

**Seismology Program Records, 1932-2001  
(Bulk 1947-1965)**



**Carnegie Institution of Washington  
Department of Terrestrial Archives  
Washington, DC**

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# Seismology Program Records, 1932-2001 (Bulk 1947-1965)

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**Seismology Program Records, 1932-2001  
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DTM-2005-02**

**Introduction**

*Abstract:* This collection contains the records of the Seismology Program of the Department of Terrestrial Magnetism (DTM) at the Carnegie Institution of Washington (CIW), begun in 1946. It includes experiments in explosion seismology as well as studies of natural seismic events. Collaboration between various groups, including the Geophysical Laboratory of CIW and the US Department of the Navy, is demonstrated in the records.

*Extent:* 20.5 linear feet; 2 oversize records center cartons, 10 records center cartons, 4 document boxes, 1 half document box, 4 flat boxes, 4 shoeboxes, 4 film boxes, 1 map case drawer.

*Acquisition:* The records have been in the possession of the Department of Terrestrial Magnetism (DTM) since their creation.

*Access Restrictions:* There are no access restrictions to this collection.

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*Preferred Citation:* Seismology Program Records, 1932-2001, Department of Terrestrial Magnetism, Carnegie Institution of Washington, Washington, D.C.

*Processing:* This collection was processed by Ann Mulfort in February 2005 through the generous support of the National Historical Publications and Records Commission.

**Administrative History**

The seismology program of the Department of Terrestrial Magnetism (DTM) at the Carnegie Institution of Washington (CIW) began in 1946. After the conclusion of World War II, the newly appointed director of DTM, Dr. Merle A. Tuve, became aware of surplus explosives soon to be destroyed by the US Department of the Navy. Tuve was inspired by colleague and then Director of the Geophysical Laboratory of CIW, Dr. Leason H. Adams, who previously proposed setting off explosives to study the Earth's interior after World War I. Indeed, Adams witnessed a seismic experimental explosion by the Navy at Pocatello, Idaho in 1945. Tuve marshaled his network of WWII colleagues to request explosives in an effort to study the discontinuity between the earth's crust and its mantle, known as the Mohorovi<sub>i</sub> or Moho. By strategically placing high explosives in mines, quarries and other areas, much could be learned which might answer questions about Earth's properties and deadly phenomena: earthquakes and volcanoes.

Because of Tuve's work with Dr. Howard E. Tatel on CIW's proximity-fuze project during WWII, Tatel was hired to work with Tuve on the seismology program, among other programs. The first explosion shots were fired in New Mexico in 1946. The distance from Carnegie's campus in Washington, DC quickly became a liability in continuing studies at that location.

Therefore, closer sites were sought and utilized. Explosions were set off in the Patuxent River, Solomon's Island, Chesapeake Bay, as well as many quarries on the eastern coast of the US. The need for closer proximity to Washington also coincided with explosion work being done by the Tennessee Valley Authority as they created dams for their hydropower program.

Tatel was appointed chairman of DTM's Earth's Crust Section in 1948, and DTM's seismology program was well underway. The program broadened its reach, and other areas of the western hemisphere were studied: California in 1949; the Mesabi Range of Minnesota in 1951; Puget Sound of Washington (state) also in 1951 (in collaboration with the Geophysical Laboratory of CIW); Arizona, New Mexico and Utah in 1954; Alaska and Yukon Territory in 1955. The Colorado Plateau study of 1954 yielded one of Carnegie's most important early seismic contributions to the scientific community: the thin crust of the Earth measures 28-34 km. Tuve and Tatel presented their results at a Columbia University symposium in October 1954.

In celebration of the International Geophysical Year (IGY) of 1957-1958, Tuve, Tatel, Dr. L. Thomas Aldrich, John W. Firor, and E. T. Ecklund set out on an Andean expedition, studying open-pit copper mine explosions in Peru and Chile. The network of stations that were established during IGY to record seismic experiments allowed them to later return to study natural earthquakes. This expedition required much planning and structure and it was the first time DTM received funds from the National Science Foundation for field work.

Extensive expeditions continued; in 1959 and 1960, expeditions were completed in Montana and Wyoming. In 1961, seismic shots were set off the coast of Maine, and in 1963, DTM organized a large expedition to Lake Superior. Fourteen groups from five nations participated in this study. In 1965, DTM returned to Lake Superior to conduct time-term analysis. Also in 1965, DTM was involved with the East Coast Onshore-Offshore Experiment (ECO OE), headed by Dr. Anton Hales of the Graduate Research Center of the Southwest. Dr. David E. James of the DTM worked extensively on this project.

By the mid-sixties, it was thought that explosion seismology had yielded as much information as was possible, so the program broadened its scope to study natural earthquakes. Because of the network of stations established in the Andes during IGY, DTM personnel were able to study an area well known for active earthquake activity. Many South American scientists joined in their work: Dr. Anibal Rodríguez of Peru; Dr. Reynaldo Salguero and Father Ramón Cabre of Bolivia; and Dr. Germán Frick and Father Germán Saa of Chile. Tuve felt that these scientists might benefit from additional information sharing, so he organized a two month Carnegie Andes Program Intensive Seminar on Local and Regional Earthquakes in 1963. Project Nariño was conducted in 1973 in southwestern Colombia, but little new was discovered. An expedition to Peru was completed in 1976.

An active seismology program continues at DTM today. Recent emphasis on large, portable arrays of seismometers has taken DTM personnel to various parts of the world: Japan, South Africa and Hawaii.

## **Scope and Content**

This collection consists of records from over 35 years of seismological investigations at DTM. It includes correspondence, photographs, equipment designs, maps, index cards, seismic shot traces and logs in numerous formats (oversize, rolled, flat and mounted), field notebooks, 16mm and 35mm film and filmstrips, magnetic audio tapes and a CD-ROM. Although the program began in 1946, the maps used for many of the explorations predate the inception of the program. The materials document the use of explosives in generating seismic waves to study the structure of the Earth's crust, as well as the study of natural earthquakes. Carnegie's work in sharing information with the scientific community is also contained in this collection through the two month intensive seminar conducted in 1963.

## **Arrangement**

The collection is arranged in five series and four subseries.

Series 1. General, 1946-1962, 1970-1972, n.d.

Series 2. Western North America, 1932-1965, n.d.

Series 3. Central North America, 1948-1951, 1956-1968, n.d.

Series 4. Eastern North America, 1948-1950, 1952-1966, n.d.

Series 4, Subseries 1: General Eastern North America, 1948-1950, 1952-1966, n.d.

Series 4, Subseries 2: ECOOE [East Coast On-shore Off-shore Experiment], 1965

Series 5, South America, 1932-1966, 1968, 1970, 1973, 1976-1977, 1982, 2001, n.d.

Series 5, Subseries 1: General South America, 1932-1966, 1968, 1970, 1973, 1976-1977, 1982, 2001, n.d.

Series 5, Subseries 2: Andes Program Intensive Seminar, 1962-1963

Some materials in this collection contain more than one geographic location (e.g. field notebooks that include experiments in Western, Central and Eastern North America). When this occurs, such materials are listed in the General Series.

The director of DTM, Dr. Merle A. Tuve, was the driving force behind this program, and his files provide a good introduction and overview for the entire collection. Therefore, his files are listed first in each applicable series. They are maintained in the order used by Tuve, which are roughly in date order. The remaining files are listed alphabetically. After the files, the additional formats are listed in the following sequence, as applicable: Maps, index card system, scientific data (seismic shot traces and log books), field notebooks, film, audio tapes, and CD-ROM.

### **Series 1: General, 1946-1962, 1970-1972, n.d.**

This series contains correspondence, equipment drawings and designs, photographs, notes, an index card system which provides a key to the shot traces coding, seismic shot traces, field notebooks, and 16mm and 35mm film. The 16 mm films provide very early visual details of seismic recording instrumentation and the scientists who performed the studies. Of note in this series are the earliest shot traces recorded by DTM, from 1946-1948. Shots were set off in New Mexico and in various locations of the Patuxent River and Chesapeake Bay. Some of these traces were mounted for purposes of photographing onto 35mm film.

### **Series 2: Western North America, 1932-1965, n.d.**

This series contains correspondence, drawings and designs of equipment, photographs, notes, maps, an index card system which provides a key to the shot traces coding, seismic shot traces,

field notebooks, 35 mm filmstrips, and 16mm film. The 16mm film documents scientists annotating seismograms, planting seismic shots and other work associated with conducting the experiments. The two largest activities in this series include the expeditions to California in 1949 and Alaska and Yukon Territory in 1955. The extensive planning involved in such an expedition is well documented in the Alaska and Yukon Territory materials. There are also materials which document the collaboration with Carnegie's Geophysical Laboratory during the summer of 1951.

**Series 3: Central North America, 1948-1951, 1956-1968, n.d.**

This series contains correspondence, equipment drawings and designs, photographs, notes, maps, an index card system which provides a key to the shot traces coding, seismic shot traces, and field notebooks. The two largest endeavors found in this series include the Mesabi Range (Minnesota) experiments in 1951 and the Lake Superior expedition in 1963, which involved the cooperation of fourteen groups from five nations.

**Series 4: Eastern North America, 1948-1950, 1952-1966, n.d.**

This series includes correspondence, data sheets, measurements, drawings, maps, seismic shot traces, shot logs, and field notebooks. These materials document DTM's cooperation with many institutions to further their study of seismology. The series is arranged in two subseries.

**Series 4, Subseries 1: General Eastern North America, 1948-1950, 1952-1966, n.d.**

Much of DTM's early explosion seismological work was conducted in the vicinity of the Patuxent River and various quarries along the Eastern Seaboard. In addition, seismic shots conducted by the Tennessee Valley Authority are found in this subseries.

**Series 4, Subseries 2: ECOOE [East Coast On-shore Off-shore Experiment], 1965**

This experiment was organized by Dr. Anton Hales of the Graduate Research Center of the Southwest and is richly detailed in this subseries. Many of the 100 seismic shots conducted throughout this experiment are found in the logs and traces (including those of the US Geological Survey). The seismic shot traces are in many formats: short rolled, oversize rolled, folded, and mounted. Many of the traces contain dates and a numbering system with the names of the stations where the data was recorded. Such station names include Delta, Sometimes, Tasman, Upstart, Wayout, Xeck, Yoke, and Zulu.

**Series 5: South America, 1932-1966, 1968, 1970, 1973, 1976-1977, 1982, 2001, n.d.**

This series, arranged in two subseries, includes correspondence, notes, photographs, charts, drawings and designs, instructions, maps, field notebooks and audio magnetic tapes and a CD-ROM. DTM's progression from studying explosion seismology to natural earthquakes is chronicled.

**Series 5, Subseries 1: General South America, 1932-1966, 1968, 1970, 1973, 1976-1977, 1982, 2001, n.d.**

This subseries contains the bulk of Tuve's files. The extensive planning for the Andean expedition undertaken in celebration of the International Geophysical Year (IGY) of 1957-1958 is well documented. A reasonable progression from studying explosion seismology to natural earthquakes led DTM scientists back to the seismically-rich region of the Andes Mountains. Networks of seismic recording stations had been set up during the celebration of IGY; therefore,

those networks were utilized to perform further studies. The CD-ROM provides a photographic record of DTM's expedition to Peru in 1976.

**Series 5, Subseries 2: Andes Program Intensive Seminar, 1962-1963**

In order to enhance the skills of South American scientists in studying natural earthquakes, DTM presented a two-month seminar in 1963 entitled: Carnegie Andes Program: Intensive Seminar; Local and Regional Earthquakes. This subseries includes correspondence, notes, program materials, notebooks, and \_” open reel audio tapes, recording the daily lectures of this program. Lecturers on the tapes include L.T. Aldrich, R.J. Brazee, Fr. Cabre, Fr. Fernandez, A. Hales, S. Hart, E. Herrin, L. Knopoff, C. Lomnitz, L. Murphy, O. Nuttli, J. Oliver, A. Rodríguez, Fr. Saa, I.S. Sacks, R. Salguiero, T.J. Smith, Fr. William Stander, J.S. Steinhart, R. Sumner, Z. Suzuki, Tuve, and F.S. Volponi. The materials also include a detailed daily description of topics discussed.

**Folder Listing**

SB = Small Box; NB = Notebook

	<u>Box</u>	<u>Folder</u>
<b>Series 1: General, 1946-1962, 1970-1972, n.d.</b>		
<b>Files</b>		
[Tuve] Explosion Seis – Europe, 1954-1959, n.d.	3	1
[Tuve] Hales at DTM, 1957, 1960-1961		2
[Tuve] Seismic General, 1958-1959 [1 of 2]		3
[Tuve] Seismic General, 1958-1959 [2 of 2]		4
[Tuve] Seismic General, 1959-1960		5
[Tuve] Seismic Monograph and Mss., 1957-1958, 1960		6
[Tuve] Quake Records, Design, etc., USA, 1958-1962		7
[Tuve] Asada, 1957-1960, n.d.		8
[Tuve] Seismic Mss., 1958, n.d.		9
[Tuve's Description of Seismic Exploration], 1951		10
[Equipment Drawings] Folder A, Early, 1947		11
[List of Explosives], 1947-1955		12
[Minnesota, Ontario, and Washington, Summer], 1951		13
[Minnesota and Washington: Scherer, Sumner], 1951		14
Seismic Distances, [Kemper], 1949-1950		15
Seismic Notes, Instrument Calibrations, 1947-1948		16
Symposium: Plate Tectonics and the Evolution of Continents, 1970-1972		17
[Symposium: Plate Tectonics] Conference Summary, 1972		18
<b>Index Cards</b>		
[Early Experiments Index Cards], 1947-1953	22	
<b>Scientific Data</b>		
[Early Shot Traces] New Mexico, Sept. 1946	17	1
[Early Shot Traces] Oct. 10, 1946		2
[Early Shot Traces] Oct. 12, 1946		3
[Early Shot Traces] Oct/Nov, 1946		4

	<u>Box</u>	<u>Folder</u>
[Early Shot Traces: Extra Slow Amp], Oct/Nov, 1946		5
[Early Shot Traces] Nov. 11, 1946		6
[Early Shot Traces] Nov. 29, 1946		7
[Early Shot Traces] Dec. 1-5, 1946		8
[Early Shot Traces] Dec. 7, 1946		9
[Early Shot Traces] Dec. 20, 1946		10
[Early Shot Traces] Dec. 24 & 25, 1946	14	1
[Early Shot Traces] Dec. 27, 1946		2
[Early Shot Traces] Dec. 27-28, 1946		3
[Early Shot Traces] Dec. 28, 1946		4
[Early Shot Traces] Jan. 1, 1947		5
[Early Shot Traces], First Solomon's Shot, Jan. 9, 1947		6
[Early Shot Traces] Jan. 15, 1947		7
[Early Shot Traces] Jan. 17, Feb. 13 & 17, 1947		8
[Early Shot Traces] Feb. 14, 1947		9
[Early Shot Traces] Apr. 28, 1947		10
[Early Shot Traces] Mar. 19, 1948		11
[Early Shot Traces] Oct. 25, 1948		12
Seis 1 Shot Traces, 1946-1947	19	1
Seis 2 Shot Traces, 1948		2
[Multiple Mounted Shot Traces], 1949-1960	1	
Seismic Recordings; DTM-Geophysical [Laboratory] Summer, 1951 [1 of 2: small box]	1	SB1
Seismic Recordings; DTM-Geophysical [Laboratory] Summer, 1951 [2 of 2: small box]		SB2
<b>Field Notebooks</b>		
Seismic Log No. 1 [Notebook], 1947-1949	15	NB1
Seismic Log No. 2 [Notebook], 1949		NB2
Seismic Log No. 3 [Notebook], 1949-1953		NB3
Seismic Shot Position Times [Notebook], 1950-1954		NB4
P.J. Hart [Notebook], 1953		NB5
<b>Film</b>		
35mm film of shot traces, 1946-1950s	26	
[16 mm film:] Quarry Shot, 8 Dec. 1948	27	
[16 mm film:] Shots 2 & 3 July 23, 1953	28	
<b>Series 2: Western North America, 1932-1965, n.d.</b>		
<b>Files</b>		
Tuve New Mexico [Notebook], 1948	1	1
[Tuve] Alaska Expedition, 1953-1955	3	19
[Tuve] Arizona-New Mexico Seismic Trip, 1953-1954		20
[Tuve Yukon Alaska], 1954-1955		21
[Tuve: St. Amand/S Naval Ordnance Test Station], 1956-1963		22

	<u>Box</u>	<u>Folder</u>
[Tuve] Wyoming, 1959-1960		23
[Tuve] Next Expedition USA: Montana-Arizona, 1959-1960		24
[Tuve] Mono Lake [CA], 1959		25
[Tuve] Quake Recorders; New Mexico Arizona, 1956-1957, 1959-1960, n.d.		26
California Notes, 1949, n.d.		27
California: Santa Cruz, 1949-1950, n.d.	21	1
[Canada/Alaska Table Comparisons], 1955	3	28
[Canadian Bench Mark Descriptions], 1956	1	2
[Montana/Wyoming Synopsis], ca. 1959	3	29
Seymour Narrows [BC] Shot, 1958		30
Yukon Territory and Alaska, 1955-1957, n.d.	21	2
<b>Maps</b>		
Alaskan Maps, 1937-1956	Map	3
Californian Maps, 1932-1949	Drawer	4
Canadian Maps, 1934-1955	13	5
<b>Index Cards</b>		
[Southwestern US Index Cards], 1954-1955	22	
<b>Scientific Data</b>		
Seymour Narrows [BC] Shot Traces, 1958 [small box]	1	SB3
Denver Shot Trace, 1949	23	Roll 1
[Mounted Alaska Shot Traces: Multiple], 1955	20	
[Mounted California Shot Traces: Multiple], 1949	20	
[Rolled Alaskan Shot Traces: Multiple], 1954-1955	25	
Tucson Shot Trace, 1949	23	Roll 2
<b>Field Notebooks</b>		
Doak Montana [Notebook], 1959	15	NB6
P.A. Johnson Montana [Notebook], 1959		NB7
Doak AZ/NM [Notebook], 1954	16	NB1
Ecks [Ecklund] AZ/NM [Notebook], 1954		NB2
Johnson AZ/NM [Notebook], 1954		NB3
Tatel AZ/NM [Notebook], 1954		NB4
Tuve AZ/NM [Notebook], 1954		NB5
T.W. Tuve AZ/NM [Notebook], 1954		NB6
Eck [Ecklund Yukon BC/Alaska Notebook], 1955		NB7
Paul Johnson [Yukon BC/Alaska Notebook], 1955		NB8
R.B. Roberts [Yukon BC/Alaska Notebook], 1955		NB9
Tatel [Yukon BC/Alaska Notebook], 1955		NB10
Tuve [Yukon BC/Alaska Notebook], 1955		NB11
T.W. Tuve [Yukon BC/Alaska Notebook], 1955		NB12

	<u>Box</u>	<u>Folder</u>
Bolton, Gronquist, Asada: Montana [Notebook], 1960		NB13
Paul A. Johnson: Montana [Notebook], 1960 [1 of 2]		NB14
Paul A. Johnson: Montana [Notebook], 1960 [2 of 2]		NB15
Poe: Montana [Notebook], 1960		NB16

### **Film**

35mm film strips (quantity: 31): Shot Traces, 1954-1956	26	
[16 mm color film:] Alaska, ca. 1955	29	

### **Series 3: Central North America, 1948-1951, 1956-1968, n.d.**

#### **Files**

Lake Superior: AFTAC [Air Force Technical Applications Center], 1963-1964	3	31
Lake Superior: Coast Guard, 1962-1968		32
Lake Superior Correspondence, 1956-1963		33
[Lake Superior Expedition Notebook], 1963		34
Lake Superior Gauge of Interest, 1962-1963		35
Lake Superior Heat Flow Experiment, 1965-1966		36
Lake Superior Paper, 1965-1966		37
Lake Superior Photos: USCGS Woodrush, 1963		38
Lake Superior Seismic Data, 1963-1964, 1966		39
Lake Superior Shot Times, 1963		40

#### **Maps**

[Lake Superior Expedition Maps], 1950, 1963, n.d.	1	3
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#### **Index Cards**

[MN/WI Index Cards], 1951	22	
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#### **Scientific Data**

Camp Ripley, MN Shot Trace, 1948	23	Roll 3
Camp Ripley, MN Shot Trace, 1949		Roll 4
St. Louis Record Shot Trace, 1949		Roll 5
Rapid City, [SD] Shot Trace, n.d.		Roll 6
Lake Superior Hydrophone Data, 1963	21	3

#### **Field Notebooks**

[Lake Superior] Playback Record [Notebook], 1963-1964	15	NB8
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### **Series 4: Eastern North America, 1948-1950, 1952-1966, n.d.**

#### **Series 4, Subseries 1: General Eastern North America, 1948-1949, 1950, 1952-1966, n.d**

##### **Files**

[Tuve] Hales Expts [Experiments?], etc. MD-VA, 1960	4	1
Tuve to Maine, 1961		2
[Tuve] VA/MD/PA, 1960		3

	<u>Box</u>	<u>Folder</u>
[Tuve] Earthquake Network; Transistor Drums: MD-VA, 1958, n.d.		4
Maine Basic, 1965, n.d.		5
[Maine Data], 1961-1964	1	4
Maine Project, 1956-1962, n.d.	4	6

### **Maps**

Maine Seismic Expedition [Map], Summer, 1951	21	4
[Potomac River Shot Locations Maps], 1956		5

### **Scientific Data**

Cedarville [Shot Traces], 26 Apr 1950	19	3
[MD Shot Trace], 1950	23	Roll 7
[MD Shot Trace], 1953		Roll 8
[Olney, MD Shot Trace], 1951		Roll 9
Patuxent River Shot Records, 1948-1949	4	7
Poolesville [Shot Traces], 11 Apr 1950	19	4
Poolesville [Shot Traces], 13 Apr 1950		5
Poolesville [Shot Traces], 19 Apr 1950		6
[Strain Seismo: Patuxent May 20 1953, 11:30 EST]	1	5
[Strain Seismo: Patuxent May 20 1953, 12:00 EST]		6
[Strain Seismo: Patuxent May 20 1953, 14:15 Shot, "SS" or "R"]		7
[Strain Seismo: Patuxent May 20 1953, 2:30]		8
[Strain Seismo: Patuxent Jun 3 1953, 11:00, 12:00 Shot I, Bucklodge]		9
[Strain Seismo: Patuxent Jun 3, 1953, 12:45, 11:54, Shot II]		10
[Strain Seismo: Patuxent Jun 3, 1953, 1:45, 12:45, Shot III]		11
[Strain Seismo: Patuxent Jun 3, 1953, 2:30, 1:30, Shot IV]		12
[Strain Seismo: Patuxent Jun 5, 1953]		13
[Strain Seismo: Patuxent Jun 5, 1953, 14:15 Shot]		14
[Strain Seismo: Patuxent Jul 24 1953, Battista Quarry]		15
[Strain Seismo: Patuxent Sep 21 1953]		16

### **Field Notebooks**

[Maine Data: Asada Notebook], 1961	4	8
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### **Series 4, Subseries 2: ECOOE [East Coast On-shore Off-shore Experiment], 1965**

#### **Files**

ECOOE C. Little Farm Data, 1965	4	9
ECOOE [Instructions and Notes], 1965		10
ECOOE Shot List, [1965]		11
[ECOOE Shot Location Notes], 1965		12
ECOOE USGS Index, 1966		13
ECOOE USGS Pick Information, 1965-1966		14

#### **Scientific Data**

ECOOE Shot Log: Sometimes, 1965		15
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	<u>Box</u>	<u>Folder</u>
ECOOE Shot Log: Suva, 1965		16
ECOOE Shot Log: Tasman, 1965		17
ECOOE Shot Log: Virginia, 1965		18
ECOOE Shot Log: Wayout, 1965		19
ECOOE Shot Log: Xecks Delta, 1965		20
ECOOE Shot Log: Yoke, 1965		21
ECOOE Shot Log: Zulu, 1965		22
ECOOE Shot Traces: C.L. Farm, 1965 [numbered 102-356]	7	
ECOOE Shot Traces: Delta, 1965 [multiple flat traces]	8	
ECOOE Shot Traces: Sometimes, 1965 [multiple flat traces]	8	
ECOOE Shot Traces: Tasman, 1965 [multiple flat traces]	10	
ECOOE Shot Traces: Unidentified, 1965 [multiple flat traces]	10	
ECOOE Shot Traces: Unidentified, 1965 [6 small rolled traces]	8	
ECOOE Shot Traces: Unidentified, 1965 [15 oversize rolled traces with numbering scheme]	2	
ECOOE Shot Traces: Upstart, unnumbered, 1965	9	1
ECOOE Shot Traces: Upstart, 101-106, 1965		2
ECOOE Shot Traces: Upstart, 107-111, 1965		3
ECOOE Shot Traces: Upstart, 113-118, 1965		4
ECOOE Shot Traces: Upstart, 119-125, 1965		5
ECOOE Shot Traces: Upstart, 126-128, 1965		6
ECOOE Shot Traces: Upstart, 132-139, 1965		7
ECOOE Shot Traces: Upstart, 140-147, 1965		8
ECOOE Shot Traces: Upstart, 149-151, 1965		9
ECOOE Shot Traces: Upstart, 309-316, 1965		10
ECOOE Shot Traces: Upstart, 320, 1965		11
ECOOE Shot Traces: Upstart, 322-326, 1965		12
ECOOE Shot Traces: Upstart, 327-330, 1965		13
ECOOE Shot Traces: Upstart, 331-337, 1965		14
ECOOE Shot Traces: Upstart, 338-343, 1965		15
ECOOE Shot Traces: Upstart, 344-349, 1965		16
ECOOE Shot Traces: Upstart, 351-355, 1965		17
ECOOE Shot Traces: Upstart, 601-602, 1965		18
ECOOE Shot Traces: USGS, 1965 [27 rolled traces]	11	
ECOOE Shot Traces: Wayout, unnumbered, 1965	9	19
ECOOE Shot Traces: Wayout, 005-101, 1965		20
ECOOE Shot Traces: Wayout, 011-019, 1965		21
ECOOE Shot Traces: Wayout, 020-027, 1965		22
ECOOE Shot Traces: Wayout, 101-106, 1965		23
ECOOE Shot Traces: Wayout, 107-111, 1965		24
ECOOE Shot Traces: Wayout, 113-118, 1965		25
ECOOE Shot Traces: Wayout, 119-125, 1965		26
ECOOE Shot Traces: Wayout, 132-139, 1965		27
ECOOE Shot Traces: Wayout, 140-147, 1965	13	1
ECOOE Shot Traces: Wayout, 149-151, 1965		2

	<u>Box</u>	<u>Folder</u>
ECOOE Shot Traces: Wayout, 303-308; 603-606, 1965		3
ECOOE Shot Traces: Wayout, 309-316; 607-608, 1965		4
ECOOE Shot Traces: Wayout, 320, 1965		5
ECOOE Shot Traces: Wayout, 322-326, 1965		6
ECOOE Shot Traces: Wayout, 327-330, 1965		7
ECOOE Shot Traces: Wayout, 331-337, 1965		8
ECOOE Shot Traces: Wayout, 338-343, 1965		9
ECOOE Shot Traces: Wayout, 344-349, 1965		10
ECOOE Shot Traces: Wayout, 350-356, 1965		11
ECOOE Shot Traces: Wayout, 601-602, 1965		12
ECOOE Shot Traces: Xeck, 1965 [multiple flat traces]	8	
ECOOE Shot Traces: Yoke, 1965 [multiple flat traces]	10	
ECOOE Shot Traces: Zulu, 1965 [multiple flat traces]	8	

**Series 5: South America, 1932-1966, 1968, 1970, 1973, 1976-1977, 1982, 2001, n.d.**

**Series 5, Subseries 1: General South America, 1932-1966, 1968, 1970, 1973, 1976-1977, 1982, 2001, n.d.**

**Files**

[Tuve] IGY-Chile & Peru, 1956-1958	4	23
[Tuve] Andes Trip, 1956-1957		24
[Tuve] Chile, 1956-1958		25
[Tuve] South America Seismic, 1959-1960		26
[Tuve] South America Seismic; To all stations: General, 1951-1958, 1960-1961		27
[Tuve] Yasky-Chile Quake, 1958-1960		28
[Tuve] Lomnitz; Santiago, Chile, 1959-1960		29
[Tuve] Trip to Peru-Bolivia Notes, 1958, 1961		30
[Tuve] Salguiero-Bolivia Quake, 1959-1960		31
[Tuve] Rodriguez-Peru Quakes, 1959-1960		32
[Tuve] Rodriguez Reports, 1959-1960		33
[Tuve] Forbush, South America, 1959-1960		34
[Tuve] South America Cooperation: Seismic, Gravity, Astronomy, 1958-1959, 1962		35
[Tuve] Old South America Seismic Notes, 1957-1960		36
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## Subject Terms

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Scientific expeditions--South America  
Seismology--Field work  
Seismometry

Occupation: Seismologists

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Forms: Audiotapes  
Calculations  
Card indexes  
CD-ROMs  
Correspondence  
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Graphs  
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