OVERTONES *of* CHRISTMAS

Agatha Mallett

Overtone Singing

When you sing a note, the sound you make is actually made up of many different pitches.


Spectrogram (ordinary voice)

There is obviously the pitch you are *trying* to sing (assuming you can sing) but, like most vibrating things, your vocal cords are *also* vibrating at twice that frequency, giving the first overtone, a pitch an octave above. They are also vibrating at three times that frequency, giving the second overtone, a pitch another fifth above—and so on, giving the octave again, the third, the fifth, the seventh, the octave, a second, a third, and a cascade of less-regular intervals on up to infinity. You aren't *trying* to produce these extra sounds. They're just a natural part of the human voice—and indeed, a natural physical tendency of vibrating objects.

The strengths of these overtones determine what the thing sounds like. A piano and a violin can play the same note, but the relative strengths of the overtones go a long way toward explaining why these two instruments sound different. Indeed, when you sing two different vowels—"A" vs. "E", say—on the same note, they will sound different because the strengths of the overtones will be different.


Spectrogram (overtone singing)

Amazingly, it turns out that you can change the strength of the overtones so much that only one (or a few) overtones remain with any significant strength. When this happens, you basically only have two pitches: the fundamental pitch, and the one remaining overtone. This is two notes—a chord!

This rare singing technique is broadly called "overtone singing". Overtone singing is intrinsically multiphonic, meaning you can effectively sing two different notes at the same time—that is, as long as they are separated by an overtone ratio. Further, we can search for intervals that form two parts in a multi-part harmony, write them down, and then try to actually sing a real song, singing *both parts at the same time*. When used to produce a multi-part harmony, this is called "polyphonic overtone singing".

How to Overtone Sing

The question arises—how is this done?

Believe it or not, you already are familiar with the basic concept of adjusting overtones: the reason vowels sound different is that the overtones come in different strengths. In principle, overtone singing is just making extreme vowels.

You make different vowels primarily by moving the position of your tongue. When you do this, you're changing the shape of your vocal tract, affecting the natural resonant frequencies that the air inside "wants" to vibrate at. For most vowels, the natural resonant frequencies don't line up very well with the frequencies that are present in your voice. However, for the “O” vowel, it's actually fairly close.

Try singing “O”. If you listen carefully, you might hear a faint ringing! That's because the resonant frequency of your mouth when you make this vowel matches some overtones, amplifying them significantly. By opening and closing your mouth, you might be able to make the resonant frequency match different overtones, picking out individual “rungs” in the harmonic series.

MRI cross-section showing tongue position (Image Wolfgang Saus and University Medical Center Freiburg)

This is nice, but it will probably be a fairly weak effect, and it isn't very controllable. To fix this, now take the tip of the tongue and place it on the roof of the mouth, just behind the alveolar ridge, which is that fleshy ledge right behind your front teeth. It is important that you use the tip of your tongue. This divides your mouth into two chambers: one in the front and one in the back, with *both* of them at the resonant frequency of the overtone. This makes the resonance much stronger, causing the desired overtone to become much louder, and the other overtones to become much softer.

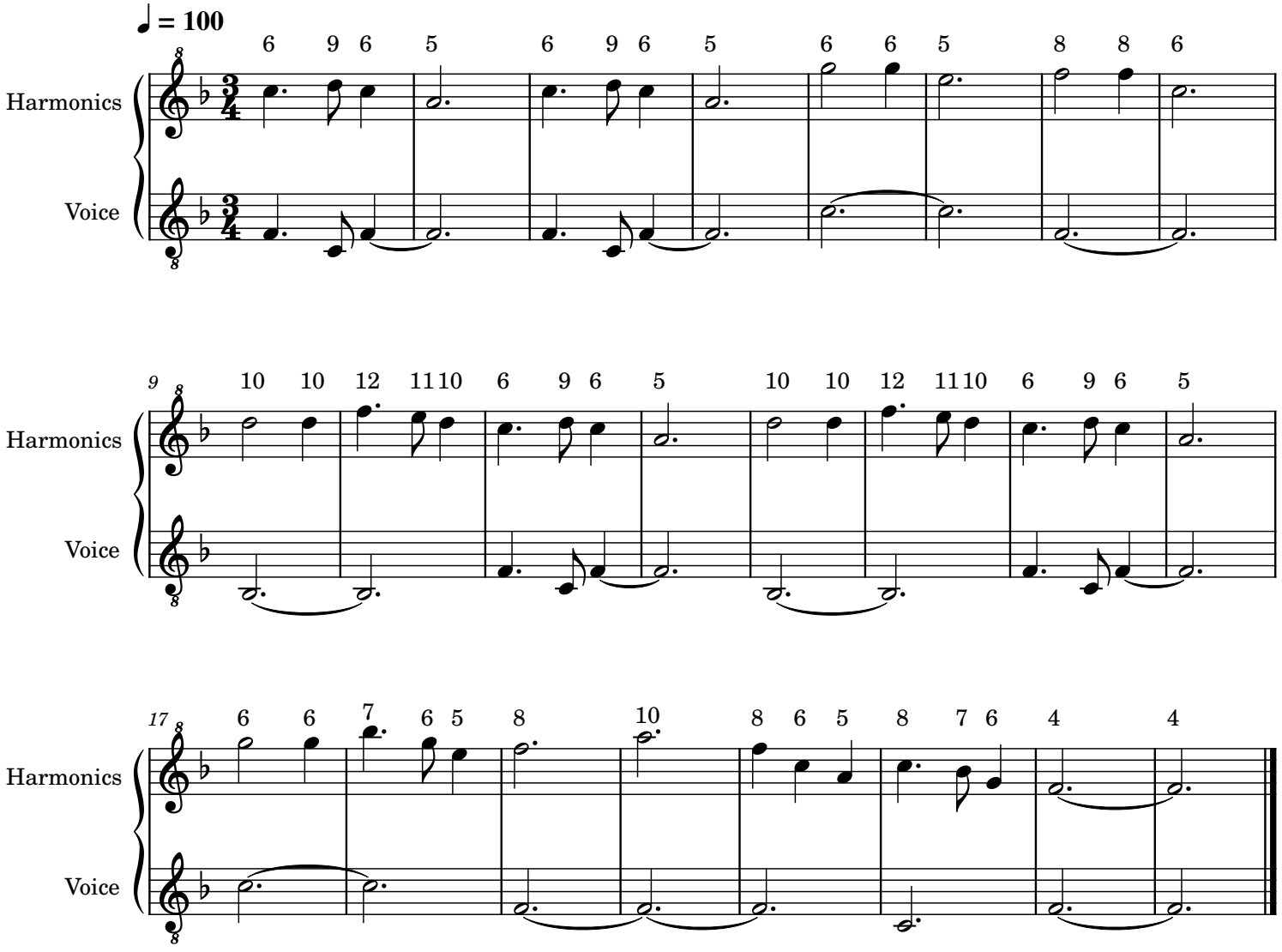
Because your tongue is now involved, you can also easily control which overtone you're selecting. To select the overtone, move the bulk part of your tongue forward and backward while keeping the tip of your tongue in roughly the same place. This is a fairly simple motion, but it's a bit hard to describe. It's similar to the motion your tongue makes when you say the words “we” or “you”. Try saying those words very *very* slowly but, as before, with the tip of your tongue on the roof of your mouth, and your mouth somewhat wider open.

Obviously, all of this will take both practice and patience. But eventually, you should be able to do it!

Stille Nacht, Heilige Nacht ("Silent Night")

(Overtone Voice)

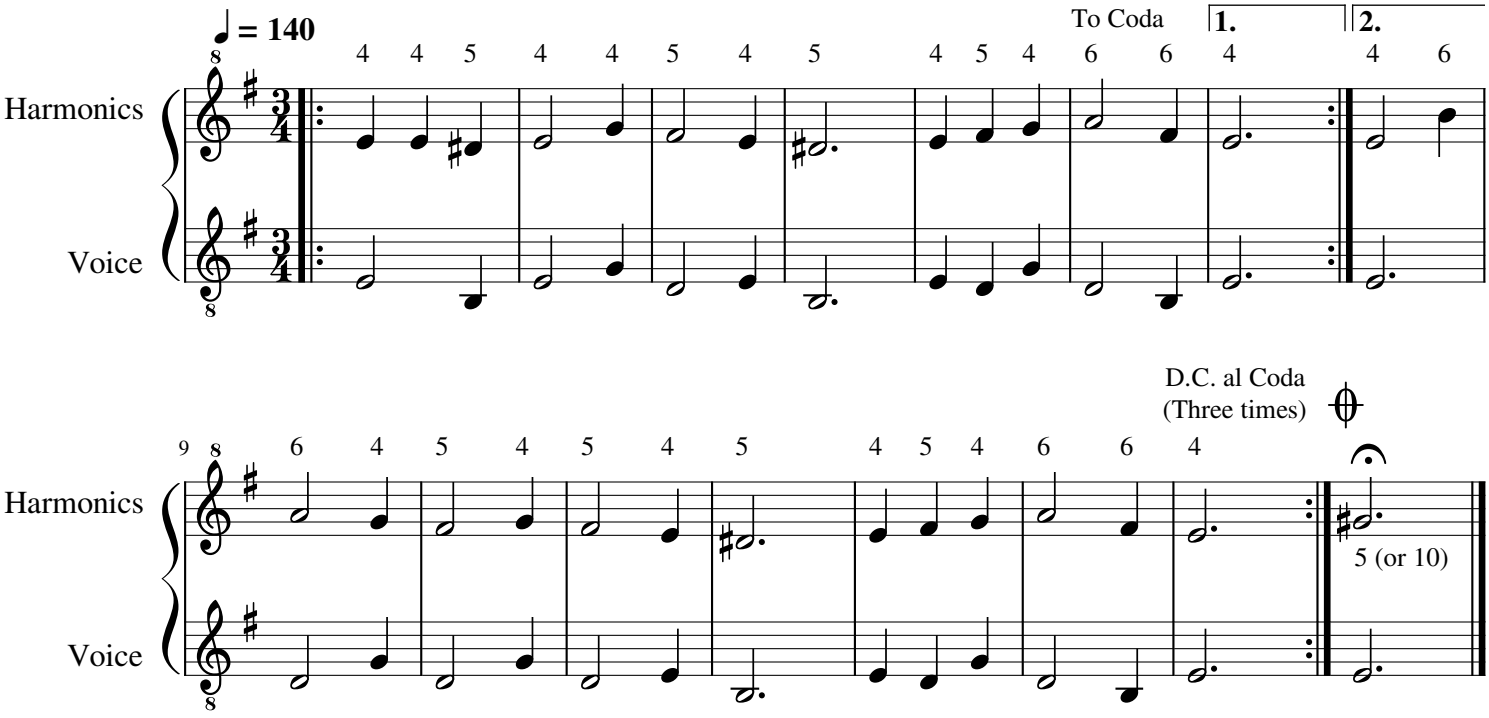
Franz Xaver Gruber
Lyr: Joseph Mohr
Arr: Agatha Mallett



Coventry Carol

(Overtone Voice)

Traditional
Arr: Agatha Mallett

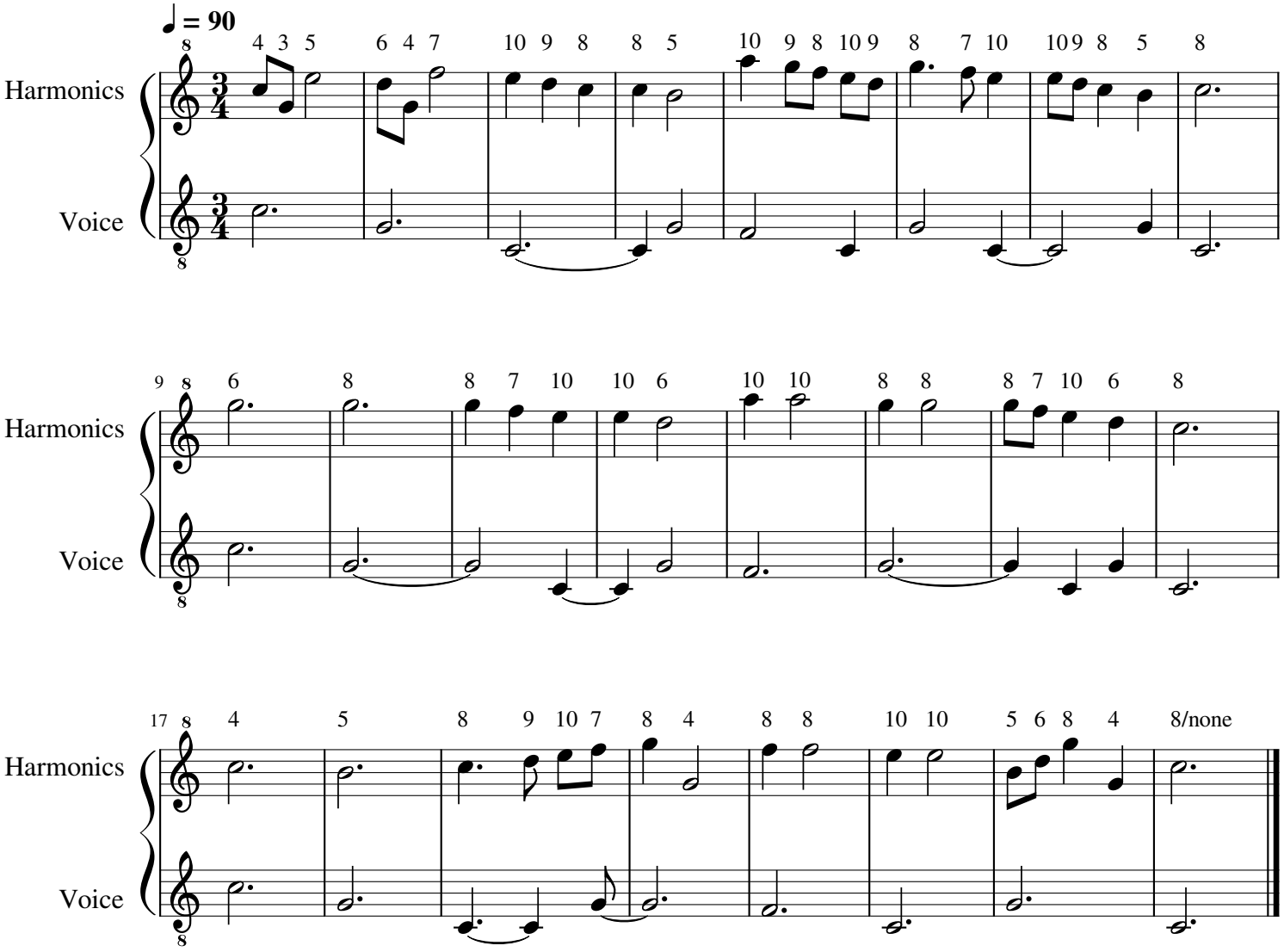


If the first and seconds lines (sans repeats) are A and B, a typical arrangement is AABABABA. The second ending in the first line transitions from A to B, and instead of the first ending on the last time through A, you do a major resolution. This is all notated approximately in the above.

Dona Nobis Pacem

(Overtone Voice)

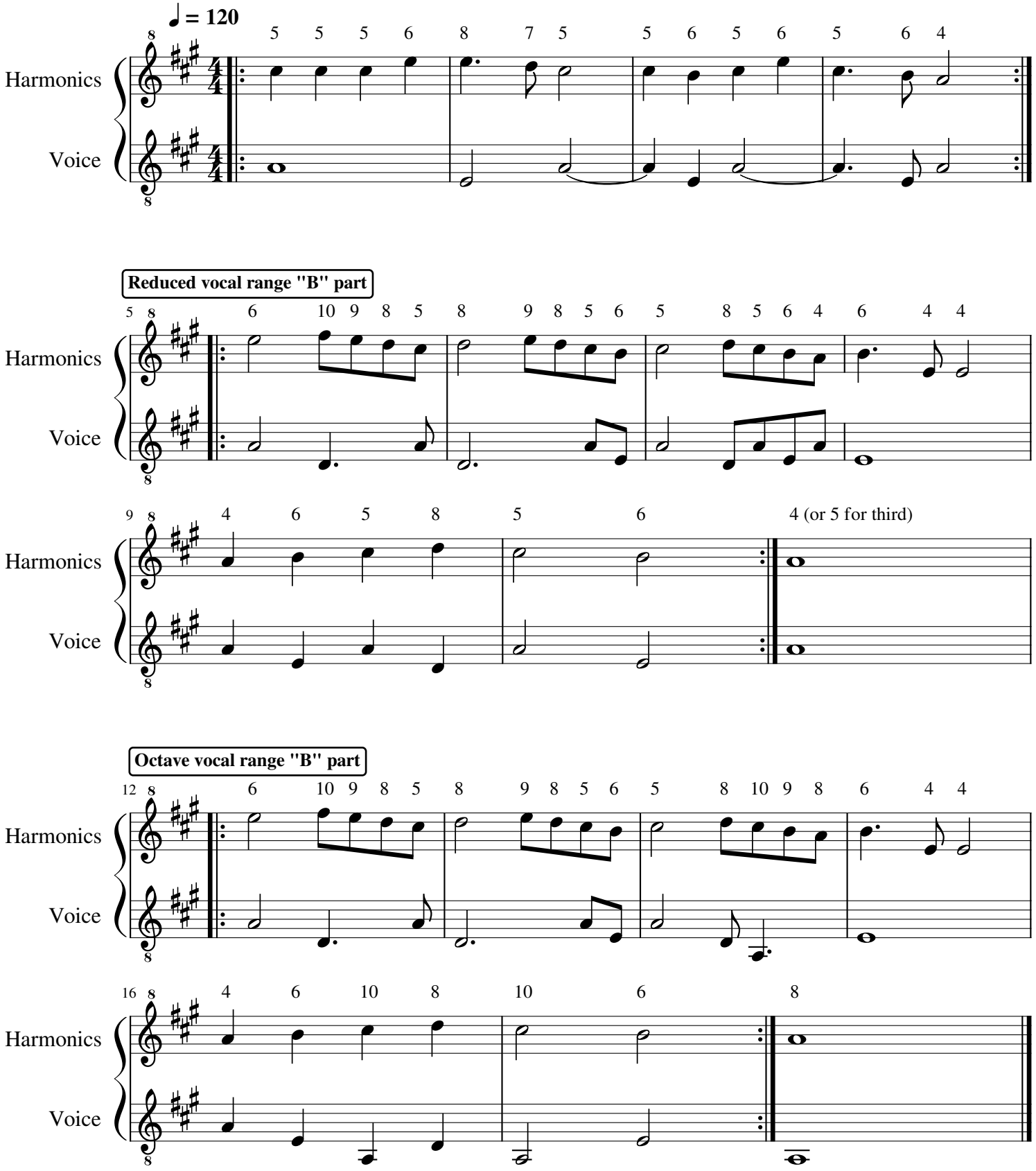
Traditional
Arr: Agatha Mallett



Angels We Have Heard On High

(Overtone Voice)

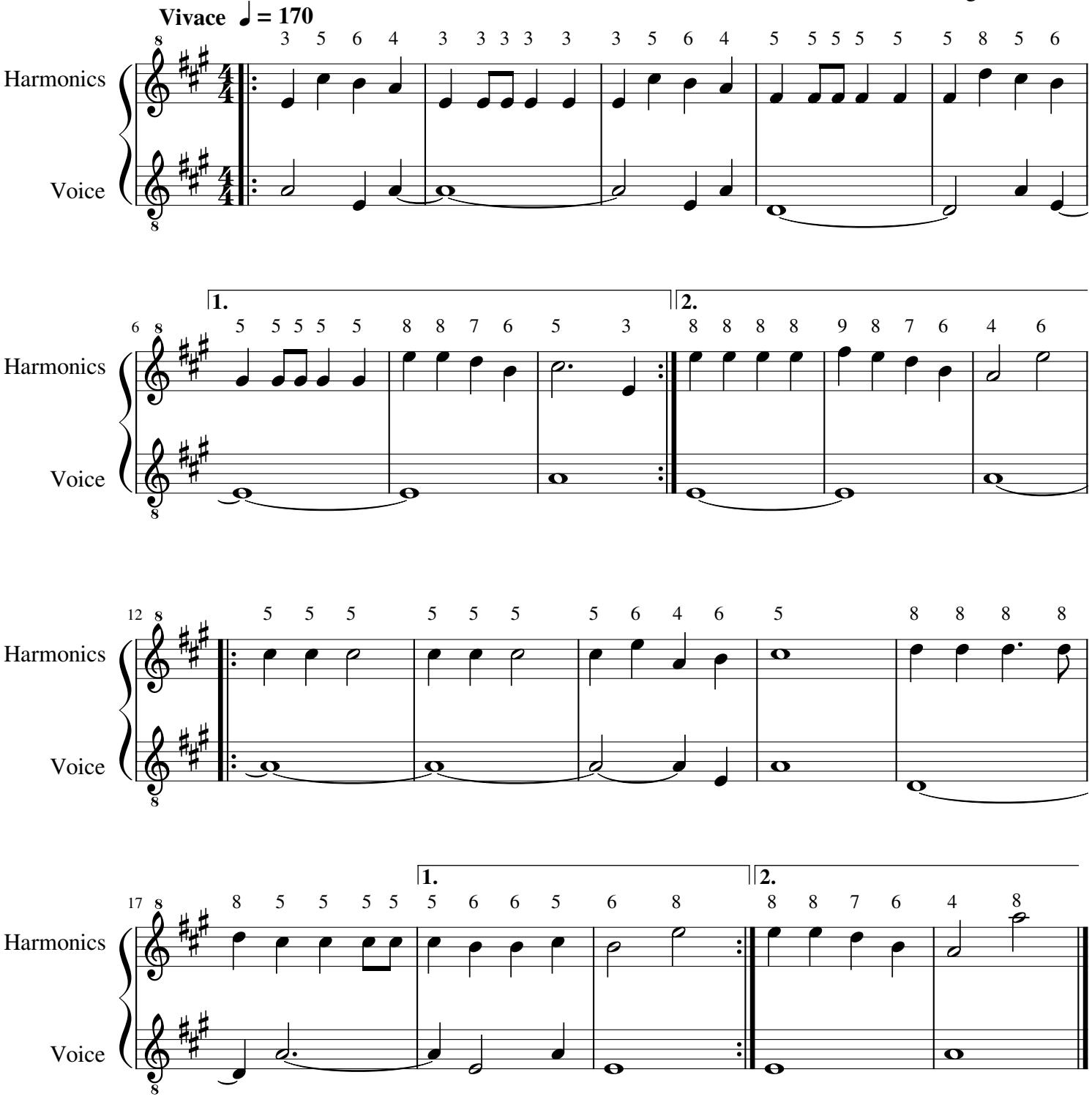
Trad. / James Chadwick
Arr: Agatha Mallett



One Horse Open Sleigh ("Jingle Bells")

(Overtone Voice)

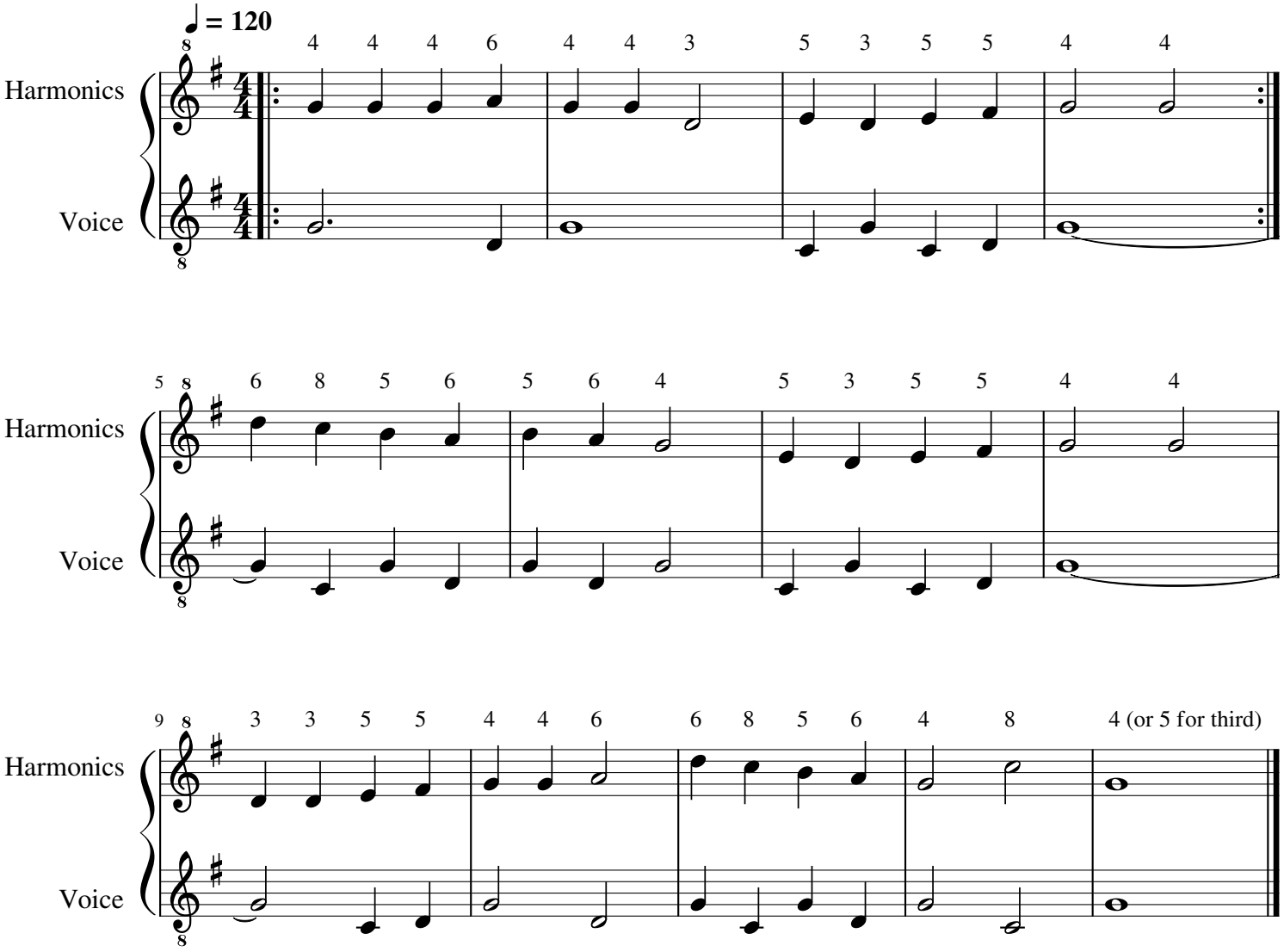
James Lord Pierpont
Arr: Agatha Mallett



Good King Wenceslas

(Overtone Voice)

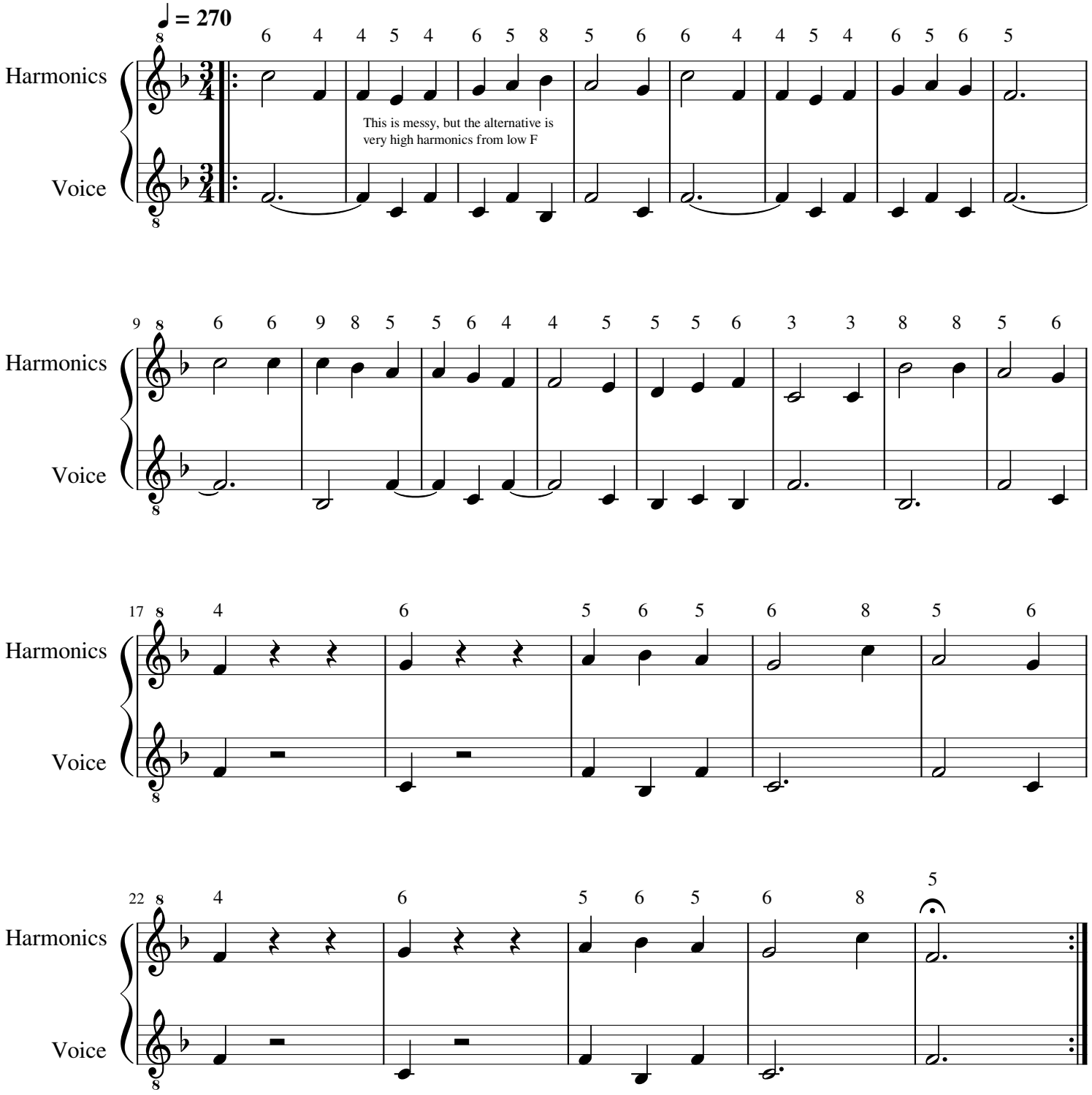
Traditional
Lyr: John Mason Neale
Arr: Agatha Mallett



Un flambeau, Jeannette, Isabelle
("[Bring]A Torch, Jeanette, Isabella")

(Overtone Voice)

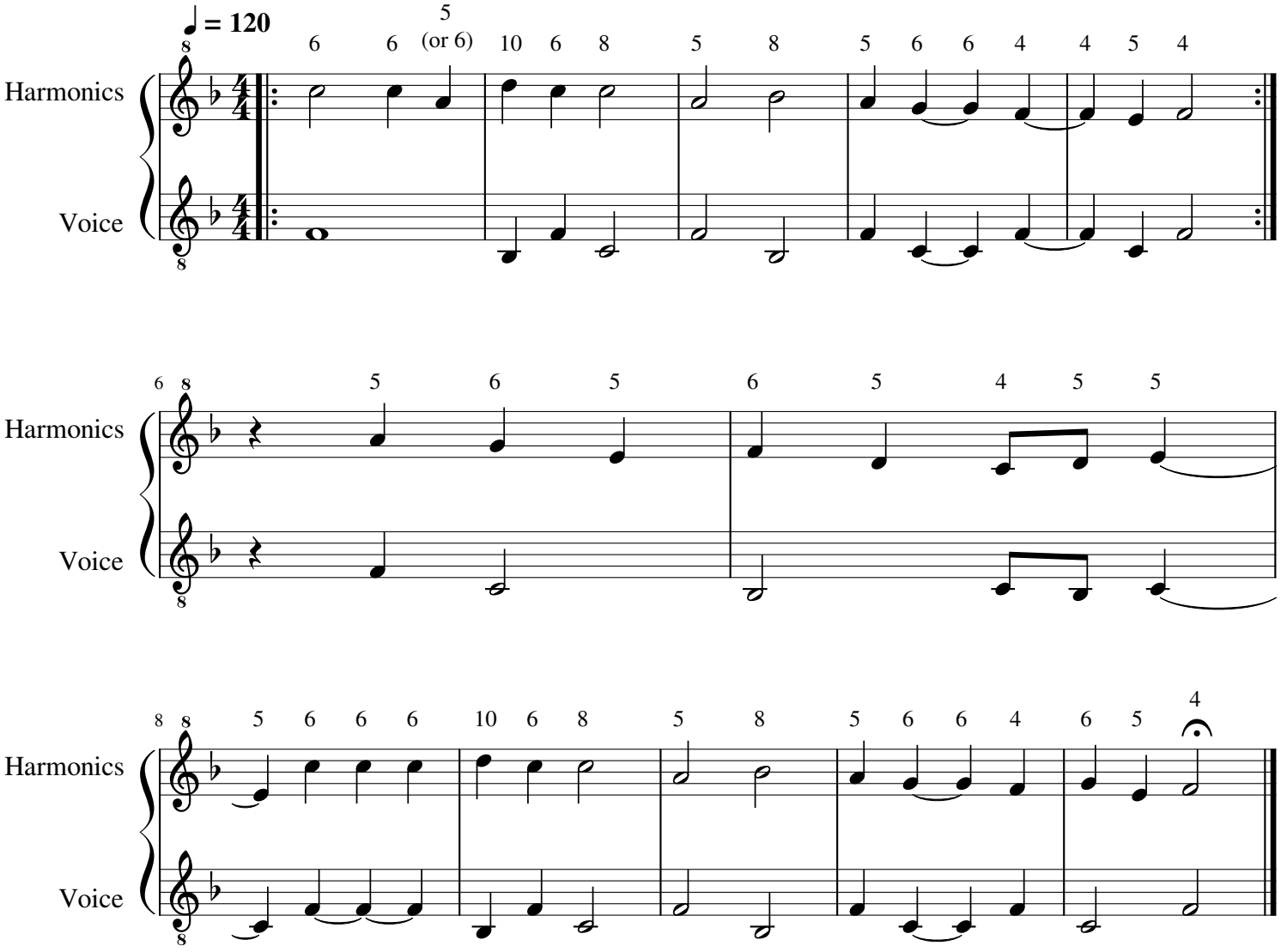
Trad. / Marc-Antoine Charpentier
Arr: Agatha Mallett



Es ist ein Ros entsprungen
("Lo, How a Rose E'er Blooming")

(Overtone Voice)

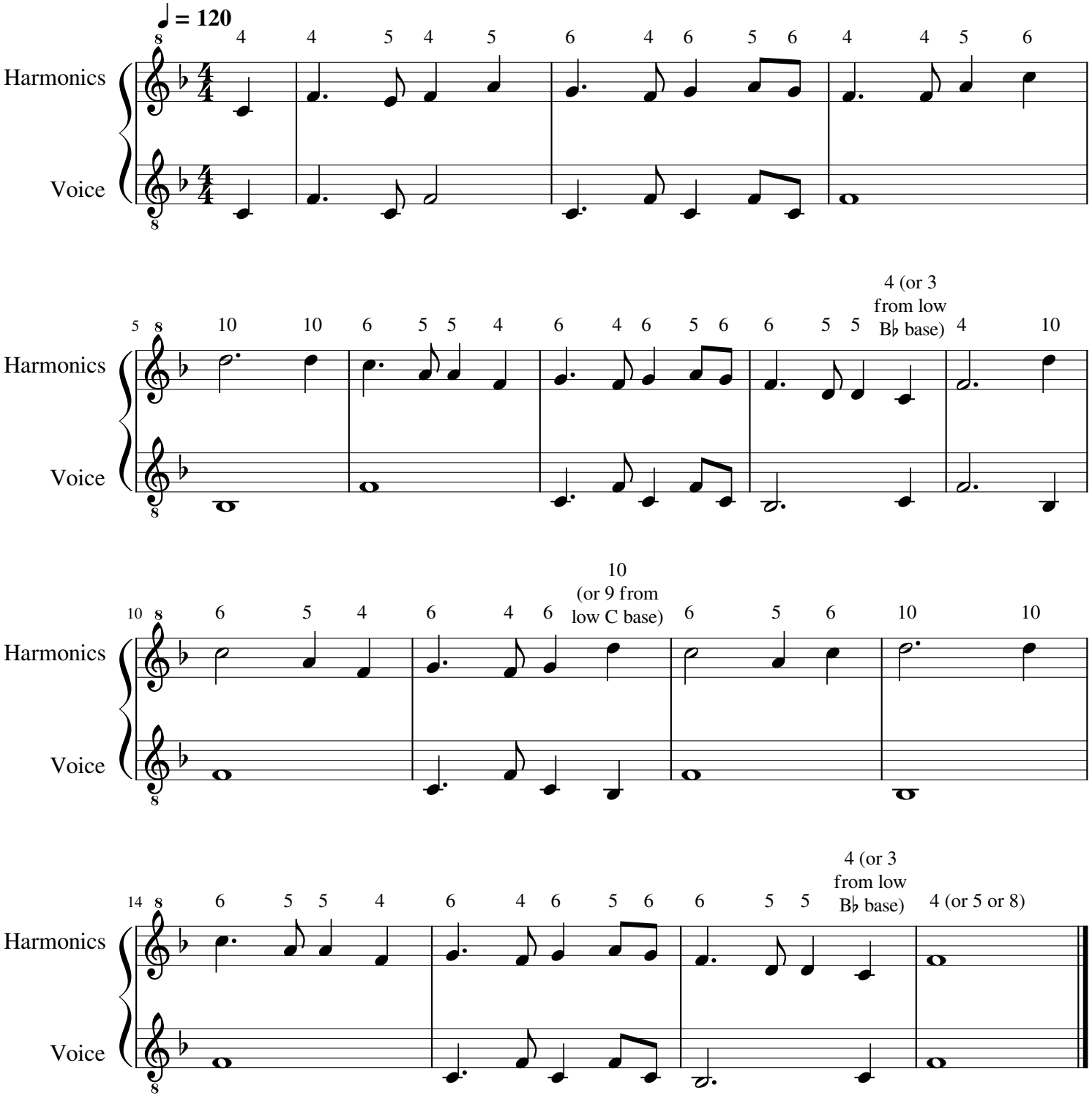
Trad. / Michael Praetorius
Arr: Agatha Mallett



Auld Lang Syne

(Overtone Voice)

Traditional
Lyr: Robert Burns
Arr: Agatha Mallett



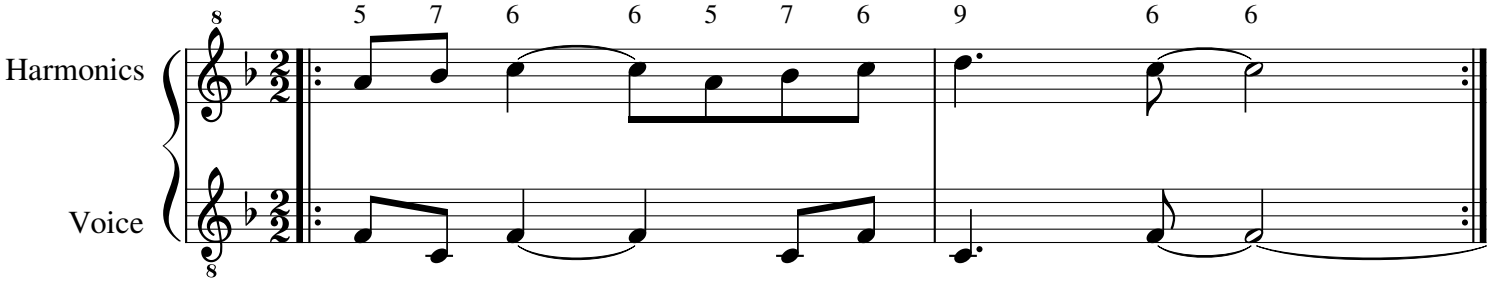
Ring in the New Year

(Overtone Voice)

Alix (& Anne?) Herrmann
Arr: Agatha Mallett

♩ = 160

(Part C in original)



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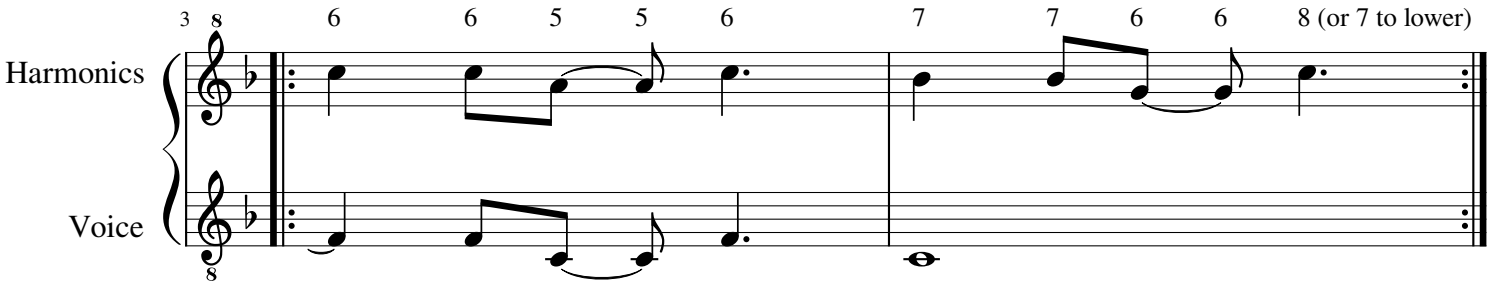

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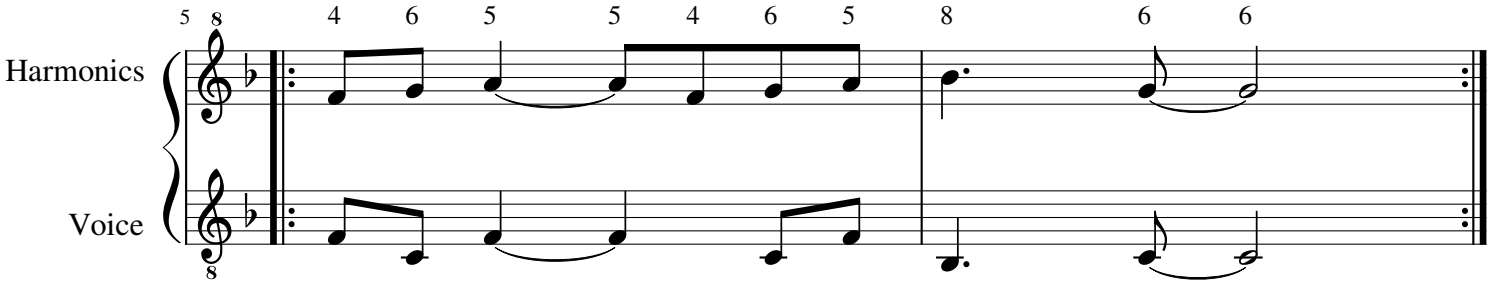

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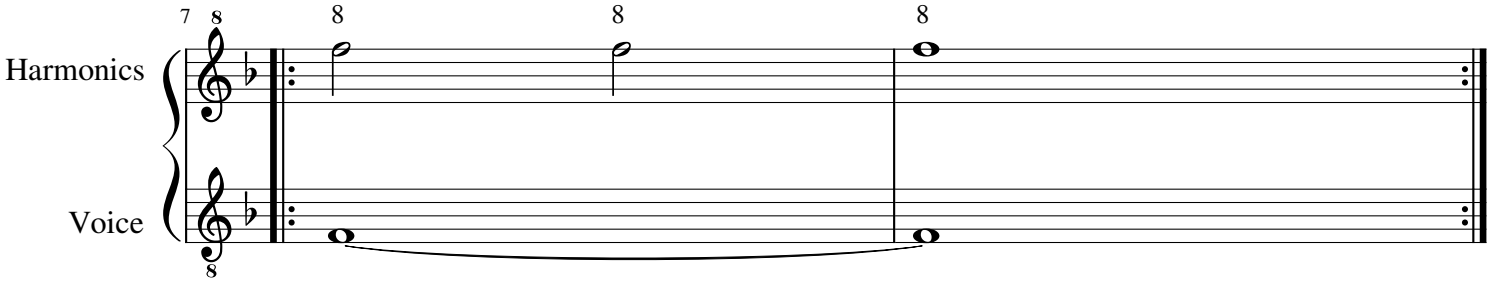

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