



Smithsonian

*National Museum of American History Kenneth E. Behring Center*

## Guide to the H. Irving Crane Papers

NMAH.AC.1119

Elizabeth Garber.

2009

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## Collection Overview

<b>Repository:</b>	Archives Center, National Museum of American History
<b>Title:</b>	H. Irving Crane Papers
<b>Date:</b>	1927-1950 (bulk 1935-1945)
<b>Identifier:</b>	NMAH.AC.1119
<b>Creator:</b>	Crane, H. Irving
<b>Extent:</b>	5.5 Cubic feet (12 boxes)
<b>Language:</b>	English .
<b>Summary:</b>	H. Irving Crane worked as a chemist for Atlantic Research Associates, Inc. (a division of National Dairy Corporation) from 1933-1940s on the production of several products utilizing casein, a protein found in milk. These products include Aralac (a synthetic fiber), Aracide (a fungicide and moth repellent), spray-dried milk, casein paints, and synthetic rubbers. The H. Irving Crane papers document Crane's work as a chemist at Atlantic Research Associates, Inc. and the development of Aralac and Aracide.

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## Administrative Information

### Acquisition Information

The collection was donated by Irving Crane's son, Andrew Crane, in 2007.

### Provenance

Transferred to the Archives Center from the Division of Home and Community Life in October 2007.

### Separated Materials

Material separated for preservation reasons:

Box 9, Folder 1, Casein fiber --dyeing, undated

Box 9, Folder 2, Aratex, Inc. --Bristol, Rhode Island plant, 1940, undated

Box 9, Folder 3, Aratex, Inc. --Bristol, Rhode Island plant and Aralac --customer contacts, 1941, undated

Box 9, Folder 4, Crane --Memoranda, reports, etc. and Reports --from H. I. Crane & others, 1940, undated

Box 9, Folder 5-6, Reports --from H. I. Crane and others, 1940-1941

Box 10, Folder 1, Oversize papers, 1944

Box 10, Folder 2-4, Reports --from H. I. Crane and others, 1941 and undated

Box 10, Folder 5, [Dyed fiber samples], undated

Box 11, Folder 1-4 , [Dyed fiber samples], undated

Box 12, Folder 1, [Loose fibers that detached from dyed fiber samples], undated

Box 12, Folder 2, [Aralac/rayon blend fabric samples], undated

Box 12, Folder 3-5, [Dyed fiber samples], undated

## Related Materials

### **Materials at the National Museum of American History**

The Division of Home and Community Life (now Division of Cultural and Community Life) holds artifacts including a suit made from Aralac (Accession #2006.0096A).

## Processing Information

Processed by Elizabeth Garber (intern), June 2009; supervised by Alison Oswald, archivist.

## Preferred Citation

H. Irving Crane Papers, Archives Center, National Museum of American History.

## Restrictions

Collection is open for research but is stored off-site and special arrangements must be made to work with it. Contact the Archives Center for information at [archivescenter@si.edu](mailto:archivescenter@si.edu) or 202-633-3270.

## Conditions Governing Use

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## Biographical / Historical

Horace Irving Crane (1912-1984) was born on May 12, 1912. In 1929, he enrolled at the Massachusetts Institute of Technology (MIT) where he earned an undergraduate degree in Chemistry in 1933 and a Ph.D. in Chemistry in 1936.

In 1933, Crane began working at Atlantic Research Associates, Inc. (ARA) in Newtonville, Massachusetts as a chemist. ARA was a division of National Dairy Products Corporation, which was later absorbed by Kraft Foods. ARA specialized in the development of products from casein, a protein found in milk. ARA had manufactured casein-based paints since 1927 and continued to produce other casein products such as glues, plastics, films, and paper coatings. Most of these products were given a name beginning with the prefix "Ara-" taken from the company's name.

Crane and other chemists at ARA began research into the production of a casein fiber in 1937. Aralac was first manufactured at a plant in Bristol, Rhode Island. Patents were granted to the president of ARA, Francis Clarke Atwood, for Aralac ("Method of Making Proteinaceous Fibers" US Patent #2,342,994 and "Method of Treating Fibrous Material and Product Resulting Therefrom" US Patent #2,342,634). In 1941, production moved to a larger plant in Taftville, Connecticut. The production of the fiber was as follows:

First the pH value of the milk was lowered using acid. The protein reached its minimum solubility, and with swelling was precipitated out of the milk as curd. This curd was the raw material for the production of Aralac. The casein (curd) was collected in small creameries as well as large ones. One hundred pounds of milk produced 3.7 pounds of casein, which in turn produced 3.7 pounds of fiber. After the casein arrived at the plant, it was carefully blended with casein from other producers and dissolved in water with proper solvents. Adjustments were made to the viscosity in order to produce a uniform base and ensure the complete removal of foreign materials. The solution became syrup-like and was forced through a spinnerette into a coagulating bath and was carried away. It remained in tow form through a succession of hardening and molecular modifying treatments interspersed at times with washing and drying.

Aralac is in the Azlon class of fibers. Fibers in this class are made from regenerated, naturally-occurring proteins such as milk, corn, soybeans, and peanuts. It was hoped that Aralac would be considered a luxury fiber in direct competition with the best grades of wool. It was introduced just as the United States entered World War II; during

the war, Aralac was blended with rayon and acetate for use in civilian dress fabric and in felted hats. It was tested for use in carpet, military socks, lace, and knitting yarn, but was not satisfactory. Due to its low strength and the difficulty in dyeing it, Aralac had a short life. Production of the fiber ended in 1948.

Crane also worked on Aracide, a moth and mildew repellent. Aracide was initially developed as a fungicide for casein paints in 1937, but was also used to prevent moths from infesting Aralac. ARA attempted to obtain a patent for Aracide, but was rejected due to similarities with another patented fungicide.

In addition to Aralac and Aracide, Crane worked on a spray drier to evaporate milk and other assorted ARA projects. In 1945, ARA was reorganized and consolidated into a larger company, National Atlantic Research Corporation.

Following his departure from ARA, Crane worked at Sylvania Electric Products, Clevite Transistor, Computer Controls Corporation, and Honeywell. In 1957, Crane received a patent for methods of treating Germanium in relation to semiconductors (US Patent #2,793,146) while at Sylvania Electric Products.

Crane married his ARA lab technician, Laura Soule, and they raised their children in Massachusetts. He retired in 1977 and died in Vermont on April 7, 1984.

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## Scope and Contents

The H. Irving Crane papers illuminate the development of casein products in the 1930s-1940s, particularly a fiber and fungicide. The collection is divided into two series:

**Series 1, Atlantic Research Associates, Inc., 1927-1950**, consists of material relating to Crane's research and experiments while a chemist at ARA. This series is divided into eight subseries:

**Subseries 1, Aralac, 1938-1945**, illuminates the development, testing, production, and uses of the casein fiber Aralac. Correspondence, memoranda, notes, and reports document the challenges associated with the initial production, dyeing, and adding of chemical washes to Aralac and the use of Aralac in manufacturing of cloth goods. Correspondence between ARA and customers documents the use of Aralac in carpet, military socks, lace, knitting yarn, and hats. Associated fiber samples from the dyeing process and material relating to the treatment of Aralac with Aracide are also included.

**Subseries 2, Aracide, 1935-1945**, consists of correspondence, memoranda, notes, and reports relating to the anti-fungal agent. Another ARA employee, Laura Adams, produced several reports on Aracide. Correspondence reflects its testing for use in carpets and an attempt to obtain a patent for the fungicide.

**Subseries 3, Other products, 1937-1945**, contains materials relating to all the products that Crane worked on, including a spray drying process for milk dehydration and casein paints. There is a small amount of documentation of Aralac and Aracide within this subseries.

**Subseries 4, Laboratory notebooks, 1937-1945**, documents Crane's daily activities on the projects he worked on. Arranged chronologically, test results, notes, graphs, and experimental procedures are recorded within these notebooks. There are significant gaps in the date range listed above.

**Subseries 5, Correspondence, memoranda, and reports, 1937-1948**, records activities and communication within ARA. Documents written by Crane relate to his work, but many other reports document projects that Crane was not directly involved with. Two letters from F. C. Atwood, the president of ARA, illuminate occurrences within ARA: the potential drafting of Crane into military service for World War II and the reorganization of the company into NARC.

**Subseries 6, Reference materials, 1936-1948**, is comprised of scientific resources that Crane utilized and created. He reviewed scientific literature, indexed and summarized chemical abstracts, and compiled bibliographies related to the fields of fiber production, casein usage, and anti-fungal agents.

**Subseries 7, Photographs, 1937-1941**, illustrates ARA company gatherings, staff, and facilities.

**Subseries 8, Printed material, 1927-1950**, contains advertisements, catalogs, pamphlets, and brochures for assorted chemicals and laboratory equipment that were available to industrial chemists at the time. ARA-produced products represented include Aralac and the paints Aratone, Aralux, and Casein Deep Colors. Additional periodicals and newsletters received by Crane are also included.

**Series 2, Biographical Material, 1936-1947**, documents Crane's educational background, insurance needs, banking, and time spent at work.

Fiber samples and oversize material have been separated from the collection for preservation concerns. Items separated are identified by folder.

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## Arrangement

The collection is arranged into two series.

**Series 1: Atlantic Research Associates, Inc., 1927-1950, undated**

Subseries 1, Aralac, 1938-1945, undated

Subseries 2, Aracide, 1935-1945, undated

Subseries 3, Other products, 1937-1945, undated

Subseries 4, Laboratory notebooks, 1937-1945, undated

Subseries 5, Correspondence, memoranda, and reports, 1937-1948, undated

Subseries 6, Reference materials, 1936-1948, undated

Subseries 7, Photographs, 1937-1941, undated

Subseries 8, Printed materials, 1927-1950, undated

**Series 2: Biographical Material, 1936-1947, undated**

**Series 3: Material separated for preservation reasons**

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## Names and Subject Terms

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

Subjects:

- Casein
- Chemical abstracts -- Outlines, syllabi, etc.
- Chemistry
- Chemists
- Fungicides -- Testing
- Spray drying
- Synthetic fabrics
- Synthetic fibers industry
- Textile fibers, Synthetic
- Textile fibers, Synthetic -- Equipment and supplies
- Textile fibers, Synthetic -- Laboratory manuals
- Textile fibers, Synthetic -- Testing
- Textile fibers, Synthetic Dyeing
- Wool, Artificial

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## Container Listing

### Series 1 : Atlantic Research Associates, Inc., 1927 - 1950, undated

#### Subseries 1.1: Aralac, 1938 - 1945, undated

Box 1, Folder 1	Casein, preparation, undated
Box 1, Folder 2	Casein fiber -- coagulation, hardening, 1938, undated
Box 1, Folder 3	Casein fiber -- softening treatments, 1938 - 1939, undated
Box 1, Folder 4	Casein fiber -- analytical methods, 1937 - 1943
Box 1, Folder 5	Ketenization of casein fiber, 1938, undated
Box 1, Folder 6	Ketenization of casein fiber -- mathematical treatment of results, 1938, undated
Box 1, Folder 7	Aralac -- Atlantic Research Associates [experimental?] spinning, 1939 - 1940, undated
Box 1, Folder 8	Casein fiber -- miscellaneous treatments, 1939 - 1945, undated
Box 1, Folder 9	Casein fiber -- dyeing, 1938 - 1942, undated
Box 1, Folder 10	Dyes, dyeing, 1939 - 1942
Box 1, Folder 11	[Dye charts], 1941
Box 1, Folder 12	General Dyestuffs [Corporation], 1938 - 1942
Box 1, Folder 13	[Aratex, Inc. -- Bristol, Rhode Island plant], 1940 - 1941, undated
Box 1, Folder 14	Aralac -- acid capacity and pH, 1939, undated
Box 1, Folder 15	Aralac customer contacts, 1940 - 1942
Box 1, Folder 16	[Assorted reports, memoranda, and notes], 1940 - 1941, undated
Box 1, Folder 17	Strength tests -- Atlantic Research Associates daily reports, 1940 - 1943
Box 1, Folder 18	<a href="#">[Newspaper clippings]</a> , 1938, 1942

Box 1, Folder 19      [\[Dyed fiber samples\], undated](#)

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### Subseries 1.2: Aracide, 1935 - 1945, undated

Box 2, Folder 1      [Memoranda, notes, and reports], 1935 - 1945, undated

Box 2, Folder 2      Fungicides -- Report by Miss [Laura] Adams, undated

Box 2, Folder 3      [Fungicides -- Miss \[Laura\] Adams, 1938 - 1942, undated](#)

Box 2, Folder 4      Fungicides -- miscellaneous notes, 1937 - 1940, undated

Box 2, Folder 5      Alex Smith & Sons Carpet Company, 1939 - 1940

Box 2, Folder 6      [General], undated

Box 2, Folder 7      [Reference materials], 1937 - 1940, undated

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### Subseries 1.3: Other products, 1937 - 1945, undated

Box 2, Folder 8      [Assorted projects], 1944, undated

Box 2, Folder 9      [Manual for preparation of casein paste paint], undated

Box 2, Folder 10      [Water paints], undated

Box 2, Folder 11      Gary plant reports, 1937

Box 2, Folder 12      [Lactic acid], 1942 - 1944, undated

Box 3, Folder 1      Acrylates [Arapol], 1942 - 1943, undated

Box 3, Folder 2      Spray drier, 1944 - 1945, undated

Box 3, Folder 3      Bobbitt Industrial Spec[ialties] Company, 1944 - 1945, undated

Box 3, Folder 5      Corrosion, 1937, undated

Box 3, Folder 5      [Tall oil soap and latex concentration], 1944 - 1945, undated

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### Subseries 1.4: Laboratory notebooks, 1937 - 1945, undated

Box 3, Folder 6      [February--March], 1937



Box 3, Folder 7	[February--June], 1937
Box 3, Folder 8	1937 September 27--1937 December 31
Box 3, Folder 9	1938 September 30--1938 October 17
Box 3, Folder 10	1939 November 14--1940 April 4
Box 4, Folder 1	1941 August 18--1943 April 15
Box 4, Folder 2-3	1943 October 14--1943 October 21, undated
Box 4, Folder 4-5	Work done on subjects other than Milk Dehydration, 1944 - 1945
Box 4, Folder 6	Casein fiber after treatments C-48 -- C-94, 1938
Box 5, Folder 1	Casein fiber after treatments C-95, 1938
Box 5, Folder 2	[Procedural notebook], 1938, undated

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Subseries 1.5: Correspondence, memoranda, and reports, 1937 - 1948, undated

Box 5, Folder 3	Correspondence -- H. I. Crane, 1937 - 1945
Box 5, Folder 4	[Correspondence regarding samples], 1946 - 1948
Box 5, Folder 5	[Atwood letters], 1942 - 1945
Box 5, Folder 6	[Boston Microchemical Society], 1946 - 1948
Box 5, Folder 7	[Weston Exposure Meter], 1945, undated
Box 5, Folder 8	Crane -- Memoranda, Reports, 1946
Box 5, Folder 9	Memoranda, 1940 - 1944
Box 5, Folder 10	Reports, H. I. Crane and others, 1939 - 1940
Box 5, Folder 11	Laboratory reports [by others], 1937 - 1939
Box 5, Folder 12	Weekly progress reports, 1938, undated
Box 5, Folder 13	[Atlantic Research Associates Technical Bulletins], 1947 - 1948
Box 5, Folder 14	[Atlantic Research Associates envelopes], undated

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## Subseries 1.6: Reference material, 1936 - 1948, undated

Box 5, Folder 15	[Testing procedures], 1941, undated
Box 5, Folder 16	Aradization, 1940, undated
Box 5, Folder 17	Abstracts, undated
Box 5, Folder 18	[Abstracts], undated
Box 5, Folder 19	[Abstracts], 1942, undated
Box 6, Folder 1	Chemical Abstracts, 1945 - 1948
Box 6, Folder 2	[Chemical Abstracts], 1946 - 1948
Box 6, Folder 3	Material for work report, O. B. [Chemical Abstracts], 1947 - 1948
Box 6, Folder 4	Bibliographies, 1942 - 1946, undated
Box 6, Folder 5	[Articles, book excerpts, and chemical abstracts], undated
Box 6, Folder 6	[Notes], 1942, undated
Box 6, Folder 7	Library Bulletin of Abstracts Universal Oil Products, 1936 - 1938
Box 6, Folder 8	Books, 1939
Box 6, Folder 9	Casein and Its Industrial Applications (book), 1939
Box 7, Folder 1	[Literature Search on Acrylates], 1940, undated
Box 7, Folder 2	Ketene by catalysis, undated
Box 7, Folder 3	Lactates, Acetoxypionates, Acrylates, and related compounds, 1942
Box 7, Folder 4	Lanital, 1945 - 1947
Box 7, Folder 5	[Duties of an Atlantic Research Associates lab assistant], undated

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## Subseries 1.7: Photographs, 1937 - 1941, undated

Box 7, Folder 6

[Image\(s\)](#)

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## Subseries 1.8: Printed material, 1927 - 1950, undated

Box 7, Folder 7            [\[Atlantic Research Associates product brochures\], 1939 - 1944, undated](#)

Box 7, Folder 8            Leeds and Northrup, 1927 - 1937, undated

Box 7, Folder 9            [\[Chemical advertisements and information\], 1933 - 1948, undated](#)

Box 7, Folder 10           [\[Chemical price lists\], 1927 - 1947](#)

Box 8, Folder 1-2           [\[Laboratory equipment advertisements and catalogs\], 1933 - 1948, undated](#)

Box 8, Folder 3-4           [\[Newsletters and bulletins\], 1930 - 1947, undated](#)

Box 8, Folder 5            [\[Milk\], 1938, 1943](#)

Box 8, Folder 6            [\[Consumer Reports\], 1947](#)

Box 8, Folder 7            [\[Chemistry -- history\], 1928, 1933](#)

Box 8, Folder 8            [\[Book advertisements\], undated](#)

Box 8, Folder 9            [\[Solicitations\], 1944 - 1946](#)

Box 8, Folder 10           [Survival Under Atomic Attack, 1950](#)

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## Series 2: Biographical Material, 1936 - 1947, undated

Box 8, Folder 11	Massachusetts Institute of Technology Qualification Record, 1936
Box 8, Folder 12	[Insurance, banking, and other material], 1946 - 1947, undated
Box 8, Folder 13	[Atlantic Research Associates timesheets], 1944, undated

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## Series 3: Material separated for preservation reasons

Box 9, Folder 1	Casein fiber – dyeing, undated
Box 9, Folder 2	Aratex, Inc. – Bristol, Rhode Island plant, 1940, undated
Box 9, Folder 3	Aratex, Inc. – Bristol, Rhode Island plant and Aralac – customer contacts, 1941, undated
Box 9, Folder 4	Crane – Memoranda, reports, etc. and Reports – from H. I. Crane & others, 1940, undated
Box 9, Folder 5-6	Reports – from H. I. Crane and others, 1940-1941
Box 10, Folder 1	Oversize papers, 1944
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Box 12, Folder 1	[Loose fibers that detached from dyed fiber samples], undated
Box 12, Folder 2	[Aralac/rayon blend fabric samples], undated
Box 12, Folder 3-5	[Dyed fiber samples], undated

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