



## Herbert Belar papers 2767

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Manuscripts and Archives

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## Summary Information

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<b>Repository:</b>	Manuscripts and Archives
<b>Creator:</b>	Belar, Herbert, 1901-1997
<b>Title:</b>	Herbert Belar papers
<b>ID:</b>	2767
<b>Date [inclusive]:</b>	1928-2020
<b>Date [bulk]:</b>	1938-1966
<b>Physical Description:</b>	3.5 Linear Feet
<b>Language of the Material:</b>	English .
<b>Abstract:</b>	Herbert Belar (1901-1997) was an inventor and research scientist in the field of acoustical engineering at the RCA David Sarnoff Research Center in Princeton, New Jersey for thirty-eight years. He developed "hi-fi" recording, the phonetic typewriter, and the electronic music synthesizer. This small collection of Herbert Belar papers reflects the professional daily work of an acoustical engineer from the 1930s through the 1960s. There is significant documentation on the phonetic typewriter, the 200 speech communication system, the music composing machine, and the electronic music synthesizer. Notable inclusions are information related to the development of "hi-fi," film motion pictures sound recording, and phonographic records recording. There is only one file that discusses Belar's work at the MAD Laboratory.

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## Biographical Note

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Herbert Belar (1901-1997) was an inventor and research scientist in the field of acoustical engineering at the RCA David Sarnoff Research Center in Princeton, New Jersey for thirty-eight years. He developed "hi-fi" recording, the phonetic typewriter, and the electronic music synthesizer. Belar was born in Laibach, Austria-Hungary (now Ljubljana, Slovenia) to Albin Belar (1864-1939) and Frances Thomann Belar (1880-1971). At thirteen he entered the Austrian Naval Academy, and graduated in 1917.

He immigrated to the United States in 1919. He earned a bachelor's degree in engineering from Drexel University in 1928, and was promptly hired by RCA Victor Photophone in Camden, New Jersey. Belar

spent the first year of his employment completing the General Electric Advanced Course in Engineering in Schenectady, New York, before returning to Camden. During World War II Belar was part of a secret RCA working group called "MAD Lab." At the "MAD Lab" he worked on projects as part of the war effort for the military between 1942 and 1943.

He was transferred to RCA Laboratories in Princeton in 1948, where he worked in acoustics under Harry F. Olson (1901-1982) for almost twenty years. While at RCA Laboratories, Belar collaborated with Olson to develop the first musical synthesizers: the RCA Mark I and Mark II. Together they also devised a music composing machine and a phonetic, or voice activated, typewriter. Belar authored one book and co-authored, with Olson, three books and eleven journal articles. He was also issued over forty patents and was one of the scientists appointed a Fellow of the Technical Staff when the title was created in 1959.

He married Glennie Marie Paul Belar (1909-1993) in 1942. The couple had two daughters.

Belar retired from RCA in 1966 and died in Florida in 1997.

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## Scope and Contents

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This small collection of Herbert Belar papers reflects the professional daily work of an acoustical engineer from the 1930s through the 1960s. There is significant documentation on the phonetic typewriter, the 200 speech communication system, the music composing machine, and the electronic music synthesizer. Notable inclusions are information related to the development of "hi-fi," film motion pictures sound recording, and phonographic records recording. There is only one file that discusses Belar's work at the MAD Laboratory

The collection is organized into five series: Engineering memorandum and designs; Prints; "Special" / career highlights; RCA reports; and Reprints.

Engineering memorandum and designs series consists of engineering memoranda from General Electric from 1928 to 1935 and RCA engineering designs and memoranda from 1938 to 1966. The RCA material consists of designs of filters, speech input and recordings, and film reproduction equipment. There is some information related to information theory and advanced development records and phonographs. There is considerable information on the 200 syllable communication system from 1964 to 1965, with some material dating from 1962. Additionally there are thirty-six photographs of the music composing machine and phonetic typewriter.

The Prints series is called "prints" to be in keeping with the title used by the creator; the materials are graphs, circuit diagrams, data sheets, and parts lists. Some folders include design layouts, formulas, block diagrams, and additional notes. The materials date from 1938 to 1967 and were organized by year by the creator. The early years tend to contain work related to several different projects which are noted for each folder, such as amplifiers, modulators, and phonograph recording. As each year progresses, his work becomes more focused on one specific project such as the phonetic typewriter, syllable selector, speech

analyzer, phonetic typewriter III, and the 200 Syllable Communication System. For each project year, the work may be for one project, however, include many different aspects and parts (one folder could contain over a hundred pages of documentation). Notably in 1940, Belar did audio engineering work for Disney's "Fantasia" road show equipment (the documentation is small in quantity, but not quality). The materials in this series are highly technical in nature and may require some familiarity with engineering.

"Special" / career highlights series consists of materials that marked significant achievements or career milestones, were designated by the creator to be of particular interest or are of a personal nature. A portion of the materials were originally in a folder marked "Special" and have been arranged into three subseries imposed by the archivist in order to preserve the original order by the creator. The subseries are: Personal, Highlights, and Sound.

The Personal subseries contains a ten-page biography written by one of Belar's daughters. There is his 25 years of service at RCA certificate and dinner program from 1953, as well as his certificate from Sigma Xi. In 1966 upon Belar's retirement he was given a retirement farewell booklet containing many letters from colleagues reflecting on their careers together and wishing him well in retirement. There is a report titled "The Herbert Belar Electron Bugle report" which appears to be humorous in nature, bound like an official report, but intended as a joke. In 1968 RCA celebrated its 25 Anniversary of RCA Laboratories with a commemorative book. The book was sent to Belar with a thank you letter from the RCA President Jim Hillier and Vice President, George Brown. There are two recordings on reel-to-reel, one is of Christmas Carols, and the other is children voices and was re-recorded from a wire recorder. The latter is dated between 1945 and 1948. There is one phonographic record, an RCA Red Label of Claude Debussy's Clair de Lune, recorded in 1947.

Highlights subseries has an album of thirty-two of Belar's patents and an album of newspaper clippings and magazine articles about Belar's work, primarily related to the electronic music synthesizer and the phonetic typewriter. The articles date from 1954 to 1982. There are few full magazines included and the page of the article that references Belar is notated on the front cover. Both albums were originally in 3-ring binders and were removed from the binders for preservation purposes, the original order of the albums has been maintained. There are three additional files included in this series. Belar's personnel file which contains promotion letters, organizational charts, employment agreements, and job descriptions. The folder on File systems is a copy of ledgers that documents Belar's research from 1948 to 1963. There is one folder of information related to Belar's work on the MAD Project and it contains a few brief summaries about the project and a chronology.

Sound subseries primarily relates to the music synthesizer, but does contain some materials on "hi fi," sound on film, and the phonetic typewriter. The first three folders were bound together: Origin of Stereographic Sound; Origin of High Fidelity; and Synthesis of Music. These folders contain research articles and, in some cases, additional handwritten notes. There are several recordings of the music synthesizer between 1952 and 1961. There are four phonographic records and five sound tape reels. The sound tape reels have an accompanying handwritten explanation written by Belar in 1995 at the request of his daughter. There are letters from Belar he wrote to M.W. Scheldorf in response to an inquiry about sounds of music. In 1955 RCA released a four phonographic record box set with a booklet titled; "The Sounds and Music of the RCA Electronic Music Synthesizer." It features narration about the characteristics of musical sounds and musical excerpts demonstrating the synthesizer. Additionally, there is a 16mm film which contains a test method for audio sound on film. There is a videocassette (VHS) copy of the film in the collection. Finally, there is a script for practicing the phonetic typewriter.

RCA reports consists of ten technical reports. There are nine reports that are a series of quarterly progress reports and then a final report for the Study of Speech Compression Systems (Syllabic Compression Techniques) the study goes from 1962 to 1964 and was performed by Belar and his colleagues R. de Sobrino, E.S. Rogers, and E.G. May. There is one report from 1960 on Speech Research Assignments.

Reprints series consists scientific publications primarily of articles authored or co-authored by Herbert Belar, but occasionally about his work, or just of interest. The publications date from 1932 to 1965. Many are duplicates of articles found elsewhere in the collection. The topics covered are film recording, "hi-fi," the phonetic typewriter, electronic music synthesizer, acoustic sound reproduction, and sound analysis.

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## Administrative Information

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### Publication Statement

Manuscripts and Archives

PO Box 3630

Wilmington, Delaware 19807

[askhagley@hagley.org](mailto:askhagley@hagley.org)

URL: <http://www.hagley.org/library>

### Access Restrictions

This collection is open for research.

### Use Restrictions

Copyright restrictions may apply.

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## Related Materials

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### Related Materials

David Sarnoff Research Center records (Accession 2464.09), Manuscripts and Archives, Hagley Museum and Library.

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## Controlled Access Headings

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- Electronic industries
- Electronics -- Research
- Music and history
- Sound -- Equipment and supplies
- Electrical engineering
- RCA Corporation
- Sarnoff Corporation

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## Collection Inventory

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### Engineering memorandum and designs, 1928-1966

#### Scope and Contents

Engineering memorandum and designs series consists of engineering memoranda from General Electric from 1928 to 1935 and RCA engineering designs and memoranda from 1938 to 1966. The RCA material consists of designs of filters, speech input and recordings, and film reproduction equipment. There is some information related to information theory and advanced development records and phonographs. There is considerable information on the 200 syllable communication system from 1964 to 1965, with some material dating from 1962. Additionally there are thirty-six photographs of the music composing machine and phonetic typewriter.

Title/Description	Instances	
General Electric engineering memoranda, 1928-1929	box 1	folder 1
General Electric engineering memoranda, 1930	box 1	folder 2
General Electric engineering memoranda, 1931	box 1	folder 3
General Electric engineering memoranda, 1932-1933	box 1	folder 4
General Electric engineering memoranda, 1934-1935		

	box 1	folder 5
RCA filter designs, 1938-1940	box 1	folder 6
<b>Scope and Contents</b>		
Includes: data sheets, schematics, and charts.		
RCA speech input and recording designs, 1938-1940	box 1	folder 7
<b>Scope and Contents</b>		
Includes: data sheets, schematics, charts, and photographic prints.		
RCA film reproduction equipment designs, 1940	box 1	folder 8
<b>Scope and Contents</b>		
Includes: data sheets, schematics, charts, and photographic prints.		
RCA Advanced development records and phonographs memoranda, 1941-1942	box 1	folder 9
RCA designs, 1948-1959-1961	box 1	folder 10
<b>Scope and Contents</b>		
Includes formulas, diagrams, frequency charts, and diagrams related to recording/cutting phonograph records.		
RCA Princeton Laboratory memoranda and designs, 1950	box 1	folder 11
<b>Scope and Contents</b>		
Includes: data sheets, schematics, charts, and photographic prints related to 45 phonograph records and stereophonic sound.		
RCA music composing machine and phonetic typewriter photographs, circa 1951	box 1	folder 12
RCA information theory, 1959	box 1	folder 13
<b>Scope and Contents</b>		
Includes reports and research notes on recording systems, noise reduction, and communication acoustics.		
RCA 200 Syllable Communication System, 1965	box 1	folder 14
<b>Scope and Contents</b>		
Includes reports on: processor and memory analyzer and switching circuits for syllable memory.		
RCA 200 Syllable Communication System, 1966	box 1	folder 15

## Scope and Contents

Includes reports on: envelope analyzer, spectrum analyzer, memory control unit, syllable memories, performance, and voice-to-voice.

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RCA 200 Syllable Communication System, speech recognition, 1962-1964	box 1	folder 16
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## Scope and Contents

Includes reports on: phonetic typewriter, phonetic typewriter III, unvoiced syllable memory, and unvoiced spectrum.

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RCA 200 Syllable Communication System, speech recognition, 1965	box 1	folder 17
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## Scope and Contents

Includes reports on: detectors, and unvoiced spectrum.

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RCA 200 Syllable Communication System, speech recognition, 1966	box 1	folder 18
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## Scope and Contents

Includes: consulting agreement, and a patent disclosure.

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## Prints, 1938-1967

### Scope and Contents

The Prints series is called "prints" to be in keeping with the title used by the creator; the materials are graphs, circuit diagrams, data sheets, and parts lists. Some folders include design layouts, formulas, block diagrams, and additional notes. The materials date from 1938 to 1967 and were organized by year by the creator. The early years tend to contain work related to several different projects which are noted for each folder, such as amplifiers, modulators, and phonograph recording. As each year progresses, his work becomes more focused on one specific project such as the phonetic typewriter, syllable selector, speech analyzer, phonetic typewriter III, and the 200 Syllable Communication System. For each project year, the work may be for one project, however, include many different aspects and parts (one folder could contain over a hundred pages of documentation). Notably in 1940, Belar did audio engineering work for Disney's "Fantasia" road show equipment (the documentation is small in quantity, but not quality). The materials in this series are highly technical in nature and may require some familiarity with engineering.

### Title/Description

### Instances

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Graphs, circuit diagrams, data sheets, and parts lists, 1938-1939	box 1	folder 19
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### Scope and Contents

Includes: variable recording; low frequency booster; amplifier for UHF police transmitter; 16mm projector amplifier; announce speaker amplifier; phototube regulator;

two stage pre-amplifiers; Keystone 16mm projector amplifier; two stage booster amplifier; MI-12204 amplifier; Bell and Howell 16mm; amplifier for C.B.C.; 86A consolette; dexluxe theatre equipment; 85x isolation amplifier; 71-A turntable compensator.

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Graphs, circuit diagrams, data sheets, and parts lists, 1940                      box 1                      folder 20

**Scope and Contents**

Disney "Fantasia" road show equipment.

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Graphs, circuit diagrams, data sheets, and parts lists, 1940-1944                      box 1                      folder 21

**Scope and Contents**

Includes: MI-3233 bridging amplifier; artificial voice; acetate recording compensator; ground noise reduction amplifier; hum reduction and demodulator; replacement PG138 amplifier; orthacoustic compensator; S-831 ballast tube and MI-1500 power supply tests; MI-10210 phototube amplifier; MI-10213 voltage amplifier; MI-4887 recording cutter; turntable with combination pickup filter; turntable motor oscillator; v205 amplifier; logarithmic voltmeter; double channel records; analysis of F.M. pickup by equivalent circuit diagrams; second harmonic in variation of capacity.

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Graphs, circuit diagrams, data sheets, and parts lists, 1948-1952                      box 1                      folder 22

**Scope and Contents**

Includes: velocity limits for 45 rpm and 78 rpm phonograph records; calculated distortion; calculated noise; analysis of cutting forces; schematic of composing machine; 45EY record player for home recording; parts for Mark I synthesizer.

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Graphs, circuit diagrams, data sheets, and parts lists, 1953-1954                      box 1                      folder 23

**Scope and Contents**

Includes: parts for phonetic typewriter.

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Graphs, circuit diagrams, data sheets, and parts lists, 1955                      box 1                      folder 24

**Scope and Contents**

Includes: parts for phonetic typewriter.

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Graphs, circuit diagrams, data sheets, and parts lists, 1956                      box 1                      folder 25

**Scope and Contents**

Includes: parts for the phonetic typewriter.

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Graphs, circuit diagrams, data sheets, and parts lists, 1957                      box 1                      folder 26

**Scope and Contents**

Includes: parts, index to audio recordings (not in collection), and sheet music studies for Mark I Synthesizer.

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Graphs, circuit diagrams, data sheets, and parts lists, 1958                      box 1                      folder 27

**Scope and Contents**

Includes: average and peak recording meter; 16 channel dividing network; master tape record; parts for the phonetic typewriter.

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Graphs, circuit diagrams, data sheets, and parts lists, 1959                      box 1                      folder 28

**Scope and Contents**

Includes: parts for the phonetic typerwriter III.

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Graphs, circuit diagrams, data sheets, and parts lists, 1960                      box 2                      folder 1

**Scope and Contents**

Includes: parts for phonetic typewriter III, mainly syllable codes.

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Graphs, circuit diagrams, data sheets, and parts lists, 1961                      box 2                      folder 2

**Scope and Contents**

Includes: tests of the speech segmenter, syllable selector, and the phonetic typewriter III.

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Graphs, circuit diagrams, data sheets, and parts lists, 1962                      box 2                      folder 3

**Scope and Contents**

Includes: parts for syllable speech synthesizer, syllable memory.

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Graphs, circuit diagrams, data sheets, and parts lists, 1963                      box 2                      folder 4

**Scope and Contents**

Includes: speech processing, and parts for 200 Syllable Communication System.

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Graphs, circuit diagrams, data sheets, and parts lists, 1964-1965                      box 2                      folder 5

**Scope and Contents**

Includes: parts for 200 Syllable Communication System.

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Graphs, circuit diagrams, data sheets, and parts lists, 1967                      box 2                      folder 6

## Scope and Contents

Includes: modulator. Original folder labeled "Volunteer work after retirement."

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## "Special" / career highlights, 1928-198219952020

### Scope and Contents

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## Personal

## Scope and Contents

The Personal subseries contains a ten-page biography written by one of Belar's daughters. There is his 25 years of service at RCA certificate and dinner program from 1953, as well as his certificate from Sigma Xi. In 1966 upon Belar's retirement he was given a retirement farewell booklet containing many letters from colleagues reflecting on their careers together and wishing him well in retirement. There is a report titled "The Herbert Belar Electron Bugle report" which appears to be humorous in nature, bound like an official report, but intended as a joke. In 1968 RCA celebrated its 25 Anniversary of RCA Laboratories with a commemorative book. The book was sent to Belar with a thank you letter from the RCA President Jim Hillier and Vice President, George Brown. There are two recordings on reel-to-reel, one is of Christmas Carols, and the other is children voices and was re-recorded from a wire recorder. The latter is dated between 1945 and 1948. There is one phonographic record, an RCA Red Label of Claude Debussy's Clair de Lune, recorded in 1947.

Title/Description	Instances	
Herbert Belar, brief biography by Cynthia D. Belar, 2020	box 2	folder 7
<u>Use Restrictions:</u>		
<b>Use Restrictions</b>		
Copyright restrictions apply. Author retains copyright.		
Children re-recorded from wire recorder, 1945-1948	box 3	Tape 6
Claude Debussy Clair de Lune , 1947	box 3	folder 19

## Scope and Contents

Movement 3 from Suite Bergamasque. Leopold Stokowski and his Symphony Orchestra. RCA Victor Red Seal 49-1009.

Sigma Xi certificate, 1948	box 2	folder 16
RCA twenty-five years service , 1953 November 6	box 4	folder 1

## Scope and Contents

RCA Laboratories Division.

"The Herbert Belar Electronic Bugle report", 1966	box 2	folder 25
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## Scope and Contents

Includes: operating instructions, application notes, accessories, warranty, and circuit diagram. Appears to be created with humorous intent.

Retirement farewell booklet, 1966 March	box 4	folder 2
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## Scope and Contents

Includes approximately twenty typescript or handwritten messages from Belar's colleagues at the David Sarnoff Research Center wishing him well on his retirement and expressing how much working with him meant to them. The first two pages includes individual signatures. There is an illustrated front cover of Belar on a ship named

"Alda Philadelphia" with two pieces of naval equipment:  
 "Phonetic Dingy Launcher" and a "Foghorn Synthesizer"  
 artwork signed by D. McCoy.

"1942-1967: Twenty-Five Years at RCA Laboratories" book and letter, 1968	box 4	folder 1
Christmas carols, undated	box 3	Tape 7

## Highlights

### Scope and Contents

Highlights subseries has an album of thirty-two of Belar's patents and an album of newspaper clippings and magazine articles about Belar's work, primarily related to the electronic music synthesizer and the phonetic typewriter. The articles date from 1954 to 1982. There are few full magazines included and the page of the article that references Belar is notated on the front cover. Both albums were originally in 3-ring binders and were removed from the binders for preservation purposes, the original order of the albums has been maintained. There are three additional files included in this series. Belar's personnel file which contains promotion letters, organizational charts, employment agreements, and job descriptions. The folder on File systems is a copy of ledgers that documents Belar's research from 1948 to 1963. There is one folder of information related to Belar's work on the MAD Project and it contains a few brief summaries about the project and a chronology.

Title/Description	Instances	
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Herbert Belar personnel, 193019321943-194819531967	box 2	folder 8
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### Scope and Contents

Includes job descriptions; organizational charts, congratulatory letters, employment agreements, and one group photograph of a dinner in honor of Walter Paul.

Patents album, 1937-1968	box 2	folder 18-21
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### Scope and Contents

Includes 32 patent filings and certificates Removed from binder for preservation purposes..

MAD Project, 1942-1943	box 2	folder 9
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### Scope and Contents

Includes: brief chronological summary; operation set-up description; and summaries of jobs one, two and three.

File systems, 1948-1963	box 2	folder 17
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### Scope and Contents

Copies of ledger information related to his research.

News album, 1954-1982	box 2	folder 22-24
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**Scope and Contents**

Includes newspaper and magazine clippings that cover his career achievements at RCA, primarily related to the electronic music synthesizer and the phonetic typewriter. In some cases the entire magazine is include and the page the article appears on is notated on the cover. The materials have been removed from the original binder for preservation purposes.

**Sound**

**Scope and Contents**

Sound subseries primarily relates to the music synthesizer, but does contain some materials on "hi fi," sound on film, and the phonetic typewriter. The first three folders were bound together: Origin of Stereographic Sound; Origin of High Fidelity; and Synthesis of Music. These folders contain research articles and, in some cases, an additional handwritten note. There are several recordings of the music synthesizer between 1952 and 1961. There are four phonographic records and five sound tape reels. The sound tape reels have an accompanying handwritten explanation written by Belar in 1995 at the request of his daughter. There are letters from Belar he wrote to M.W. Scheldorf in response to an inquiry about sounds of music. In 1955 RCA released a four phonographic record box set with a booklet titled; "The Sounds and Music of the RCA Electronic Music Synthesizer." It features narration about the characteristics of musical sounds and musical excerpts demonstrating the synthesizer. Additionally, there is a 16mm film which contains a test method for audio sound on film. There is a videocassette (VHS) copy of the film in the collection. Finally, there is a script for practicing the phonetic typewriter.

Title/Description	Instances	
Origin of Stereophonic Sound, 193019441960	box 2	folder 11

**Scope and Contents**

Includes: RCA engineering memorandum of visit of Dr. Langmuir and Mr. Stokowski; a handwritten note about Kellogg; and the article "Acoustics of Sound Reproduction in the Home" by Harry F. Olson and Herbert Belar.

Origin of High Fidelity, 1932-1934	box 2	folder 12
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**Scope and Contents**

Includes: handwritten note about High Fidelity and the RCA trademark; article "Extension of the Frequency Range of Film Recording and Reproduction" by G.L. Dimmick and H. Belar; article "Noiseless Recording with Double-Triangle Slit, and Double-Cathode Photo-Cell" by G.L. Dimmick and H. Belar; "High-fidelity Broadcast Transmitter Performance" by Edmund A. Laport; The Society of Motion Picture Engineers "Tentative Program"; and "Attaining the Ultimate Goal! High Fidelity Sound!" an RCA Victor Company copies of pages from an unknown source.

Synthesis of Music, 19281955-19601968	box 2	folder 13
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**Scope and Contents**

Includes: correspondence; a brief history of the electronic music synthesizer; article "Electronic Music Synthesizer" by Harry F. Olson and Herbert Belar; handwritten notes about the Demonstration of Synthesis of Music; "The Synthesis of Music: an illustrated story of the advances in Musical Engineering" typescript; San Diego Bulletin; sheet music; and article "Electronic Music Synthesis" by H.F. Olson, H. Belar, and J. Timmens.

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Music synthesizer phonograph records, 1952undated	box 3	folder 15-18
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**Scope and Contents**

Includes: Obelin, Jota, 3AM in Quito, Nola, and MCM.

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Music synthesizer recording, 1958 January 10	box 3	Tape 1
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**Scope and Contents**

3 AM Quito, Timmens; Obelin, Timmens (First piece composed for synthezier); 2 Finger Theme, Malby; Perfidia, Maly. Synthesized on Mark II.

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Music synthesizer recording, 1958 March 15	box 3	Tape 2
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**Scope and Contents**

JTOB: Jim Timmen Olson Belar.

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Music synthesizer recording, 1958 April 10	box 3	Tape 3
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**Scope and Contents**

Edition 3.

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Music synthesizer recording, 1961 May 13	box 3	Tape 4
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**Scope and Contents**

Aid to music composition employing a random probability system, Harry F. Olson and Herbert Belar, RCA Laboratories, Princeton, New Jersey. Demonstration.

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Music synthesizer recording, circa 1961	box 3	Tape 5
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**Scope and Contents**

Synthesizer selection. Obelin, Jota, 3AM in Quito, 155 Lunar Fife and Drum, 2 Finger Theme, Prelude Lo Fi, Panama, Whistle While You Work, Bumble Bee, Peanut Vendor, Perfidia, Jungle Waltz, Over the Rainbow, Bluer, Syncopated Sugar Counter.

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Letter to Scheldorf, 1981	box 2	folder 14
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## Scope and Contents

Correspondence between Belar and M.W. Scheldorf related to the electronic music synthesizer.

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Music synthesizer explanation, 1995	box 2	folder 15
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## Scope and Contents

Describes the content on the audio reel tapes.

### Use Restrictions:

## Use Restrictions

Copyright restrictions apply.

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The Sounds and Music of the RCA Electronic Music Synthesizer booklet and phonographic records, 1955	box 3	folder 10-14
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## Scope and Contents

Side 1-4 Physical Characteristics of Musical Sounds and The Synthesis of Music with music excerpts from musical selections produced with the RCA Electronic Music Synthesizer, Synthesized under the Direction of Dr. Harry F. Olson, Narrated by John Preston. Sides 5-8 contains the following music produced by the RCA Electronic Music Synthesizer: Arndt - NOLA; Berlin - Blue Skies; Barnby - Sweet and Low; J.S. Bach - The Well-Tempered Clavier Fugue No. 2; Brahms - Hungarian Dance No. 1; Adam - Oh Holy Night; Bishop - Home, Sweet Home; Sephen Foster - Medley.

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Phonetic typewriter script, undated	box 2	folder 10
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## Scope and Contents

Composed poem for practicing the phonetic typewriter.

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Stroboscope turntable disc, undated	box 3	folder 20
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Test method of audio sound on motion picture film, undated	box 4	
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## RCA reports, 1960-1964

### Scope and Contents

RCA reports consists of ten technical reports there are nine reports that are a series of quarterly progress reports and then a final report for the Study of Speech Compression Systems (Syllabic Compression Techniques) the study goes from 1962 to 1964 and was performed by Belar and his colleagues R. de Sobrino, E.S. Rogers, and E.G. May. There is one report from 1960 on Speech Research Assignments.

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**Title/Description**

**Instances**

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Speech Research Assignments, 1960 May 5-1961 May 4                      box 2                      folder 26

**Scope and Contents**

Contract No. DA-18-119-sc-1363. Final Report, P.D. No. R4.028 Crockett. Prepared by H. Belar and R. de Sobrino. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 1, 1962 April 15-1962 July 15                      box 2                      folder 27

**Scope and Contents**

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. First Quarterly Progress Report. Prepared by H. Belar, R. de Sobrino, and E.G. May. U.S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 2, 1962 July 16-1962 October 15                      box 2                      folder 28

**Scope and Contents**

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. Second Quarterly Progress Report. Prepared by H. Belar and E.S. Rogers. U.S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 3, 1962 October 16-1963 January 15                      box 2                      folder 29

**Scope and Contents**

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. Third Quarterly Progress Report. Prepared by H. Belar, E.S. Rogers, and E.G. May. U.S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 4, 1963 January 16-1963 April 15                      box 2                      folder 30

**Scope and Contents**

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. Fourth Quarterly Progress Report. Prepared by H. Belar, E.S. Rogers, and E.G. May. U.S. Army Electronics Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 5, 1963 April 16-1963 July 15                      box 2                      folder 31

## Scope and Contents

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. Fifth Quarterly Progress Report. Prepared by H. Belar, E.S. Rogers, and E.G. May. U.S. Army Electronics Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 6, 1963 July 16-1963 October 15	box 2	folder 32
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## Scope and Contents

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. Sixth Quarterly Progress Report. Prepared by H. Belar, E.S. Rogers, and E.G. May. U.S. Army Electronics Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 7, 1963 October 16-1964 January 15	box 2	folder 33
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## Scope and Contents

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. Seventh Quarterly Progress Report. Prepared by H. Belar, E.S. Rogers, and E.G. May. U.S. Army Electronics Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 7 Appendix, 1963 December 10-1964 January 17	box 2	folder 34
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## Scope and Contents

Appendix A, Acoustical Laboratory Data Sheet. Prepared by H. Belar. David Sarnoff Research Center, Princeton, New Jersey.

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Study of Speech Compression Systems (Syllabic Compression Techniques), Report No. 8, 1962 April 15-1964 April 14	box 2	folder 35
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## Scope and Contents

Contract No. DA-36-039-SC-89191. DA Project No. 3B31-07-001. Final Report. Prepared by H. Belar, E.S. Rogers, and E.G. May. U.S. Army Electronics Research and Development Laboratory, Fort Monmouth, New Jersey. David Sarnoff Research Center, Princeton, New Jersey.

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## Reprints, 1932-1965

### Scope and Contents

Reprints series consists scientific publications primarily of articles authored or co-authored by Herbert Belar, but occasionally about his work, or just of interest. The publications date from 1932 to 1965. Many are duplicates of articles found elsewhere in the collection. The topics covered are film recording, "hi-fi," the phonetic typewriter, electronic music synthesizer, acoustic sound reproduction, and sound analysis.

Title/Description	Instances	
Film recording, 19321934	box 3	folder 1
<b>Scope and Contents</b>		
<p>"Extension of the Frequency Range of Film Recording and Reproduction," by G.L. Dimmick and H. Belar. "Noiseless Recording With Double-Triangle Slit, and Double Cathode Photo-Cell," by G.L. Dimmick and H. Belar.</p>		
Electroacoustic Applications, 1933-1960	box 3	folder 2
<b>Scope and Contents</b>		
<p>Contains 18 articles authored by Harry Olson, F. Mass, A.R. Morgan, John C. Bleazey, and Herbert Belar.</p>		
<p>"Practical Analysis of Ultra High Frequency Transmission Lines, Resonant Sections, Resonant Cavities, Wave Guides," by J.R. Meagher and H.J. Markley, 1943</p>	box 3	folder 3
<b>Scope and Contents</b>		
<p>RCA Service Company, Inc.</p>		
<p>"History of Sound Motion Pictures," by Edward W. Kellogg, 1955</p>	box 3	folder 4
<b>Scope and Contents</b>		
<p>Extensive historical review which mentions Belar's work.</p>		
Electronic music synthesizer/composing machine, 195519601961	box 3	folder 5
<b>Scope and Contents</b>		
<p>"Electronic Music Synthesizer," by Harry F. Olson and Herbert Belar. "Electronic Music Sythesis," by H.F. Olson, H. Belar, and J. Timmens. "Aid to Music Composition Employing A Random Probability System," by Harry F. Olson and Herbert Belar.</p>		
Phonetic typewriter, 19561961	box 3	folder 6

## Scope and Contents

"Phonetic Typewriter," by Harry F. Olson and Herbert Belar. "Phonetic Typewriter III," by Harry F. Olson and Herbert Belar.

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"Acoustics of Sound Reproduction in the Home," by Harry F. Olson and Herbert Belar, 19591960	box 3	folder 7
Speech recognition and speech analyzer, 196019621965	box 3	folder 8

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## Scope and Contents

"Recognition of the Spoken Word by Machine," by Harry F. Olson and Herbert Belar. "Time Compensation for Speed of Talking in Speech Recognition Machines," H.F. Olson and H. Belar. "A Print-Out System for the Automatic Recording of Spectral Analysis of Spoken Syllables," by H.F. Olson and H. Belar. "Demonstration of a Speech Processing System Consisting of a Speech Analyzer, Translator, Typer, and Synthesizer," by Harry F. Olson, Herbert Belar, and Ricardo de Sobrino. "Syllable Analyzer, Coder and Synthesizer for the Transmission of Speech," by H.F. Olson and H. Belar. "Research Towards a High Efficiency Voice Communication System," by Harry F. Olson, Herbert Belar, and Edward S. Rogers.

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Processing of Sound: Analysis and Synthesis of Speech and Music and Applications, 1961-1962	box 3	folder 9
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## Scope and Contents

Contains 15 articles authored by Harry F. Olson, Herbert Belar, Jim Timmens, and Ricardo de Sobrino.

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