

City Talk



French luthier **Benedicte Friedmann** at her workshop in Cremona, Italy. Above: **Mira Wang** plays the Ames Stradivarius in New York.



WHY A STRAD TOUCHES YOUR HEART STRINGS

Unlike a bulky piano with more than 10,000 moving parts that generates intermittent notes with key strikes, a handy violin generates continuous notes by drawing a bow across its four strings.

Compared with other western string instruments, violins are considered the hardest to play as they have no frets on the fingerboards to determine the notes like guitars. Violinists need prolonged vigorous practice to skillfully place their finger positions for different notes.

Yet, the violin remains immensely popular as it effectively projects heavenly sound that can be highly penetrative.

Technically, a violin is a sound box with a neck mounted with tensioned strings. The sound box has distinct features such as a unique hourglass shape with multiple curves, the arching of its top and back plates, and the two long "f" holes.

The wood materials are usually spruce for the top, and maple for the back and sides. The neck and the fingerboard have an ebony veneer surface to resist wear.

At the pointed end of the neck is the pegbox where the tension of the strings can be adjusted. The other ends of the strings are tied to the tailpiece at the bottom of the sound box. All joints are glue-connected without the use of nails.

When the strings are excited by a bow, they produce musical notes that are transmitted through the tiny maple bridge to the sound box for amplification and projection through the "f" openings. High-quality bows use specially treated natural horsehair to ensure durability and consistency.

As with other musical instruments constructed from natural materials, no two violins are alike in sound quality and each violin has its own unique tone for the same musical notes.

String instruments that look like violins first appeared in paintings of the 16th century. They evolved gradually into the popular violin form in the early 18th cen-



Nuts and bolts

Edmund Leung

ture. The violin family also includes the viola, cello and double bass, which produce notes of lower pitch and of distinct characteristics with the larger size.

Makers of violins are called luthiers. They are both engineers and craftsmen as they look after all associated technical and quality issues of violin construction.

Probably the most renowned luthier was Antonio Stradivari (1644-1737) of Italy who spent his whole career on musical instruments, mostly in violins. He experimented extensively with different geometries of violins in his early career and eventually established some optimum forms, which are still copied by other luthiers to the present day.

He produced more than 1,100 instruments in his life, with about 650 – including 500 violins – surviving until today. His instruments are nicknamed Stradivarius, or simply Strad.

These limited 300-year-old instruments are mostly sold to collectors or renowned violinists through fierce auctions, and are worth tens of millions of US dollars.

No one can explain why Strads can produce such good sound. Instead, luthiers have been trying extremely hard over the centuries to replicate Strads with similar wood materials, grain pattern and directions, geometries and assembly methods.

But it took them a long time to replicate satisfactorily. Latest studies indicate that most violinists cannot differentiate real Strads and high-quality modern replicas in terms of sound quality.

Technological development and computer-aided analyses have helped to achieve top sound quality for musical instruments, and this is what made them interesting for playing and for collecting.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over features and forces in modern life