

# harmonic partial

## Ramsay

which seems to show that not only has one part of a vibrating [string sympathy](#) with another part of it so as to go into **harmonic partials**, as we have just seen, but as if the very air itself had [sympathy](#) with harmoniously vibrating [strings](#); for Tartini observed that two harmonious sounds being produced and sustained as they can be, for example, by a strong [bow](#) on the [violin](#), a [third sound](#) will be heard. Tartini's name for it was simply "a [third sound](#)." This is not an [overtone](#), as [Helmholtz](#) has called the **harmonic partials** of one sounding string, but an [undertone](#), because it is a "[grave harmonic](#)," away below the sounds of the two strings which awaken it. The subject of these [undertones](#) has been carefully studied since Tartini's day, and more insight has been obtained since we are now able to count and register the [vibration](#) of any [musical sound](#). [Helmholtz](#) has called these [third sounds](#) of Tartini's "[difference sounds](#)," because when awakened by two strings, for example, the [vibration-number](#) of the third tone is the difference of the [vibrations-numbers](#) of the two tones which awaken it. The [note](#) C with [vibration-number](#) 512, and another C whose [vibration-number](#) is 256, the [octave](#), awakened no third sound, because there is no difference between the two [numbers](#) - the one is just the doubled or halved; but if we take C256 and G381, its [fifth](#), the difference number is 128; this being a low octave of C256, it has the effect of strengthening the upper one. [Helmholtz](#) found this to be the [law of the third sound](#) as to its producing, and the effect of it when produced. This [third sound](#), mysteriously arising in the air through the [sympathy](#) it has with all [concordant](#) things, is another among many more suggestions that the whole [Creation](#) is measured and numbered to be in [sympathy](#) one part with another. The [Creation](#) is a universe. [[Scientific Basis and Build of Music](#), page 60]

See Also

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[difference tone](#)

[harmonic](#)

[partial](#)

[Power of Beat Harmonics](#)