality and beauty of their varnishes. The persistent myth in the media of the “secret varnish” of Stradivari is a sufficient motive to further investigate our findings.

At first we dedicated ourselves to verifying the accuracy of Captain Guidotti’s claims, carrying out searches that were more challenging than anticipated. Upon finding this “essence of elm” in its current conditions (conditions that have completely changed since the 18th century), our

1 Martin Zemitis, “Violin varnish coloration”; Lamberto Corbara “Le vernici antiche e moderne per liuteria”; A. Tolbeque “L’art du luthier”, Watin; “ L’art du vernisseur”; Gabriele Carletti “Vernici in liuteria”

empirical experimentation began and achieved the isolation of a useable resin.

The collection of the “essence” or “balsam” of elm

The pouches described by Captain Guidotti bring us to the galls that are normally produced by the settlement of aphids in elm leaves. The research in the field concentrated mostly on the identification and the harvesting of galls originating from two species of aphids: the *Tetraneura ulmi* (Figure 1) and the *Eriosoma lanuginosum* (Figure 2).

fig. 1

fig. 2

The biological cycle of these aphids are extremely complex as they alternate from two different hosts, one being the elm and the other the pear tree. In spring one of these phases concur with the formation of the galls. The galls act as temporary hosts and protect the aphids as they progressively mature until the galls' final blackening and drying.
The contents within these galls was used in herbal medicines, for its supposed virtue in healing wounds and ulcers, and its ability to clear and cure pulmonary ailments. Almost all botanical, herbal, and pharmaceutical texts cite these properties.

Our fieldwork to find these elm galls began in March 2011. The searches focused on the river basins of the lower Arno (a river that runs northwest through Florence then west to

Pisa), the plains between Prato and Lucca, the Mugello region, Pratomagno, Maremma, and a wide range of Emilia-Romagna and Lombardy.

It's worth underlining that the botanic genus *Ulmus*, which our Italian elms belong to, have been victims to a series of plagues of Dutch Elm Disease that began towards the end of the 19th century and continue to this day. Like many other countries in Europe this assault has been strong enough to put the elm at risk of complete extinction in Italy. Today a timid return can be found with young examples of elms in the formation of hedges in some of the examined areas.

A region particularly devastated by Dutch elm disease was the Padana plain where elm trees have become practically impossible to find. Meanwhile in Tuscany, elm trees can be found with young examples in every plains region in hedges of cultivated areas. It is our intent to extend our search to other regions of central Italy in the future to determine the extent of the elm's recovery.

There is a great variety of forms and colors of galls. Nonetheless, the galls produced by the *Tetraneura ulmi* (Figure 3 and 4) were disproportionate to Guidotti's description, with examples having diameters no larger than 1.2 cm. Once opened the galls failed to produce any liquid or viscous substance from within.

fig. 3

fig. 4

On the other hand, we found galls of the *Eriosoma lanuginosum* (see Figure 5 and 6) with dimensions up to 10 cm in diameter. Along with matching dimensions, the galls

occasionally held the substance we were searching for inside (see Figure 7 and 8).

fig. 5

fig. 6

fig. 7

fig. 8

Identifying the correct type of galls in the field did not make the collection of the “resin” simple, because the “resin” was not found within every gall collected. The best results were obtained during precise periods of the galls’

development, particularly towards the end of June, when we observed an abundance of small dark colored aphids within the galls. An impalpable ashy dust that appears hydrophobic (so hydrophobic that moisture droplets can easily be expelled by simply blowing on them) was also present within the galls.
In rare instances where the conditions were favorable, we were able to collect a dense transparent brown liquid with a pleasant odor from the bottom of the galls.

Upon observation, the substance displays all the characteristics of the “essence of elm” or “balsam of elm” cited in various pharmaceutical, herbal, and medical publications. From the moment it is harvested it is soluble in water and once diluted, seems to preserve indefinitely as it showed no signs of putrefaction when left out in the open. Thus, the principal factor limiting its harvest appears to be its natural scarcity, the fact being that only a small percentage of the right galls produce the “resin” during a short period of time during the year.
When aged the galls blacken and harden remaining attached to the plant even after a year, but fail to produce any essence or balsam that can be used (see figure 9).

fig. 9

The process for isolating “resin” from the elm balsam

From preliminary tests the substance retrieved from the galls is not only soluble in water, but is easily and completely soluble in ethyl alcohol as well as denatured alcohol. The complete solubility in oil and in turpentine is less certain, but is probable given the results we’ve obtained so far. High temperatures do not seem to help the purity or the transparency of the solution.

Rendering the watery solution basic gives us a precipitate that once dried, has a dark and opaque complexion that tends to disintegrate (see fig. 10).

fig. 10

In an acidic environment no precipitate was present. By evaporating, drying and then pressing the solvent, transparent shards were obtained that are quite hard and exhibit a nice dark reddish color when held in light (see fig. 11 and 12).

fig. 11

fig. 12

When exposed to an open flame these shards are rapidly carbonized with modest diminishing. However, neither flame, nor particular odors nor considerable amounts of smoke were produced.

As much of the “resin” collected was used in experiments and rendered unfit for varnish, further studies on the “resin’s” ability to mix with other common resins in varnish making, will have to wait until more can be harvested next season.

Conclusion

The next steps to follow this year will be to continue with empirical experiments based on the norms and traditional methods of preparing resins for varnish making. We have begun contacting laboratories and researchers in the field to begin integrating and completing an understanding of the origins, composition and properties of this rediscovered “elm balsam resin”.

Regardless of further scientific research that may prove that this is not the lost ingredient of classic varnishes, it still remains a resin at the disposal of luthiers. We continue to hope that once we begin using a varnish containing a high percentage of “elm balsam resin”, we will find that we have solved another piece to the puzzle that is classic Italian lutherie.