



Smithsonian

National Museum of American History Kenneth E. Behring Center

Guide to the ITT Industrial Research Laboratories Electron Tube Research Records

NMAH.AC.0822

Mitch Toda

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Collection Overview

Repository:	Archives Center, National Museum of American History
Title:	ITT Industrial Research Laboratories Electron Tube Research Records
Date:	1934-1984
Identifier:	NMAH.AC.0822
Creator:	Papp, George International Telephone and Telegraph Corporation Lott, H.J. Salinger, Hans W.G. Hirsch, Robert L. Farnsworth, Philo Taylor, b. 1906 National Museum of American History (U.S.). Division of Information, Technology and Society Cawein, Madison Essig, Sanford Eberhardt, Edward
Extent:	3.5 Cubic feet (9 boxes, 1 oversize folder)
Language:	English .

Administrative Information

Acquisition Information

ITT donated the collection to the Division of Information, Technology & Society, National Museum of American History through Elaine Tuttle, Vice President of Director of Contracts on September 4, 1992. The collection was transferred to the Archives Center on September 13, 2002.

Provenance

The papers were transferred from the Division of Information, Technology and Society (now the Division of Work & Industry) to the Archives Center on September 13, 2002.

Related Materials

130 vacuum tubes, many related to Philo Farnsworth were donated to the Division of Information Technology & Society (now Division of Medicine and Science), National Museum of American History.

Processing Information

Collection processed by Mitch Toda, 2004.

Preferred Citation

ITT Industrial Laboratories Electron Tube Research Records, 1934-1984, Archives Center, National Museum of American History.

Restrictions

Collection is open for research.

Conditions Governing Use

Collection items available for reproduction, but the Archives Center makes no guarantees concerning copyright restrictions. Other intellectual property rights may apply. Archives Center cost-recovery and use fees may apply when requesting reproductions.

Biographical / Historical

The ITT Corporation Industrial Research Laboratories, Electron Tube Division's laboratories in Fort Wayne, Indiana conducted research and product development in the field of special purpose vacuum tubes and sensors. Their history in the research and development of these special purpose devices originated in Fort Wayne in 1939, when Philo T. Farnsworth, the inventor of television, moved there. What brought him there was that his company, Farnsworth Television and Radio Corporation, purchased the Capehart Incorporated plant in Fort Wayne.

Rather than build a plant of their own, Farnsworth Television and Radio Corporation decided to purchase the plant, which had a reputation for building quality phonographs, and retool it to build radio and television receivers. Farnsworth and his engineers' research at the plant led to the invention of numerous devices, including amplifier tubes, cathode-ray tubes, vacuum tubes, electron multipliers, and photoelectric materials.

The laboratories in Fort Wayne were responsible for developing new technical concepts, methods and designs of tubes, sensors and devices for application in industrial, government and commercial markets. Laboratory activities included applied research, advanced development and product design, and development and fabrication. They concentrated their efforts on designing and developing components which operated in the infrared, visible and ultraviolet portions of the electromagnetic spectrum.

Their various areas of research and development led to a diverse offering of products, including: multiplier phototubes (for stellar observation, star tracking, laser detection, vibration analysis, scintillation counting); vacuum photodiodes (for laser detection, scintillation detection, high speed switching, solar radiation monitoring, interference detection); image dissectors (for slow scan TV systems, slide projector readers, industrial process control, electronic star trackers, electronic scanning spectrometers); electron multipliers (for space research, radiation detection, vacuum monochromators, single particle counting, demountable vacuum systems), image converters (for high-speed photography, infrared viewing and surveillance, optical correlation, pulsed light systems, ultraviolet detection and viewing), correlation devices (for motion compensation, area correlation, map reading, document reading, tracking), and accessories (for focusing magnets, image dissector cameras, focusing and deflection coil assemblies and yokes, phototube holders, power supplies).

The Tube and Sensor Laboratories were world leaders in the areas of photometric quantum detectors, image devices, camera tubes, and optical pattern correlators. Some of their major developments included the Star Tracker sensors used in the Lunar Orbiter Program, Vidisector camera tubes used in several observational satellites, and the cockpit display storage tubes used in the F105 Thunderchief and A4D Skyhawk fighter planes.

They were innovators in developing a number of specialized high vacuum devices including: image dissectors, star tracking dissectors and multiplier phototubes, single quantum counting photomultipliers, grid-controlled photomultipliers, biplanar and laser monitoring photodiodes, windowless electron multipliers and single particle detectors, ultraviolet sensitive photodiodes, image converters, image storage and image correlation tubes, and spectral response information.

Throughout the collection there are numerous names that the laboratories were known as that reflects different stages in the company's development. What follows is a chronology of the names of the laboratories in Fort Wayne, Indiana:

1929 – Capehart Corporation

1936 – Capehart, Inc.

1938 – Farnsworth Television & Radio Corporation
1949 – Capehart-Farnsworth Corporation
1953 – Capehart-Farnsworth Company, Division of ITT
1954 – Farnsworth Electronics Company, Division of ITT
1958 – ITT Laboratories, Division of ITT
1960 – ITT Federal Laboratories
1962 – ITT Industrial Laboratories
1969 – ITT Electron Tube Division, Tube and Sensor Laboratories
1973 – ITT Electro-Optical Products Division, Tube and Sensor Laboratories

Scope and Contents

This collection contains a diverse selection of materials that address a variety of aspects of the ITT Industrial Laboratories in Fort Wayne, Indiana. There are research and development notebooks from various scientists and engineers, reports and articles on products being developed and research being conducted, technical drawings, a large body of product information, and photographs of products and research projects. People represented in the collection include: George Papp, Hans W.G. Salinger, Philo T. Farnsworth, Madison Cawein, Robert L. Hirsch, Sanford F. Essig, H.J. Lott, and Edward H. Eberhardt. When these materials came to the Archives Center a portion of them were housed in envelopes with captions written on them. The envelopes were photocopied to preserve the information and the contents were incorporated into the above series in order to facilitate intellectual access to the materials.

Arrangement

The collection is divided into six series

Series 1: Company Records, 1937-1984

Series 2: George Papp, 1938-1964

Series 3: Hans W.G. Salinger, 1944-1945

Series 4: Research Records, 1934-1969

Series 5: Product Information, 1955-1979

Series 6: Photographs, 1960-1965

Names and Subject Terms

This collection is indexed in the online catalog of the Smithsonian Institution under the following terms:

Subjects:

Electron tubes
Inventions -- 20th century
Television
Vacuum-tubes

Types of Materials:

- Certificates
- Laboratory notes
- Photographs -- 20th century
- Project files
- Technical drawings
- Technical reports

Container Listing

Series 1: Company Records, 1937 - 1984

Scope and Contents: This series consists of records regarding the company and gives insight into its organization and functions. Included in this series are organizational charts, telephone directories, and memos. The general memos contain information about distribution lists, tube lists, Philo T. Farnsworth, facilities descriptions, and phototube contracts. Other memos discuss the organization of the various departments and employees within the company. The miscellaneous materials contain articles and newspaper clippings about the company, sales figures from 1958-1963, a list of publications regarding ITT photo devices, and press releases. Also in this series are materials that were originally contained in a binder labeled "Obsolete Materials" and two examples of ITT Industrial Laboratories binders.

Box 1, Folder 1	Organizational charts, 1954-1982
Box 1, Folder 2	Memos-Organization of departments and employees, 1963-1983
Box 1, Folder 3	Memos-General, 1961-1981
Box 1, Folder 4	Company name changes, 1964-1984
Box 1, Folder 5	Company summary report, 1962
Box 1, Folder 6	Electro-Optical Products Division summary report, 1973
Box 1, Folder 7	Telephone directories, 1957-1969
Box 1, Folder 8	Newsletters, 1957-1964
Box 1, Folder 9	Philo T. Farnsworth documents regarding his San Francisco laboratory's landmark status, 1974-1981
Box 1, Folder 10	Patent documents, 1937-1952
Box 1, Folder 11	Miscellaneous documents, 1963-1984
Box 2, Folder 1-3	<p>Obsolete materials, 1960-1970</p> <p>Notes: encompasses the following areas: advertisements, articles, accessories, cathode ray tube, electron multiplier, experiences, newsletters, photodiodes, photomultipliers, proximity focused image converter, uvissector, vidicon, viditron, vacuum tube components, and miscellaneous. Two examples of ITT Industrial Laboratories binders.</p>

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Series 2: George Papp, 1938 - 1964

Scope and Contents: George Papp was born in Hungary, receiving his bachelor's degree from the University of Szegeed and his PhD from the University of Budapest. Papp came to the United States in 1949 and was a research associate at George Washington University working on the development of electron multiplier tubes. In 1952, Papp went to Fort Wayne, Indiana to be work as an engineer at ITT Industrial Laboratories. He would later head the Electron Physics Laboratory and serve as the Technical Advisor to the Storage and Vacuum Tube Development Manager. His experience included the physics and measurement of gamma rays, the oxidation of complex organic metal compounds, secondary electron emission, the physics and application of electromultipliers, high speed coincidence counting technique and circuitry, nuclear instrumentation, tube diodes for microwave detection, image converter tubes, image storage tubes, and infrared detection and imaging.

This series contains materials that were originally in two binders labeled "George Papp." Materials include: correspondence, research notes, reports, curriculum vitae, publications, and proposals. Of note is an address given by Papp at the annual banquet of the Fort Wayne Kiwanis Club celebrating the achievement of the best students of Fort Wayne's high schools in the field of citizenship, May 27, 1958.

Box 3, Folder 1-3	Personal papers, 1940-1964
Box 3, Folder 4	Publications, 1938-1951
Box 3, Folder 5	Report on rectification of diode tubes, 1952
Box 3, Folder 6	Report on HF (High Frequency) power loses in diode tubes, 1952
Box 3, Folder 7	Report on microwave detection with diode tubes, 1952
Box 3, Folder 8	Amendment to research memo with note on signal-to-noise ratio in video detection, 1952
Box 3, Folder 9	Report on microwave rectification in diode tubes and related materials, 1952-1960

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Series 3: Hans W.G. Salinger, 1944 - 1945

Scope and Contents: Hans W.G. Salinger joined ITT Industrial Laboratories in 1936. In his career with the company he was a research engineer, Head of the Radar Department, Acting Director of the Components and Instrumentation Laboratory, and Scientific Advisor to the Laboratory Director of ITT Industrial Laboratories Division. Salinger received his PhD from the University of Berlin and was awarded 19 patents. His experience included development work associated with circuit theory, acoustics, magnetic materials, electron optics and ballistics, wave filters, research and development on submarine cables, telegraphy, analog computers for fire control, photomultipliers, and infrared systems.

This series contains materials that were originally in a binder labeled "H. Salinger." It includes his reports and notes regarding the Omegatron, magnetic focusing in image tubes, picture quality in electrostatic dissectors, photometric units, and image tubes.

Box 3, Folder 10-11 Reports and notes, 1944-1945

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Series 4: Research Records, 1934 - 1969

Scope and Contents: Contained within this series are the research and development notebooks of Madison Cawein, Hans W.G. Salinger, Sanford F. Essig, Edward H. Eberhardt, and H.J. Lott. Also included are official research memos (memos intended for release outside of the company), correspondence, memos, notes, reports, and technical drawings. Of interest are Sanford F. Essig's notes and photographs from his dusting machine and film evaporation experiments from 1938.

Box 4, Folder 1	Farnsworth Television & Radio Corporation, research and development notebook no. 7, Madison Cawein, 1942-1945
Box 4, Folder 2	Farnsworth Television & Radio Corporation, research and development notebook no. 56, Hans W.G. Salinger, 1943
Box 4, Folder 3	Farnsworth Television & Radio Corporation, research and development notebook no. 317, Sanford F. Essig, 1947-1959
Box 4, Folder 4	Farnsworth Television & Radio Corporation, research and development notebook no. 6788, Sanford F. Essig, 1958-1960
Box 4, Folder 5	Multiplier work, notebook no. 1, Edward H. Eberhardt, 1959 6
Box 4, Folder 6	Photomultiplier development, notebook no. 2, Edward H. Eberhardt, 1959
Box 4, Folder 7	Multipliers, notebook no. 3, Edward H. Eberhardt, 1959
Box 4, Folder 8	Photomultipliers, notebook no. 4, Edward H. Eberhardt, 1959
Box 5, Folder 1	Notebook, Project 4900, H.J. Lott, 1954-1955
Box 5, Folder 2	Notebook, Work on demountable system, Edward H. Eberhardt, 1955-1957
Box 5, Folder 3	Notebook, New methods in IR detection, Edward H. Eberhardt, 1959
Box 5, Folder 4	Specifications, IC 6A image tube, 1947-1957
Box 5, Folder 5	Specifications, IC-16-3 image tube, 1947-1959
Box 5, Folder 6	Sanford F. Essig notes on dusting machine and film evaporation experiments, 1938
Box 5, Folder 7	Photographs from Sanford F. Essig's dusting machine and film evaporation experiments, 1938
Box 5, Folder 8	Report-Recording Microdensitometer for Analysis of Line and Continuous Spectra, 1934
Box 5, Folder 9	Report-Project #2017, Semi-Conducting Camera Tube, 1941

Box 5, Folder 10	Report-Lusters: Their Characteristics & Limitations in Vacuum Tube Applications, 1945
Box 5, Folder 11	Report-Unipotential Image Tube IC6, 1949
Box 5, Folder 12	Report-High Voltage Image Tube, 1949
Box 5, Folder 13	Report-Cold Weld Vacuum Chamber History, 1960
Box 5, Folder 14	Report-Selected Topics in the Inertial Confinement of Ionized Gases, 1967
Box 6, Folder 1	Official research memos, 1959-1966
Box 6, Folder 2	Research correspondence and memos, 1937-1972
Box 6, Folder 3	Spectral response documents, 1964-1969
Box 6, Folder 4	Miscellaneous research notes, 1937-1961
Box 6, Folder 5	Examples of drawing labels, 1946-1959
Box 6, Folder 6	General technical drawings, 1949-1969
Map-folder 1	Technical drawings of theta orthicon tube and parts, 1943-1948

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Series 5: Product Information, 1955 - 1979

Scope and Contents: This series represents a large body of material containing information about products produced by ITT Industrial Laboratories. There are application and technical notes which were created by ITT to help their customers in understanding how their products work and how they can perform in a variety of applications, in addition to numerous items of trade literature, brochures, advertisements, price lists, and tube lists.

Box 6, Folder 7	Index to application notes and technical notes, undated
Box 6, Folder 8	Application notes, 1970-1979
Box 6, Folder 9	Technical notes, 1966-1975
Box 7, Folder 1-2	Tubes, 1959-1968
Box 7, Folder 3	Infrared, 1961-1963
Box 7, Folder 4	Instrumentation, 1960-1963
Box 7, Folder 5	Videx, 1962-1963
Box 7, Folder 6-7	Brochures, 1955-1971
Box 7, Folder 8	Advertisements, 1962-1972
Box 7, Folder 9	Price lists, 1961-1970
Box 7, Folder 10	Tube lists, 1962-1969
Box 7, Folder 11	Miscellaneous, 1963-1970

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Series 6: Photographs

Scope and Contents: The photographs in this series include images of products, laboratories, research projects, and drawings for trade literature.

Box 8, Folder 1	General, includes photos of a vacuum compton detector, an electrostatic vidicon, a UV photometer display unit, an electronic scanning spectrometer, and other electron tubes and laboratory equipment (33 photographs), 1960
Box 8, Folder 2	Image dissectors, includes photos of 1" and 1-½" vidisector and 4-½" image dissector, undated 4 Photographs
Box 8, Folder 3	Electron multipliers, includes photos of standard and ruggedized versions, undated 12 Photographs
Box 8, Folder 4	Multiplier phototubes, includes photos of startracker tube, ruggedized startracker tube, ruggedized startracker tube-potted, high temperature design multiplier phototube, high current-fast response design multiplier phototube, and a quadruple multiplier phototube, undated 25 Photographs
Box 8, Folder 5	Image converters, includes photos of electrostatic image converters, a proximity image converter, a storage image tube, and an image converter-fiber optic output, undated 14 Photographs
Box 8, Folder 6	Photodiodes, includes photos of a biplanar photodiode, a biplanar photodiode-flush faceplate, ¾" and 7" biplanar photodiodes, triplanar photodiodes, a photodiode holder (tube in place), and developmental high current photodiodes, undated 17 Photographs
Box 8, Folder 7	Storage Tubes, includes photos of a 7" Iatron-Loral Version, multimode Iatrons, a barrier-grid tube, and Gilfillan Iatrons (, undated 12 Photographs
Box 9, Folder 1	Instrumentation, includes photos of various video equipment, an electronic scanning spectrometer, a Corning flaw detector, a Corning lens inspector, a camera pad amplifier, and a multiple access computer (27 photographs), 1960
Box 9, Folder 2	Videx, includes photos of various configurations of the Videx system (26 photographs), 1965
Box 9, Folder 3	Laboratory project, 5032-B-15.97, captions from photographs are as follows:, undated Notes: 1. Projection Equipment 305C in Operation; 2. Schmidt Optical Projector, Exterior View; 3. Schmidt Optical Projector, Interior View; 4. Type FW-201 Projection Iatron, Tube No. 126002 5.

5-Mile Range Rings Projected Upon Screen; and 6. Faceplate
Crack in FW-201 Tube No. 106001.

Box 9, Folder 4 Laboratory project, 10-12-60C, operating image transducer (8 photographs),
1960

Box 9, Folder 3 Laboratories, includes various interior laboratory views (9 photographs),
undated

Box 9, Folder 4 Color photographs, includes photos from publications and of various electron
tubes (15 photographs), undated

Box 9, Folder 5 Drawings for trade literature, captions from photographs
Notes: 1. Vacuum Compton Detector; 2. Night Vision Devices; 3.
Solar Blind Sensors; 4. Rocket Exploration Probes 5. Camera
Tubes; 6. Lunar Orbiter Star Tracker; 7. Wall-Eye; 8. Laser
Receiver Sensors; 9. Non-Contacting Optical Displacement
Measuring; 10. Scintillation Detector for Oil Well Logging;
11. Patter Correlation Device; 12. Laser Receiver Sensors 13.
Particle Detectors 14. Multiplier Phototubes 15. Vidisector 16.
Startracker Tubes

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