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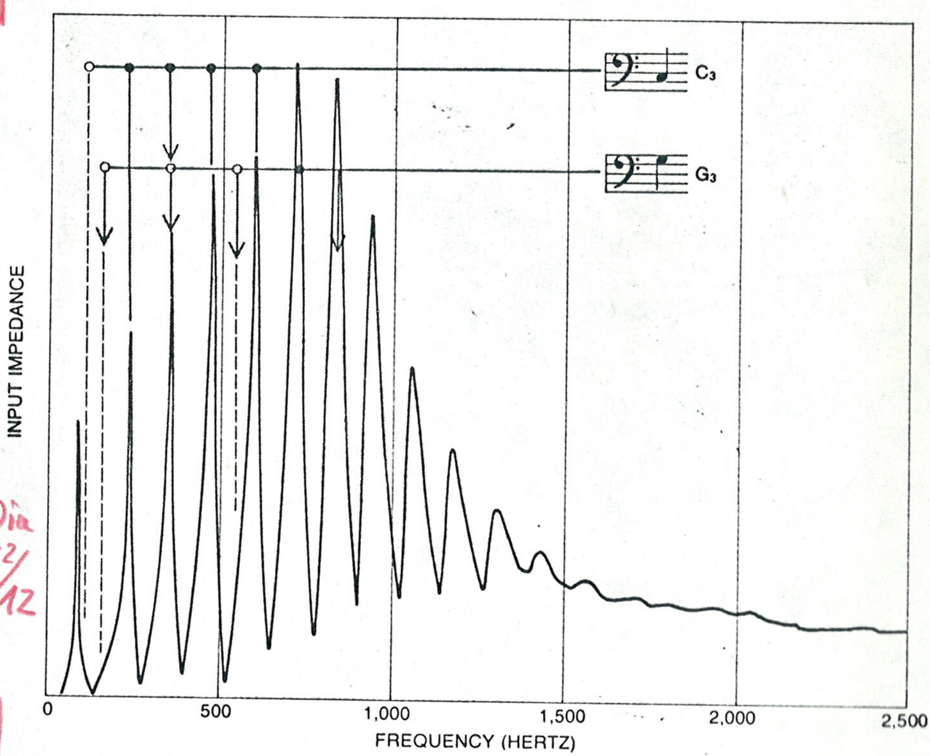
hand is bent more, so that once again the player has a means for tuning them for optimum cooperation with the other members of the regime. Trumpet players sometimes find it interesting and technically worthwhile to adapt the horn player's hand technique for their own purposes—especially for playing high passages on a piccolo trumpet."

"Acoustical theory tells us that, first and foremost, a given instrument will require that the mouthpiece have a certain well-defined 'popping frequency' when its cup is slapped shut against the palm of the hand. In other words, the lowest natural frequency of the mouthpiece alone (with the cup closed) must be of the correct value. It is this requirement



UNUSUAL REGIMES OF OSCILLATION are associated with notes whose frequencies correspond to impedances that are close to minimum values. The note C_3 in the bass clef is known to musicians as the pedal tone. Its regime of oscillation is such that the second, third and fourth resonance peaks of the trumpet sustain an oscillation that lies at a frequency equal to the common difference between their own natural frequencies. Since there is actually a loss of energy at the fundamental playing frequency for this note rather than a gain, there is only a small amount of fundamental component in the sound, and even the small quantity present is converted to that frequency from the higher components by way of the nonlinearity in the flow-control characteristics of the player's lips. The situation for G_3 is even more unusual in that the second and fourth components of the tone are the chief source of oscillatory energy, whereas the fundamental component and the other odd harmonics contribute virtually nothing since the impedance is minimal at their frequencies.