First study of 'Golden Age' mandolins unlocks secrets of their beauty

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Fluorescence induced by ultraviolet radiation of a mandolin made by G.Filano, particularly of the sound hole decoration. The orange color is characteristic of the resin of the false inlay, which organic fraction seems to be composed by shellac only. © Rovetta/Canevari

Some of the most elaborately decorated instruments in history were produced in 18th century Naples. The materials for varnishes and decorations used by individual mandolin masters, honed for wealthy clients in the ancient city's labyrinthine artisan quarter, have been kept secret for over 200 years. Details are disclosed for the first time by Tommaso Rovetta from the Università degli Studi di Pavia and colleagues at the Laboratorio Arvedi Research Group in Springer's journal *Applied Physics A - Materials Science & Processing*.

Italian conservation scientists studied ten instruments from some of the most important dynasties of the "Golden Age" of Neapolitan mandolins. Advanced high-resolution imaging techniques shed light on some of the most jealously guarded decorative secrets and could provide a new way to accurately identify mandolins from specific workshops.

The Neapolitan mandolin was set apart by the deeper bowl of its body, producing a more resonant sound heard in works by Beethoven and Verdi. The style was developed by the Vinaccia family and adopted by other leading luthiers such as the Filano, Fabricatore and Gagliano families.

The scientists obtained mandolins from each of these makers courtesy of the National Museum of Musical Instruments in Rome and a private collector. Given their rarity and excellent state of conservation, only microscopic samples could be analysed from already-damaged areas. Nevertheless, the team was able to see that different workshops used different techniques and materials to achieve the same aesthetic effect.

"For mandolins of unknown origin, our results could represent a new way to identify where they were made and therefore their historic and economic value," says Tommaso Rovetta.

In particular, the resin used between patterns of pearl, ivory, bone or possibly horn around the sound hole contain a mixture unique to each workshop. Shellac, a resin from the lac beetle popular today in nail varnish, seems to be the only substance which formed a common base to which pigments and minerals were added. In a 1796 Fabricatore, a mineral found only in the volcanic lavas of Mount Vesuvius was detected. The mixtures in Vinaccia instruments were particularly complex and the scientists were surprised to find the fossilised remains of diatoms, a type of algae.

"We assume there were intense exchanges of technical know-how between masters and their apprentices but, with no written records, this knowledge was taken to the grave," says Rovetta. "We hope the rediscovery of ancient recipes will provide inspiration to today's luthiers."

More information: Rovetta, T. et al. (2014). The golden age of the Neapolitan lutherie (1750–1800): new insights on the varnishes and decorations of ten historic mandolins. *Applied Physics A – Materials Science & Processing*. DOI: 10.1007/s00339-014-8882-5 , link.springer.com/article/10.1007%2Fs00339-014-8882-5

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