soldering iron and create custom hard-wired looping components or objects. However, the Y connector offers access to any discrete loops for modular performance or any interrelated configurations. This allows for fluid potential topologies of electronic feedback instruments that can be explored, configured and reconfigured easily during performance. It is also a really quick way to assess potential instrumentalization of any piece of hardware when searching through old equipment that has been stored in the back of the studio or garage for years. Used surreptitiously, this method can be very useful when looking to purchase any bargain or second-hand equipment, so I recommend: Always keep a short jack lead and a Y connector in one's pocket.

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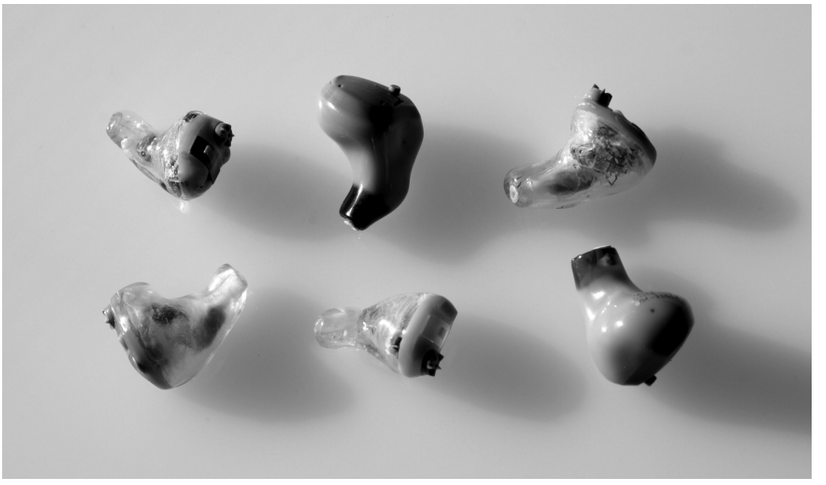

Fig. 3. John Wynne's father's hearing aids, 2007. (Photo © John Wynne)

Hearing Loss

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Transferring the emphasis from *hearing* to *loss* in the title of this installation results in an interesting shift from a medical or factual orientation to an emotional or philosophical one. *Hearing* loss is a routine, progressive physical disability; hearing *loss* is something altogether more nebulous and poetic.

My father died in 2006, leaving behind three pairs of hearing aids (Fig. 3) and a typically extensive supply of batteries. Hearing aids, like false teeth, are very personal objects that are not only used daily but are actually inserted into bodily orifices. One of the first things that struck me when I began to work with them is that they are made in the shape of my father's ear canals, giving a positive shape to a negative, internal and intimate space that no longer exists. It was literally through these objects that he heard the world during the final years of his life. Interestingly, his hearing seemed to recover somewhat on his deathbed. We were surprised at his ability to follow conversations we assumed he would not be able to hear without his hearing aids, although we may previously have been misled by the selective nature of his hearing loss when he was at home.

Just handling these objects makes you feel old: your fingers seem clumsy and, unless your eyesight is perfect, glasses or some other magnification are essential, even to insert a battery. The piece makes use of the minute but complex feedback field produced by what are essentially six tiny microphones and six tiny speakers in close proximity. The feedback produced is relatively quiet but piercing and difficult to localize. When I arrived home in London from Vancouver after my father's funeral, one of the hearing aids had turned itself on inside my suitcase, and I felt for a few moments like Harry Caul at the end of *The Conversation* as I searched high and low for the source of the annoying new sound in my flat before remembering the hearing aids in my bag. Installing the work in Vancouver triggered a bout of tinnitus, my nervous system's own feedback loop, from which I have still not fully recovered.

In my work with auditory warnings of my own design, I have sought to draw attention to an abstract beauty in alarm sounds that is usually ignored because of their overwhelming annoyance factor and their association with danger. Likewise, feedback is most often seen as a nuisance and a potential danger to hearing or to electronic equipment rather than as legitimate material for music or art. There is significant interest in feedback in the experimental music community, as witnessed by Knut Aufermann's special Feedback issue of *Resonance* magazine (2002), but the general perception of feedback is overwhelmingly negative. In a recent study at Salford University, it took second place only to vomiting in a list of the sounds people found most upsetting or irritating.

The pitch and timbre of the feedback produced by these devices change in ways that are interesting and difficult to predict, depending on their proximity to each other and the direction in which they face, the size and shape of the space which contains them and the presence and movement of the viewer's hands or body. Integral noise gates in each device, designed to protect the user from ear-damaging build-up of feedback, mean that rather than unchanging tones, the effect is rather like a conversation between the six diminutive objects as feedback builds up and subsides in complex polyphonic patterns.

In most of my installation work, the only visual element is the sound-making technology itself, and here I want to let physics and the emotional associations of these evocative objects speak for themselves, but when I looked through Dad's meticulously organized and labeled slides just before installing, I came across an image I immediately knew belonged in the piece. It is a shot taken by him somewhere in the middle of the Atlantic. We were on the Homeric, on our way to the port of Quebec City from Europe: I would have been about 2 ½ years old and this was my first trip to Canada, where I was to grow up. It was uncharacteristic of him to take a picture of nothing but waves, even more so to give it the arguably poetic title *Cold Atlantic*, and the empti-

ness of the image speaks of absence or loss in a way that echoes the lack of an active sound source in the piece. And it is an unexpected record of the world seen through my father's eyes.

Hearing Loss addresses the absence of the person for whom these devices were made, and for this purpose, few sound sources could be more suitable than feedback, "the Zen-like infinite amplification of silence." Its "tautological elegance" [1] and musical potential contradict its status as problem or systemic fault: in this piece, its antagonistic relationship to hearing aids is harnessed to explore the *presence* of loss [2].

References and Notes

1. Nicolas Collins, "All This and Brains Too: 30 Years of Howling Round," *Resonance* **9**, No. 2, 6–7 (2002).

2. *Hearing Loss* premiered at Signal and Noise 2007 in Vancouver, Canada.

John Wynne has a Ph.D. in Sound Art from Goldsmiths College, University of London and is a Senior Lecturer at the University of the Arts, London. Recent works include Hearing Voices, *an installation and award-winning radio piece based on endangered click-languages in the Kalahari Desert and a huge 17-channel installation,* 230 Unwanted Speakers. *He is currently artist-in-residence at Harefield Hospital in Middlesex, one of the world's leading centers for heart and lung transplantation.*

Fig. 4. Richard Garrett's Vantage Pro at home in North Wales, 2004. (Photo © Richard Garrett)

The Davis Instruments Vantage Pro Weather Station

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Sound examples related to this article are available at <www.weathersong.org/music/raw.htm>.

My favorite piece of equipment has to be the Vantage Pro electronic weather station sitting in my back garden. This unit, built by Davis Instruments of Hayward, California, collects data regarding air temperature, pressure, wind speed, wind direction, humidity and rainfall rate and, every 2 or 3 seconds, transmits them by radio to a computer in my studio. This data then makes up the raw material for composition.

The Vantage Pro (Fig. 4) is completely self-contained; all the sensors and the radio transmitter run off a small camera battery recharged by a tiny photovoltaic cell; and there are no cables running into the house. The receiver can accommodate a data logger that holds days' or months' worth of information ready for download. Best of all, the device is very clearly documented. When I first purchased the system, I anticipated that it would be the task of a week or two to get my head around the documentation well enough to write an interface routine for Max/MSP. To my pleasure and surprise, I found the data logger so well written that I was able to get it up and running in about a day and a half.

The Vantage Pro forms the hub of my *Weathersongs* Project: a real-time installation that composes music from the ever-changing patterns of wind, rain, temperature and pressure that make up the weather here in North Wales. In the installation, a program written in Max sits in a continuous loop making up musical phrases. Each time it needs to choose a new note, it checks out recent data input and selects pitch, intensity and duration based on the values received. Different weather events produce different kinds of sounds but, typically, temperature and humidity provide bass drones; air pressure provides higher-pitched accompaniment; and the wind produces a lead voice whose pitch, intensity and phrasing all change as it shifts direction, ebbs and flows. Rain, when it rains, is heard as random percussive events whose statistical density changes with the rate of fall.

The Vantage Pro is well suited to this work because of its reliability. It is a truly professional instrument and is built to withstand serious weather. In fact, when I first acquired it, it got blown over a couple of times and still worked. So long as one changes the battery once every 2 years, cleans out the rain collector from time to time and evicts spiders from the sensor suite when necessary, it keeps working.

Every day, the Vantage Pro just sits there, a continuous source of nonrandom, highly complex data, probably never repeating itself but always full of patterns. Although I bought it specifi-