Assignment #5 bell-tower visit essay
Marisa Brook
Music 1466
6 March 2009

It's hard to believe that I, a second-semester senior at Cornell, had never gone up to the top of the clock-tower before the Music 1466 field-trip in February. It seems to be one of those things that students arriving on campus decide they definitely need to do at some point before graduating, and then never get around to actually doing. Ludicrous, really, especially given that it's not a difficult climb up the seven flights of stairs to the chimes-platform – as our section-group quickly discovered after meeting at the base of the tower.

From the ground, the tower's height creates the natural illusion of it appearing smaller than it is, so it came as a surprise to find that our whole section and a few other visitors could fit into the chimes-room with room to spare.

The actual bells, 21 in number, are higher up in the tower and connected to a series of levers ending in handles. These are divided into two keyboards, one for the hands and other for the feet. I'd always suspected based on the clear difficulty of playing fast notes on the chimes that actually producing the sounds took some physical effort, but I didn't realize that part of the issue is simply how far apart the wooden handles for each note are. Unlike the keys on a piano or the like, pushing a particular handle down also requires an entire hand or foot, meaning quick actions with three limbs are necessary to keep to the rhythm. Lower notes are also much harder to press down on than higher ones (as if the chimesmaster didn't already have enough to worry about while playing a concert).

Bells are very different from instruments that rely on the vibrations of either strings or columns of air to produce sound. Because the whole three-dimensional bell vibrates, subtle variations in its shape make a major difference to its tuning. Even after being cast, a bell needs to be altered very slightly by having thin sheets of metal stripped from its insides at just the right locations. This is because the modes of vibration of a bell have to be adjusted so that some of them are close enough to harmonic ratios to produce a cohesive note. (However, a few remain outside these values; they do not contribute to the pitch but to the timbre – that is, the texture – of the sound. These are crucial to the characteristic sound of a bell.)

It might come as a surprise that the main pitch at which a bell seems to be ringing is not actually there at all. One of the odd quirks of the human auditory system is that when several modes of vibration are related in the same ratios as the upper harmonics of a certain pitch, the brain will decide that they simply must be as such, and will automatically fill in the missing main note; this is called 'virtual pitch'. Because three of a bell's harmonics are related in a 2:3:4 ratio, the brain extrapolates their greatest common factor and you hear the complex tone with the pitch of the 1 value. So, perceptually speaking, you may be hearing Billy Joel's 'Piano Man' emanating from our clock-tower, but physically, the pitches of it aren't being played.

After giving us a bit of the history of the tower and its bells, a chimesmaster played two or three songs. Being watched by all of us didn't seem to faze her a bit – but then, I suppose she's accustomed to the notion that her performances are audible from all over the campus and the surrounding areas.

Another aspect of the chimes-concerts that I hadn't expected was that chimesmasters occasionally pair up to play duets. We were given a demonstration of this with an elaborate arrangement of the Cornell alma-mater at the end of the afternoon concert.

I left feeling sorry that I haven't been to more chimes-concerts over the years. In how many places are concerts on bells not only played three times every day, but almost always open to the public for free?