James D. Watson Collection

RECORD GROUP 2
SERIES 6:
Laboratory and Course Notebooks, 1947-1951, 1958-1961

Volume: 9 cubic feet
Restrictions: None
Processed by: Shannon Bohle and Charles Egleston
Completion Date: March 2006
Finding aid prepared by: Shannon Bohle
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SERIES DESCRIPTION

This series consists of James D. Watson's handwritten graduate school course notebooks and laboratory research notebooks between 1947 and 1951. It is divided into three subseries: Subseries 1: Ph.D. Courses and Dissertation Research, Indiana University; 1947-1950, Subseries 2: Copenhagen Laboratory Research, 1950-1951; and Subseries 3: Harvard Medical School Research, 1958-1961. Of note, there are approximately 2.5 cubic feet of additional laboratory notebooks dated 1949-1950 that are currently unprocessed and will later be added to Subseries 1. Arranged chronologically.

In 1947, Watson began graduate work for his doctoral degree at Indiana University at the age of 19 with the initial goal of studying with Hermann Muller. In his first year of study, he enrolled in a course called *Bacteriology 258a–"Viruses"* taught by geneticist Salvador E. Luria (subseries 1, box 1, folder 3). According to *A Passion for DNA*, Watson was drawn to Luria because they both shared the hope that learning more about bacteriophages would lead to an understanding of the nature of the gene. Before the end of his first term, Watson approached Luria with the proposal to do research under him, and was quickly accepted as Luria's first experiment at dissertation supervision. Luria had been working on the problem of using ultraviolet light to create genetically damaged bacteria and had instructed Watson to look at the related question of "whether phages inactivated by X-rays gave any multiplicity reaction." Much of Watson's doctoral research was an extension of Luria's own research. The specific question was how to inhibit or stop the ability of viruses from multiplying, either by inactivating the bacteriophages themselves or by creating resistant strains of bacteria. Luria had observed that small units of UV-damaged, inactivated phage particles reassembled with many active ones to regain their infectious nature. He called this process *multiplicity reactivation*. Calculating the number of these smaller units in various phages, Luria felt, was essential to understanding the replication process. Studying the multiplication process and being able to control it, by stopping (inactivation, interference) and starting it (reactivation), are the main activities documented Watson's dissertation research files (subseries 1, boxes 1-2).

While most of the research was conducted in Bloomington, additional work was done at Cold Spring Harbor Laboratory (summer 1948 and spring 1949), Memorial Hospital in New York City (summer 1948), as well as the California Institute of Technology (summer 1949) (subseries 1, boxes 1-2). The findings from all four locations culminated in Watson's June 15, 1950 doctoral dissertation, *The Biological Properties of X-ray Inactivated Bacteriophage*.

After completion of his dissertation in 1950, Watson headed to Copenhagen for a year to continue his study of phage replication in the laboratory of Herman Kalckar. However, he and Gunther Stent left Kalckar's laboratory to work instead with Ole Maaløe. Here, Watson set out to determine whether there were two types of DNA, one type which carried genetic material and one type that did not. To accomplish this, he used radioactive isotopes of phosphorous and carbon to be able to observe what material was transferred from the original phage to its progeny.

In 1956 Watson joined the faculty at Harvard University to teach courses in Zoology. From 1959 to 1961, he conducted additional laboratory research Harvard Medical School. This focused research consisted of experiments done with viruses believed to cause cancer, such as the Papilloma virus. After this research Watson's attention turned to messenger RNA, and not until he returned to Cold Spring Harbor Laboratory, did his interest in pursuing the viral causes of cancer resume.

Missing from the collection are any laboratory notebooks which may have been created during the years 1952 to 1957 and from 1962 to the present.

INVENTORY

Subseries 1: Ph.D. Courses and Dissertation Research, 1947-1950 (2.5 cubic feet)

Box	Folder	Title & Date Span
1		**Ph.D. Courses and Dissertation Research, 1947-1950**
	1	Muller Lecture: Zoology 344 – "Advanced Genetics," September 1947-January 1948 (Indiana University, Bloomington)
	2	Luria Lectures: Bacteriology 258a–"Viruses", September 1947- January 1948 (Indiana University, Bloomington)
	3	Multiplicity of X-ray Inactivated Phages (Reactivation, Adsorption, and Interference), August - September 1948 (CSHL); September – December 1948 (Indiana University, Bloomington)
	4	Inactivation of T_2 and T_4 Phages by Hydrogen Peroxide (H_2O_2), September 1948–spring 1949 (Indiana University, Bloomington)
	5	Reactivation of X-rayed Phage, summer 1948 (Cold Spring Harbor Laboratory; Memorial Hospital, NYC; Indiana University, Bloomington)
	6	Inactivation of Phages by X-ray and UV, Fall 1948-January 1949 (Indiana University, Bloomington)
	7	Inactivation of Phages by X-ray and UV, Fall 1948-January 1949 (Indiana University, Bloomington) (continued)
	8	Inactivation of T_2 and T_4 Phages by Formalin (Formaldehyde) and Other Chemicals, May 1949 (California Institute of Technology)
	9	Inactivation of T_2 Phage by Hydrogen Peroxide (H_2O_2), [June – September] 1949 (California Institute of Technology)

2		**Ph.D. Courses and Dissertation Research, 1947-1950 (Continued)**
	1	Inactivation and Adsorption of T_1-T_7 Phages Under Various Solvent Conditions October –November 1949 (Indiana University, Bloomington)
	2	Inactivation and Adsorption of T_2 Phage by X-ray, UV, Heat, and Iron Chloride ($FeCl_2$, $FeCl_3$), December 1949-January 1950
	3	Inactivation and Loss of Adsorption of T_2 and T_4 Phages by Direct and Indirect Effects of X-rays and L-Tryptophan, January 1949-February 1950 (Indiana University, Bloomington)
	4	Bacterial Killing Ability, Interference, and Photo Reactivation of Purified T_2 Phage, February 7 – March 1950 (Indiana University, Bloomington)
	5	Inactivation of T_2 and T_6 Phages by Hydrogen Peroxide (H_2O_2), February 13 – March 1950 (Indiana University, Bloomington)
	6	Bacterial Killing Ability of X-ray Inactivated T_1-T_6 Phages (Inactivation, Survival Curves, Adsorption, Reactivation), circa 1947-1950 (Indiana University, Bloomington)
	7	Inactivation of T_1, T_2, and T_4 Phages by Potassium Permanganate ($KMNO_4$), circa 1947-1950 (Indiana University, Bloomington)
	8	Lecture: "The Genetics of Chlamydomonas With Special Regard to Sexuality", circa 1947-1950 (Indiana University, Bloomington)

Subseries 2: Copenhagen Laboratory Research, 1950-1951 (1.5 cubic feet)

Box	Folder	Title & Date Span
1		**Copenhagen Laboratory Research, 1950-1951 (Oversized Material)**
	1	"Lysis from Without", June 1950 (Copenhagen)
	2	Purification and Adsorption of Phages on Heat Killed Bacteria (HKB), November 1950-February 1951 (Copenhagen)
	3	Purification and Adsorption of Phages on Heat Killed Bacteria (HKB) November 1950-February 1951 (Copenhagen) (Continued)
	4	Isotopic Transfer of T_2-T_4 Phages from Parent to Progeny of Glycine, Purine, and Adenine (Under UV Conditions), March 1951 (Copenhagen)
	5	Isotopic Transfer of T_2 Phage from Parent to Progeny (C^{14} Adenine), circa 1951 (Copenhagen)
	6	Isotopic Transfer of T_3 and T_4 Phages from Parent to Progeny Under Conditions of Mutual Exclusion (P^{32} Adenine), circa 1951 (Copenhagen)

Subseries 3: Harvard Medical School Research, 1958-1961 (5 cubic feet)

Box	Folder	Title & Date Span
1		**Harvard Medical School Research, 1958-1961**
	1	Diagram of Yeast Microsomes, circa 1950s (Harvard Medical School)
	2	Papilloma Purification Experiments Using Cesium Chloride ($CsCl_2$), April 1958 (Harvard Medical School)
	3	Papilloma Virus Imaging (magnification 150,000x-300,000x), circa 1959 (Harvard Medical School)
	4	Papilloma Experiments in Sucrose ($C_{12}H_{22}O_{11}$), Phosphate (PO_4), and Duponol C (Sodium Lauryl Sulfate) using UV and Schlieren Optics, June 30 – November 9, 1959 (Harvard Medical School)
	5	sRNA of E. coli, October-November 1959 (Harvard Medical School)
	6	Papilloma Spectra and Melting Out Curves, July 4–25, 1959 (Harvard Medical School)

	7	Papilloma Centrifuge Work – Viral Purification and DNA Isolation Using Sodium and Potassium Phosphate Buffers: Na_2HPO_4 and KH_2PO_4, July 4-27, 1959 (Harvard Medical School)
	8	Papilloma Purification Experiments Using Cesium Choloride ($CsCl_2$), December 1959 (Harvard Medical School)
	9	Papilloma Purification Experiments Using Cesium Chloride ($CsCl_2$), January-February 1960 (Harvard Medical School)
	10	Papilloma Purification Experiments Using Sodium Chloride (NaCl), February-March, 1960 (Harvard Medical School)
2		**Harvard Medical School Research, 1958-1961 (Continued)**
	1	Archibald's Runs, January-February 1960 (Harvard Medical School)
	2	sRNA Transfer Experiments – UV Sedimentation Runs with RNase Controls, May 1960 (Harvard Medical School)
	3	Pulse Labeling of E. coli, September-October 1960 (Harvard Medical School)
	4	Pulse Labeling of E. coli, November 1960 (Harvard Medical School)
	5	Pulse Labeling of E. coli, December 1960 (Harvard Medical School)
	6	Attachment of C Plevol Props, December 1960-April 1961 (Harvard Medical School)
	7	C_{14} Uracil Long Exposures Chase & Pulse Extraction / Messenger Isolation, October 1960-April 1961 (Harvard Medical School)
	8	Messenger Isolation, March-April 1961 (Harvard Medical School)
	9	Incorporation of C_{14} Guanine Into TCA Soluable Pool, May 1961 (Harvard Medical School)

PROVENANCE

The James D. Watson papers were donated by him to the Cold Spring Harbor Laboratory Archives in 2005.

RELATED MATERIALS BY NAME AND SUBJECT HEADINGS

Bacteriophages
California Institute of Technology
Centrifugation, Density gradient
Cold Spring Harbor symposia on quantitative biology
Delbrück, M. (Max), 1850-1919
Escherichia coli
Harvard University
Indiana University, Bloomington
Kalckar, Herman M. (Herman Moritz), 1908-
Luria, S. E. (Salvador Edward), 1912-
Lysogeny
Maaløe, Ole
Papillomaviruses
Radioactive tracers in biochemistry
Radioactive tracers in biology
Sedimentation analysis
Stent, Gunther S. (Gunther Siegmund), 1924-
Watson, James D., 1928-

RELATED ARCHIVAL MATERIALS

Correspondence with Salvador E. Luria, Watson Collection, Cold Spring Harbor Laboratory Archives.

RELATED PUBLISHED MATERIALS

Cairns, John; Stent, Gunther; Watson, James D. 1992. *Phage and the Origins of Molecular Biology*. Expanded Edition. Cold Spring Harbor: CSHL Press.

Inglis, John, Joseph Sambrook, Jan Witkowski, Eds. *Inspiring Science: Jim Watson and the Age of DNA.*

McElheny, Victor K. 2003. *Watson and DNA: Making a Scientific Discovery*. Cambridge, MA: Perseus Publishing.

Olby, Robert. *The Path to the Double Helix.* Seattle: University of Washington Press, 1974.

Watson, James D. 1968. *The Double Helix: A Personal Account of the Discovery of the Structure of DNA.*

Watson, J. D. 1955. "Growing up in the phage group." *Phage and the Origins of Molecular Biology*. Eds. John Cairns, Gunther S. Stent, James D. Watson. *CSHLQB*, p. 239-245.

Watson, James D. 2000. *A Passion for DNA: Genes, Genomes, and Society*. Cold Spring Harbor, NY: CSHL Press.

Watson, James D. *The Properties of X-ray Inactivated Bacteriophage*. Diss. Indiana University. 1950.