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Editorial: Out of This World

For our first issue of IMS Musicological Brainfood we are launching two short, interconnected essays into cyberspace. “Music Theory in Space” by Daniel K. L. Chua, president of the International Musicological Society (among other things), and “Musicologists in Space” by Alexander Rehding, former editor of the IMS’s peer-reviewed journal Acta Musicologica (among other things). We have chosen an auspicious day for the launch. Read on to find out . . .

Music Theory in Space

Daniel K. L. Chua

Forty years ago to this day, September 5, 1977, NASA rocketed the space probe Voyager I into space. While music theory at that time was busy circling within its own orbit exploring “the music itself,” the astronomer Carl Sagan placed on Voyager I a gold-plated disc with a selection of music ranging from J. S. Bach to Chuck Berry and rocketed human music out of Earth’s orbit in the slim hope of communicating to some extraterrestrial intelligence beyond our galaxy. The golden LP literally put a new spin on the idea of music as a “universal language.” Strangely, Sagan’s team did not include any music theory to go with NASA’s instructions for playback; there was no Heinrich Schenker for Beethoven’s Fifth, or Allen Forte for the Rite of Spring. They probably realized that such theory would have been incomprehensible to the average alien. Perhaps, they also figured out that there was no single theory capable of explaining the representative samples of music encoded on the disc. If Beethoven and Stravinsky already require different theoretical models, what would a pygmy girl’s initiation song from Zaire, panpipes from the Solomon Islands, or Louis Armstrong and his Hot Seven demand of music theory? Not only is theory inadequate to this global task, it would become increasingly disparate if it attempted to explain the diverse music on the record, resulting in a proliferation of discrete techniques. A golden textbook in several volumes would have to accompany the golden disc, ultimately alienating the alien from deciphering our music. It would be overwhelmingly incomprehensible.

The same could be said of the cultural and historical methods with which we frame music’s meaning. They would be irrelevant since music would arrive on a distant planet long after human extinction as a dislocated artifact. If an alien were to intercept the space module, it would not discover music as such but a package of “frequency-making” objects—a rotating disc etched with pits and grooves, a stylus designed to vibrate, and a set of instructions with “hieroglyphics” for setting the right frequency for playback. It would encounter music as a post-human thing, torn from the field of cultural meaning and historical reception. Our ancient technology would probably be the only surviving cultural relic of our species, floating in a distant sector of the Milky Way long after the incineration of our planet. Such music would require a “thing theory” to make sense of an obsolete humanity.

Sending music into outer space puts musicology in perspective. Has musicology been all too human? Has it been so obsessed with humanity as the heroic subject of knowledge that it has forgotten that there is a universe out there in which we are embedded as creatures along with other species? Have we narrowed what counts as music to such an extent that we no longer understand what music is? Are we just talking to ourselves, so enamored with our own universe of musicological autonomy that we already sound alien to
the rest of the sciences and humanities let alone a real alien? Perhaps we need to imagine an intergalactic music theory to help us reconnect music to the rest of the universe and broaden what constitutes music. After all, music theory was the first “string theory” of the universe. It explained everything. Pythagoras would probably have called it a “big twang theory,” had his universe not been timeless and without a beginning.

So, what would a music theory for aliens be like? How would another life form begin to understand the music on the golden disc—not just the Beethoven and Stravinsky, but Senegalese percussion, rock ‘n’ roll, gamelan, and Navaho chant? What would the fundamentals of this music be, given a distant exoplanet with life forms that have evolved ears in a different planetary system? Such questions demanded by an intergalactic music theory are clearly bizarre and seemingly impractical. So why posit an extraterrestrial music theory, particularly as we are unlikely to be discussing Chuck Berry with an alien any time soon?

There are two reasons: The first reason is strategic. An intergalactic impulse should propel music theory—and musicology in general—at warp speed to the cutting edge of the humanities. Recently, the humanities have called into question the very humanity from which it derives its name. The human subject that claims to be the center of the universe is far too arrogant a being to entertain in an age where its powers have wreaked such havoc on the environment that it has inaugurated its own geological timeframe—the Anthropocene. The “post-human” turn in the humanities is, in fact, far more human than its previous incarnation, dethroning that god-like subject with a human who is more creaturely and more environmentally friendly—a reduced being, recyclable in time, reusable in nature, at one with biodegradable matter. An intergalactic music theory acknowledges the post-human and the Anthropocene . . . but it also whizzes past them in its spacecraft, waving out of the window as if to say “Been there! Done it!” With a space-age theory, the post-human is surpassed by the extraterrestrial, and the geological outshone by the intergalactic; its time frame is measured not by millions of earth years but millions of light years. By the time some alien beams back the message “send us more Chuck Berry,” the Anthropocene may be over. The vision of an intergalactic music theory is beyond the post-human and the Anthropocene; as such it can have an epistemological impact from a perspective and scale that encompasses the science and humanities and so move beyond its own disciplinary boundaries.

The first reason, then, is strategic, repositioning the epistemological relevance of music theory; the second reason is practical, addressing the question of incomprehensibility. If we can design a theory that can explain music to an alien it should be comprehensible for humans. The alien hypothesis provides a defamiliarizing frame that enables us to rethink theory from the basics. This would be a theory that has to work at any point in our universe based on properties that we might share with an alien. It forces us to return to fundamentals of being, of physics, of time, space, and matter. It obliges us to re-evaluate what music is, particularly as any sound reproduction from Voyager’s golden LP is unlikely to sound like anything we know on earth. The differences in pressure, density, atmosphere, and evolutionary adaptation alone is enough to ensure that the second Brandenburg Concerto—the first track on the disc—is Bach . . . but not as we know it. If music theory is wide enough to encompass such redefinitions of what music is, then it might finally open up an interdisciplinary platform where music can be a shared discourse that is everywhere and for everyone . . . on earth.
Is musicology limited to human culture? The NASA team that put together the Voyager mission forty years ago didn’t think so. They included on board of their two spacecraft a “Golden Record” that included greetings in more than fifty languages, samples of music from various cultures across the world, as well as a range of environmental sounds. A gramophone player (cartridge and stylus) that would allow for these sounds to come to life was included in the spacecraft, as well as carefully crafted, non-verbal instructions on how to use this device.

The Golden Record was put together in only six weeks. Given the relative difficulty of acquiring recordings of non-western music at the time, this is a remarkable achievement. Much of what is now leaving the solar system, which can safely be described as a reified canon of world music, is as much the result of careful planning as of what was available at short notice. The collection includes a wide range of musical traditions, from Australian Aboriginal songs to Mexican mariachi music, from Georgian choral singing to Senegalese percussion, from Chinese guqin to Stravinsky’s The Rite of Spring. (A persistent rumor has it that the Beatles’ “Here Comes the Sun” was not included because of copyright issues.)

The Golden Record has attracted much attention. It is not easy to explain exactly what the researchers were hoping for when they included it in the mission. As critics were quick to point out, the Golden Record makes certain assumptions about the kinds of extraterrestrials—above all, that they have ears, or some kind of auditory apparatus, to perceive the sounds of earth. In the end, the researchers agreed that the Golden Record has largely metaphorical value; it is best described as a “message in a bottle”—or even a “mixtape for outer space”—that may or may not find a sympathetic recipient at the other end in outer space. As if to underline the symbolic nature of the recording, the line “To the makers of music—all worlds, all times” is etched into the center of the record, in breach of the rules against verbal explanation.

But let’s assume for a moment there is more to this message than just a playful, and somewhat sentimental stocktaking of human musical culture. Let’s take the boundless optimism that carried the entire Voyager mission somewhat more seriously. Especially in light of the discoveries of more and more exoplanetary systems in the last few years, and the growing confidence that life must be out there, somewhere, we can turn seriously to the question of what would happen if another carbon-based (or maybe, just maybe, silicon-based) life forms. What would happen if extraterrestrials at the other end found the Golden Record and succeeded in playing it?

There is every reason to believe that music plays such an important role precisely because of its communicative power beyond the world of words. The term universal language was carefully avoided in this context, but the idea that music might allow for a form of communication across planetary systems, and perhaps across species, is strongly present.

This is where musicology enters the post-human age. How can we even begin to imagine what the listening experience of extraterrestrials is like? Despite Steve Martin’s quip that an extraterrestrial message had been decoded as “Send more Chuck Berry!,” we will likely not...
have a definite answer for quite some time. But that doesn’t mean that we have to wait with bated breath until we receive signals from outer space. As philosopher Peter Godfrey-Smith has recently counseled, if we try to understand how alternative lifeforms on other planets operate, we can do worse than to begin by studying the radically different organizations of other species found on earth, starting with the octopus and its enigmatic non-somatotopic nervous system.

Musicology, similarly, can begin imagining forms of extraterrestrial hearing by starting with the constraints of non-human auditory apparatus. To remain with octopodes for the moment, their hearing seems to be limited to a much-reduced range, between 400 and 1,000 Hz. That suggests that low instruments—essentially the entire range below middle C on the piano—is inaudible to the octopus, and any timbre rich in overtones will only be transmitted as a relatively simple spectrum that is limited to, at best, the first few upper partials. But this may also have other consequences: humans, for instance, perceive the infrasound range, that is, the range below the auditory threshold, at 20 Hz, as pulsations. Is that the case for the octopus as well? Does that mean that the rate of individual events that the octopus can perceive per second is higher than for humans? This seems fairly likely. Even though research on this particular question has not been conducted, many species, such as birds, have a higher rate of perception than humans. If a pigeon watches a movie made for humans, it would appear slow and jittery, since the rate of 24 images per seconds at which movies operate to simulate smooth motion is below the perceptual threshold of birds. Their flicker-fusion threshold is at 90 to 100 images per second. To answer this question, to enter into post-human musicology, we would need to rethink the very parameters of what makes music—or rather, the dimensions in which we (and others) listen to music. In post-human musicology, the very act of listening is a creaturely activity. Interestingly, even though the occasion that motivates this question here is new, there are numerous approaches that thinkers have offered throughout history, though sometimes we have to scratch the surface somewhat to get to an answer, however preliminary.

In this context, creative fringe thinkers such as Friedrich Wilhelm Opelt, who tried to reinvent musical listening from the ground up in the early nineteenth century, starting with the mechanical siren, move center stage. Put simply, Opelt saw that pitches and rhythms both operate in the temporal dimension, though in a different frequency range. The difference was demarcated by the auditory threshold, which separated stimuli below 20 Hz into rhythms, and those above 20 Hz into pitches. Opelt’s eccentric music theory sought to exploit this correlation.

It was left to a biologist, Karl Ernst von Baer, addressing the Russian Society of Entomology in 1860, to describe the effects of creaturely perception. For an insect with a lifespan of twenty-eight days, that is, one thousandth of the average lifespan of a human, the world presents itself very differently. Since they don’t live for more than one lunar cycle, the waxing and waning of the moon will not combine into a repeating pattern. Seasonal changes are far beyond the insect observer’s horizons, and sunrises and sunsets will become rare and meaningful events. If we assume, with von Baer, that the metabolic rate of our imaginary insect is a thousand times faster, implying that the number of individual perceptions made over the lifespan will correspond to those of one human life, then this thought experiment even affects our auditory perception. A frequency of 20,000 Hz at the very top end of the auditory range would be heard at a mere 20 Hz, which means that it is barely perceptible as a pitch.

Opelt and von Baer, plus a whole range of other thinkers who no doubt still remain to be rediscovered, expand and relativize our idea of
what listening might mean. We need to reduce the idea of music to its most basic components—to bare vibrations—and to build it up again from there. This radical stripping of what music might mean may allow us a radically different approach to a phenomenon that may easily seem all too familiar.

Who knows whether Edda Moser’s “Queen of the Night,” included in the Golden Record, might sound like a basso profundo to an extraterrestrial? Perhaps the Peruvian Wedding Song, which lasts about half a minute on the recording, will exceed the natural lifespan of our listening extraterrestrials and punctuate their lives from birth to death as a curious rhythm? Or perhaps there are undetected structural similarities between Japanese shakuhachi music and the Night Chant of the Navajo that only become perceptible when heard through alien ears?

By grappling with music at its most fundamental level and trying to understand what it means to listen in its various manifestations—in short: by shaking up our fundamental assumptions about music—we explore the communicative potential of music and can gain a new angle on its workings. In other words, even as we turn our attention to distant planets, the benefits we may reap from this post-human musicology are ultimately geocentric and distinctly human.

References

1 The greetings in various languages have a similar improvized quality. The native speakers were simply asked how they would greet beings from other planets. Perhaps the most charming greeting is in the Amoy dialect (spoken in the Fujian province in Southeastern China): “Thài-không pêng-iú, lin-hó. Lin chi-âh-pâ–bê? Ù-êng, tōh lái gún chia chê–ôl,” which translates as: “Friends of space, how are you all? Have you eaten yet? Come visit us if you have time!”

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Editors’ note: The IMS is a global organization and currently has no extraterrestrial ambitions.
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