

John Belling Collection
1928-1933
Mss.581.35.B41

American Philosophical Society
2002
105 South Fifth Street
Philadelphia, PA, 19106
215-440-3400
manuscripts@amphilsoc.org

Table of Contents

Summary Information	3
Background note	5
Scope & content	7
Arrangement	7
Administrative Information	8
Related Materials	8
Indexing Terms	9
Bibliography	10
Collection Inventory	11
Series I. Bibliographic card files.....	11
Series II. Photographs.....	12
Series III. Photo albums.....	13

Summary Information

Repository	American Philosophical Society
Creator	Belling, John, 1866-1933
Title	John Belling Collection
Date [inclusive]	1928-1933
Call number	Mss.581.35.B41
Extent	1.5 Linear feet 4 vols., 4 boxes
Location	LH-B-31-7
Language	English
Abstract	<p>The cytogeneticist John Belling (1866-1933) developed the iron-acetocarmine staining technique, which facilitated detailed study of chromosomal structures. In his work with Arthur F. Blakeslee at Cold Spring Harbor on <i>Datura</i> (1920-1927) and at the University of California, Berkeley (1928-1933) on lilies, hyacinths, and other plants, Belling made accurate estimates of chromosomal numbers, helped to demonstrate the interchange of segments between non-homologous chromosomes, and proposed that the chromomeres (small condensations of stain that appeared along the length of chromosomes) represented individual, physical genes. Although he was a gifted technician and insightful cytologist, his career was hampered by mental instability and curtailed by frequent hospitalizations before his sudden death in 1933.</p> <p>The Belling Collection consists of four photograph albums, 38 glass slides and approximately 75 glass negatives and positive prints of chromosome preparations made by Belling, primarily during the years at Berkeley,</p>

along with an annotated bibliographic card file. The images in the albums are fully identified, but most of the glass slides are not.

Preferred Citation

Cite as: John Belling Collection, American Philosophical Society.

Background note

The cytologist John Belling struggled through a life that saw his career repeatedly delayed and interrupted by severe depression and hospitalization. Born in Aldershot Camp, England, on October 7, 1866, the son of a Army schoolmaster, Belling was employed as a teacher of science in secondary schools from the age of 16. An excellent student, he learned botany and zoology through coursework at the workingmen's Birkbeck Institute in London before entering Mason College at the University of Birmingham in 1892, and earning his BSc (Honors) from the University College, London, two years later. Belling's attempts to craft an academic career for himself began well, when he was appointed resident lecturer at the Horticultural College in Swanley, however by the end of the decade, with further advancement stalled, he returned to teaching in secondary schools.

In 1901, Belling fairly literally changed course, taking a position with the Imperial Department of Agriculture in the West Indies, and emigrating to the United States six years later to work as an assistant botanist with the Florida Experimental Station. His research on plant hybridization and patterns of inheritance resulted in several well-regarded publications in the *Bulletin* of the Florida Experiment Station, using, in part, his talents for preparing stained slides of chromosomes. The promise of this work was curtailed in 1916, when Belling was forced to resign due to ill health, attributed publicly to the Florida climate. In actuality, though, Belling suffered from a severe depression that required hospitalization.

With the assistance of Paul Popenoe, Belling came to Washington in 1918 or 1919, but Belling's erratic behavior soon resulted in another period of hospitalization. Sewall Wright, who come to know Belling, arranged to have the ailing cytologist come live with his parents, who had recently moved to Maryland, and in 1919, Belling met and, in short order, married Wright's Aunt Hannah. By the fall, he had recovered enough to search for a new position, landing an unpaid research post under Albert Blakeslee at Cold Spring Harbor.

Belling's success in his first year at the Laboratory encouraged Blakeslee to commute him to the payroll as assistant cytologist in the Department of Genetics, where he was initially assigned to work on the relationship between chromosomal abnormalities and hybrid sterility. A fine microscopist and master technician, Belling developed an iron acetocarmine stain for chromosomes that soon paid huge dividends in the form of a series of important papers in the cytogenetics of *Datura*, most co-authored with Blakeslee. Using acetocarmine, Belling provided accurate counts of chromosomal numbers in a variety of angiosperm genera and more importantly, he and Blakeslee became the first to demonstrate the interchange of segments between non-homologous chromosomes. His work on crossing over gained wide recognition in the early 1930s, when both his staining technique and findings were taken up and furthered by his friend, Barbara McClintock. Belling was recognized with an honorary DSc. from the University of Maine in 1922.

But as his career was gaining steam, Belling once again ground to a halt. He was forced to suspend his research in December 1924 having spiraled downward yet again into what Charles Davenport described as "a severe and somewhat prolonged depression in spirits." For three years, Belling was confined in the King's Park State Hospital, an asylum for the mentally ill, continuing his botanical research only

sporadically. When Hannah died in 1926, he lost a colleague as well as partner, spinning him deeper into depression and leaving him, as his brother later wrote, alone apart from the benevolent care of the Carnegie Institution.

Feeling that a change of scenery would be of benefit, and with Belling stewing over what he perceived to be Blakeslee's exploitation of his talents, Belling's friends arranged for him to leave King's Park in October 1927 to take up an offer from E. B. Babcock at the University of California. Babcock had worked with Belling and Blakeslee since at least 1924, and in concert with Davenport, agreed to arrange laboratory space for Belling to continue his research out west, while still under the employ of Cold Spring Harbor.

Belling's superlative technical skills helped him once again to return to productive work, now focused on the cytogenetics of hyacinths and lilies. He gained a measure of recognition for his claim in 1928 to having observed the actual, physical genes on chromosomes. Chromomeres, he suggested, small condensations along the length of chromosomes, were in fact genes, and on this basis he made the relatively accurate estimate of several thousand genes in a typical angiosperm.

A productive author when he was well, Belling wrote several papers and small monographs on plant chromosomes and cytology, a popular text on microscopy, and two slender books of poetry, *Life* (San Francisco, 1928) and *The Life World: Poems of Science* (San Francisco, 1930). Yet as his career appeared once again to be gaining momentum, fate stepped in. Belling died unexpectedly on February 28, 1933, of unstated causes. His major monograph on the current state of research on chromosomes was left incomplete.

Scope & content

The Belling Collection consists of four photograph albums, 38 lantern slides, and a number of glass negatives and photographic prints of preparations of plant chromosomes. These images appear to represent the products of his research during his years at Berkeley, 1928-1933, reflecting his interests in the cytogenetics of lilies and other flowering plants. The images laid into the photograph albums are fully labeled, but the majority of the rest are not.

The collection is organized in three series, based largely on format.

Arrangement

Series I. Bibliographic card files	1.5 boxes	ca.1928-1933
Series II. Photographs	1.5 boxes	ca.1928-1933
Series III. Photo albums	4 vols.	ca.1928-1933

Administrative Information

Publication Information

American Philosophical Society 2002

Provenance

Custodial History

The images in the Belling Collection were given by David Perkins to Joseph Gall, who donated them to the APS in May 2002.

Processing Information

Recatalogued by rsc, 2002.

Related Materials

Related Material

The Albert Blakeslee Papers contain approximately 15 letters between Blakeslee and John and Hannah Belling, 1925-1928. The correspondence deals primarily with Belling's and Blakeslee's publications on the cytogenetics of *Datura* and the "wiry" mutant and, by implication, they document Hannah Belling's efforts on behalf of her husband during his bouts of depression.

Two other collections contain significant letters from Belling. The Demerec Papers contain three letters between Belling and Milislav Demerec, 1931, concerning Belling's cytological demonstration of crossing-

over in liliaceous plants and his plans to write a text on karyology, and the Sewall Wright Papers contain three letters, 1932, between Belling and Wright, discussing one of Belling's papers.

The largest body of correspondence relating to Belling in APS collections, six folders, is located in the Cold Spring Harbor Series of the Charles Davenport Papers. The Belling files provide background information on Belling and document the course of his academic career from approximately 1906 through his death in 1933. The collection includes a typescript copy of Belling's "A working hypothesis for segmental interchange between homologous chromosomes in flowering plants," 1928, copies of his progress reports to the Carnegie Institution detailing his research, a brief and lightly sanitized obituary, and an interesting letter from Belling's brother, James, written after Belling's death.

Charles Davenport's correspondence with E.B. Babcock (Davenport Papers, Series I) provides valuable information on Belling's move to Berkeley in 1927-1928, and Davenport's laudable efforts on Belling's behalf.

A small collection of Belling's correspondence, written while employed at the Florida Agricultural Experiment Station, is located in the Department of Special Collections and University Archives, University of Florida.

Information on John and Hannah Belling is located in the Quincy Wright Papers, Regenstein Library, University of Chicago.

Separated Material

Copies of Belling's books of poetry have been transferred to the Printed Materials Department.

Indexing Terms

Genre(s)

- Glass negatives
- Lantern slides
- Photograph albums
- Photographs
- Photomicrographs

Personal Name(s)

- Blakeslee, Albert Francis, 1874-1954.
- Gall, Joseph

Subject(s)

- Cytology
- Plant genetics

Bibliography

Belling, John, *Use of the Microscope* (N.Y.: McGraw Hill, 1930).

Provine, William B., *Sewall Wright and Evolutionary Biology* (Chicago: University of Chicago, 1986).

Call no.: B W937p. For information on Belling, see pp.101-102.

Series I. Bibliographic card files

Collection Inventory

Series I. Bibliographic card files	1928-1933	1.5 boxes
---	------------------	------------------

Card file	ca.1928-1933	2 boxes
------------------	---------------------	----------------

Bibliography of works, with some annotations in shorthand.

Series II. Photographs

Series II. Photographs	1928-1933	2 boxes
Glass plates	1928-1933	2 boxes
Lantern slides and glass plate negatives of unidentified chromosomal squashes.		
Photoprints	1928-1933	1.5 boxes
Photoprints of chromosomes of <i>Lillium</i> , <i>Fritillaria</i> , and unidentified genera.		

Series III. Photo albums

Series III. Photo albums	1928-1933	4 vols.
Belling, John, 1866-1933 Camera drawings, J. B. <i>Datura stramonium</i> Camera lucida drawings of chromosomal squashes of <i>Datura</i> in prophase, metaphase, and anaphase.	1928-1933	1 vol.
Belling, John, 1866-1933 Camera drawings 2, <i>Hyacinthus</i> , <i>Lilium</i> , <i>Rhoeo</i> Camera lucida drawings and photomicrographs.	ca.1928-1933	1 vol.
Belling, John, 1866-1933 Camera drawings 3, <i>Hosta</i> , <i>Tradescantia</i> , <i>Galanthus</i> , <i>Galtonia</i> , <i>Scilla</i> , <i>Narcissus</i> , <i>Lillium</i> , <i>Hyacinthus</i> , <i>Canna</i> Camera lucida drawings.	ca.1928-1933	1 vol.
Belling, John, 1866-1933 Camera drawings 4, <i>Hemerocallis fulva</i> , <i>Cypripedium pubescens</i> , <i>vularia</i> <i>grandiflora</i> , <i>Iris</i> (<i>versicolor?</i>), <i>Secale</i> Camera lucida drawings.	ca.1928-1933	1 vol.