

A blue-tinted photograph of a person in a neon green jacket holding a pair of 3D glasses on a wet city street at night. The person is walking away from the camera, and their reflection is visible on the wet pavement. In the background, there are trees, streetlights, and a building. The overall scene is atmospheric and futuristic.

VIRTUAL MUSIC

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How the Web Got Wired for Sound

connected all the stations in a large loop stretching all the way across the country. Any station in the NPR system could broadcast nationally by opening the loop and feeding their program to all the others. Neuhaus "saw that it was possible to make the loop itself into a sound-transformation circuit" by closing it and inserting a frequency shifter so that the sounds would circulate, creating "a sound-transformation 'box' that was literally fifteen hundred miles wide by three thousand miles long." As sounds from individual callers came in and circulated, they became mixed and layered with the sounds of the loop. Referring to each loop as "in a sense a living thing" with its own characteristic sound, Neuhaus saw his role as tuning the loop, that is, constantly adjusting the gain, the mix, and the shift, a process he described as "holding the balance of this big five-looped animal with as little movement as possible."⁶

In Neuhaus's previous *Public Supply* pieces he had allowed the individual callers to decide the nature of the sounds they would make, but in *Radio Net* he decided to ask all the participants to whistle. He did this in order to give himself a body of pitched material with which to work. As the sounds came into each city, they passed through the self-mixers he had created and distributed to each of the five stations, and began to loop. Each cross-country pass created additional layers of sound that overlapped and slowly died out as new sounds took their place. By maintaining a continuous conference call with the engineers in the five cities during the broadcast, Neuhaus could hear each loop and could request that changes be made to one or more of them in frequency shift and/or gain.

During the course of the two hours on the Sunday afternoon that the program aired, ten thousand people called in and whistled their sounds. The writer and critic John Rockwell said that "what one heard at home was a subdued whistling cacophony that any listener with sufficient imagination could feel part of."⁷ Neuhaus said that the people making the sounds were the real composers of the piece, and that his role was to be "the catalyst for the situation," setting up, as he did, the mechanism to make it all possible. He concluded, "maybe that's a new concept or role for a composer."⁸

Dialtones (a Telesymphony)

If Max Neuhaus's work represents the beginnings of interactive telephone music, then Golan Levin's *Dialtones (a Telesymphony)*, or *The Cell Phone*

Symphony as it is now more commonly known, represents one of its most recent and inventive manifestations. Unlike Neuhaus, who was dependent on his listeners' willingness to call the hub cities, Levin—thanks to the technological advances of the past quarter-century—is able to create his music by calling his participants directly. Employing hundreds of telephones, all at once and in the common space of an auditorium, Golan Levin (b. 1972) creates music of both charm and substance, arranging and spatially placing his sounds through the choreographed dialing and ringing of his audience's own mobile phones, an audience that is seated in a prearranged grid. Levin's creation is not a cacophonous jumble of ring tones, all going off at once, as you might imagine. It is a subtle, sophisticated organization of sounds, which, at times, may resemble a forest (with bird calls and sonic patterns snaking through the crowd), waves of harmonic progressions, or the canonlike ringing of polyphony, all plotted in space and time as carefully as a Mahler symphony, or a 3-D ride at Disneyland.

Levin has undergraduate and graduate degrees from the MIT Media Laboratory where he studied in the Aesthetics and Computation Group. He is quick to point out that one in ten people on the planet owns a mobile phone, giving him a ready stock of "instruments" for all of his performances. *Dialtones* represents Levin's "personal inquiry into abstract communications protocols"; he creates "new communications systems to explore such protocols," using them "in performances which strive to be both demonstrative yet sublime."⁹ Although Levin is not particularly fond of the traditional sound of the telephone, saying "one cellphone sounds kind of horrible, but in unison, they can sound quite pretty,"¹⁰ he does appreciate the telephone's high level of mechanical and design sophistication, pointing out that "the mobile phone's speakers and ringers make it a performance instrument ... the buttons make it a keyboard and remote control ... [and] the programmable rings make it a portable synthesizer."¹¹

Levin achieves this degree of musical sophistication with an everyday appliance by being involved, both technically and artistically, in all aspects of the planning and performance of *Dialtones*. His first step, made with the help of his small team of programmers, is to design the customized ringtones, over one hundred different ones for each performance. Then, when the audience arrives at the concert, Levin asks each of them to

register their mobile phones into a networked database (both the calling number and the model number), at special Web-based terminals located in the lobby or near the hall. Simultaneously, a seat is assigned to each participant and a new customized ringtone is encoded in RTTTL format (ringtone text transmission language) and downloaded to each user's phone using SMS, or short messaging service, which sends text messages between cell phones in a manner similar to e-mail. During the actual performance, which normally lasts some twenty-eight to thirty minutes, Levin's small group of programmer/performers activate the audience's mobile phones *en masse* by dialing them using a specially designed interactive graphical software interface that draws on the database of phone numbers collected before the concert. Because both the audience's seating positions and ringtone sounds are known in advance, Levin's musicians are able to create unique spatially distributed melodies and chords, as well as more novel textural phenomena such as waves of polyphony and roving clouds of sound that Levin categorizes as "a diverse range of unprecedented sonic phenomena and musically interesting structures."¹²

As a piece of music, *Dialtones* consists of three large subsections or movements, each some ten minutes in length. Additionally, the overall thirty-minute structure is overlaid by a group of fifteen "sound-textures," each about two minutes long. The first section consists entirely of these kaleidoscopic sound-textures produced through the ringing of various combinations of the audience's mobile phones. The second section is a solo movement performed on ten amplified cell phones by one of the *Dialtones* staff members. And the third movement is a combination of soloist and ensemble, ending with a climactic crescendo in which increasingly greater numbers of phones are rung. Although the maximum number of telephones that can be rung simultaneously with Levin's custom-designed software interface is sixty, a combination of almost instantaneous round robin dialing and the replacing of quieter rings with louder ones makes it appear that all of the audience's phones are ringing together. Levin created this three-part structure "to introduce the contrasting aesthetic possibilities of virtuosic real-time cell phone performance ('mobile phone jockeying') on the one hand, with coordinated-ensemble handheld-music on the other."

To support the spatial characteristics of the sound, and as a means of adding visual and diagrammatic dimensions to the performance, Levin also created two visual subsystems for *Dialtones*, one that casts a small overhead spotlight on the person or persons whose phone is being rung, the other a series of small red LED keychain lights that flash when they are held within one meter of a ringing phone. According to Levin, the combined effect of the ringing phones and the synchronized lights is “to render each participant as an audio-visual pixel,” and the group as a simultaneous “audience, orchestra and (active) score.” During the first two performances of *Dialtones*, both of which took place at the Ars Electronica Festival in Linz, Austria, on September 2, 2001, the two hundred people in each audience were arranged in a 20×10 seating grid. For the next seventeen performances, which occurred during May and June 2002 as a part of the Swiss National Exposition, each audience of ninety-nine participants was arranged into a 9×11 grid. For these performances, Levin estimates that somewhere between five thousand and eight thousand phone calls were placed.

Although *Dialtones* may sound like a highly programmed and controlled sonic experience, there is an element of Cagean chance involved because, ultimately, the exact realization of the piece is a function of both the sounds planned by the project’s staff, in particular Scott Gibbons and Gregory Shakar, and the actual cell phones brought by the audience to the performance, phones from some thirteen different countries in the case of the two Linz performances. This is where the element of chance comes in, because not all cell phones can have their ring modified. For about one third of the phones in the audience, not only could Levin’s team not change the ring, but also they had no way of knowing what sound these phones might make, an element of chance that influenced their planning and composing of the concert.

Golan Levin wrote *Dialtones* in the hope that experiencing a performance could “permanently alter the way in which its participants think about the cellular space we inhabit,” inverting “our understandings of private sound, public space, electromagnetic etiquette, and the fabric of the communications network which connects us.” Ultimately, if the global communications network is now to be considered “a single communal organism,” then his goal in writing *Dialtones* was to “transform the way

we hear and understand [this] multicellular being." By enclosing each participant inside the grid of the ringing instrument, the surrounding music "makes the ether of cellular space viscerally perceptible." By further pointing out that in *Dialtones* it is the phones themselves, and not their owners, that speak to one another, Levin says his participants are invited "to perceive an order in what is otherwise disorganized public noise, and ratify it as a chorus of organized social sound." This "determined Play" (as Levin refers to it) is a way to counteract "the overdetermination of the world of Work," transforming, and causing us to rethink "the noise of business, of untimely interruptions, [and] of humans enslaved to technology."

Sound Maps of Krakow

In April 2002, Matthew Mirapaul of the *New York Times* characterized the Global Positioning System (GPS) and the Internet as "invisible networks of digital information." He continued that GPS "is not strictly considered part of the Internet, but it is a close cousin. Both are invisible networks of digital information."¹⁴ Mirapaul was specifically discussing Jeremy Wood and Hugh Pryor's car drawings. Wood and Pryor are two Englishmen who, since November 2000, have been plotting out gigantic drawings—animals, faces, other figures—over a map of the roads and towns of England.¹⁴ They meticulously trace these routes with their car, tracking their progress as they go with portable GPS equipment that measures and records their movements to within a few yards. Their journeys are then reproduced on the Internet in a scale small enough and fast enough for the figure they traced earlier to become visible.

Wood and Pryor are able to create these virtual drawings thanks to the Global Positioning System, a network of twenty-four satellites—twelve of which are always above the horizon any place on earth—whose triangulated timing signals can be used to calculate one's latitude and longitude and—with the help of signals from a fourth satellite—altitude, too. Operated by the Defense Department—which lifted the restrictions on the sale of portable consumer models in 2000—GPS devices are now used by everyone from hikers, to truckers, to people who make art, art that runs the gamut from the doodlings of Wood and Prior, to the Sound Maps of Krakow (or GPS-Art) being made in Poland by Marek Choloniewski.