



ELECTRIC GUITARS & PARALLEL REALITIES



## BBC Radiophonic Workshop (1958)

Daphne Oram, Brian Hodgson, Delia Derbyshire, David Cain, and many more...

# DAPHNE ORAM

Developed “Oramics” in 1959, a graphically controlled synthesizer.

Classically trained musician and BBC engineer.

Visited Schaeffer and RTF in Paris

Attended the Brussels World Fair and Poem Electronique

First to notate ideas for synthetic sounds that could be reproduced by sound-generating instruments

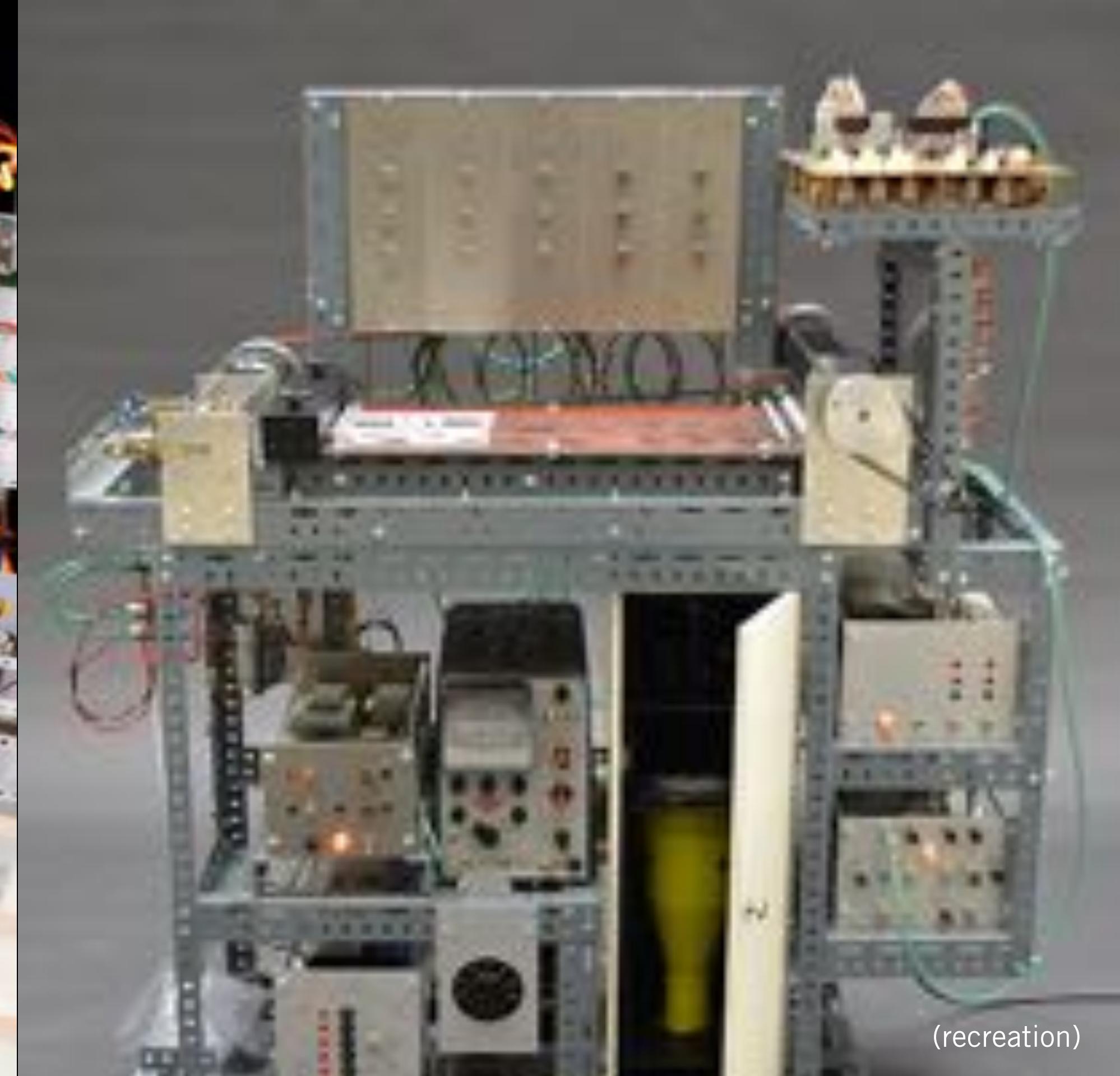
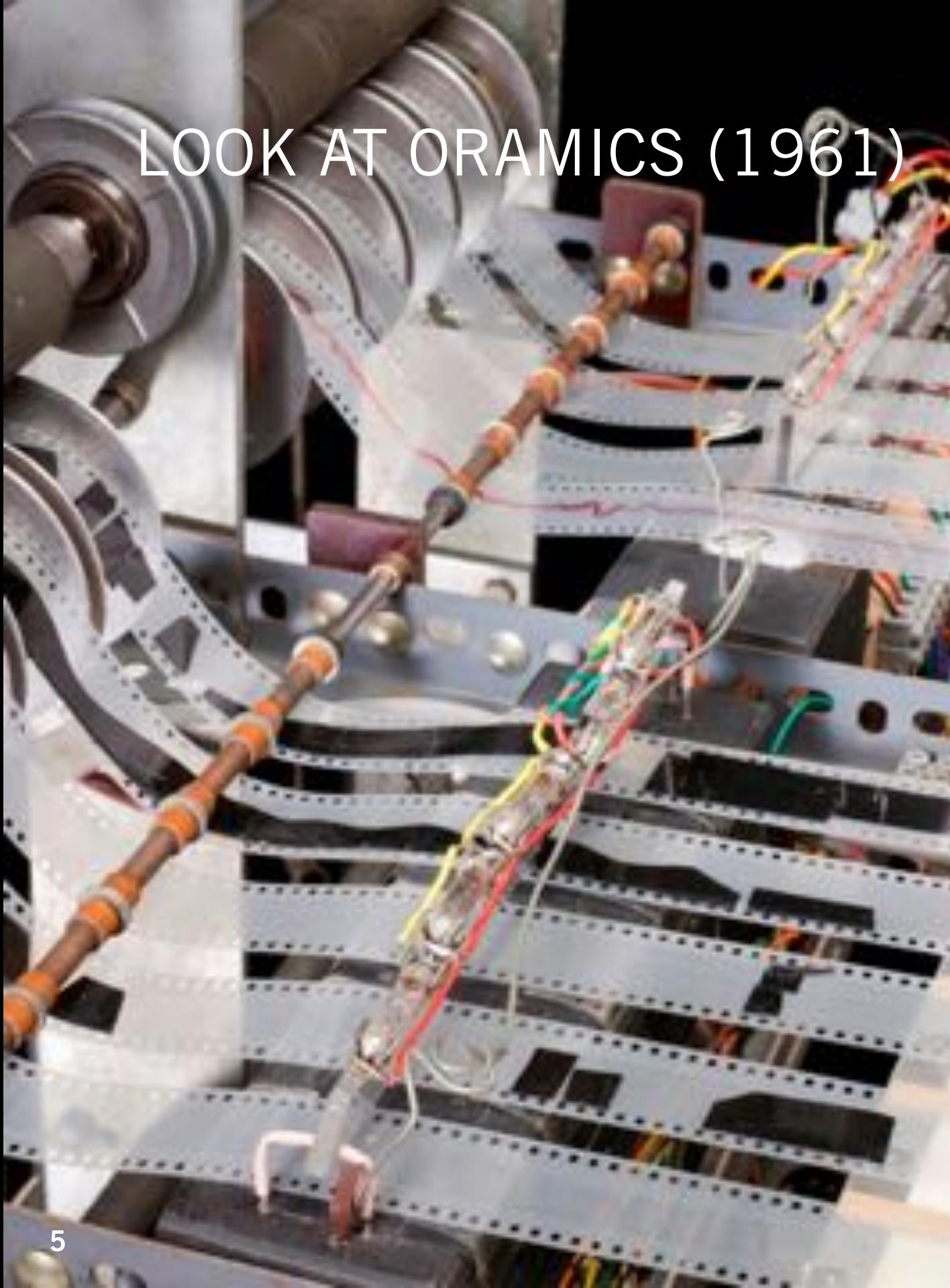
Drawing Sounds



ORAMICS



LOOK AT ORAMICS (1961)



# DELIA DERBYSHIRE

BBC RADIOPHONIC WORKSHOP



By most accounts, the most talented engineer at the BBC. Largely written out of history until recently.



# DOCTOR WHO THEME (1963)

Delia Derbyshire & Ron Grainer



## TAPE CENTERS REVIEW

late 1940s First privately-built studios. Louis and Bebe Barron (1948) & Raymond Scott (1946) (both in NY)

1948 - Musique Concète, abstract tape music. Pierre Schaeffer and Pierre Henry - l'ORTF radio station in Paris

late 1940s - First multitrack tape recorder, popular & commercial music. Les Paul & Raymond Scott (today!)

1951 - Elektronische Musik, music generated by electronic means. Herbert Eimert - Cologne Studio

1951 - Columbia University Studio, tape music. Otto Luening and Vladimir Ussachevsky

1950s Chance music, indeterminacy, live electronics. John Cage

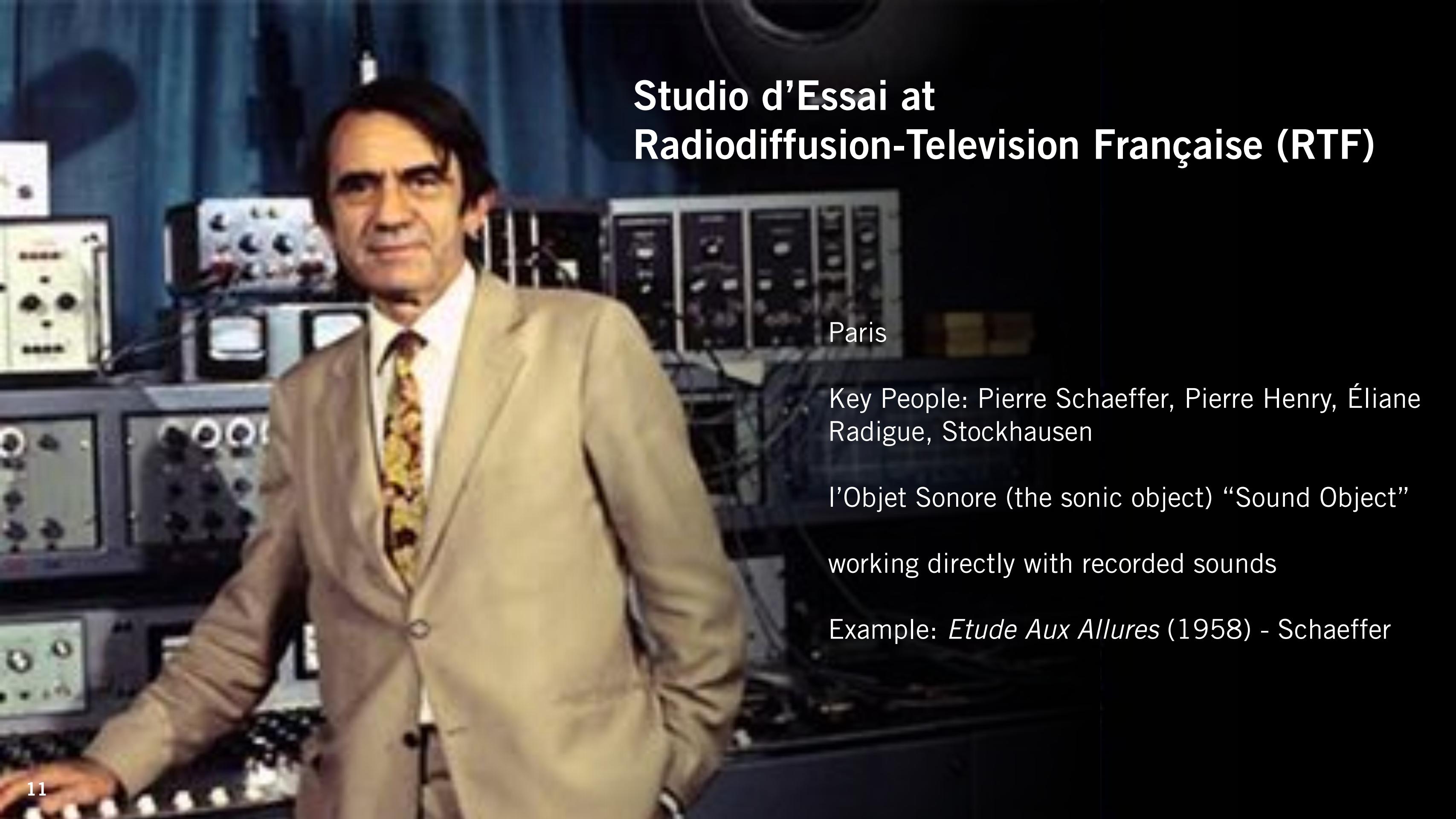
1957 - Computer music! Max Mathews working at Bell Labs (in 2 weeks!)

# Manhattan Research New York

Raymond Scott

Collaboration between humans and machines. Commercial Jingles.

Example: Lightworks (1950s)

A color photograph of a man with dark hair and a mustache, wearing a light-colored suit jacket, a white shirt, and a patterned tie. He is standing in front of a large array of vintage electronic audio equipment, likely a mixing console or tape machine. The background is filled with various knobs, sliders, and illuminated buttons. The word "Paris" is visible on a panel to the right.

# Studio d'Essai at Radiodiffusion-Television Française (RTF)

Paris

Key People: Pierre Schaeffer, Pierre Henry, Éliane Radigue, Stockhausen

l'Objet Sonore (the sonic object) “Sound Object”

working directly with recorded sounds

Example: *Etude Aux Allures* (1958) - Schaeffer



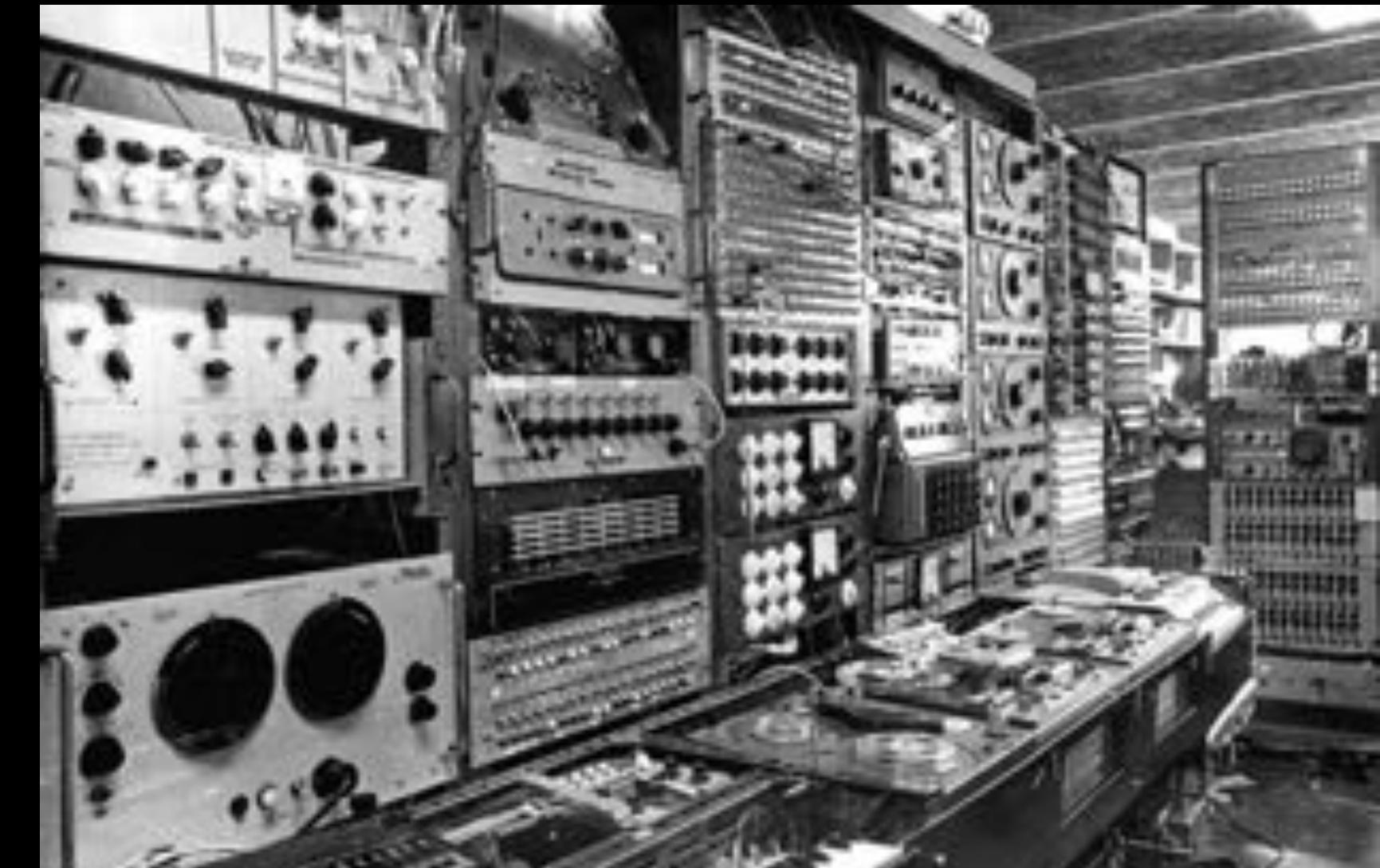
## NWDR (Northwest German Broadcasting) Studio

Cologne

People: Dr. Werner Meyer-Eppler, Herbert Einmert, Robert Beyer, Stockhausen

Synthesized sounds over recorded sounds

Example Piece: Einmert's *Klangstudie II* (1952)



# KARLHEINZ STOCKHAUSEN



A musical bridge between the French and German schools of thought / composition.

Both synthesized and recorded sounds.

Spatial projection of sound

In 1963, Stockhausen succeeded Eimert as the director of the Cologne studio

**Example: Gesang der Jünglinge**



## Columbia-Princeton Electronic Music Center (1950s)

People: Vladimir Ussachevsky and Otto Luening | Example: Piece for Tape Recorder (1956) - Ussachevsky



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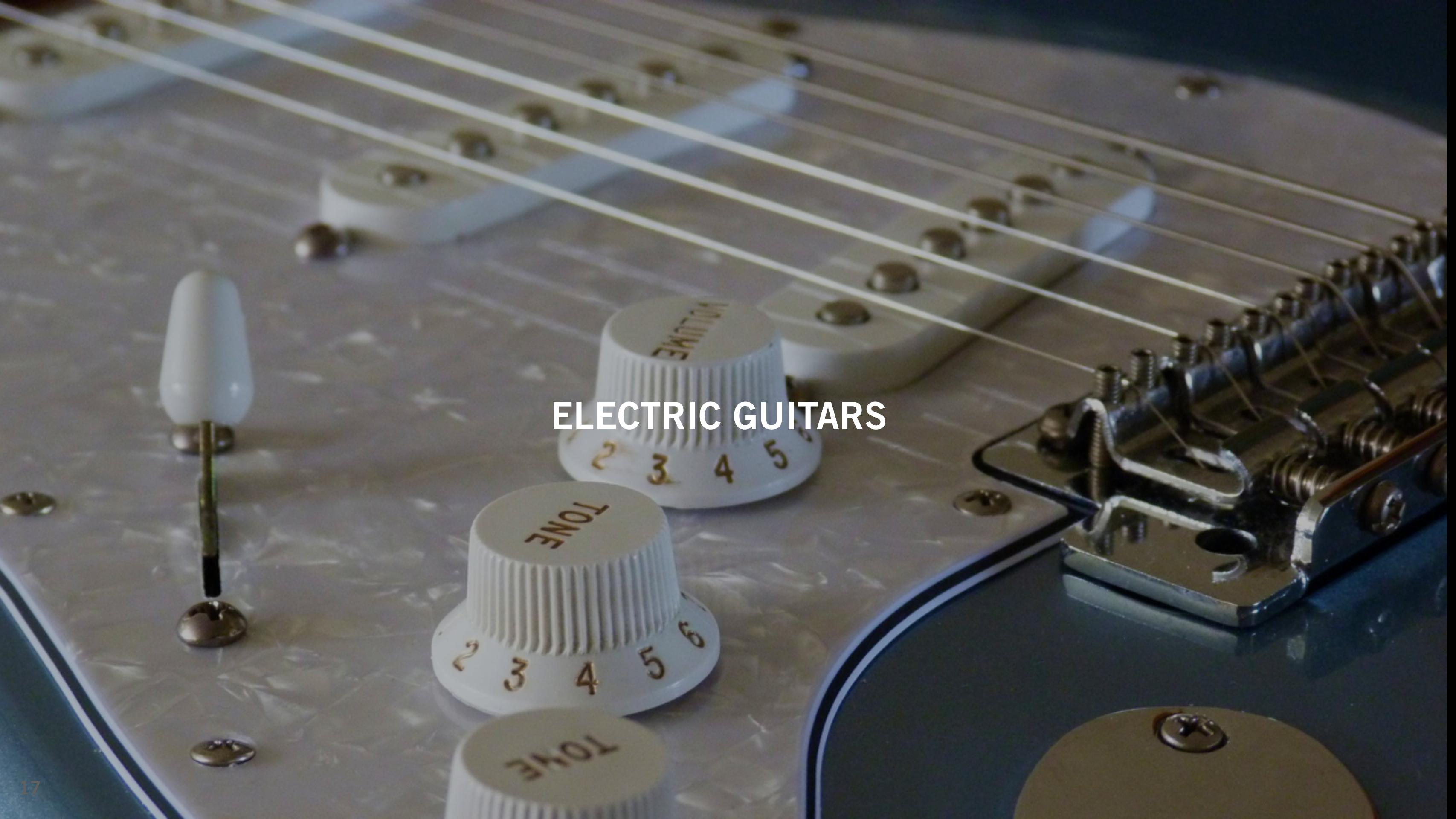
## **OTHER IMPORTANT ELECTRONIC MUSIC CENTERS**

**Studio di Fonologia Musicale, Italy (1953)**

Luciano Berio & Luigi Nono

**Nippon Koso Kyokai (NHK) Japanese Broadcasting Corporation (1954)**

Toshiro Mayuzumi & Toru Takemitsu



# ELECTRIC GUITARS

## EARLY ELECTRIC GUITARS (1930-1945ish)

ELECTRIFIED 'SPANISH STYLE' ACOUSTIC GUITARS

HOLLOW BODY

LOW AMPLIFICATION DUE TO FEED-BACK



GIBSON ES-150  
1936



**SWING TO BOP**

CHARLIE CHRISTIAN

1941 AT MINTON'S NYC

Muddy Waters

Blues Guitarist

Part of the 1940s Chicago Jazz Scene



# THE “FRYING PAN”

RICKENBACKER ELECTRO A-22

INVENTED BY GEORGE BEAUCHAMP & PRODUCED BY ADOLPH RICKENBACKER IN 1931



## SOLID BODY ELECTRIC GUITARS

LES PAUL INVENTS “THE LOG” IN 1940



## LES PAUL INVENTS “THE LOG” IN 1940





FENDER TELECASTER  
1950



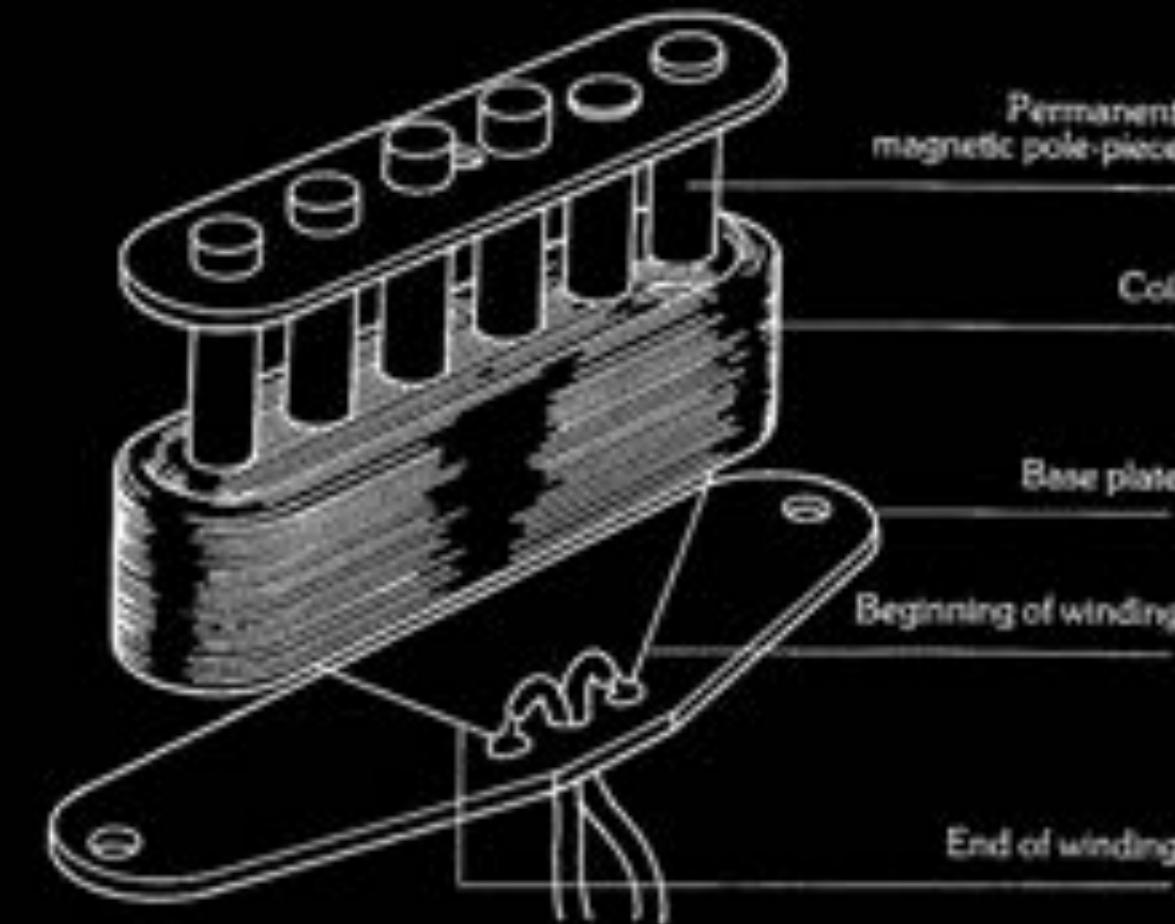
GIBSON LES PAUL  
1951



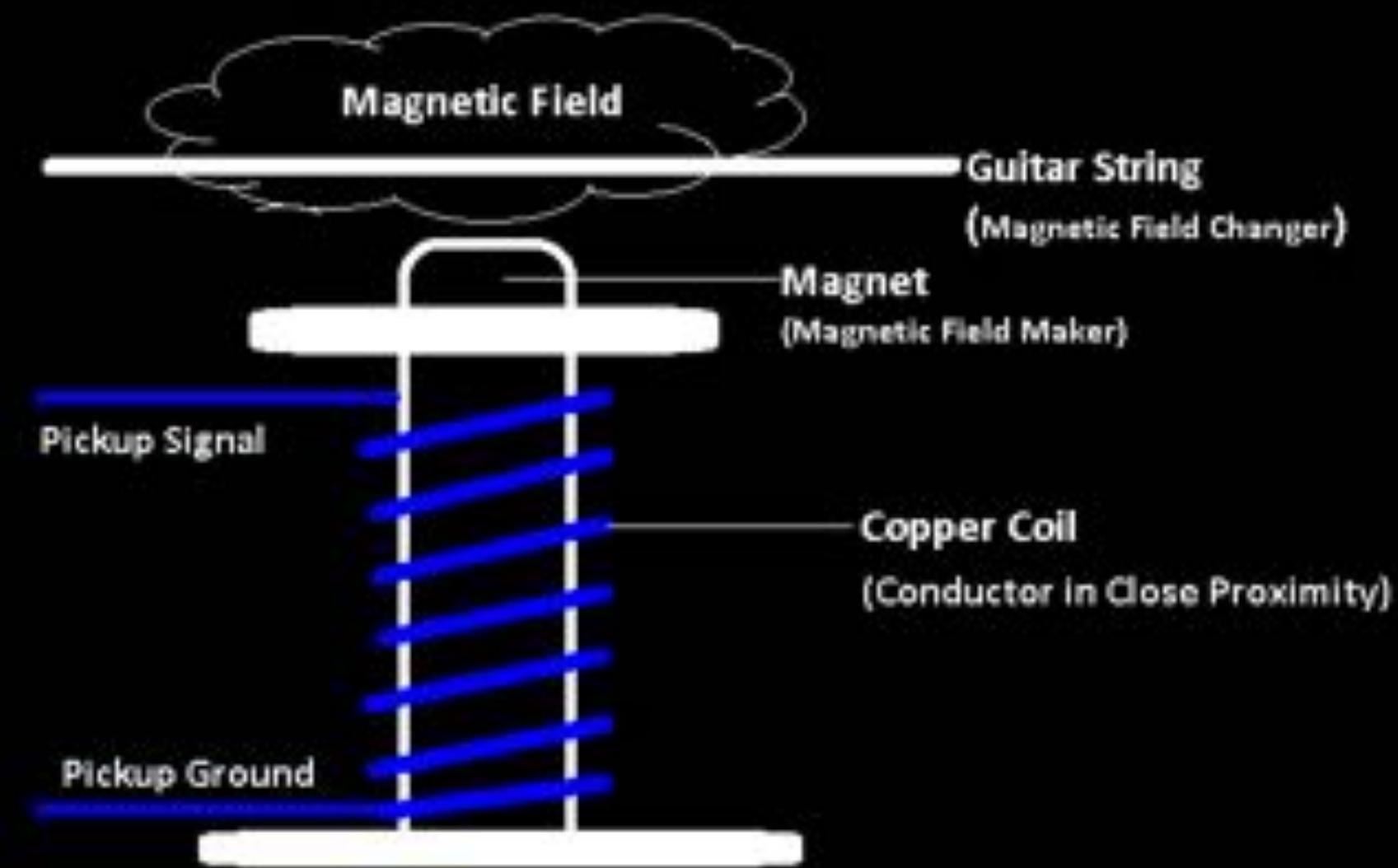
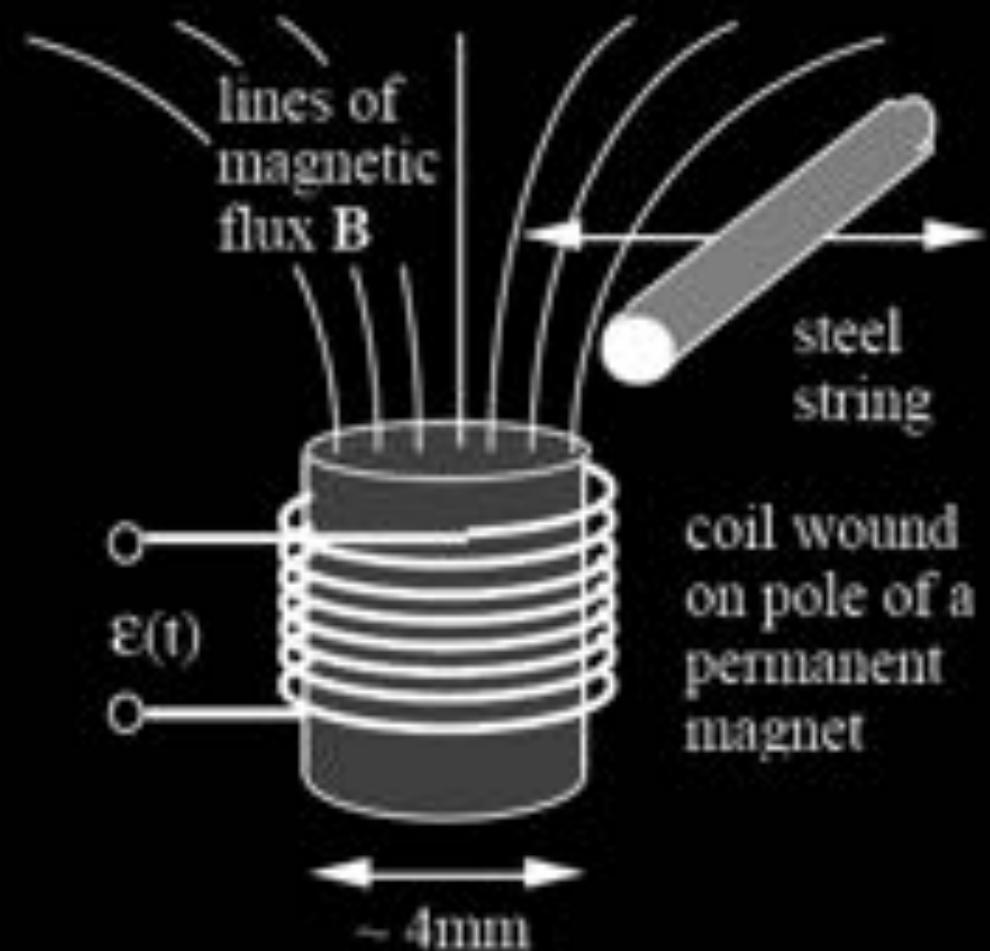
GRETsch WHITE FALCON  
1955

# HOW DO GUITAR PICKUPS WORK?

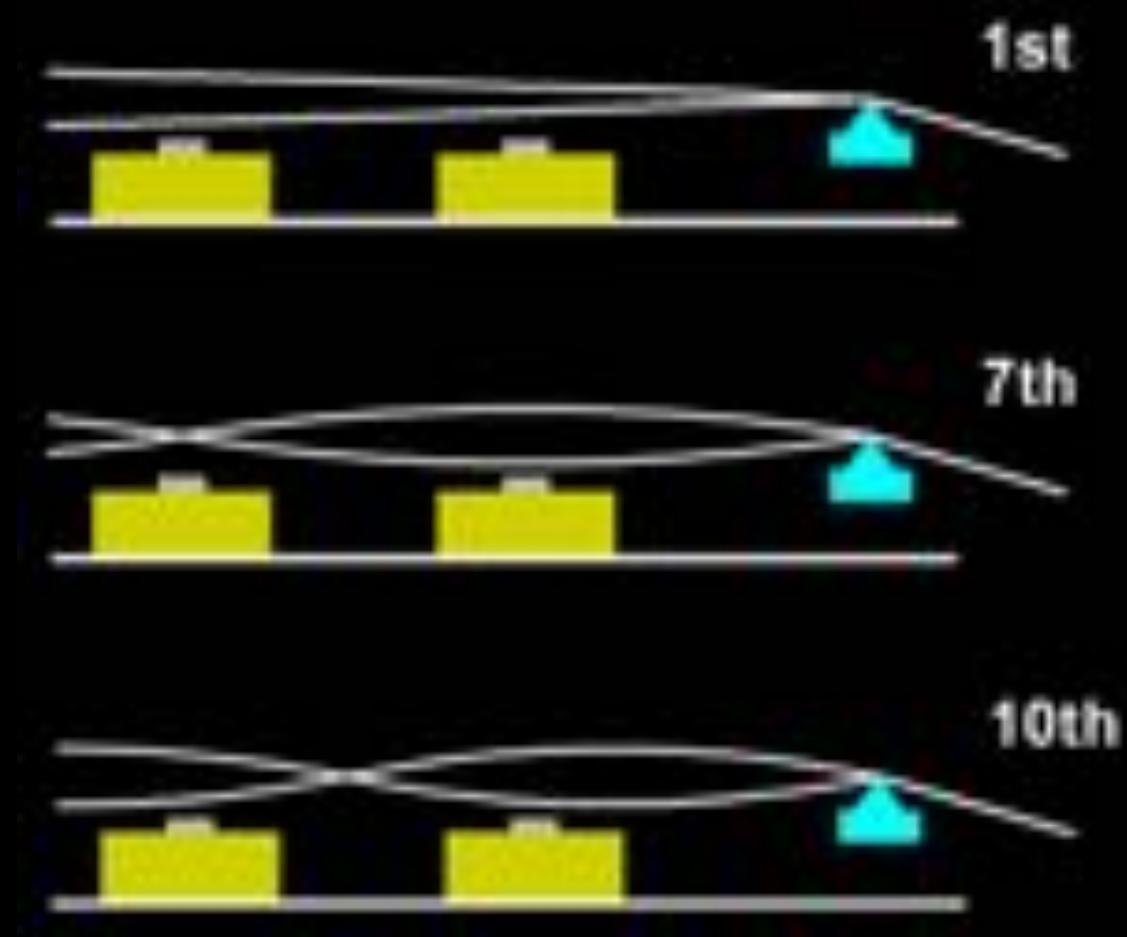
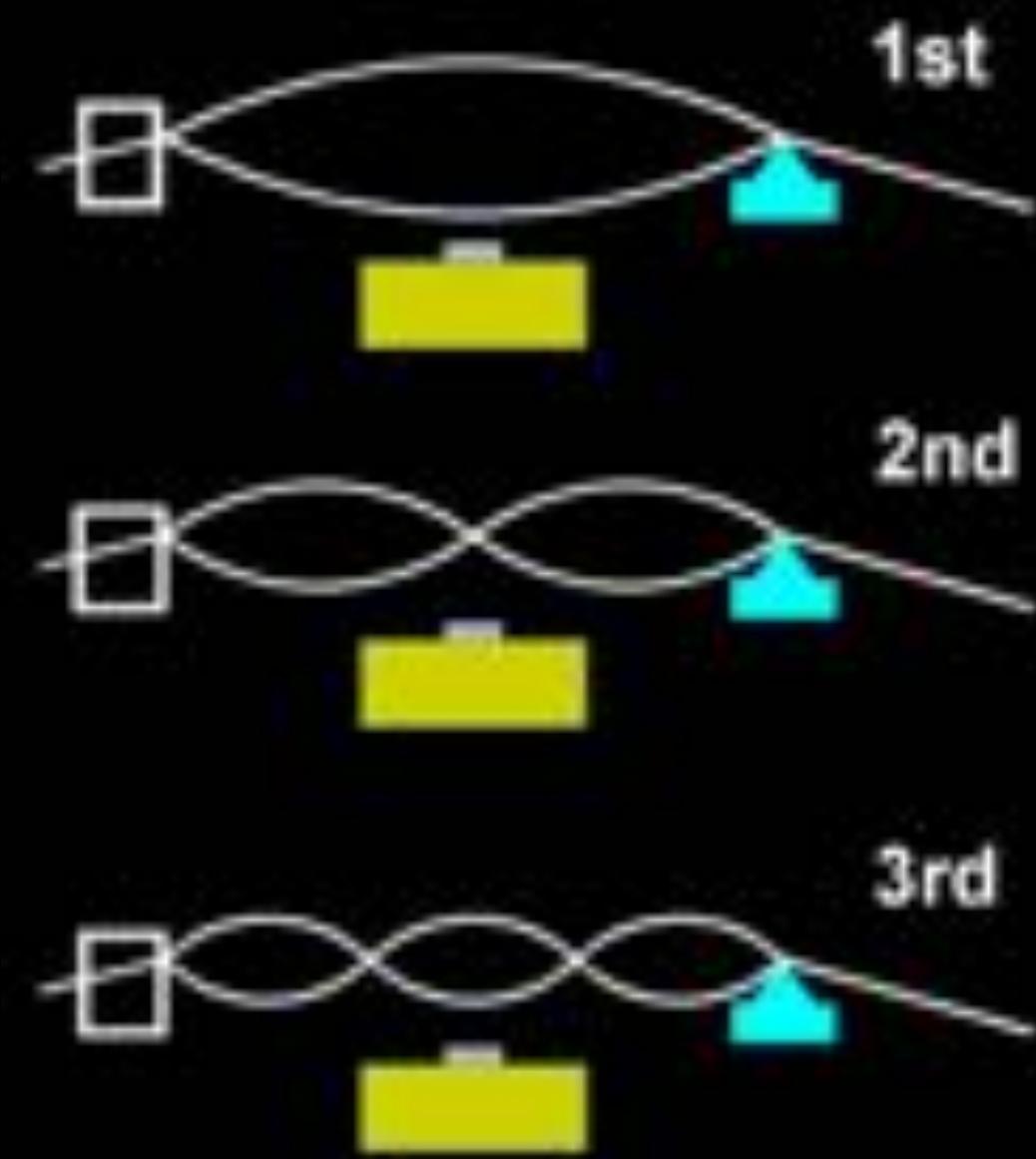
Faraday's Law - a changing magnetic field will generate electricity in a conductive wire



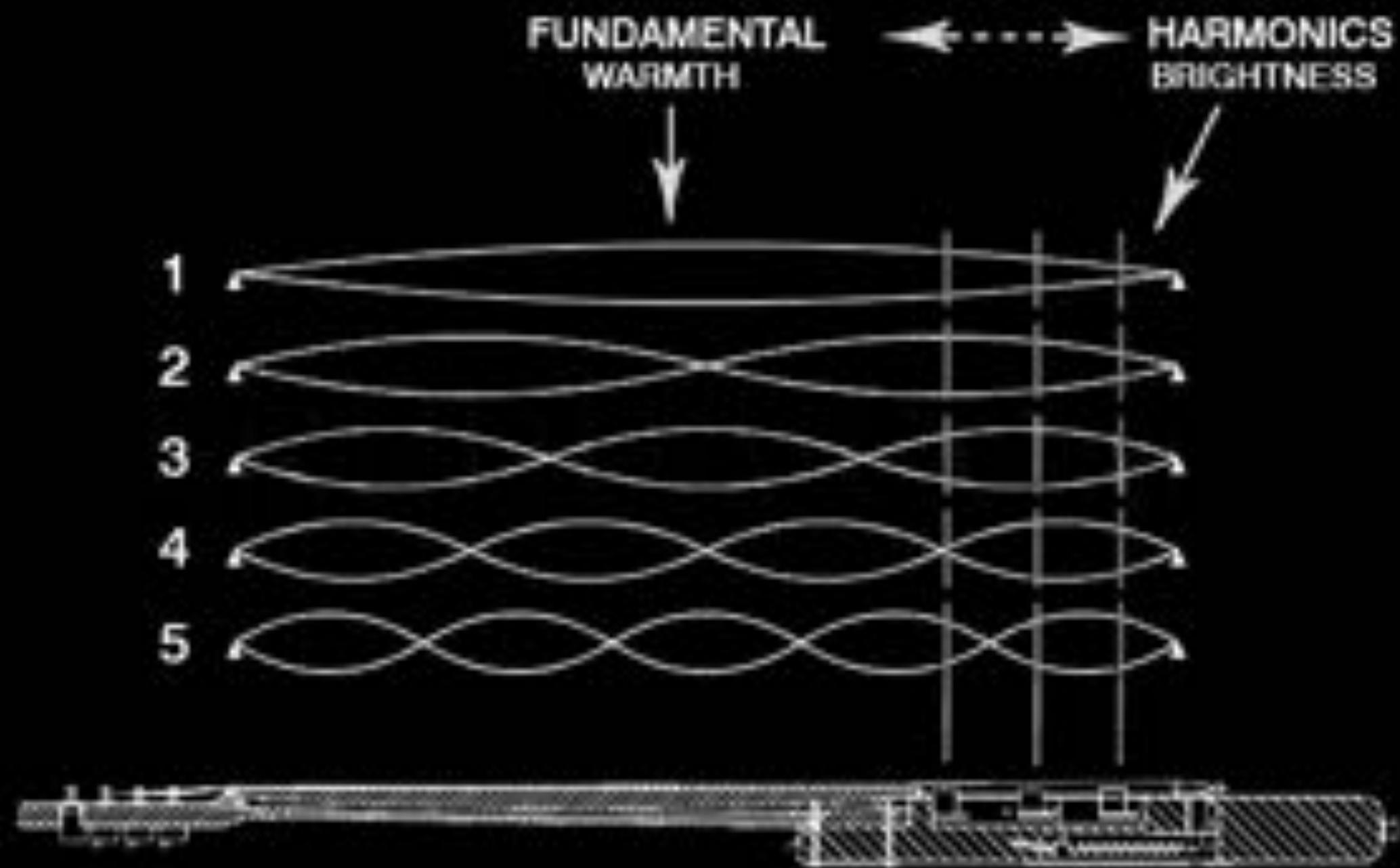
# HOW DO GUITAR PICKUPS WORK?



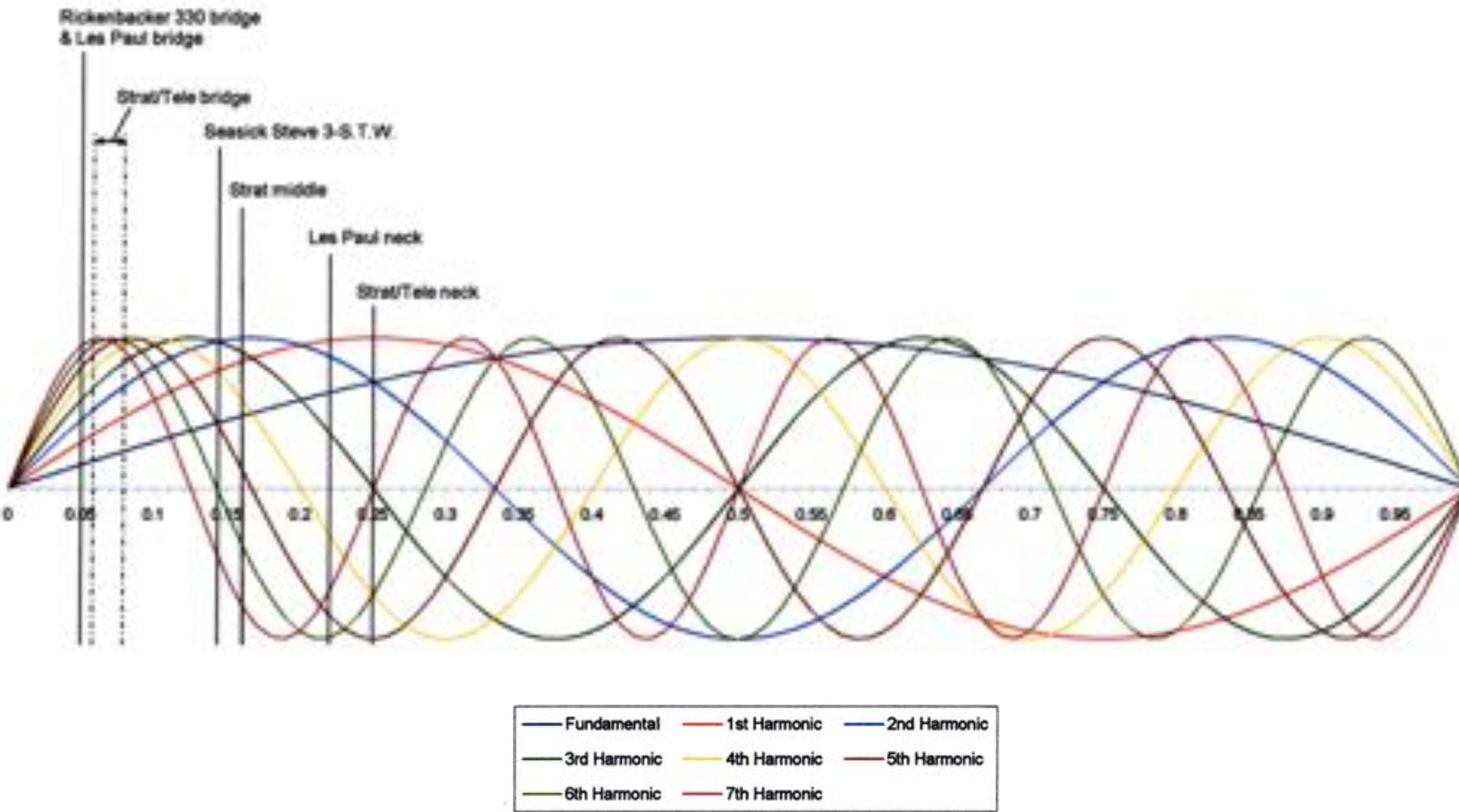
## PICKUP SWITCH



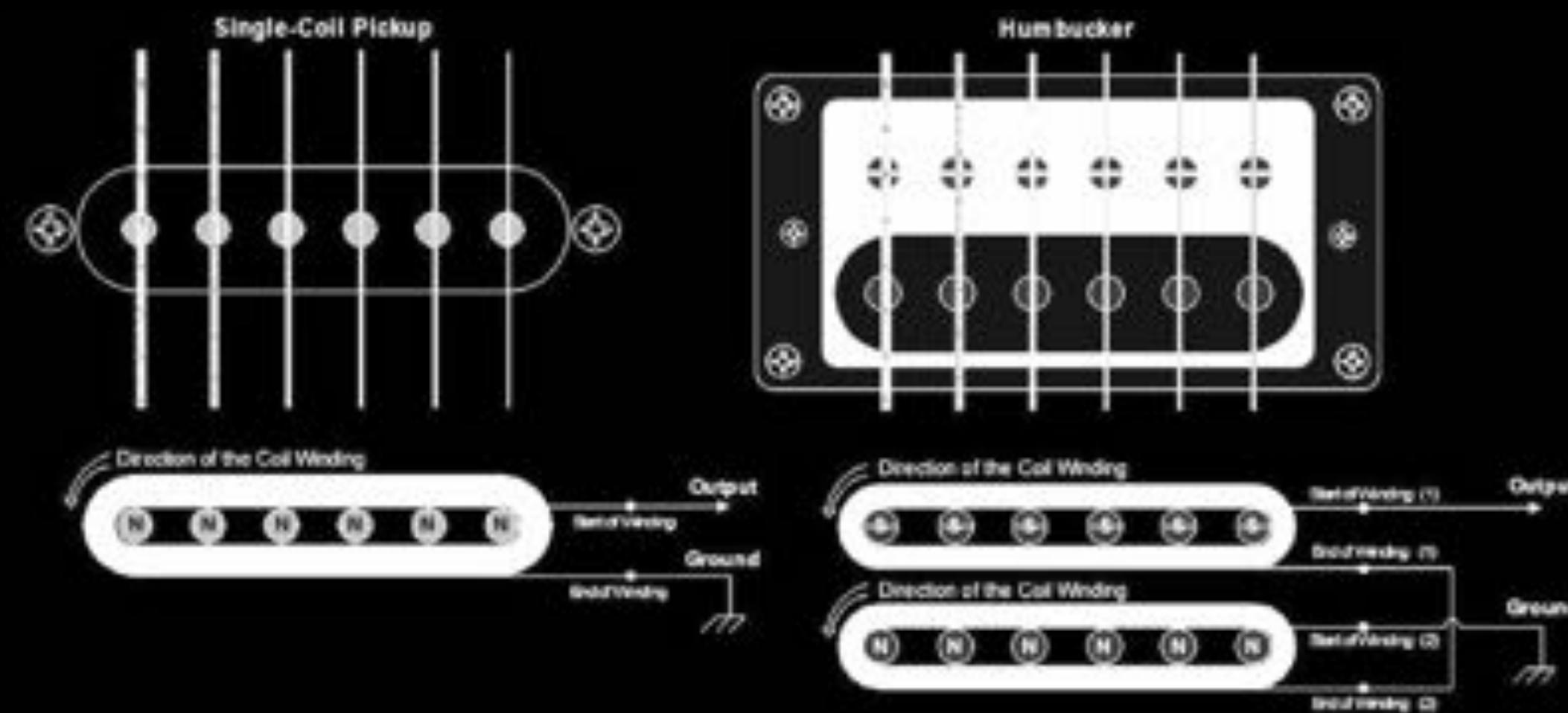
# PICKUP PLACEMENT



# PICKUP POSITIONS ON FAMOUS ELECTRONIC GUITARS



# SINGLE COIL VS. HUMBUCKER

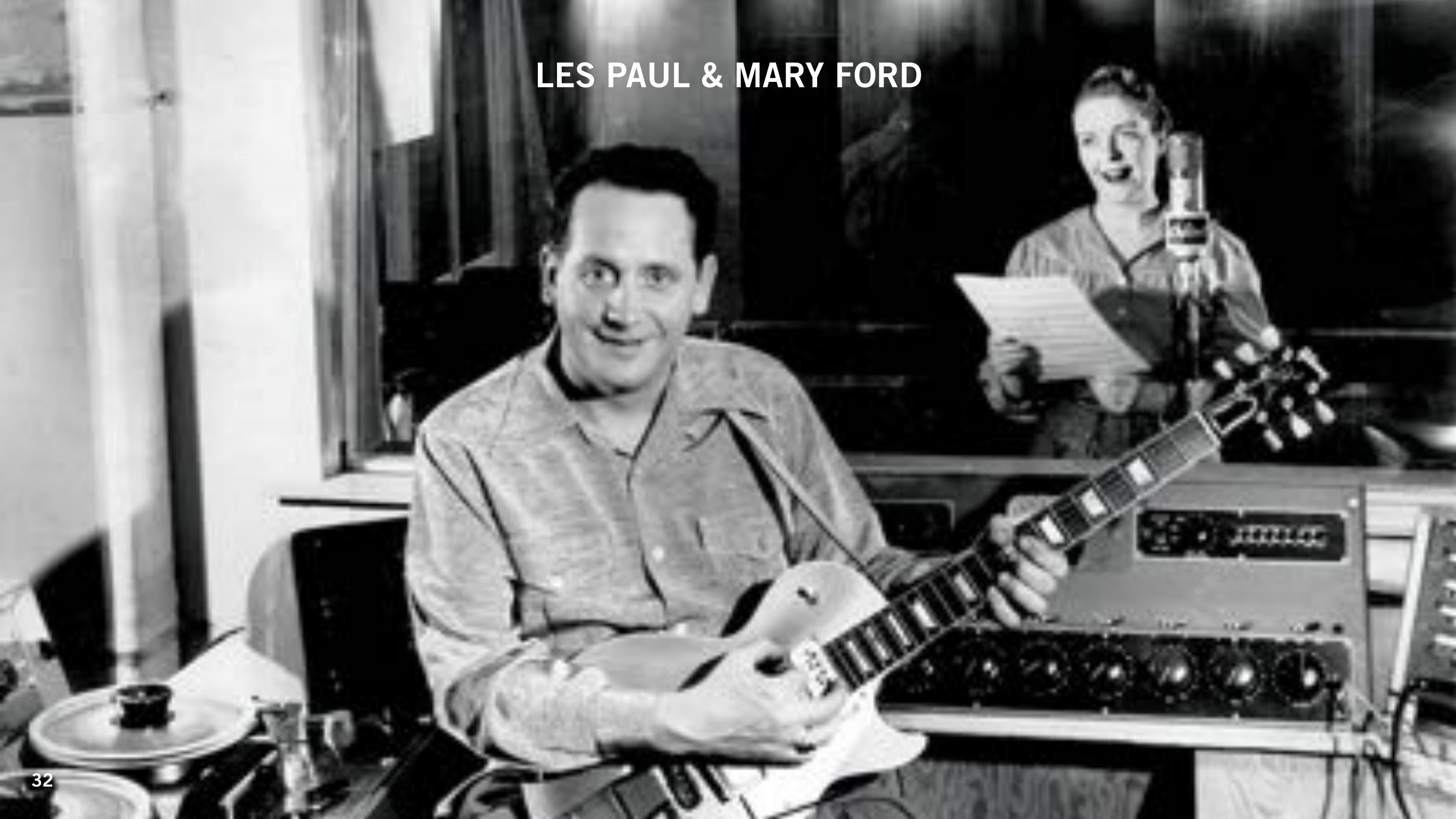


# Les Paul and Overdubbing

Listen: Lover (1948)



## LES PAUL & MARY FORD





## MULTITRACK TAPE

Late 50s and 60s

8 tracks recorded to 1 inch or 2 inch tape

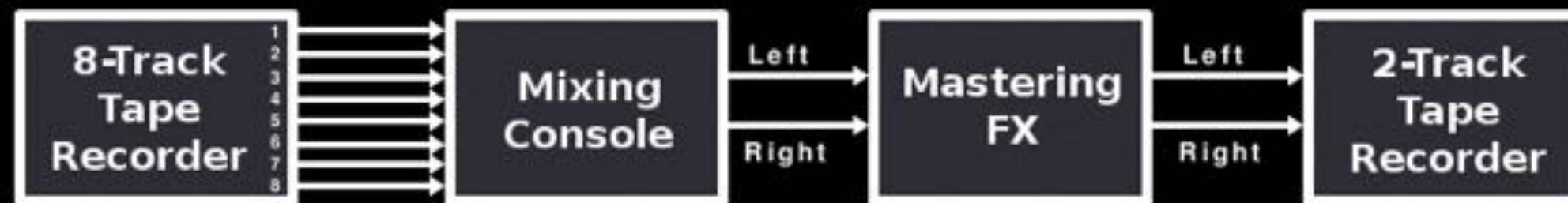
Allowed for non-destructive overdubbing

no mechanical sync problems

creative bouncing



# BOUNCING & MASTERING TAPE



## NEW FORMS

**Concept Album:** conceived as a single composition more than a collection of songs.

**Studio Album:** studio techniques and instrumental forces that could not be reproduced on stage.

## NEW ELEMENTS

Synthesized sounds, surrealist collage, tape manipulation, echo, extreme panning, vocal processing, feedback, sound effects (everyday sounds), spatial effects, orchestral effects.



# The Beach Boys

Brian, Dennis and Carl Wilson, Mike Love, & Al Jardine

"I Get Around" on The Ed Sullivan Show in 1964

# Brian Wilson

songwriter, producer & studio perfectionist

- ★ studio arrangements were “impossible to perform live”
- ★ why mono?
- ★ the studio as an instrument, a compositional tool

using studio techniques (mixing, mixing, bouncing, collage, etc) and effects (primarily echo & reverb) songs became explorations of musical soundscapes.

context as a compositional device?

parallel realities?





THIRTEEN



# PET SOUNDS (1966)



LISTEN “GOD ONLY KNOWS”

# THE BEATLES

formed in 1960 in Liverpool, England

over 1 billion records sold

In 1966 they released the Revolver LP and followed with what would be their last commercial tour.

stopped touring in 1966 and focused on studio production

John Lennon, George Harrison, Paul McCartney, Ringo Starr at Shea Stadium 1966



## SGT. PEPPER'S LONELY HEARTS CLUB BAND



# A DAY IN THE LIFE

echo, stereo panning and tape manipulation.

took 34 studio hours to complete.

for the orchestral parts Martin wrote out a somewhat improvisatory score starting with their lowest note and ending on their highest note.

