interval from Mercury to Neptune-Pluto correspond to the octave C-C, then the planetary orbits correspond exactly in angular displacements to the principal steps of the scale. The asteroid belt occupies exactly the angular position corresponding to the interval between F and F-sharp. This region is where the soprano makes the register-shift, in C 256 tuning. Thus, complete coherence obtains, with this tuning, between the human voice, the solar system, the musical system, and the synthetic geometry of conical spiral action. (Recent work by Dr. Robert Moon and associates has extended this coherence to the "microcosm" of subatomic physics.)

Now, what happens if the tuning is arbitrarily raised, from C 256 (corresponding to A between 427 and 432 Hz) to, for example, A 449? **Figure 10** illustrates the result. We see that the soprano register shifts (at approximately 350 Hz and 700 Hz) fall, in the higher tuning, between E and F, rather than between F and F-sharp! This divides the octave in the wrong place, destroys the geometry of the musical system, destroys the agreement between music and the laws of the universe, and, as others shall discuss at this conference, finally destroys the human voice itself!

If we would arbitrarily change the "tuning" of the solar system in a similar way, it would explode and disintegrate! God does not make mistakes: Our solar system functions very well with its proper tuning, which is uniquely coherent with C 256. This, therefore, is the only scientific tuning.

The violin and increases in frequency: Cremona expert

The following presentation, here translated from the original Italian, was made by Prof. Bruno Barosi, of the International Institute of Violinmaking, in Cremona, Italy, at the Schiller Institute's April 9, 1988 conference on Music and Classical Aesthetics in Milan. Professor Barosi addresses the problem of raising the pitch at which the old violins are played, to today's concert pitch of A = 440 and upwards.

The increase in frequency which is being hypothesized involves, for the violin, serious and not easily solvable problems.

From the physical standpoint the violin is a machine which must fulfill two contrasting roles simultaneously:

A static one, of holding the forces of tension of the strings, forces which act constantly upon the structure and to which it must constantly react to maintain, precisely, static equilibrium;

A dynamic one, of vibration around the position of equilibrium, to transmit the vibrations of the strings into the surrounding environment.

Now the violin's case is not a resonating box, but a coupler between the strings and the surrounding air; practically speaking, the instrument's case fulfills the same role which the magnetic nucleus plays in electrical transformers. In this instance, the secondary [circuit] is the air of the surrounding environment, while the primary is obviously constituted by the strings. But what counts is the coefficient of coupling, a coefficient which depends on the volume and its correlated surface. As a result, it is not possible to change the form of the case. Then, to increase the frequency of the four strings themselves, is only possible under these three conditions:

1) By shortening the instrument's neck.

2) By increasing the tension on the strings.

3) By changing the diameter or the material of which the strings are made.

Solution 1 is not possible because of the already consolidated technique which would have to be changed. All violinists, from the greatest to the most humble, would have to learn a new technique of positioning their fingers on the finger board.

Solution 2 involves an increase in the forces acting upon the structure of the case, which, when analyzed in their particulars, lead us to state that the increase in the single stresses is such as to reduce the half-life of the instrument, insofar as the effect of an overload depends both on its value, and its time duration.

The increase in the components which tend to flatten the bottom and curve the top, intervenes also to modify the timbre.

Solution 3 involves problems with the bow and hence with the production of sound. A too-small diameter of the string (for example, the E-string) involves a variation of the coefficient of friction and hence definitely a smaller sonority. The change in the material make-up of the strings involves problems connected to the duration and the sonority of the strings, as well as problems connected to the horsehair of the bow, which have not yet been experienced.

Finally, but surely no less importantly, there remains the problem of the early instruments which are now used in orchestras and by soloists:

The increase in the tension would inevitably shorten their life, as well as lessen their acoustical rendering. The shortening of the neck would, once again, damage their integrity as works of art.

The studies and experiments conducted in the Physical Acoustics Laboratory of the International Institute of Violinmaking of Cremona confirm what has been stated here.