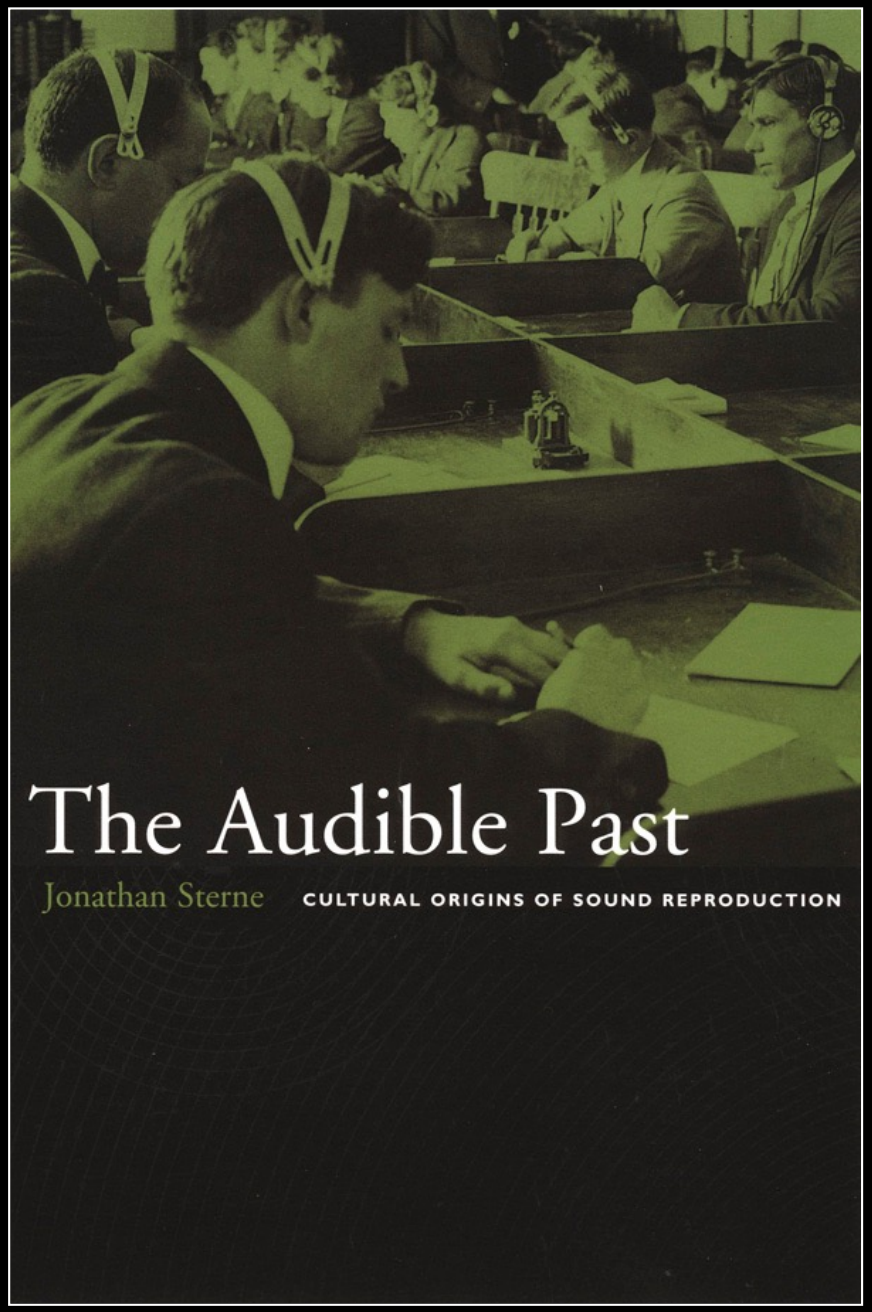
21A.505 / STS.065
Anthropology of Sound
Spring 2022 MIT

4. Feb 24 HELMREICH
Listening Machines

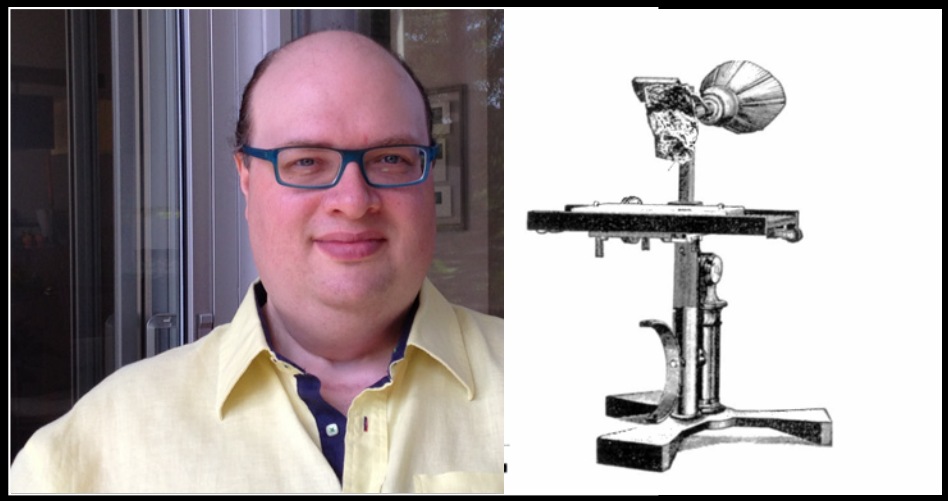
One of our big questions for today is:

WHAT IS HEARING?

and WHAT HAPPENS WHEN HEARING comes to be understood as a *technical* operation, one that becomes abstracted such that it can be done *through* machines — like telephones — *with* machines — like cochlear implants — and *by* machines — like Artificial Intelligence-enabled voice-recognition devices.



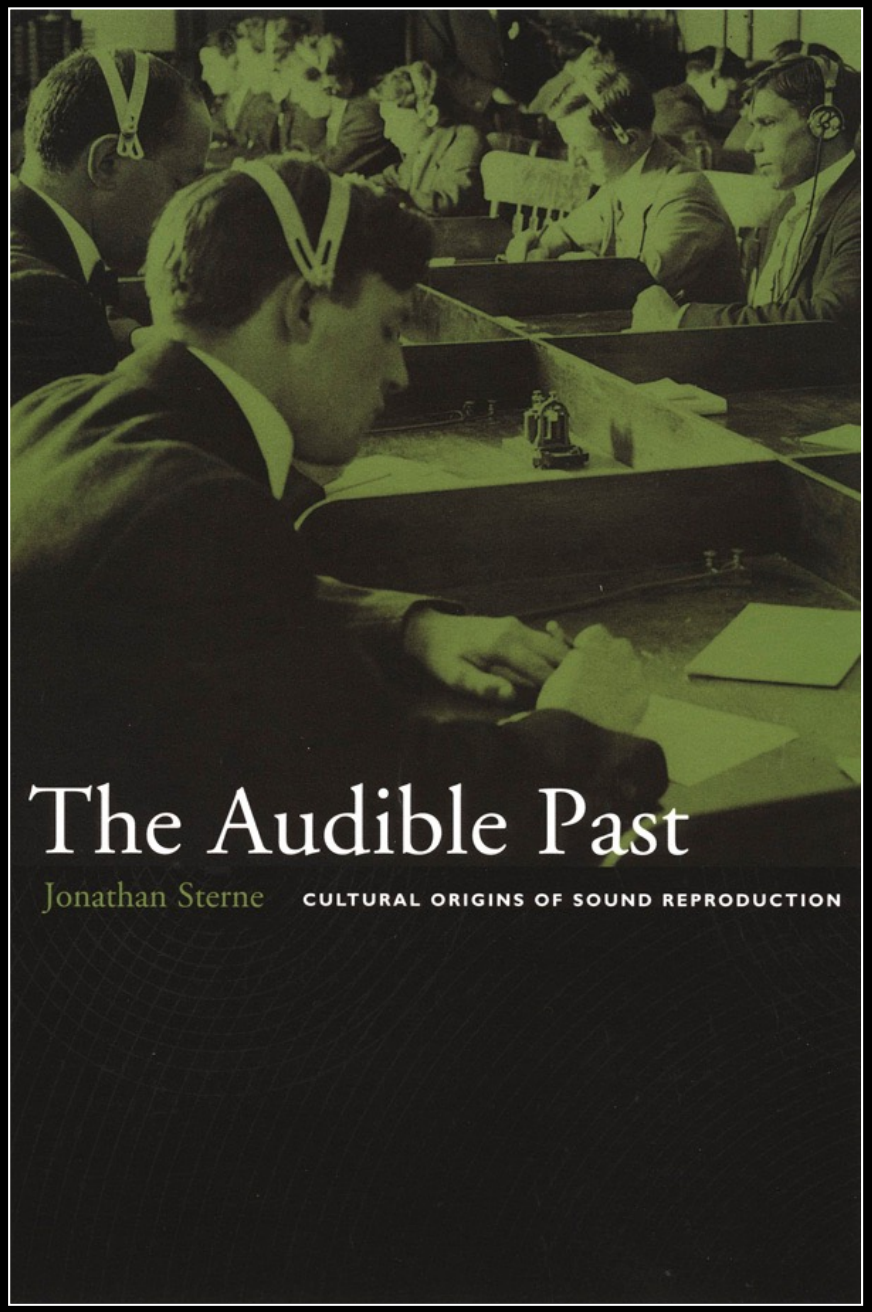
Duke University Press, 2003



TYMPANIC FUNCTION

By the 19th century, "it is possible to speak of a 'Tympanic apparatus' the purpose of which is to' receive the sonorous vibrations from the air and to transmit them to the membranous wall of the labyrinth.' By the end of the century, tympanic also refers to the function of a telephone's diaphragm or anything else resembling a drum" (34).

"the abstraction of auditory perception and its condensation into a *tympanic function* define sound-reproduction technologies as we know them today" (51)



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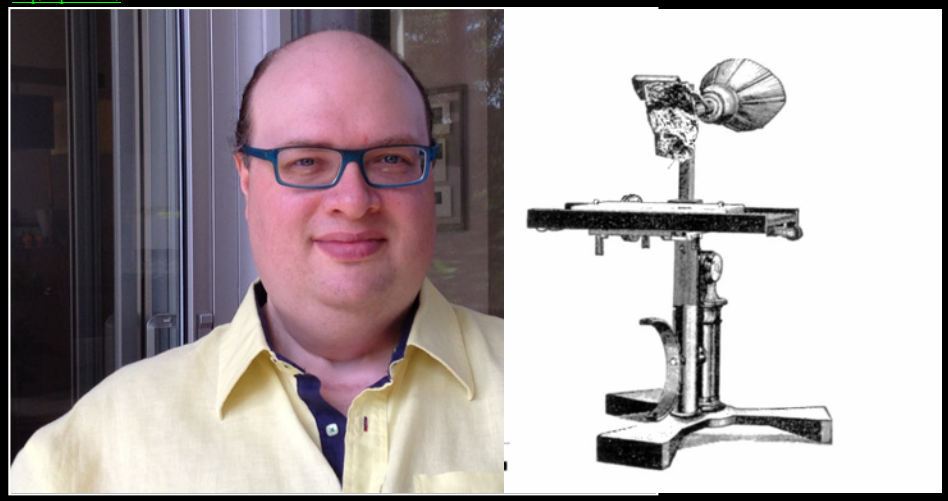
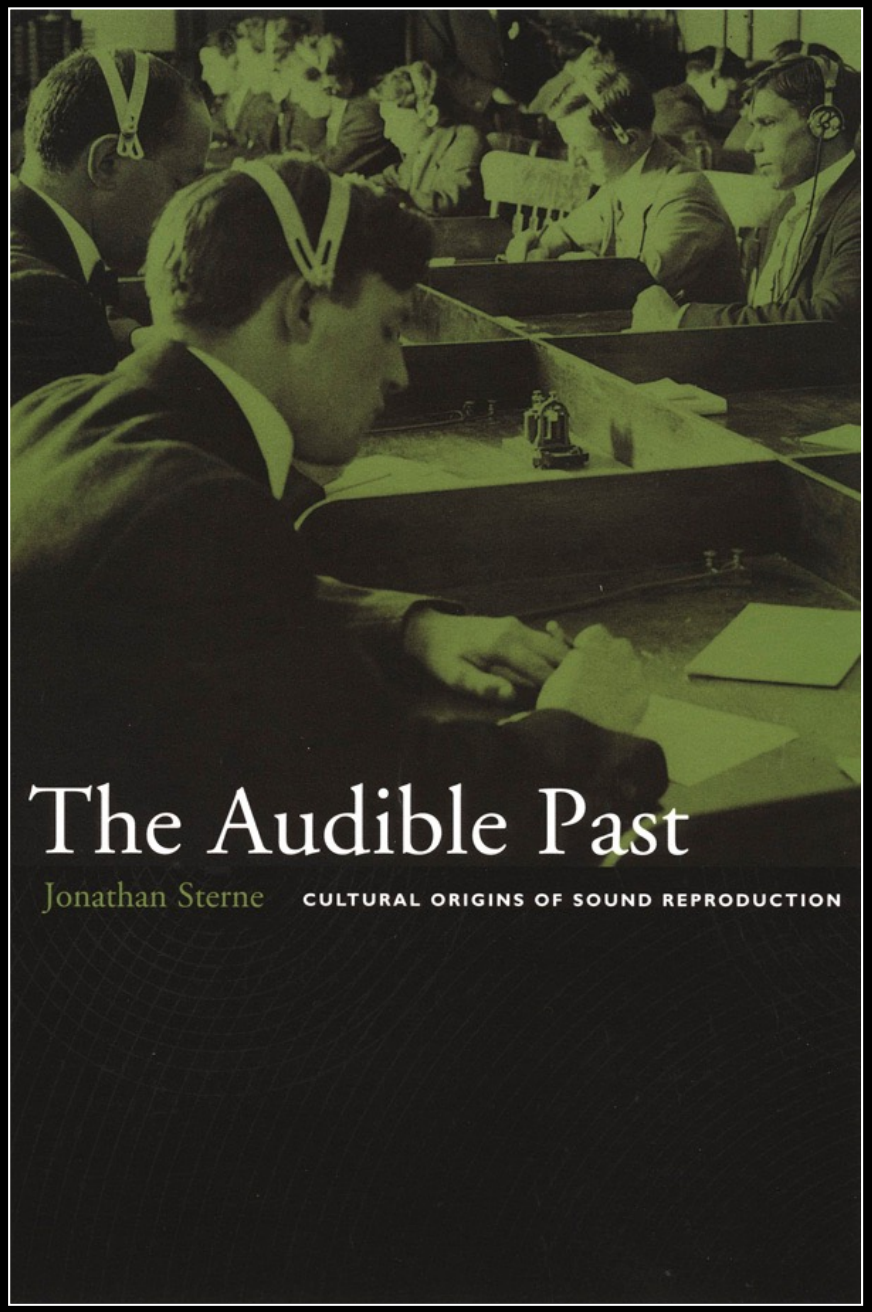


"the ear phonautograph is an artifact of a shift from models of sound reproduction based on imitations of the mouth to models based on imitations of the ear"

— emphasizes sounds as effects, rather than as phenomena to do with nature of the source (mouth, violin, etc.)

—sound becomes genericized, understood as a kind of vibration



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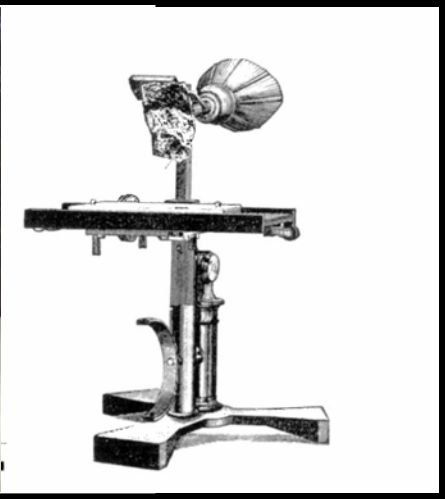


TRANSDUCTION

Not only are the senses separate and mechanical, but they are also almost purely indexical. That is to say, *any* stimulus of the nerves of sensation can register as a sense datum. Müller argues that there is no fundamental difference between interior and exterior sensation and that the nerves of hearing can be excited by several causes:

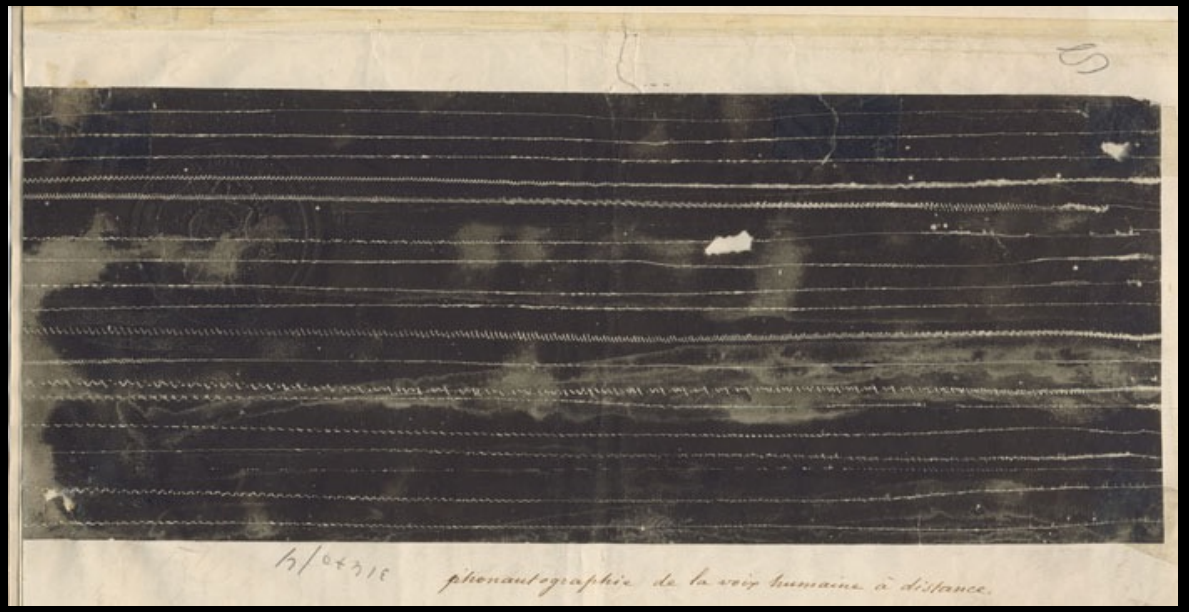
1. The mechanical influences, namely, by the vibrations of sonorous bodies imparted to the organ of hearing through the intervention of media capable of propagating them.
2. By electricity.
3. By chemical influences taken into circulation; such as the narcotics, or alterania nervina.
4. By the stimulus of blood.[62]

Hearing, in other words, is already an instrument. More

important, it is for Müller a specific kind of instrument, a transducer. Transducers, like microphones and speakers, change audible vibrations into electric impulses and back again.[64]

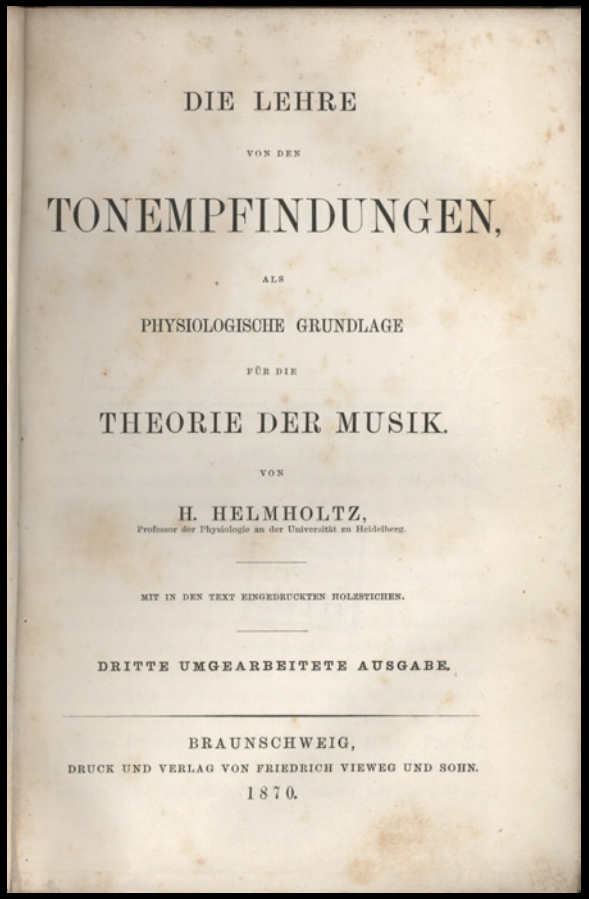
è Qmspac s l i l m u l, ? j j p g e f r q p c q c p t c b, R f g q a m l r c l r g q c v a j s b c b d p m k m s p A p c _ r g t c A m k k m l q j g a c l q c, D m p k m p c g l d m p k _ r g m l * q c c f r r n q b - - m a u, k g r, c b s - f c j n - d _ o + d _ g p + s q c -,

Leon Scott's phonautograph



"Phonautography of human voice at a distance, " from Scott's 1857 patent papers

The "phonautograph imitated (or, more accurately, isolated and extracted) [a] process of transducing sound for the purpose of hearing and thereby applied it to another purpose — tracing." "tracings were a direct effect of the tympanic vibrations" (Sterne 2003: 32).



DIE LEHRE

VON DEN

TONEMPFINDUNGEN,

ALS

PHYSIOLOGISCHE GRUNDLAGE

FÜR DIE

THEORIE DER MUSIK.

VON

H. HELMHOLTZ,

Professor der Physiologie an der Universität zu Heidelberg.

MIT IN DEN TEXT EINGEDRUCKTEN HOLZSTICHEN.

DRITTE UMGEARBEITETE AUSGABE.

BRAUNSCHWEIG,

DRUCK UND VERLAG VON FRIEDRICH VIEWEG UND SOHN.

1870.

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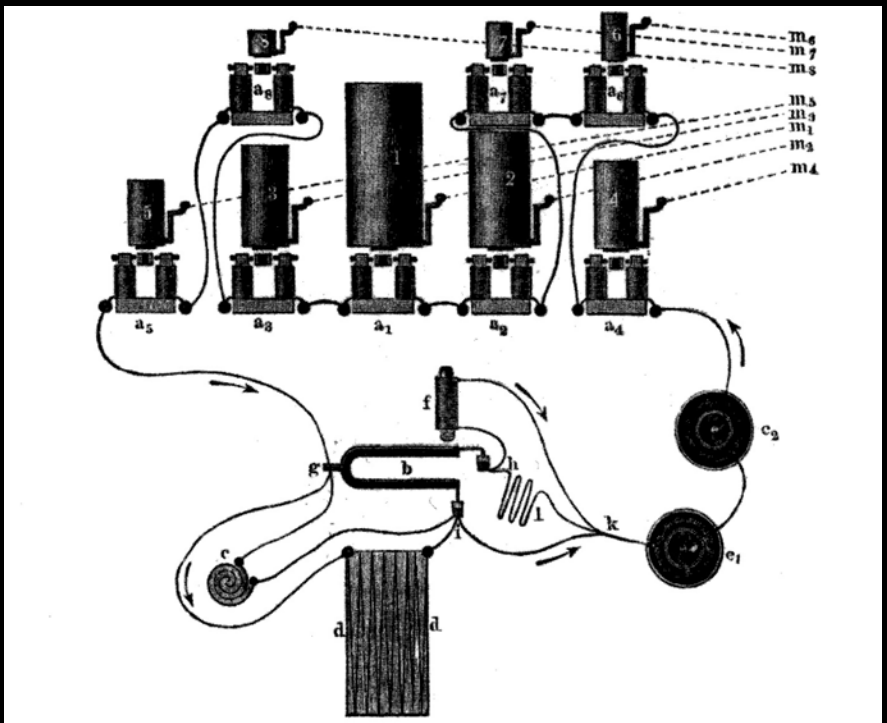
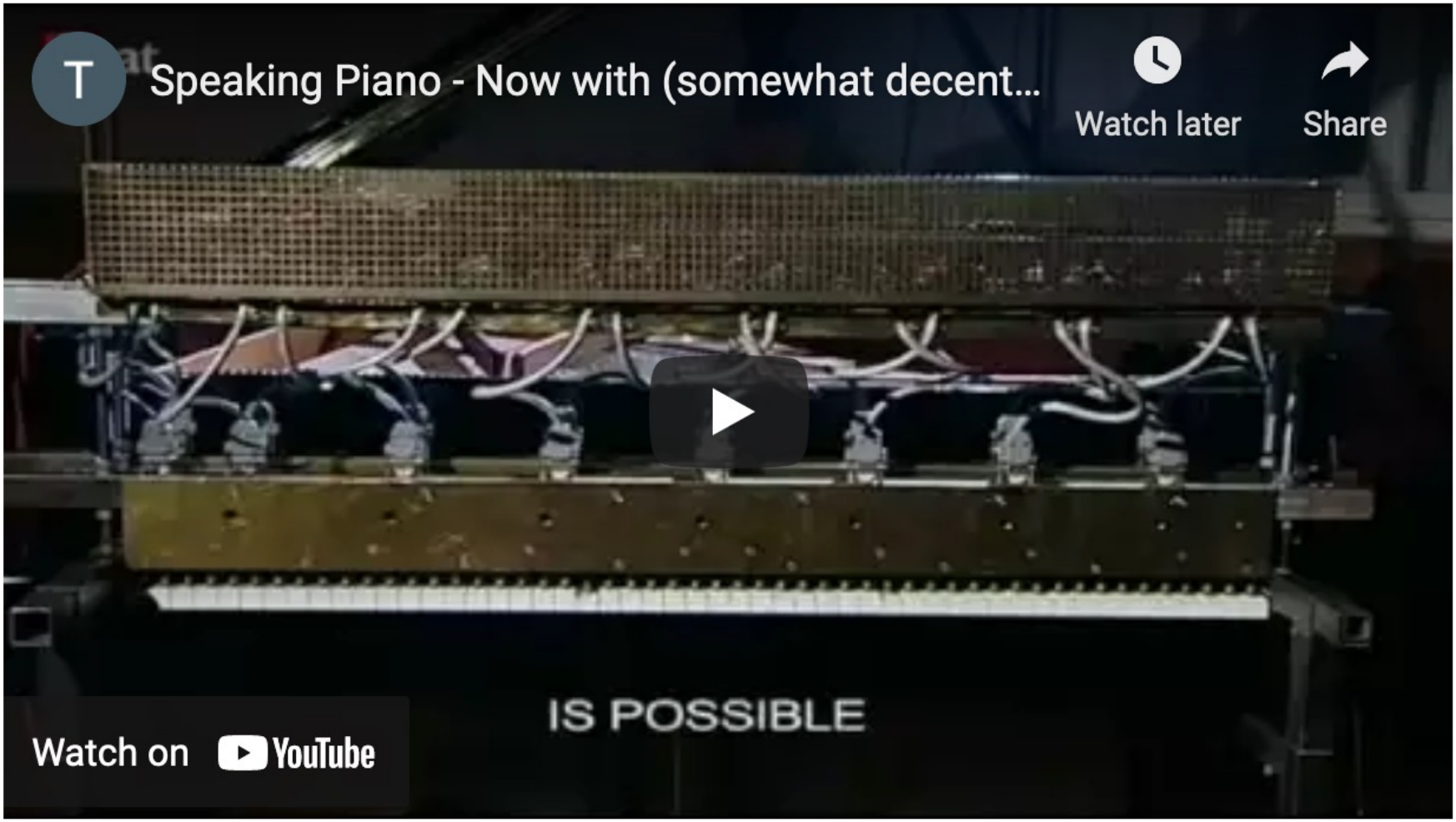


Figure 1. *The connected series of tuning-fork resonators that Helmholtz used to combine partial tones, creating tones indistinguishable from those produced by musical instruments. See the discussion on page 200. From Hermann Helmholtz,* Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik, *5th ed., (Brunswick: Vieweg & Sohn, 1896), p. 633.*

"one of Helmholtz's most lasting contributions was his theory of upper partials or overtones — a principle still widely applicable every time someone listens to a telephone" … "The theory of upper partials is important because it treats sound fundamentally as an effect that can be reproduced, rather than something that is tethered to a specific and local cause" (65).



The video is in German but there are subtitles and the piano speaks in English.

"Speaking Piano - Now with (somewhat decent) captions!" YouTube.

SCIENTIFIC AMERICAN

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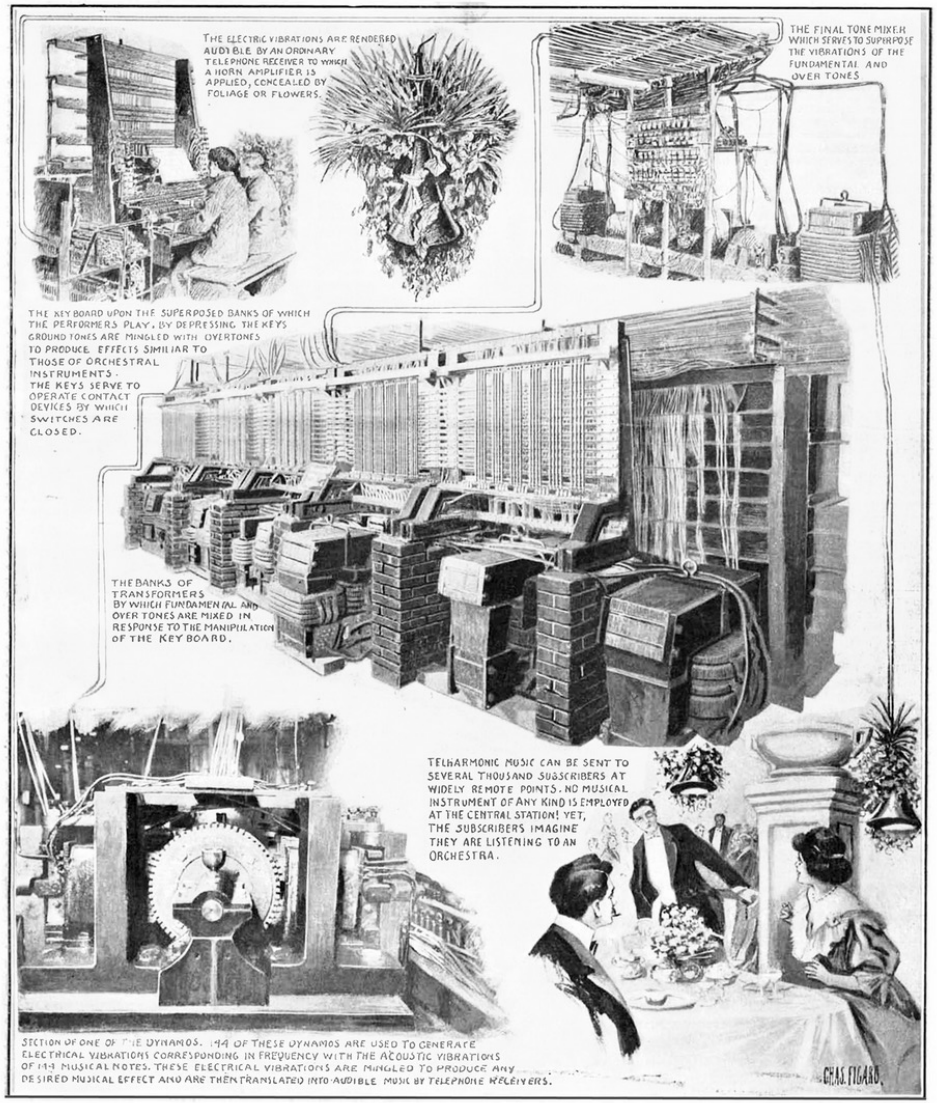
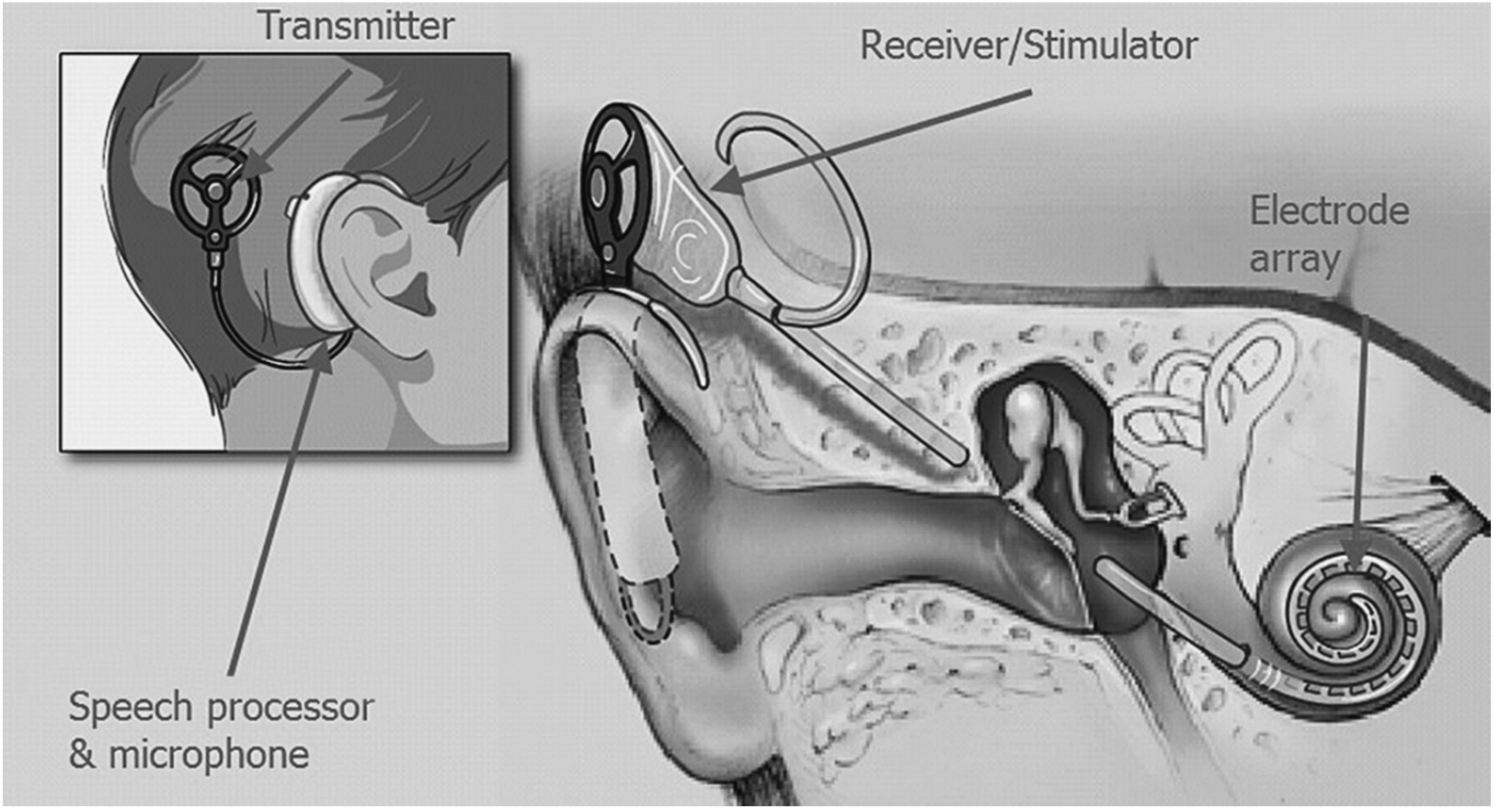
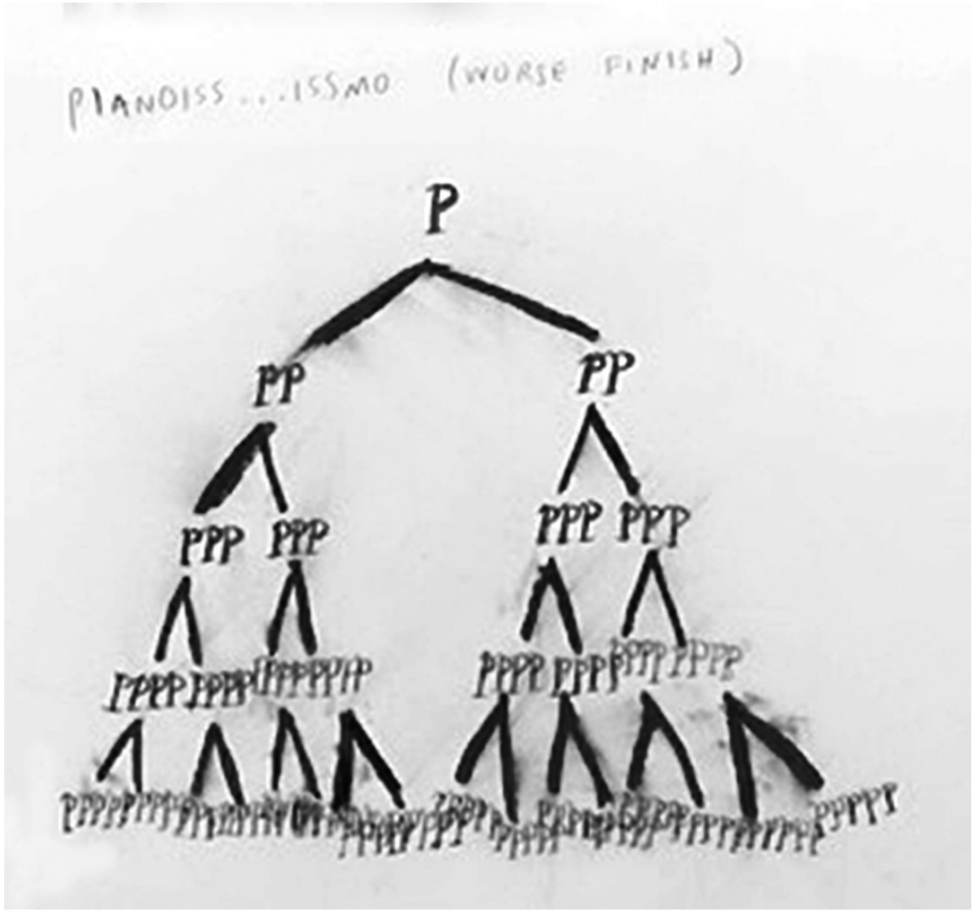


THE TELHARMONIUM—AN APPARATUS FOR THE ELECTRICAL GENERATION AND TRANSMISSION OF MUSIC.—[See page 210.



C19.F1 **FIGURE 19.1** Diagram of a cochlear implant. (Morgan Leahy, "I Woke Up One Morning to Find I Was Deaf," *The Tab*, 2016)



C19.F3 **FIGURE 19.3** Christine Sun Kim, Pianoiss…issmo (Worse Finish) 38.5 x 50" (hxw), pastel and pencil on paper, 2012.

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