

'Those Silken Strings' – a Correction to Comm. 2013 and Other Notes.

Comm. 2013 was hastily put together 'at the last minute' so there is an error to correct on page 27 with reference to the silk strand numbers noted in the 'Kanz al-Tuhaf'.

I wrote in error:-

"Here the number of silk strands given for each string from treble to bass is 16, 24, 32, 48 and 64. Again – with the exception of the additional treble course – the numbers of strands increase by a 4:3 ratio."

Clearly the ratio increase in the number of strands from treble to bass is 3:2, 4:3, 3:2, and 4:3 and so incorporates another divine harmonic ratio of 3:2. Among the thread count ratios can also be found other ratios 2:1 (32/16, 64/32, and 48/24), 3:1 (48/16), 4:1 (64/16) and 8:3 (64/24).

According to G.H. Farmer's translation of the relevant segment of the 'Kanz al-Tuhaf' (Note 1) there is no mention of string diameter so it may be assumed that with plain silk strings at equal tension and tuned a fourth apart, string diameter will increase by 4:3 ratio between courses from treble to bass. (Mersenne-Taylor Law and the 10th C. Ikhwan al-Safa)

Assuming a minimum top string diameter of 0.4 mm, the required string diameters for the remaining courses would then be:-second course – 0.53 mm, third – 0.71 mm, fourth – 0.95 mm and fifth – 1.26 mm.

If the silk strand diameter is constant for all strings then the cross sectional area of each strand, based upon an untwisted top string diameter of 0.4 mm made of 16 strands, would be about 0.008 mm². This would then give the approximate diameter – untwisted – of the other strings as second course – 0.49 mm, third – 0.58 mm, fourth – 0.70 mm and fifth – 0.81 mm. For twisted bundles of silk strands diameters would be increased by a maximum of 12% to 18% dependent upon the number of strands in a bundle so giving approximate maximum twisted string diameters of:- second course – 0.55 mm, third – 0.68 mm, fourth – 0.83 mm and fifth – 0.96 mm.

So both the fourth and fifth course strings would have to be made in a fashion other than simply twisted to achieve the required diameters (assuming equal string tension). For a smooth, plain braided string (i.e. with no weighted core) the diameter of the fourth course string would be about 1.13 mm and the fifth – 1.31 mm (based upon an increase over the diameter of a simply twisted string at maximum twist of about 36%). Note also that the thread counts are all divisible by four – a requirement for braided string construction.

Some Further observations,

The appetite of Roman citizens for the meat of baby lambs ensured a plentiful supply of raw material necessary for making the finest gut treble instrument strings and so established Rome as an important centre for gut string making since at least the early 16th C (Note 2). On the other hand Rome – despite the best efforts of the Vatican - did not manage to establish a viable silk industry until the second half of the 17th C (Note 3) so likely was never able to compete in silk instrument string manufacture - a speciality of other silk producing regions of Italy and Europe that were established at least a century earlier (Note 4).

In Venice, the production of silk haberdashery increased to the point that in 1593 the Venetian 'passamaneri' founded an autonomous guild. The trimmings makers in 1596 claimed that they were able to fully supply the domestic market and requested protectionist measures against foreign imports (Note 3). Presumably these restrictions applied to all imports not only originating from the mainland regions of Europe but also from the silk producing regions of the Ottoman Empire?

Interesting that a significant proportion of raw silk filament coming annually through Venice during the late 16th and early 17th C was imported from Syria and Persia (500,000 pounds per annum or about 40% of total imported raw silk filament) under control of the Ottoman Turks and that there was a reciprocal trade in finished heavy silk fabrics exported to the Ottoman Empire from Venice (Note 3). Perhaps exports from Venice also included silk instrument strings for oud and related instruments?

Note

- 1) 'The Structure of the Arabian and Persian Lute in the Middle Ages', G.H. Farmer, 1936.
- 2) 'Roman and Neapolitan Gut Strings 1550- 1950', Patrizio Barbieri, G.S.J.
- 3) 'The Silk Industry of Renaissance Venice', Luca Molà.
- 4) For example "Strings made from Sheepes and Catts gutte are made at Rome or about Rome and none that are good are made in any other place except the great strings and octaves that are made in Lyons at France and nowhere else", Mary Burwell, 1676.