



"It Talks!"  
a very brief history of voice synthesis



"human voice"  
one of the oldest organ stops

# When?

- We don't know, but
  - organ-like instrument 3<sup>rd</sup>-century BCE
  - programmable automatic instruments in 9<sup>th</sup>-century Baghdad



reconstruction  
of automated  
reed instrument



hydraulis, 1<sup>st</sup>-century BCE  
Dion, Greece

photo: [QuartierLatin1968](https://www.flickr.com/photos/quartierlatin1968/)

# The Captain's Parrot & the Magician



"Captain Birdseye"

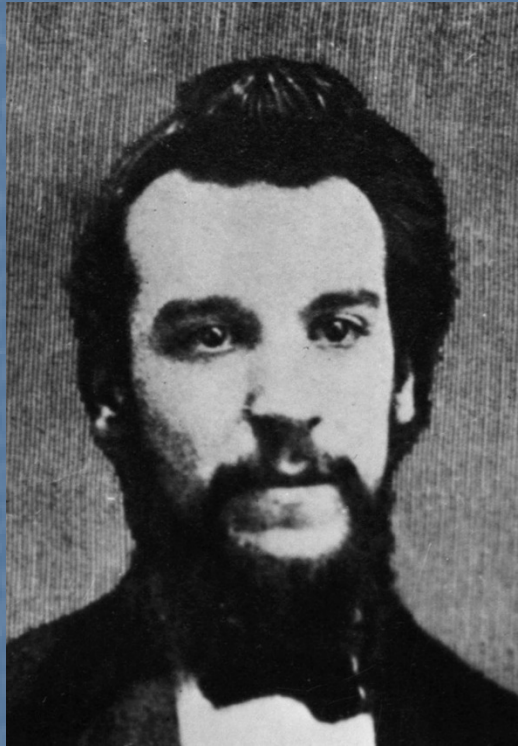


# Pope Sylvester II (999-1003)

said to have had a "brazen head" that could answer questions yes or no



# Alexander Graham Bell (& Trouve)



"How are you  
grandmamma?"

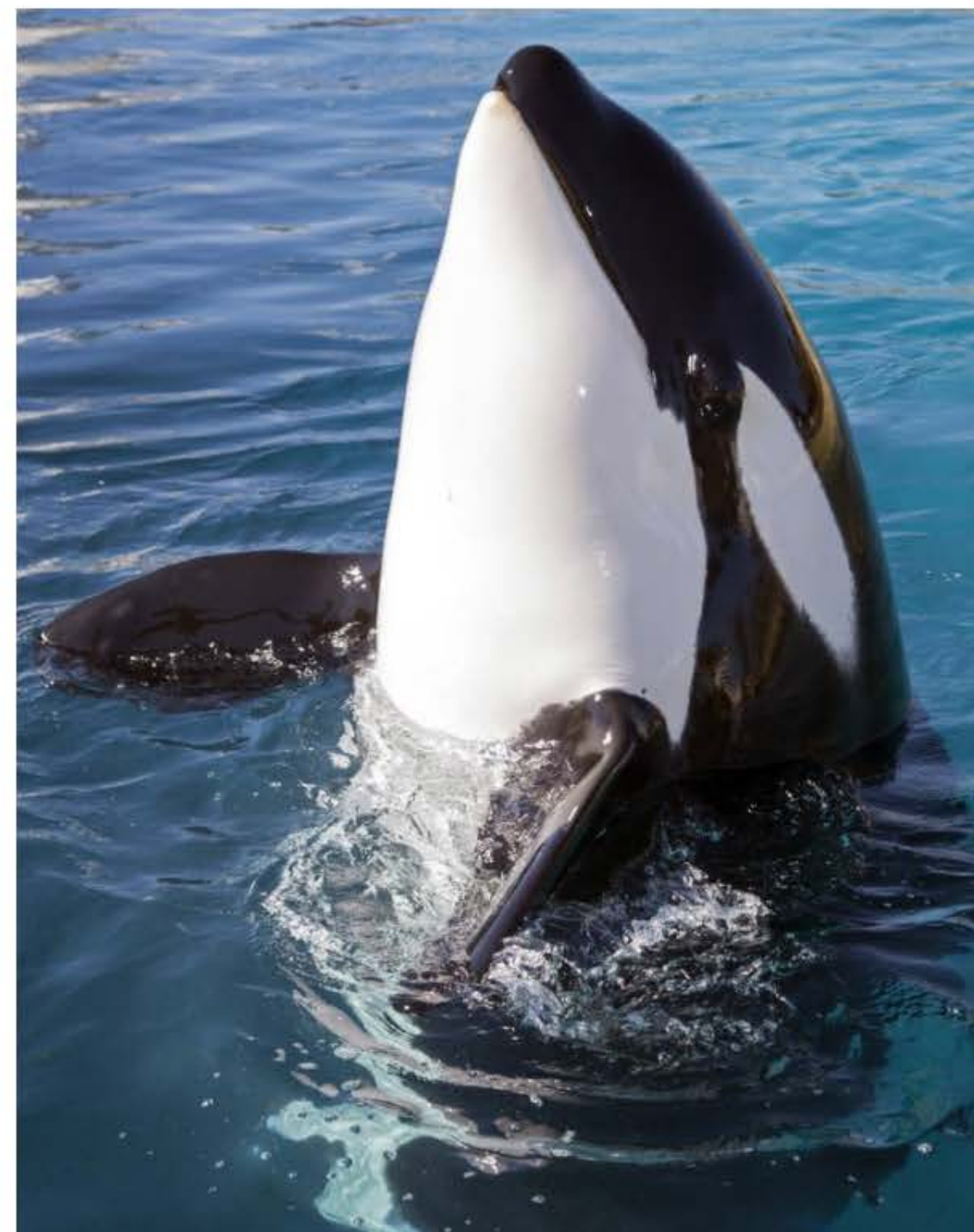
## SCIENCE

# *How to Get a Killer Whale to Say 'Hello'*

Researchers trained an orca to mimic human sounds like, “hello,” “Amy” and “bye-bye,” which could contribute to understanding of the behavior and culture of killer whales in the wild.

**Trilobites**

By STEPH YIN JAN. 31, 2018



LECTIONS



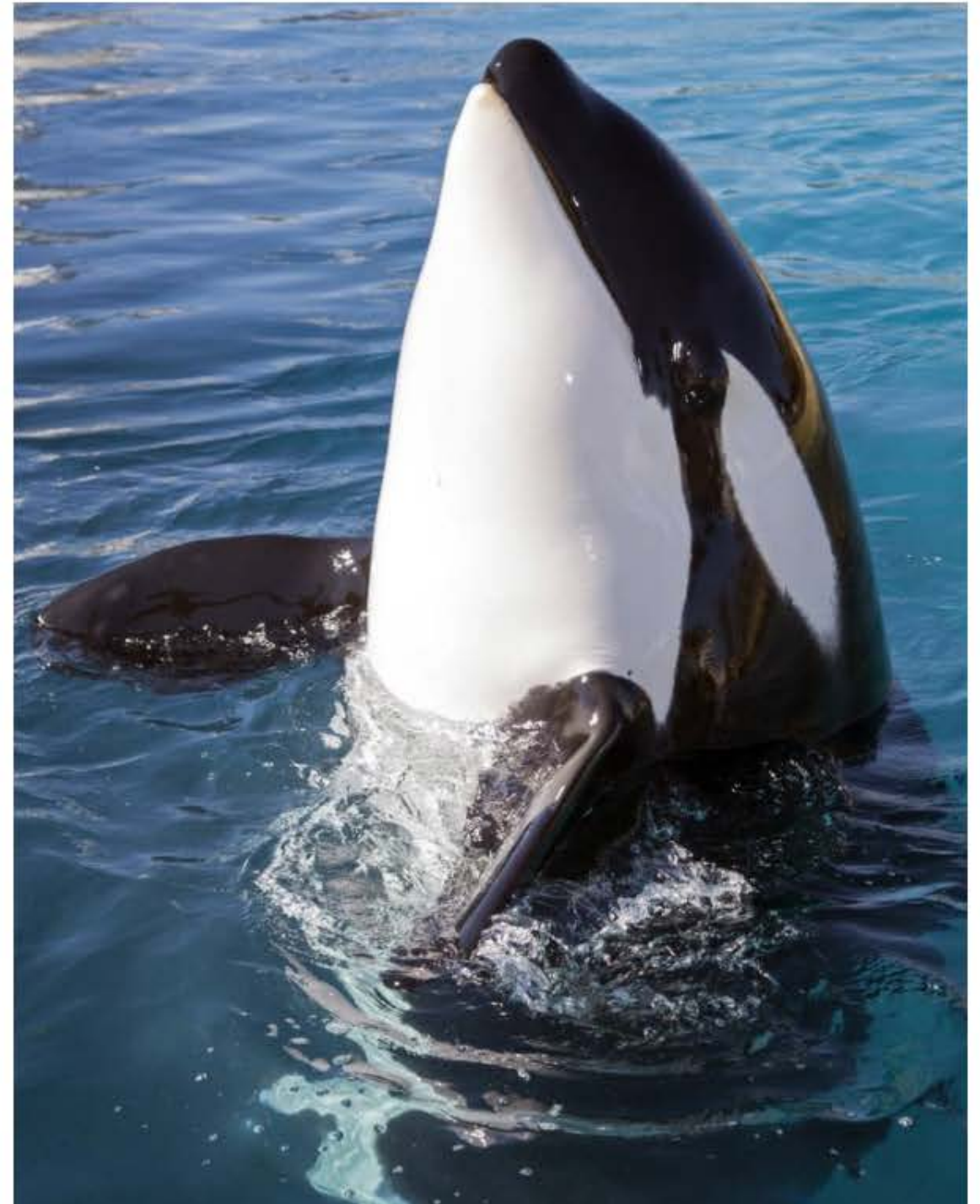
CROSSWORD



## SCIENCE

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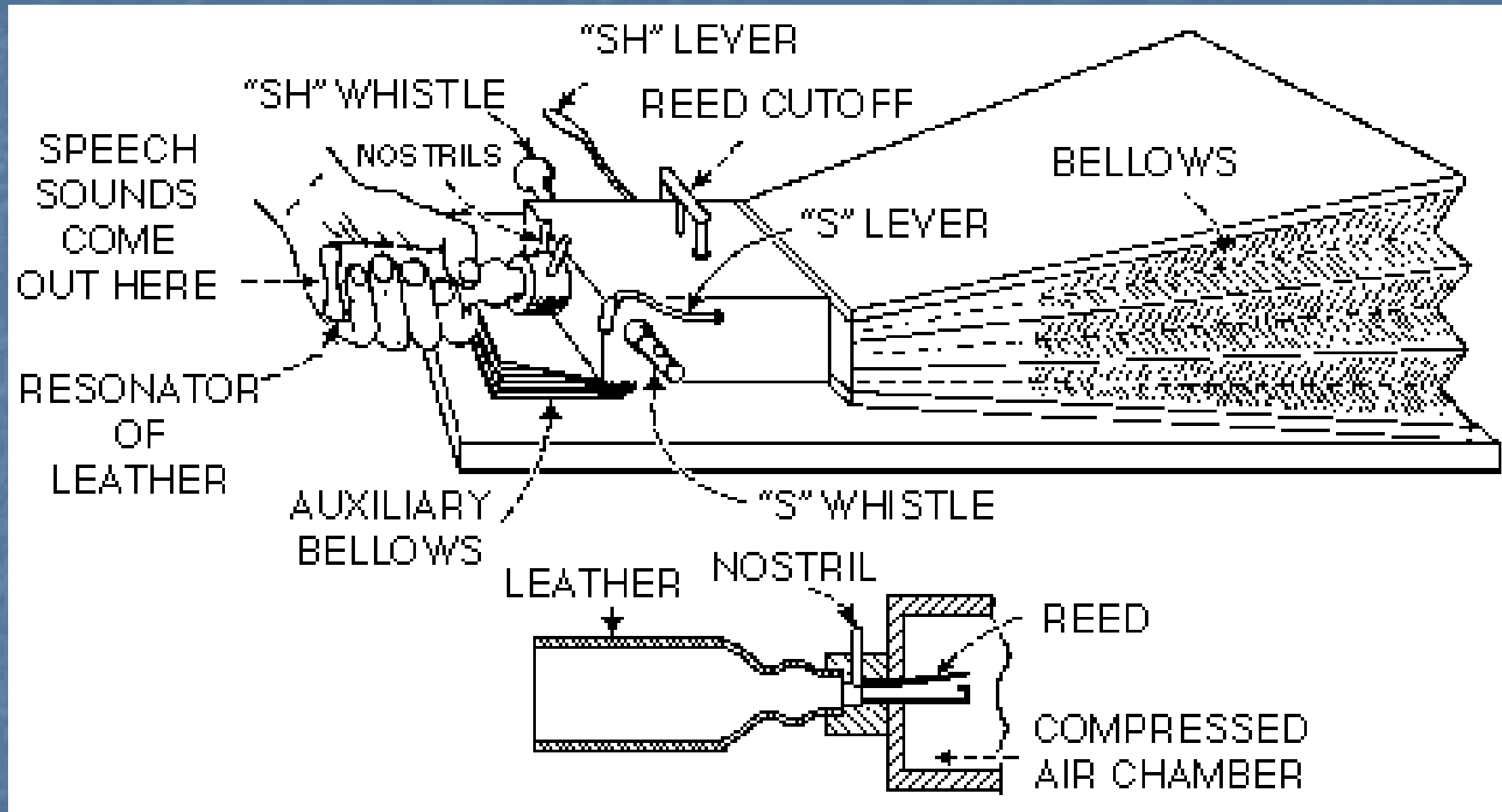


**Trilobites**

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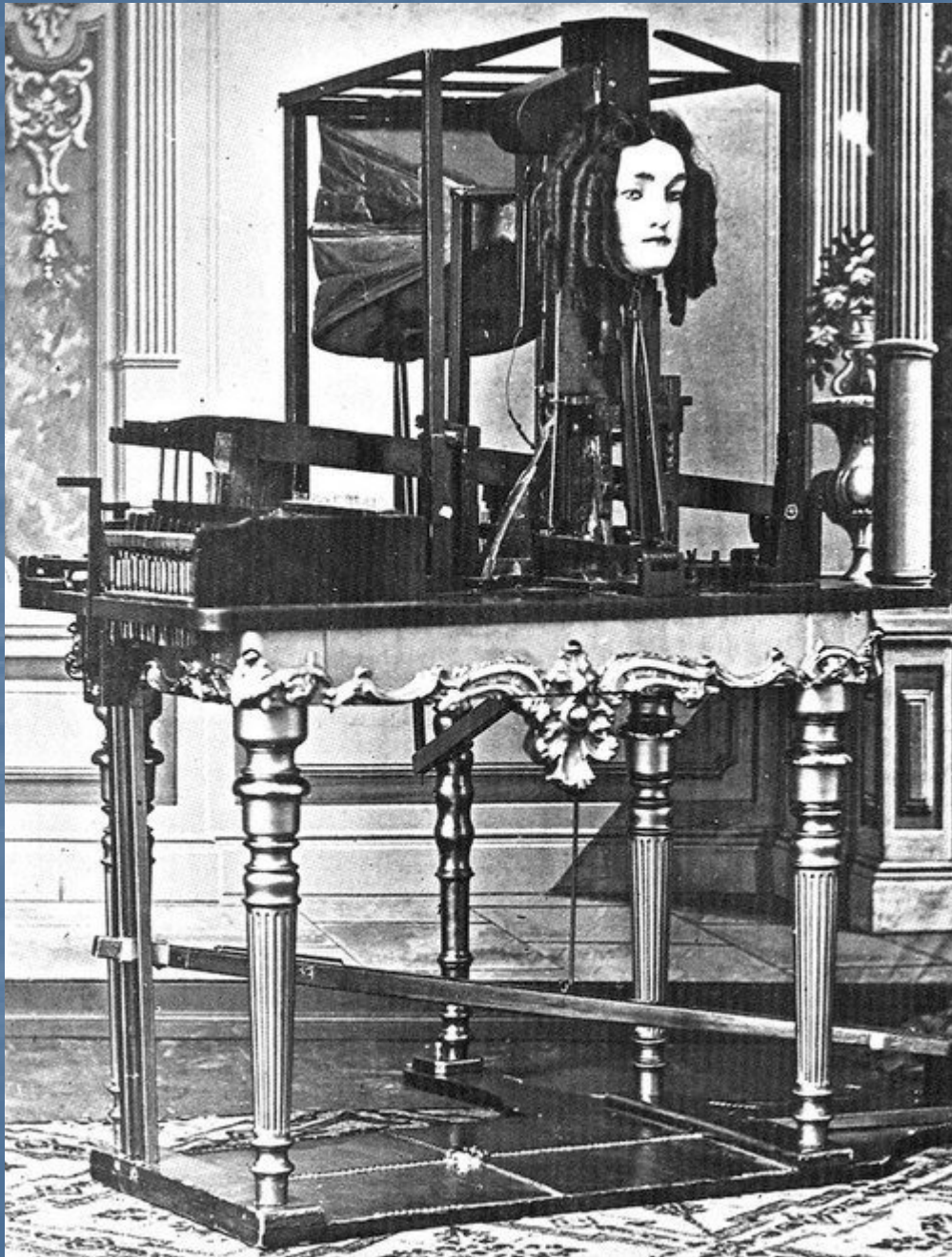


# 18<sup>th</sup> & 19<sup>th</sup> Centuries

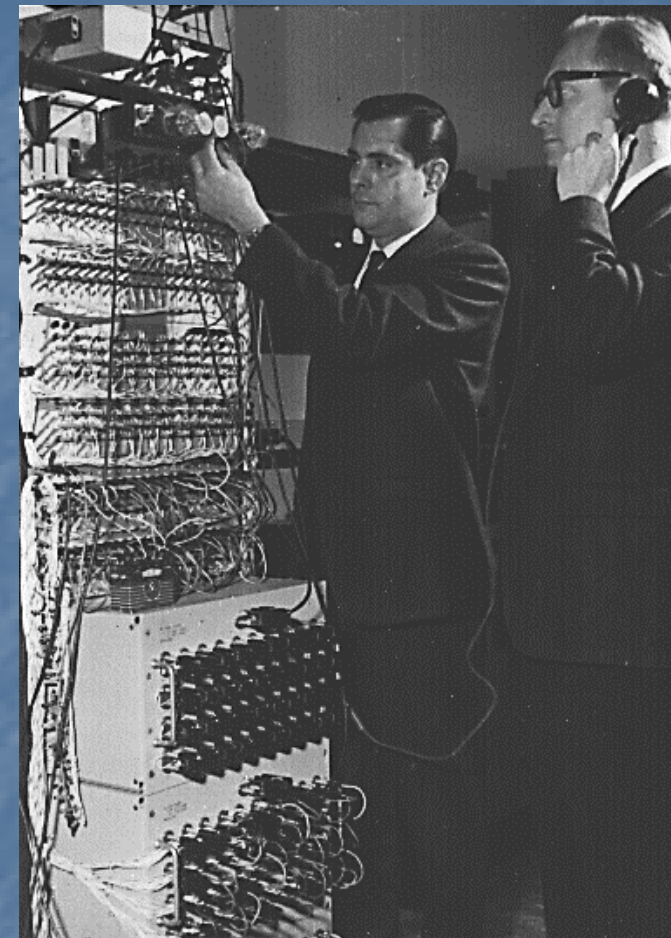
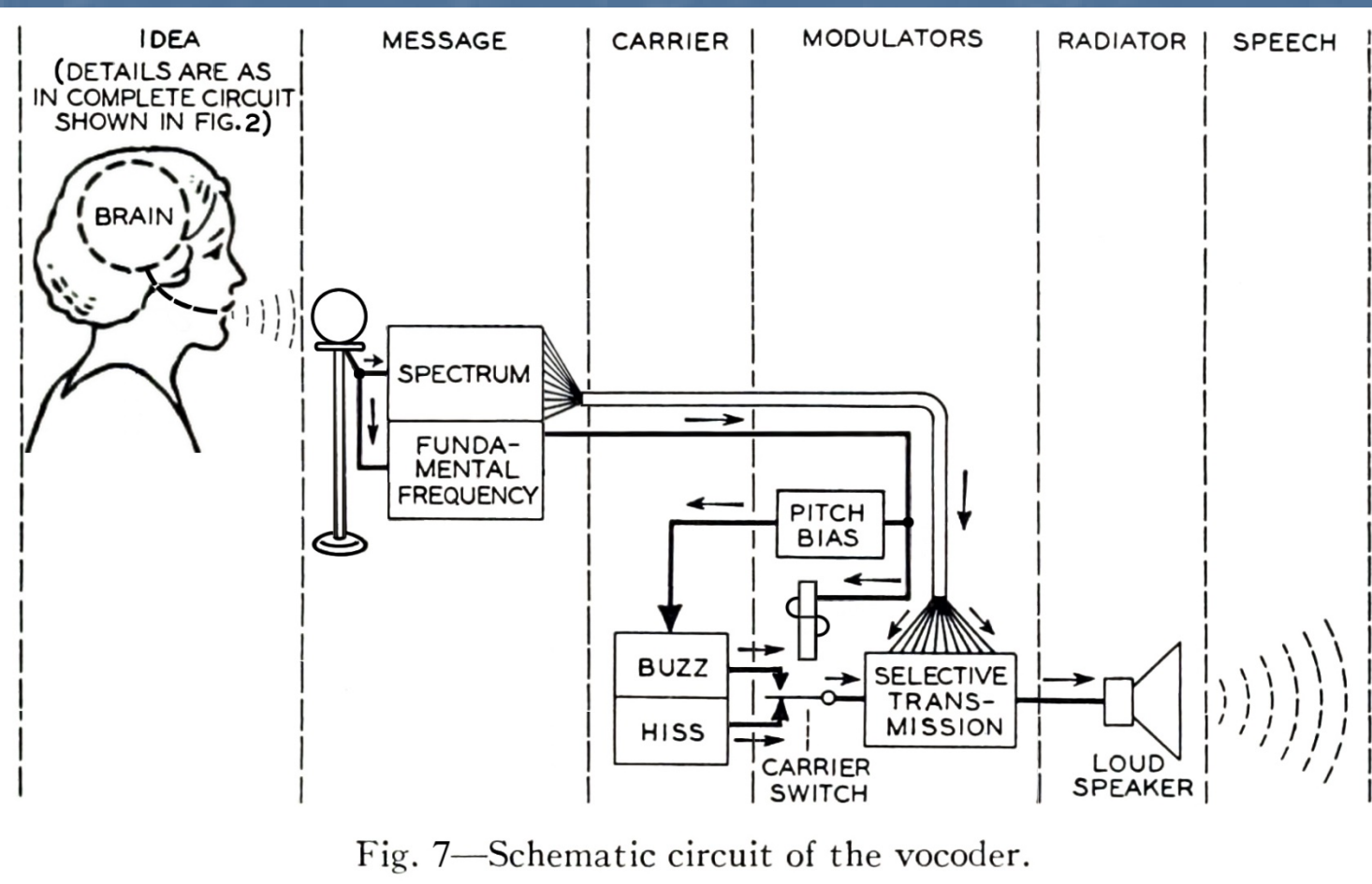


part of Charles Wheatstone's version of Wolfgang von Kempelen's talking machine

# Joseph Faber's Euphonia



# Electronics: Initially *Not* for Synthesis



"vocoder"

Homer Dudley, "The Carrier Nature of Speech"  
*Bell System Technical Journal*, October 1940

1940  
version

images courtesy of Bell Labs Archive

# But There Were World's Fairs in 1939

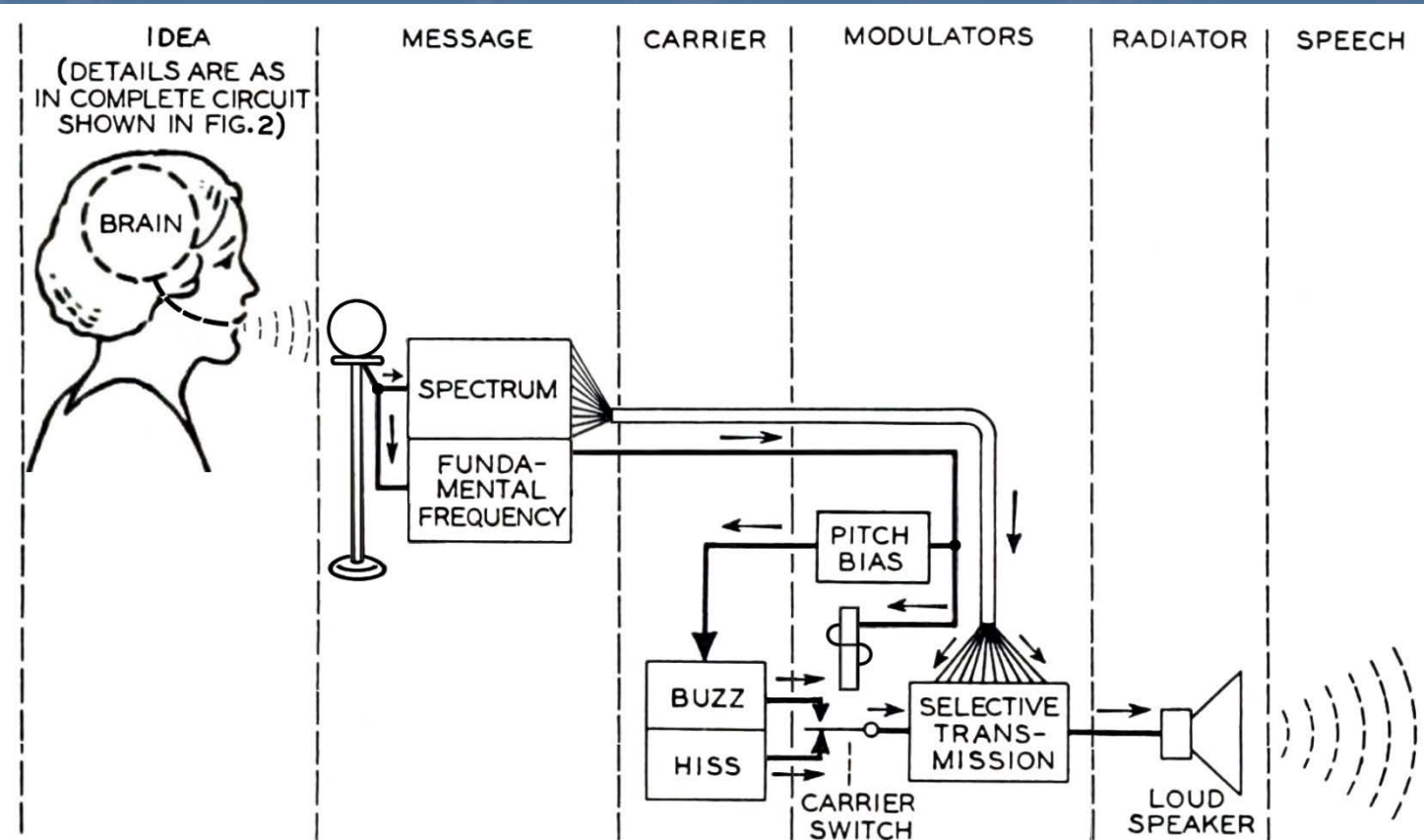


Fig. 7—Schematic circuit of the vocoder.

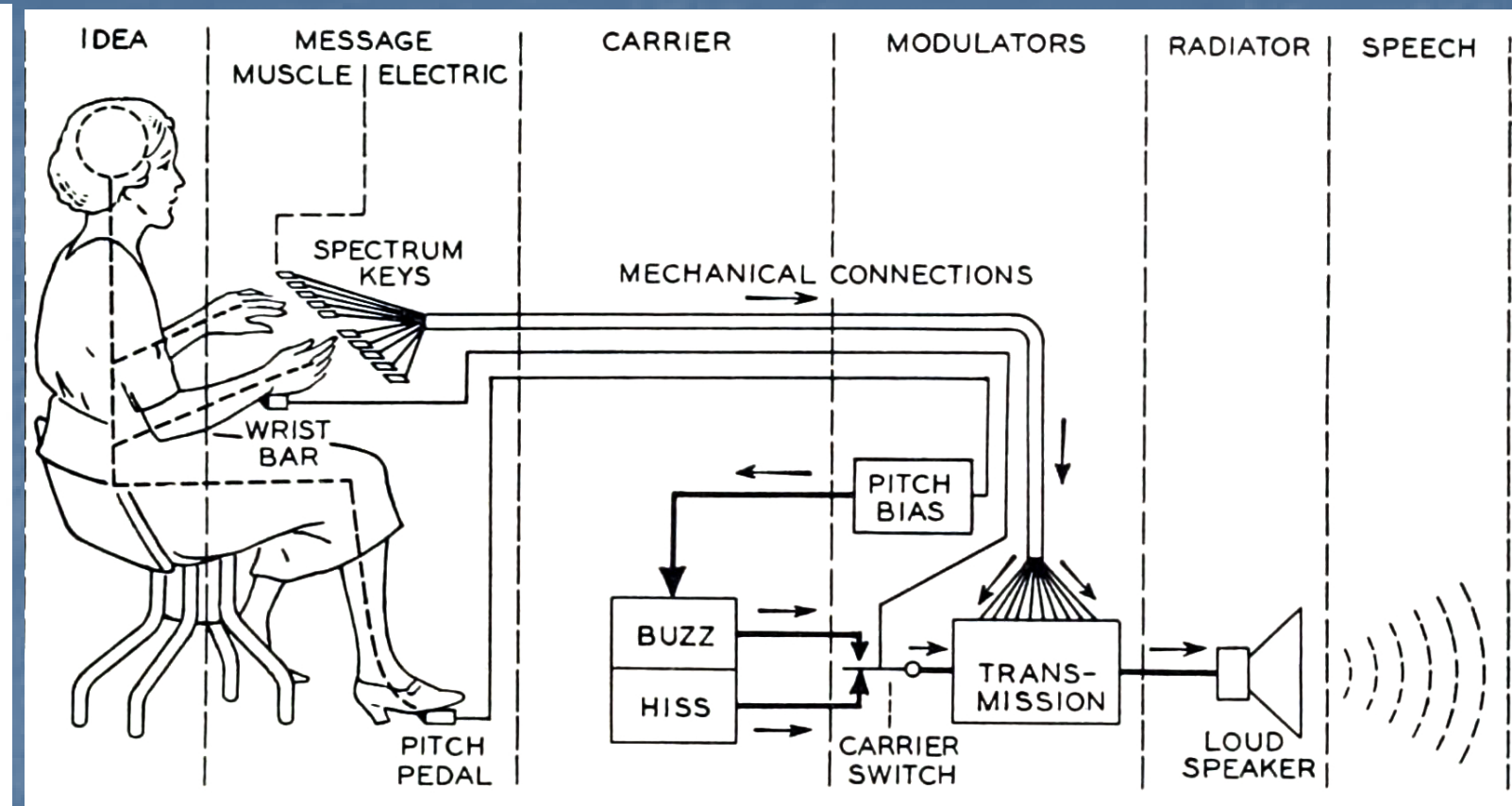


Fig. 8—Schematic circuit of the voder.

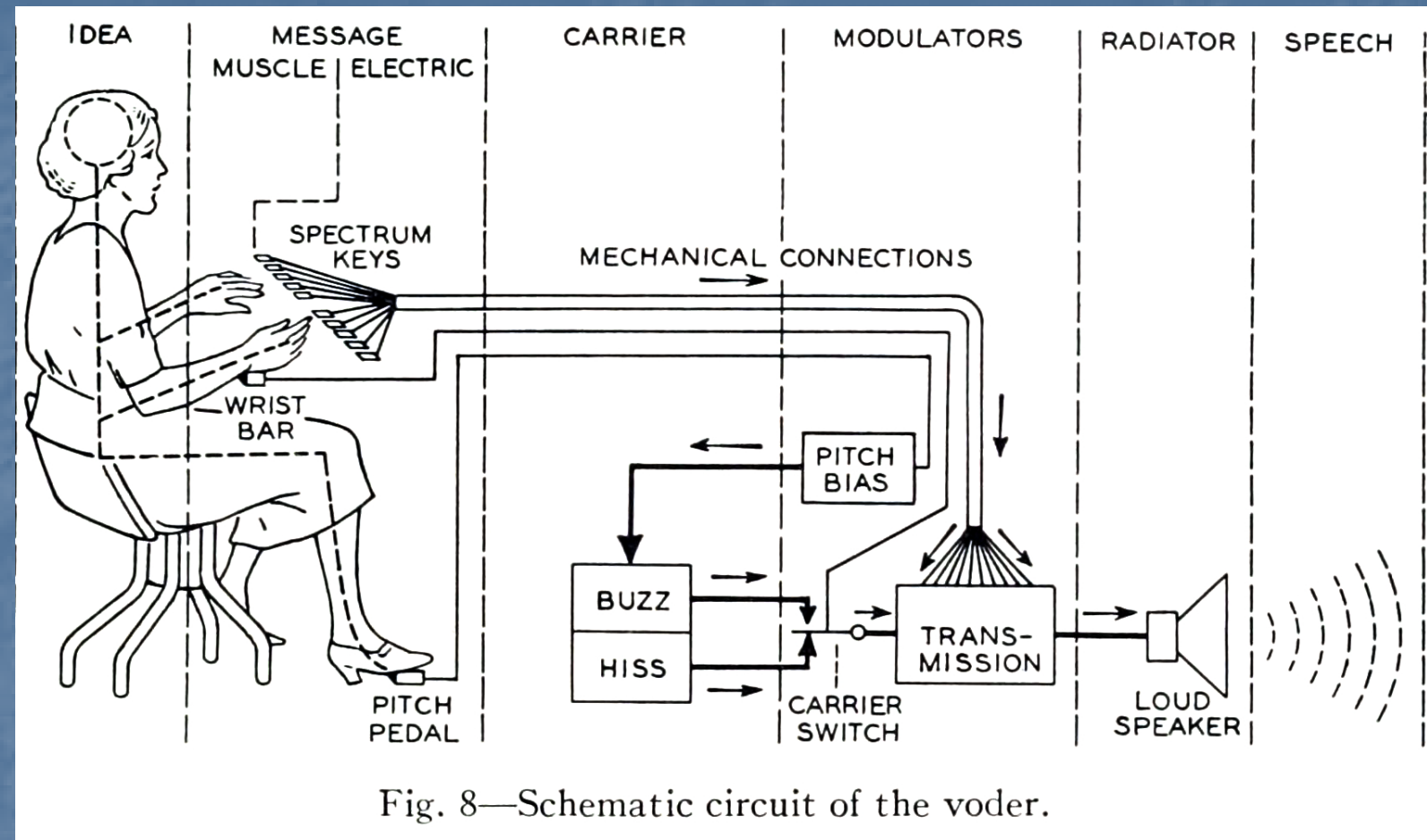
"vocoder"

Homer Dudley, "The Carrier Nature of Speech"  
*Bell System Technical Journal*, October 1940

"voder"

images courtesy of Bell Labs Archive

# Speech *Manually* Synthesized



"voder"  
(also known as Pedro)

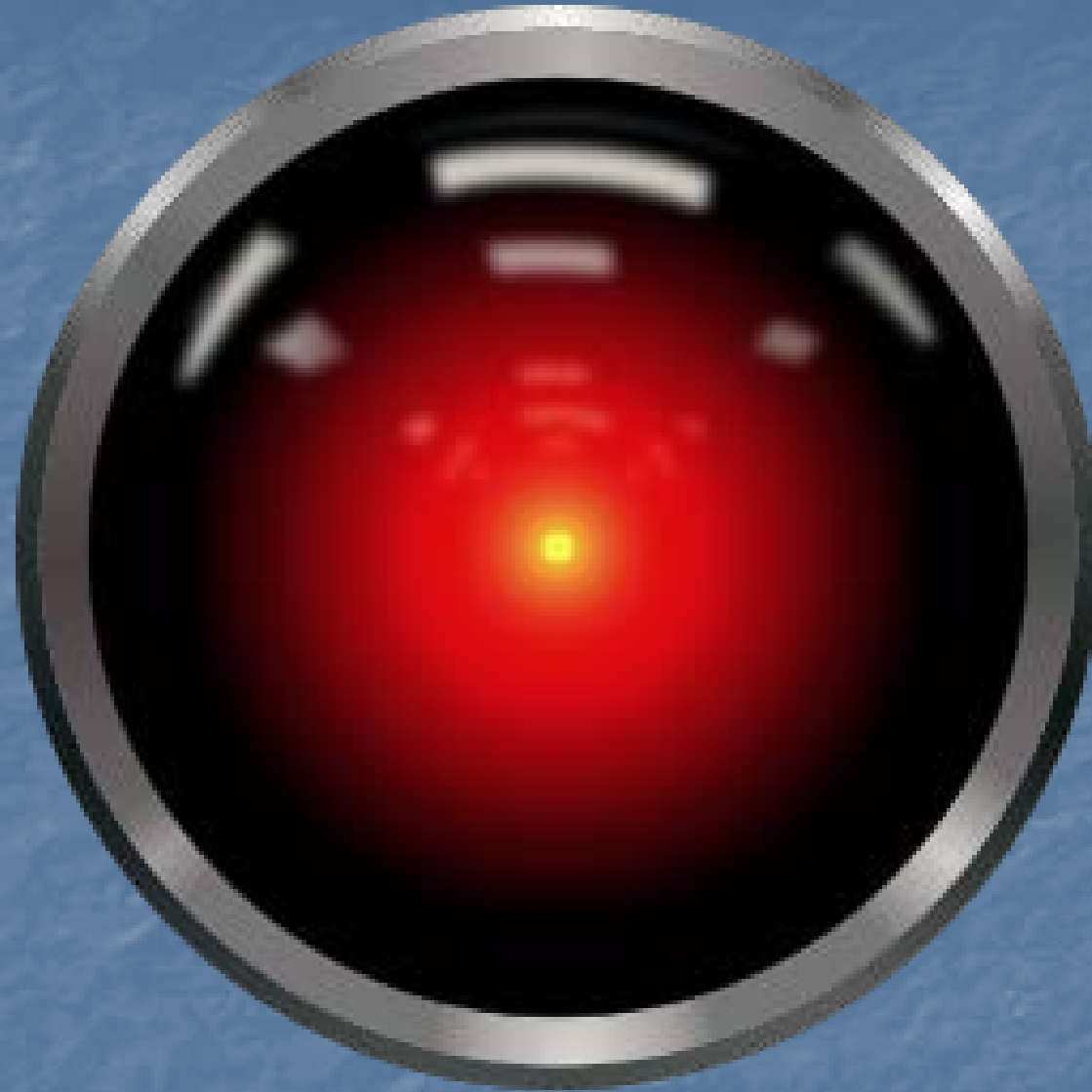
images courtesy of Bell Labs Archive



**SPOILER**

**ALERT**

# AI Gone Bad: "I'm Sorry, Dave."



HAL 9000 computer eye  
from *2001: a space odyssey*

# HAL Regresses As It Loses Its Mind



*from 2001: a space odyssey*



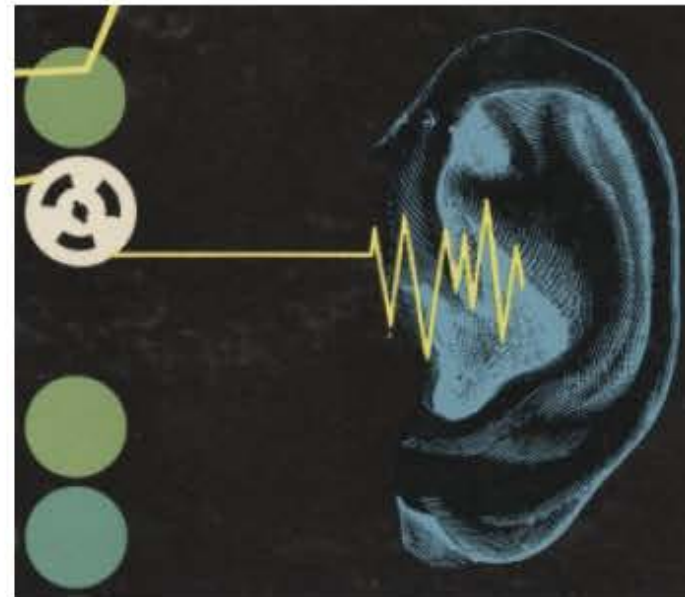
# “Daisy Bell (Bicycle Built for Two)”—Max Mathews, John L. Kelly, Jr., and Carol Lochbaum (1961)

Added to the National Registry: 2009

Essay by Cary O’Dell

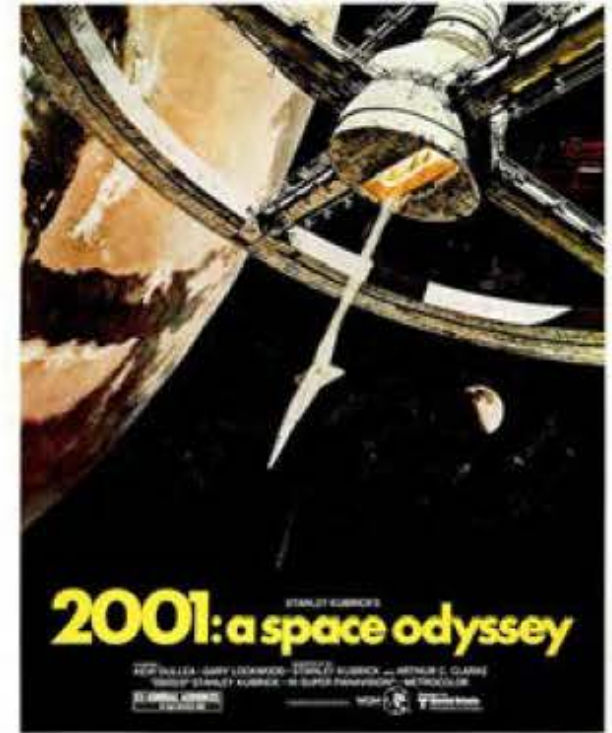


*Max Mathews*



*Sleeve for 45rpm  
“Computer Speech”*

An epic drama of  
adventure and exploration



*“2001: A Space Odyssey”  
film poster*

The song “Daisy Bell” (often more popularly referred to as “A Bicycle Built for Two”) was written in 1892 by an Englishman, Harry Dacre.



IBM  
704

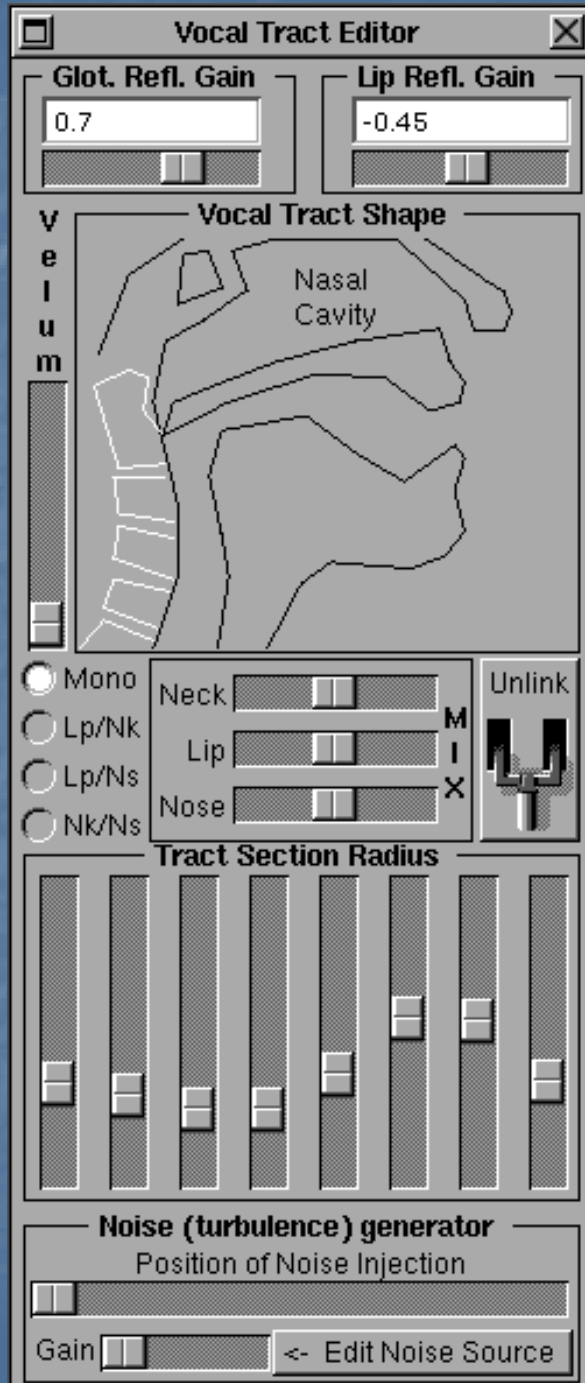
1 hr. to  
output  
17 sec.



IBM  
704

1 hr. to  
output  
17 sec.

# 1990 Duet with Perry Cook's "Sheila"



<http://www.cs.princeton.edu/~prc/SingingSynth.html>  
used with permission

*The New York Times*  
April 9, 1975

# Opera: Computer Love

By DONAL HENAHAN

One of the durable myths of modern times is the mechanical monster that turns into a human (not to be confused with the familiar reality of a human turning into a monster). From Dr. Frankenstein's creation down to the computer Hal in "2001: A Space Odyssey" the idea has demonstrated its staying power as one of man's long-

range worries and sources for comedy.

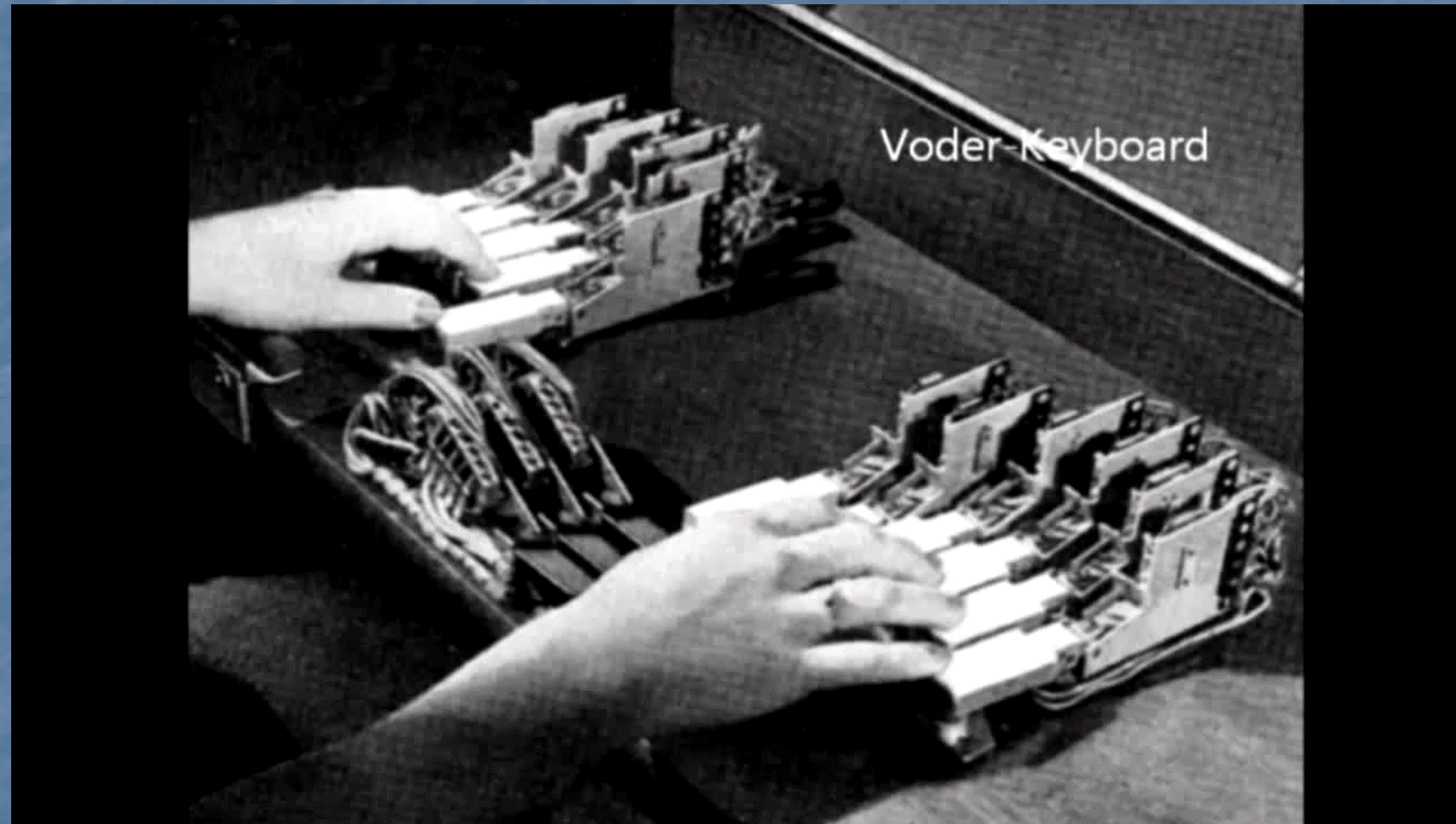
Joseph Olive's "Mar-ri-ia-a," a miniature opera for soprano, computer and chamber ensemble that had its premiere performance on Monday night at Carnegie Recital Hall, showed once again that a lot of fun can be wrung from the rise of mechanical man to humanoid status.

Mr. Olive, who has done a good deal of experimental work in electronically synthesizing human speech with computers, offers as his sci-fi comic plot the dilemma of a woman scientist (Alexandra Ivanoff) who builds a computer that turns out to be sociable—in fact, sex-mad. The scientist falls in love and has to kill the thing to avert a fate worse than death.



photo courtesy of  
Bell Labs Archive

# Voder Singing



[https://www.youtube.com/watch?v=5hyl\\_dM5cGo&t=207s](https://www.youtube.com/watch?v=5hyl_dM5cGo&t=207s)

# Voder Talking



[https://www.youtube.com/watch?v=5hyl\\_dM5cGo&t=207s](https://www.youtube.com/watch?v=5hyl_dM5cGo&t=207s)

# Now You Know

these slides at [bit.ly/hpa18-voice](https://bit.ly/hpa18-voice)