

History's greatest loudspeaker is back in business

by [Will Dunn](#)
20 April 2014

The Science Museum has rebuilt the Exponential Horn, a 27-foot-long speaker from 1929



Not everything that belongs to the Science Museum is kept at the Science Museum. Blythe House, a massive Victorian building near Shepherd's Bush, holds over 170,000 items in its archive, and within this vast collection of scientific curios, on top of a couple of filing cabinets, is a nine-foot-long piece of tapered metal tubing. It's not much to look at these days, but it's all that remains of what was once the most amazing speaker in the world. For museum-goers of the 1930s, the Exponential Horn was the auditory experience of a lifetime. After 80 years of silence, sound artist Aleks Kolkowski has brought it back to life.

the original audiophile

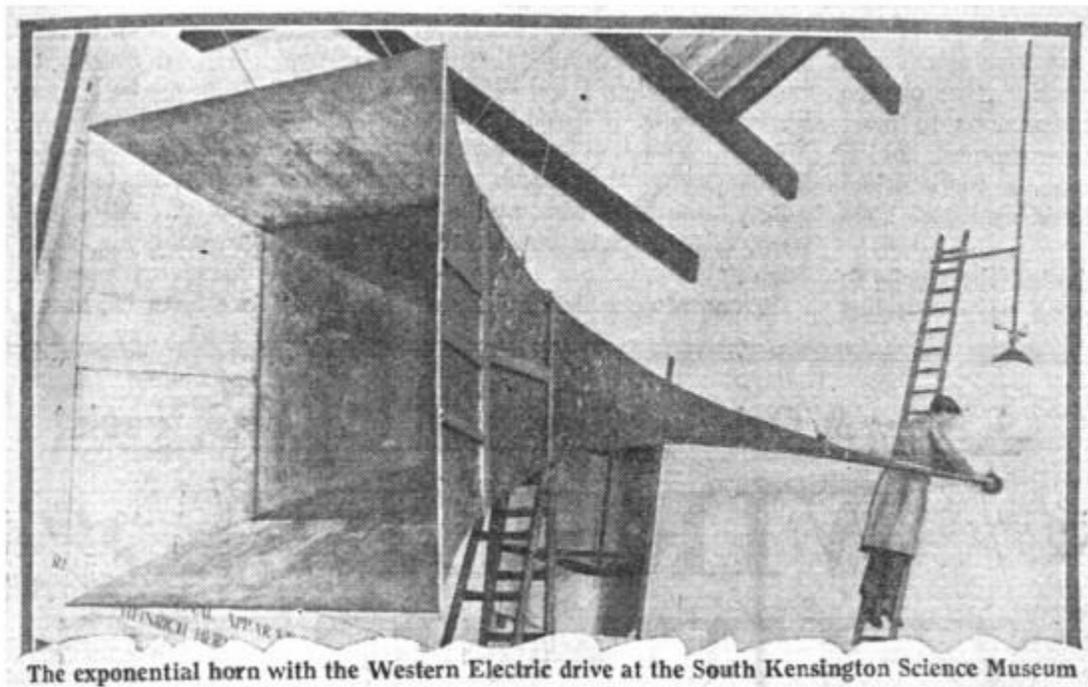
Kolkowski begins his story by telling us about one of the curators at the Science Museum during the 1920s and 30s, Roderick Denman.

“Denman was an accomplished engineer and an obsessive audiophile,” says Kolkowski. “He actually had a huge loudspeaker horn built into the roof of his house, pointing down into an octagonal room that he used as the flare of a giant horn, which extended over 20 feet out of the top of his roof. So this whole room was an extension of a downwards-pointing loudspeaker, and when you were in the room, you were inside the speaker. He had reclining chairs put in there, so people could lie down right in the path of the sound.”

More after the break...

the ultimate speaker

[Open Gallery](#)



Denman’s time as Curator of Telecommunications at the Science Museum coincided with a revolution in sound. “These new moving coil speaker drivers were arriving from the States,” says Kolkowski, “called the Western Electric 555W. It was the mother of all compression drivers. They were actually designed at Bell Laboratories, and people still talk in awe about these things today. There are people who believe they improve with age, which I think is nonsense, but they do last for ages - there are cinemas that ran them continuously for 50 or 60 years. Today, they change hands for thousands. People say it’s the best loudspeaker ever made.”

While Bell Laboratories were making the perfect loudspeaker, Denman was building the perfect horn. Horn-building was an art form that had been practised by instrument-makers for centuries, but in Denman's hands it became a science.

To get the full range of possible frequencies from the speaker, Denman knew he needed a shape that would perfectly match the energy coming from the driver and allow the speaker to play frequencies at the upper and lower limits of human hearing. Most horns at the time were curves or spirals, to save space, but Denman's calculations led him to a straight horn. To accommodate the deepest low-end frequencies it needed to be big - as long as a Routemaster bus, and with a mouth like a basking shark, seven feet across.

For ten years, the Exponential Horn was a daily fixture in the Science Museum. "It was part of the museum tours," explains Kolkowski. "It showed what was possible in audio at the time, and it provided a benchmark for audio quality that other systems could be judged by. People who heard it at the time must have been completely blown away by the sound, they wouldn't have heard anything else like it."

[Open Gallery](#)



The demonstrations stopped at the outbreak of WWII, and in 1949, during building work, a wall fell on the horn and destroyed most of it. The remaining section stayed in storage at Blythe House until Aleks Kolkowski, a sound artist in residence at the museum, uncovered the story of Denman's mighty horn and began rebuilding it according to Denman's original specification.



“It took eight months to reconstruct it, using a very thick fibreglass - the original was made from a lead-tin alloy. It has an exponential shape - the width increases exponentially - so instead of having a linear increase in width, it has a very fast, steep curve. For the first ten feet it has a very gradual taper, and then it quickly gets steeper and steeper as it approaches the mouth. It was incredibly labour-intensive to make, they had to build giant formers and coat them with resin.”

After months of work, however, the new horn was attached to Denman’s original loudspeaker, and the windows of Kensington rattled to a noise not heard since the outbreak of World War Two.

“It’s a form of sound reproduction we just don’t hear these days”, says Kolkowski. “It’s quite unlike listening to hi-fi loudspeakers. It’s completely monophonic and it’s very, very directional - you have to be basically in front of it, if you wander to the side, the sound changes completely. But when you are in front of it, you get an extraordinary three-dimensional sound image, because you’re stood in this huge horn mouth. One of the features of a horn is that it’s very present - you don’t get any secondary reflections - so you get this incredible impression of the band or the singer being in the room. It’s really convincing, immersive 3D sound, from the 1930s.”

Kolkowski says spoken word, in particular, sounds “astonishing” through the speaker. “It’s like this enormous mouth. It’s quite intimidating, in a way.”

And just as it did through the 1930s, the Exponential Horn will once more be dazzling visitors to the Science Museum, playing a mixture of archive material from the 1930s, including HG Wells and TS Eliot, along with Kolkowski’s recordings of museum objects and talks with curators. The lunchtime concert from BBC Radio 3 will be played through it as a live, high-quality stream, Resonance FM will be broadcasting live from the installation, and a number of composers are writing or adapting works especially for the horn. You’ll be able to see it (and more importantly, hear it) on the second floor of the museum from May 20.

Pictures courtesy of the Science Museum.