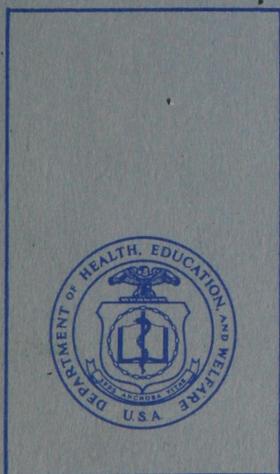


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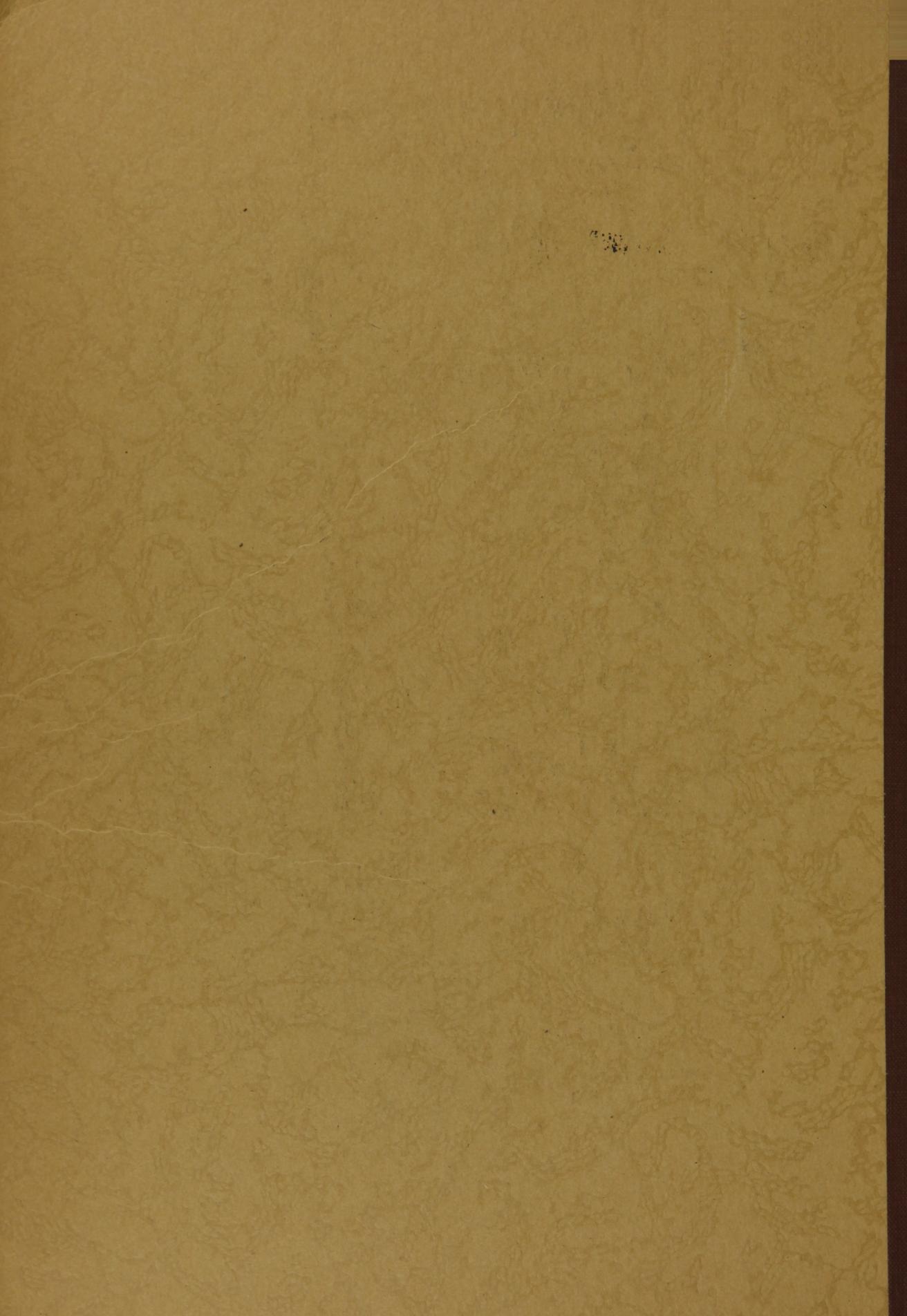
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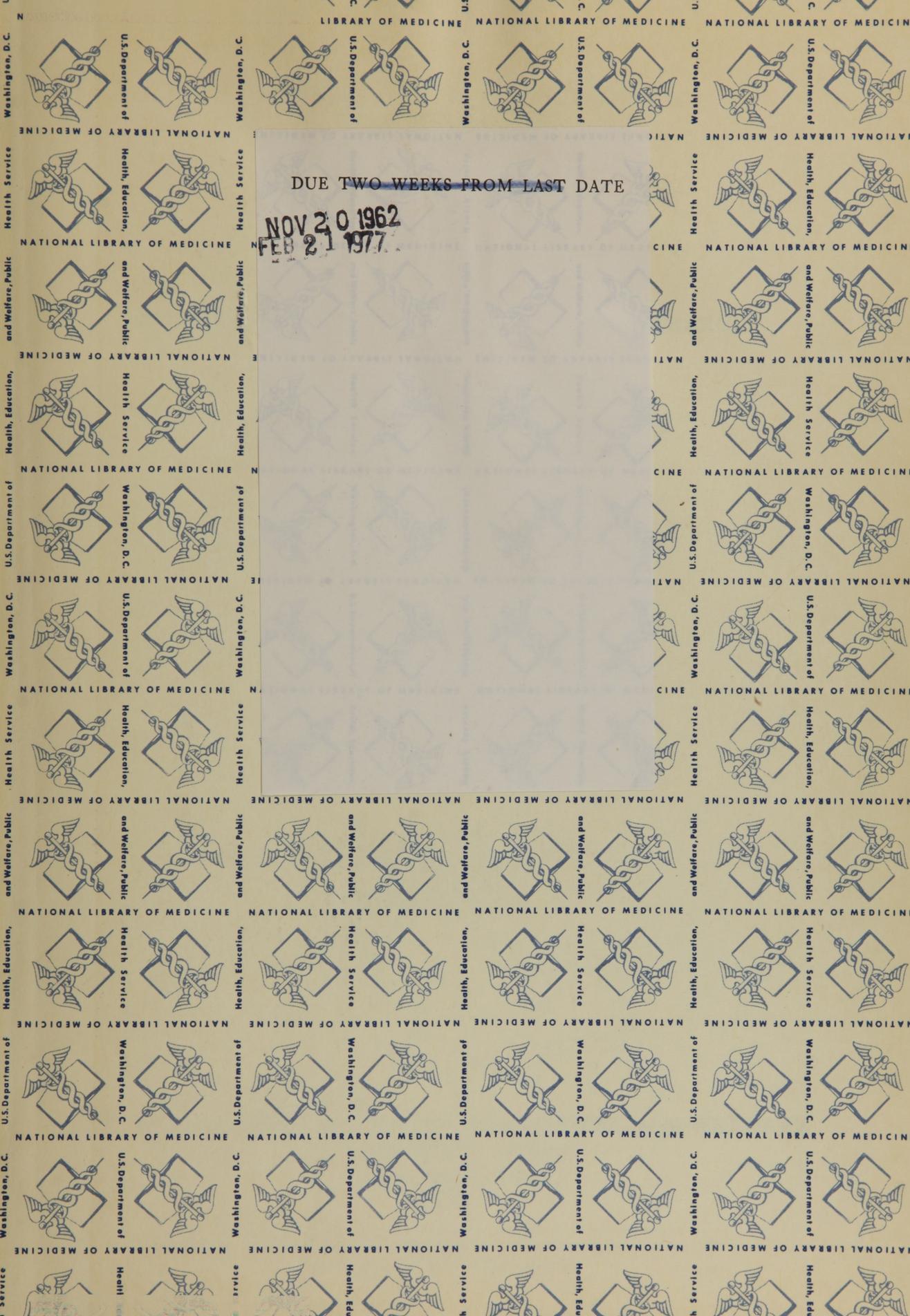
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TO *Medical*
Research
By
Public Health Service Scientists

A Biobibliography to 1940



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CONTENTS

	Page
Preface	v
Chronological Table: Notable Public Health Service Scientists	xi
John Fleetezelle Anderson	1
Charles Armstrong	5
Ida Albertina Bengtson	9
William Mansfield Clark	13
Barnett Cohen	17
Rolla Eugene Dyer	19
Alice Catherine Evans	23
Edward Francis	27
Wade Hampton Frost	30
Joseph Goldberger	34
Claude Silbert Hudson	40
Reid Hunt	43
Joseph Hoeing Kastle	48
James Payton Leake	50
Kenneth Fuller Maxcy	52
George Walter McCoy	55
Ralph Robinson Parker	63

CONTENTS (continued)

	Page
Milton Joseph Rosenau	66
Louis Schwartz	71
Atherton Seidell	73
Maurice Isadore Smith	76
Roscoe Roy Spencer	79
Charles Wardell Stiles	82
Arthur Marston Stimson	87
Carl Voegtlin	90
William Buchanan Wherry	93

ABBREVIATIONS

The journal title abbreviations in the bibliographies are those used in the Current List of Medical Literature and for older references, those used in the several series of the Index-Catalogue of the Library of the Surgeon General's Office.

Annotations in the references identified as quoted from "Bloomfield", "Garrison", "Kelly" or "Williams," refer to numbers 1, 4, 5, and 11 in the general bibliography following the preface.

PREFACE

This series of brief bio-bibliographies presents a selection of books and articles by medical and scientific officers of the United States Public Health Service, most of whom worked in the Hygienic Laboratory (later the National Institute of Health) and in the Division of Scientific Research. It covers work prior to 1940, and records contributions to medical research made by these officers during that period.

"By the last decade of the 19th century, some of the pertinent questions concerning contagious diseases had been answered by demonstrating specific causative organisms in numerous instances and showing how infection might be prevented. Nonetheless, certain observations remained unexplained and mysterious. Light was finally thrown on these obscurities in the germ theory of disease during the closing decade of the 19th century and the first decade of the 20th century by a number of brilliant investigations, which revealed the part played by vectors, or intermediaries, in the transmission of communicable diseases.

"While Americans contributed only in a limited degree to the growth of microbiological knowledge, they were more alert than their European confreres to its practical applications. Out of this awareness developed the diagnostic laboratory, a new public health institution for the application of bacteriology." *

*Rosen, George. Trends in American public health, from the Colonial period to the present. In: Marti-Ibañez, F., ed. History of American medicine; a symposium. New York, MD Publications, 1959. p. 160.

By the turn of the century organization for research and bacteriological investigations had been well established by Dr. Kinyoun, the Laboratory's first director. The first severe test of the competency of Service bacteriologists was said to have occurred in 1900, when suspected cases of bubonic plague began to come to the attention of local sanitary authorities in San Francisco.

Some of Dr. Kinyoun's innovations were: standardization and control of biological preparations, a graduate school in laboratory methods to train officers in investigations, establishment of separate divisions in the Hygienic Laboratory, defense of animal experimentation, examination and purification of public water supplies, and others. In 1901 a Division of Scientific Research was established in the Public Health Service, and the Laboratory was made a part of it.

There was no hard and fast differentiation between the work of the Division and that of the Laboratory. The Laboratory scientific staff was sent out on field studies, and investigatory units sent materials to the Laboratory for study. These combined field-laboratory investigations developed into operating programs such as Frost's stream pollution studies, Lumsden's local health department demonstrations, the monumental industrial hygiene investigations, the study of drug addiction problems and nutritional deficiency diseases,

and many others.

In this list, selection of contributors and their contributions was made from references in standard bibliographies, textbooks, dictionaries and encyclopedias, listed in the general bibliography. Only those references are cited for which a published evaluation by a scientific authority could be found. Consistently cited in bibliographies as classic or original studies in their respective fields, they are historically important because acknowledged as such by later investigators. Not all the important and valuable work done by this group of investigators during this period is listed. This is a bibliography of "landmarks" and is not intended to summarize the entire contribution of the Public Health Service to medical research to 1940.

The biographical notes have been compiled from published accounts and evaluations of the investigators and their work, many written by former associates or contemporaries. Some have been quoted from obituary notices.

Fourteen of the scientists were "starred" by Cattell in the earlier editions of American Men of Science. (A star was prefixed to the specialty of the 1000 students of the natural and exact sciences in the United States whose work was considered the most important.) The Sedgwick Memorial Medal -- the highest honor in the public

health field -- was awarded to six, and many received other medals, awards and citations, and served as presidents of their professional societies. Some of the scientists made the Public Health Service their career; others were attached for only brief periods. Those leaving the Service went on to distinguished careers in medical education and public health. A number continued as consultants to the Service.

It seems logical to close the chronicle at the time of the removal of the National Institute of Health to new quarters at Bethesda. This coincided with the beginning of World War II and with the great expansion into the various institutes. Medical knowledge became so vast and so specialized that an individual contribution could with difficulty be isolated and identified.

Although the "contributions" listed here are remembered as personal and individual, they were dependent upon the unselfish pooling of effort of a group.

"Each [investigator] made a personal contribution of first-rate importance. Behind and around him there is always a constellation of scientists who have taken part in the same work. Their preliminary researches have made it possible, or their subsequent efforts have made it more fruitful. [Each scientist] is therefore not only a discoverer in his own right, but a representative -- by virtue of his outstanding contribution -- of those who have worked toward the same or a similar goal. The configuration of the heavens may be roughly indicated by mapping the principal stars, but the sky would be dim indeed without the rest."*

* Stevenson, L. G. Nobel prize winners in medicine and physiology. New York, Schuman, [1953] Preface.

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Service in **NOTABLE PUBLIC HEALTH SCIENTISTS: Their Fields of Medical Research,**
 and their Contributions: a Chronological Table

1890-1915 * S	Rosenau, M. J. (1869-1946) Epidemiologist	Anaphylaxis Typhoid Studies Standardization of biological products Text: <u>Preventive Medicine and Hygiene</u>
1898-1915	Anderson, John F. (1871-1958) Bacteriologist	Dermacentor <u>andersoni</u> (Stiles) <u>Measles transmitted to monkeys</u> Test for typhus Anaphylaxis and allergy, first use of word "allergen"
1899-1929 *	Goldberger, Joseph (1874-1929) Bacteriologist and Epidemiologist	"Straw itch" (Dermatitis Schambergi) Transmission of typhoid by lice Experimental production of pellagra, and prevention by proper diet
1900-1938 *	Francis, Edward (1872-1957) Bacteriologist	"Tularemia Francis" Deer-fly fever Operative procedure in embalming Agar as culture medium
1900-1940	McCoy, George W. (1876-1952) Bacteriologist, Immunologist and Epidemiologist	Isolation of <u>B. tularensis</u> <u>Plague in California ground squirrels</u> Leprosy -- epidemiology and public health management

Continued

* Starred in American Men of Science S Recipient of Sedgwick Memorial Medal,
 American Public Health Association

Service in
PHS

NOTABLE PUBLIC HEALTH SERVICE SCIENTISTS -- Continued

1902-1931	Stiles, C. W. (1867-1941) Zoologist	Hookworm identification and control in North America <u>Index Catalogue of Medical and Veterinary Zoology</u>
1902-1941	Stimson, A. M. (1876-1953) Bacteriologist and Epidemiologist	<u>Leptospira icterohaemorrhagiae</u> Modification of Pasteur rabies treatment and method for vaccine preparation Identification of rabies vaccine reactions
1904-1913 *	Hunt, Reid (1870-1948) Pharmacologist	Discovery of thyroid hormone in blood Hunt's Test: acetonitril test for thyroid Toxicity of alcohol Hypotensive effect of acetylcholine
1905-1929 * S	Frost, Wade Hampton (1880-1938) Epidemiologist	Epidemiological method Stream pollution studies
1905-1909 *	Kastle, Joseph H. (1864-1916) Chemist	Chemical tests for blood Kastle reagent Oxygen catalysts
1906-1947	Schwartz, Louis (1883-) Dermatologist	Dermatitis and melanosis due to photosensitization
1907-1939 *	Seidell, Atherton (1878-) Chemist	Chemistry of vitamins Anti-neuritic substances Solubility of organic and inorganic compounds Chemistry of thyroid (with Hunt)

1908-1909 1917	Wherry, William B. (1874-1936) Bacteriologist	Discovery of sylvatic plague in California ground squirrels Tularemia in man first identified
1909-1945	Leake, James P. (1881-) Immunologist	Multiple pressure method of vaccination
1913-1943 *	Voegtlin, Carl (1879-) Chemist	Action of arsenicals
1914-1947	Spencer, R. R. (1888-) Bacteriologist and Immunologist	Development of Rocky Mountain spotted fever vaccine, with Parker
1916-1950 * S	Armstrong, Charles (1886-) Bacteriologist and Pathologist	Lymphocytic choriomeningitis -- "Armstrong's disease" Post-vaccinal tetanus Experimental transmission of poliomyelitis to animals Psittacosis
1916-1946	Bengtson, Ida A. (1881-1952) Bacteriologist	New variety of <u>Clostridium botulinum</u> ("C") Standardization of gas gangrene antitoxins
1916-1950 * S	Dyer, Rollo E. (1886-) Pathologist and Epidemiologist	Endemic typhus -- "murine typhus" -- transmission and vaccine Scarlet fever antitoxin
* Starred in <u>American Men of Science</u>		Continued S Recipient of Sedgwick Memorial Medal, American Public Health Association

Service in PHS NOTABLE PUBLIC HEALTH SERVICE SCIENTISTS -- Continued

1918-1945	Evans, Alice C. (1881-) Bacteriologist	Brucellosis Etiology of epidemic encephalitis "Evans' [salt] Solution" "Evans' Modification"
1920-1951	Smith, Maurice I. (1887-1951) Pharmacologist	"Smith method" of assaying ergonovine Jamaica-ginger paralysis
1920-1927 *	Clark, William M. (1884-) Chemist	Acid-base equilibria Oxidation-reduction equilibria Hydrogen-ion determination
1920-1928	Cohen, Barnett (1891-1952) Biochemist	Associate of Clark, <u>see above</u>
1921-1929 S	Maxcy, Kenneth (1889-) Epidemiologist	Murine typhus -- "Maxcy's Disease"
1921-1929	Parker, R. R. (1888-1949) Entomologist	Tularemia infection in ticks Development of Rocky Mountain spotted fever vaccine
1929-1951 *	Hudson, Claude (1881-1952) Chemist	Structure of carbohydrates Anomerism Hudson's Lactone Rule

* Starred in American Men of Science S Recipient of Sedgwick Memorial Medal,
American Public Health Association

JOHN FLEETZELLE ANDERSON, M. D. 1871-1958
BACTERIOLOGIST

United States Public Health Service, 1898-1915
Director, Hygienic Laboratory, 1909-1915

Dermacentor andersoni (venustus)
Anaphylaxis and allergy
Measles transmitted to monkeys
Anderson and Goldberger's test for typhus fever
Anderson and Leake's method of producing
tetanus toxins

John Fleetezelle Anderson was born in Fredericksburg, Virginia, March 14, 1871. Following medical school at the University of Virginia, he went to Europe to study bacteriology at Vienna, Paris, and at the School of Tropical Medicine in Liverpool. He joined the Marine Hospital Service in 1898, and was detailed to various European ports. In 1902 he was made Assistant Director of the Hygienic Laboratory, and served as Director from 1909 to 1915, when he resigned to become Director of Research and Biological Laboratories for E. R. Squibb and Sons, where he remained until his retirement in 1946.

In 1903 he described a new disease -- Rocky Mountain spotted fever -- and suggested the wood tick as the possible carrier. C. W. Stiles later identified the tick and named it Dermacentor andersoni (venustus) after him.

Throughout his career in the Service he was actively engaged

in research. Independently, he studied serum and vaccine therapy, immunology, cholera, typhus, poliomyelitis, and public health and sanitation problems. With Dr. Rosenau he worked on anaphylaxis and hypersusceptibility, and together they published several important papers on the subject. In one (5), the word "allergin" was first seen in medical literature. Investigators at the Hygienic Laboratory were pioneers in the American development of anaphylaxis. Their interest was twofold: first, responsibility to protect the public as much as possible from any deleterious effects of administering biological products; second, it was a new and highly interesting phenomenon of general pathology. Modern applications to the theory and practice of medicine could not possibly have been foreseen, but a working basis for their interpretation was laid down.

With Joseph Goldberger he collaborated in experiments on the transmission of measles to monkeys, which provided science with an experimental animal for that disease.

In 1956 he made a grant to his alma mater, the University of Virginia to establish a lectureship in medical science or public health, to be known as the John F. Anderson Memorial Lectures in Medicine. He died in New Brunswick, N. J., September 29, 1958, of heart disease.

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See also: Rosenau, reference no. 3.

**CHARLES ARMSTRONG, Sc. D., M. D. 1886-
BACTERIOLOGIST**

United States Public Health Service, 1916-1950
Chief, Division of Infectious Diseases, (NIH) 1947-1950

Post-vaccinal tetanus and encephalitis
Psittacosis
Lymphocytic choriomeningitis, "Armstrong's Disease"
Experimental transmission of poliomyelitis to animals

Charles Armstrong was born in Alliance, Ohio, September 25, 1886. He took his M. D. degree at Johns Hopkins in 1915, and was awarded a D. Sc. from Mt. Union College, his alma mater, in 1933. He entered the Public Health Service in 1916 on the completion of his internship, and his entire career has been in the Service.

His scientific investigations have been in the field of infectious diseases, and he has himself been infected with malaria, dengue fever, encephalitis, psittacosis, Q fever and tularemia as a result of his laboratory work. At the presentation to Dr. Armstrong of the Sedgwick Memorial Medal of the American Public Health Association in 1941, Dr. T. E. Parran said: "He is unique in that he has made a distinct contribution to our knowledge of every disease with which he has worked."

In 1940 Dr. Armstrong and his co-workers succeeded in transmitting the virus of poliomyelitis to the Southern cotton rat and to white mice. This marked a significant advance in research on this disease since heretofore the only available experimental animal had been the

costly imported Rhesus monkey.

He served as Chief of the Division of Infectious Diseases from 1947 to his retirement in 1950, and still is actively engaged in research.

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19. Cotton rats and white mice in polio research. Am. J. Pub. Health 31: 228-232.

IDA ALBERTINA BENGTON, Ph. D. 1881-1952
BACTERIOLOGIST

United States Public Health Service, 1916-1946

Botulism

Standardization of gas gangrene antitoxins

Born in Harvard, Nebraska, on January 17, 1881, of parents who were Swedish immigrants, Ida A. Bengtson received a liberal education, with an A. B. degree from the University of Nebraska in 1903. In those days few women were interested in the physical and biological sciences, and these subjects were not among Ida Bengtson's interests. Shortly after graduation she came to Washington to be a cataloger in the Library of the U. S. Geological Survey. On comparing her own professional life with that of a friend in a scientific position, she decided upon the life of a scientist, resigned from the Geological Survey in 1911, and entered the University of Chicago to study bacteriology, with chemistry and physiology as minor subjects. She received the M. S. degree in 1913; held a university scholarship for two years; received the Ph. D. in 1919. After a year as bacteriologist in the Chicago Department of Health, she was appointed in 1916 as assistant bacteriologist in the Hygienic Laboratory, with an annual salary of \$1,800. Low as her entrance salary appears compared with present salaries, it was very good for those days, and her fellow graduate students and professors were astonished at her

attractive appointment. She was the first woman of science in the U. S. Public Health Service.

In scientific investigation Dr. Bengtson was painstaking and thorough; her conclusions were conservative. She was the sole or senior author of many papers on miscellaneous bacteriological subjects, most of them appearing in the early years of her career. She made a prolonged study of three subjects: (1) anaerobes and their toxins; (2) trachoma; (3) rickettsial diseases.

Dr. Bengtson's work on anaerobes and their toxins covered two periods. During the earlier period (1902-1923) Clostridium botulinum was of especial interest. She experienced the thrill of discovery when she identified a new variety "C", of the organism, which she obtained from a culture grown from larvae of the green fly, Lucilia caesar. The toxin was responsible for an outbreak of paralytic disease (limberneck) in chickens. During the later period (1934-1939) she carried on basic studies which led to the establishment of the official U. S. and international units for standardizing the antitoxins specific for the four toxins most commonly involved in cases of gas gangrene -- those produced by Clostridium perfringens, C. oedematiens, C. septicum, and C. histolyticum.

In 1924 she went to Rolla, Mo., to study the etiology of trachoma in the U. S. Public Health Service Hospital. The seven years spent

there, although marked by a slowing in scientific publication, were a good preparation for her later assignment, because among the various organisms she considered as a possible causal agent of trachoma were rickettsia.

In 1937, as a member of the "typhus unit", the study of rickettsiae became her major assignment. In 1938 H. R. Cox discovered that the yolk sac tissue of the developing chick embryo provided a suitable medium for prolific growth of rickettsiae, and Dr. Bengtson was in a position to put this discovery into immediate practical use, and she entered into the most productive period of her career. She modified the complement fixation test, adapting it for the detection and differentiation of rickettsial infections. Her technique is now in wide use. She had done some of the early work in the tissue culture of typhus rickettsiae which was a great importance in the subsequent development of the vaccine which played such an important part in the protection of troops against typhus, one of the major wartime diseases. She retired in 1946 after work in the Rickettsial Unit which won her praise from its chief, Dr. Norman Topping. She died in 1952.

She was a member of the Society for Experimental Biology, the Society of Tropical Medicine and numerous other scientific organizations, and was awarded the Typhus Medal of the American Typhus Commission in 1947.*

* Obituary. A. C. Evans. J. Washington Acad. Sc. 43: 238-240, 1953.
(Condensed)

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WILLIAM MANSFIELD CLARK, Ph. D., hon. Sc. D. 1884-
CHEMIST

United States Public Health Service, 1920-1927
Chief, Division of Chemistry, Hygienic Laboratory, 1920-1927

Acid-base equilibria
Oxidation-reduction equilibria
Hydrogen-ion determination

William Mansfield Clark was born in Tivoli, New York, August 17, 1884. He attended Williams College, receiving his A. B. in 1907, his A. M. in 1908, and hon. Sc. D. in 1935. His Ph. D. was granted by Johns Hopkins University in 1910. He worked as a chemist in the Department of Agriculture from 1910 to 1920, then came to the Hygienic Laboratory, where he was Professor of Chemistry and Chief of the Division of Chemistry until 1927. He then served as DeLamar Professor of Physiological Chemistry at Johns Hopkins University until 1952, when he became emeritus.

He has been a member of the National Research Council, as Chairman of the Division of Chemistry and Chemical Technology, since 1941. He has been president of the Society of Biological Chemistry (1933-1934), of the Society of American Bacteriologists (1933), and has received the Borden Award and the Nichols medal of the American Chemical Society. In 1952 he delivered the Remsen Memorial Lecture.

The contributions of Clark and his associates to the subject of hydrogen-ion concentration have had widespread influence on a wide

variety of public health laboratory conceptions and techniques. His studies on oxidation-reduction phenomena and indicators have enabled investigators in almost every area of pure and applied chemistry to make notable advances, otherwise impossible.

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BARNETT COHEN, Ph. D. 1891-1952
BIOCHEMIST

United States Public Health Service, 1920-1928

Oxidation-reduction equilibria

Barnett Cohen was born in Russia in 1891 and brought to America by his parents when he was two. As a naturalized citizen he served as a lieutenant in World War I, and as an official investigator under OSRD in World War II. Cohen's education was at the College of the City of New York, where he came to the attention of Professor C-E. A. Winslow, who was to have a determining influence in his life. After graduation, practical work in chemistry and bacteriology took him to positions in Connecticut, Virginia and Georgia. He was then brought to Yale by Professor Winslow. With Winslow he studied the viability of certain bacteria in natural and polluted waters and conducted many other investigations.

He spent the summer of 1917 in the Dairy Division of the Department of Agriculture with William Mansfield Clark who, on the basis of this work, had him appointed to his staff in the Division of Chemistry of the Hygienic Laboratory in 1920. There Cohen was permitted by Yale University to complete his work for the Ph. D., with his dissertation on the effect of temperature and pH upon several phases of the growth and decline of bacterial populations. During the ensuing

seven years he worked with Clark on oxidation-reduction indicators.

In 1928, he followed Clark to Johns Hopkins, and from that date until his death in 1952 he was Associate Professor of Physiological Chemistry in the Johns Hopkins School of Medicine. For fifteen years he edited the Bacteriological Reviews and served as President of the Society of American Bacteriologists in 1950.

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**ROLLA EUGENE DYER, LL. D., M. D. 1886-
BACTERIOLOGIST AND EPIDEMIOLOGIST**

United States Public Health Service, 1916-1950
Chief, Division of Infectious Diseases, (NIH) 1936-1942

**Scarlet Fever Antitoxin
Endemic typhus**

Rolla Eugene Dyer was born November 4, 1886, in Delaware County, Ohio, but grew up in Bourbon County, Kentucky. He received his college education at Kenyon College, Ohio, and taught history and Latin for four years. Deciding to become a doctor, he attended the University of Texas, receiving his M. D. in 1914, and then interned at the Philadelphia General Hospital.

In 1916, after a brief try at general practice, he entered the Public Health Service, which became his career. Until 1921 he was engaged in field work and epidemiological investigations. He then requested a course at the Hygienic Laboratory, and within a year was made assistant director. Every possible encouragement and support was given by Dr. McCoy, including a year of foreign study in 1923-1924, financed by the League of Nations.

In 1925, with B. T. Sockrider, he did special work on scarlet fever antitoxin, publishing a paper that is still authoritative. In 1929, Doctors Dyer, Rumreich and Badger were assigned to carry on Dr. Kenneth Maxcy's research on the endemic American form of typhus,

investigating the method of transmission of the disease. Dr. Dyer found the agent in the common rat flea, and worked on a vaccine to protect against typhus.

From 1936 to 1942 he was Chief of the Division of Infectious Diseases, becoming Director of the National Institutes of Health in 1942, a position he retained until his retirement in 1950. Since 1950 he has been Professor of Medicine and Director of Research at Emory University School of Medicine, coordinating research at that institution.

Dr. Dyer received many honors; among them are the Sedgwick Memorial Medal, the Lasker Award, the Carlos Findlay Medal of Cuba, the U. S. Typhus Commission Medal, and the Walter Reed Medal, American Society of Tropical Medicine. He is a Diplomate of the American Board of Preventive Medicine and Public Health.

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**ALICE CATHERINE EVANS, M. S., hon. Sc. D., hon. M. D. 1881-
BACTERIOLOGIST**

United States Public Health Service, 1918-1945

Relationship of Malta fever and Bang's disease
"Evans' Solution"
"Evans' Modification"
Etiology of epidemic encephalitis

Alice Catherine Evans was born January 29, 1881, in Neath, in the Welsh farm country of northern Pennsylvania. She received her B. A. degree from Cornell University in 1900, and her M. S. degree from the University of Wisconsin in 1910. She afterward continued her graduate studies at George Washington University and at the University of Chicago.

From 1910 to 1918 she worked as a dairy bacteriologist at the Department of Agriculture in Washington.

"Evans, while working on the bacterial flora of milk aseptically drawn from the udder, found rods resembling B. abortus. This finding led her to consult Eichorn of the Bureau of Animal Industry and during the conversation the question of comparing the abortus organism with that of Malta fever was discussed. Following this suggestion Evans compared both organisms and found them indistinguishable, morphologically and culturally. The serum from animals inoculated with either organism agglutinated with the other, as well as the homologous type, and the two organisms could be differentiated only by agglutinin absorption. This work of Evans led investigators to study the possibility of human infection with the abortus organism." (4)

Her services were soon secured by Dr. McCoy and she joined the staff of the Hygienic Laboratory as bacteriologist.

She continued her studies of the melitensis and abortus organisms and published papers on questions of classification and nomenclature and on cattle and hogs as sources of infection. She worked with Francis in the serological diagnosis of tularemia, and did important work on the etiology of epidemic encephalitis. She herself fell ill with undulant fever in 1922, and was seriously ill for seven years.

In recognition of her scientific achievements, she was elected to the presidency of the American Society of Bacteriologists in 1928, the first woman to be so honored. From 1925 to 1931 she was a member of the National Research Council Committee on Infectious Abortion. In 1930 she was a delegate to the International Microbiological Congress at Paris. She received an honorary M. D. from the Women's Medical College of Pennsylvania in 1932.

After her retirement her interests continued; she was president of the Inter-American Committee on Brucellosis, 1946-1957, member of the FAO-WHO Committee on Brucellosis, 1946-1957. She is a Fellow of the American Association for the Advancement of Science.

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EDWARD FRANCIS, M. D., LL. D., hon. Sc. D. 1872-1957
BACTERIOLOGIST

United States Public Health Service 1900-1938

Operative technic for embalming
Deer-fly fever
"Tularemia Francis"
Use of agar as culture medium

Edward Francis was born in Shandon, Ohio, March 27, 1872.

He received his medical degree from the University of Cincinnati School of Medicine in 1897. He joined the Public Health Service in 1900 as a bacteriologist; he was appointed Medical Director in 1930, and retired January 1, 1938.

He was renowned as an authority on tularemia, popularly called "rabbit fever".

"...Doctor Francis and other investigators delineated the method of human transmission through the bite of deer flies which receive the organism from diseased wild rabbits. Proof of transmission by a variety of arthropods, especially ticks, was a major contribution by the Service." Williams, p. 192.

Dr. Francis contracted tularemia from the first "deer fly fever" patient he visited in Utah; sick for three months, he kept a careful record of his illness. He discovered that one attack confers permanent immunity in man. He was continuously exposed to Bacterium tularense for sixteen years, accidentally reinfecting himself on four occasions. He proved conclusively that local reinfection in a

tularemia-immune individual is an immune reaction, as in revaccination with smallpox vaccine virus.

In 1928 the American Medical Association awarded him its Gold Medal for his contributions to the knowledge of tularemia. He received honorary degrees from Miami University and Ohio State University. His endeavors carried him into all phases of bacteriology, and his name is connected with most of the investigations conducted by the Service during his career.

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WADE HAMPTON FROST, M. D. 1880-1938
EPIDEMIOLOGIST

United States Public Health Service, 1903-1929

Epidemiological method

Wade Hampton Frost was born March 3, 1880, in Marshall, Virginia, the son of a country physician. In 1898 he entered the University of Virginia, receiving the B. S. degree three years later, and his M. D. degree in 1903. He entered the Public Health Service in 1903 and had duty at New Orleans, Baltimore and with the U. S. Revenue Cutter Service, (now the Coast Guard).

The most fortunate turn of events in his career came in 1908. In the fall he was assigned to duty at the Hygienic Laboratory, which, under the direction of M. J. Rosenau, was then well launched upon its commission from Congress "to investigate the diseases of man". Rosenau left the following year for Harvard, and was succeeded by John F. Anderson.

On detail to the Laboratory was an unusually competent group of young officers. Anderson and Goldberger were investigating the relationship of Mexican tabardillo to Old World typhus, and to Brill's disease, and, with Nicolle, were establishing the role of the louse in transmission. A board consisting of Rosenau, Lumsden, and Kastle (later Lumsden, Anderson and Frost) was conducting an

investigation of the origin and prevalence of typhoid fever in the District of Columbia. Lavinder was beginning the work on pellagra which was later continued so brilliantly by Goldberger. Francis was engaged in studies of the tetanus bacillus incidental to the control of the manufacture and sale of biological products. Stimson was gathering the facts about rabies and setting up procedures for the administration of the Pasteur treatment. Hunt and his assistants were developing and systematizing pharmacology. Kastle was contributing to knowledge of enzymes and the sanitary chemistry of water.

In such company the latent capacities of Frost's keen and sensitive mind were stirred into action. Reviewing the four and one-half years of duty at the Hygienic Laboratory, one cannot but be impressed by Frost's accomplishment. He entered it as a young physician familiar only with the practice of medicine. Mastering the techniques and methods of the investigation of disease in the laboratory, he carried them into the field. Through personal experience he became acquainted with the existing knowledge and problems presented into control of typhoid fever, septic sore throat, cerebro-spinal meningitis, and poliomyelitis. He emerged from this experience a trained and highly competent investigator in epidemiology.

Devoting a quarter of a century to developing the use of the epidemiological method in the investigation of disease, he contributed to the transformation of epidemiology from a speculative and descriptive methodology to an analytic and productive science.

In 1919, when the School of Hygiene and Public Health was established at Johns Hopkins University, Dr. William Welch persuaded Surgeon General Cumming to detail Frost as Resident Lecturer, later as Professor of Epidemiology, and then as Head of the Departments of Epidemiology and Public Health Administration. At the same time he continued to discharge other responsibilities as an officer of the Public Health Service until 1929 when demands upon his time became so great that he found it necessary to resign his commission, but continued a consulting relationship with the Service.

He was awarded the Sedgwick Memorial Medal in 1938, with this evaluation from the American Journal of Public Health: "His promising work in the old Hygienic Laboratory of the Public Health Service, his demonstration of a capacity to link together the data from the field and the laboratory, led to his selection for many notable investigations." Condensed from Maxcy (2)

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JOSEPH GOLDBERGER, M. D. 1874-1929
BACTERIOLOGIST and EPIDEMIOLOGIST

United States Public Health Service, 1899-1929

"Straw itch" - Dermatitis Schambergi
Transmission of typhus fever by lice
Measles transmitted to monkeys, (with Anderson)
Pellagra

"Joseph Goldberger's life was a Horatio Alger experience common to other great Americans. He was born on a peasant tenant farm in Czechoslovakia and brought to New York City when he was seven. For the early part of his life he delivered groceries for his father on the lower East Side. At 16, he decided on a course of civil engineering, but two years later switched to medicine after he heard the Harvey Lecture given by a Bellevue Hospital College physician. In 1895 he graduated second in his class at Bellevue, where he had acquired a reputation as a hater of routine but a master of case history writing. To him every case was a great and absorbing mystery, the solution an exciting challenge. After a 2-year try he decided that private practise was not his field and he entered the Marine Hospital Service. He performed brilliant and dangerous work on typhus fever, operating always at the epidemic scene. He also made important studies of the Mexican form of typhus fever and of yellow fever. But the chance to exercise his talents, his greatest contribution to humanity, came when he was put in charge of pellagra investigations." Williams, R. C. (5)

Wading through the wilderness of conflicting theories as to the cause of pellagra, and in the face of those who claimed to have proved that it was infectious in origin, Goldberger's first theory, which he announced in 1914, was that pellagra was due to a deficiency in diet. This he proceeded to prove conclusively and devised ways in which the

disease could be prevented and cured. Even so, he did not discard the possibility that pellagra might have an infectious element until he proved to his own satisfaction that this could not be true. This he did by injecting blood from patients with pellagra into himself, his associates, and even into his own wife. Furthermore, he made pills from the intestinal discharges and the skin rash scales from pellagrous subjects and ate them as further proof that no infectious agent was involved.

Later he sharpened his ideas about the dietary origin of pellagra to include the concept that a "vitamine" deficiency was involved. This was a quite new concept in disease etiology since Funk had coined the name "vitamine" only in 1911. Later his ideas shifted to include the possibility that an amino acid deficiency, specifically cystine and tryptophan, was causative. Both of these theories were proved after Goldberger's untimely death, although it was not until 1945 that the amino acid tryptophan was clearly implicated.

Never one to form a theory and fail to test it, Goldberger and his associates reported in 1922 on tests with cystine and tryptophan, although their claims for therapeutic value were very conservative. For reasons unknown, he never reported on some dramatic results which he and his associate Tanner obtained with tryptophan alone. Nicotinic acid was not known as a vitamin during his lifetime so it

could not be tested.

Goldberger's influence on nutrition research continued long after his death and continues even today. The dog, which he introduced and established as a tool in pellagra research, is still used today. The dietary data which he and his associates collected have been used recently to recalculate the human requirement for nicotinic acid.

Not the least of his amazing abilities was his capacity to gather brilliant associates who ably continued his work after his death. His career in research was marked by courage, rare intellectual insight, wisdom and perseverance. In the words of Dr. Arthur M. Stimson: "He illuminated everything he touched and won the admiration and affection of his associates." Condensed from Hundley (3)

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Measles transmitted to monkeys

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Transmission of typhus fever by lice

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CLAUDE SILBERT HUDSON, Ph. D. 1881-1952
CHEMIST

United States Public Health Service, 1929-1951
Chief, Division of Chemistry, National Institute
of Health, 1929-1951

Carbohydrate chemistry
Anomerism
Hudson's Lactone Rule

Claude Silbert Hudson was born in Atlanta, Georgia, January 27, 1881, and spent his boyhood in Mobile, Alabama. After graduation from Princeton in 1901 he was elected into an endowed fellowship in experimental science and began an investigation on the mutarotation of milk sugar. This investigation, published in 1902 when he was twenty-one, marks the first of his outstanding series of more than 250 publications on the carbohydrate group.

After a year with Nernst at Göttingen, and several years in teaching posts in the United States, he was chemist to the Bureau of Chemistry at Washington until 1919, and at the Bureau of Standards until 1929. In this year he was invited to the Professorship of Chemistry at the Hygienic Laboratory, where he remained until his retirement at the age of seventy. During his tenure he was enabled to secure the assistance of a succession of brilliant young scientists who, inspired by his able leadership, have achieved world-wide distinction.

Among his many works on carbohydrates, Hudson's contributions to preparative methods and to the relationship between rotatory power and structure stand out, while his famous "lactone rule" was perhaps his greatest single personal contribution and was one of the most notable landmarks in carbohydrate chemistry. He was a brilliant experimentalist and his writings bear the stamp of a master mind. He infused his passion for the sugars into his many pupils, who bore him great respect and devotion.

"The main contribution of carbohydrate chemistry of Hudson, and the theme that runs through all of it, is the study of anomerism. He carefully purified and measured the rotatory powers of almost countless anomeric pairs, utilizing especially the acetates of sugars and glycosides. This work culminated in the beautiful correlations made with Ernest L. Jackson (1937) and others, through applications of the glycol-cleaving reagent of Malaprade. Thereby, anomeric assignments made only on the basis of the optical isorotation rules were shown to valid in fact." Wolfrom, M. L. (3)

"The simplicity and elegance of the methods of investigation which have been developed and the unambiguous nature of the conclusions are such that this whole chapter of work from Hudson's laboratory is likely to be regarded as a classic example of organic chemistry at its best."
Hirst, E. L. (1)

Many honors came to him, particularly from the American Chemical Society. He received the Borden Medal and Award, (1941) also the Nichols Medal, the Willard Gibbs Medal, the Richards Medal, and

the Hillebrand Prize. The Chemical Society in London elected him to honorary fellowship. He died suddenly on December 27, 1952, mourned by carbohydrate chemists all over the world.

Condensed from: Stacey, M. (2)

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REID HUNT, Ph. D., M. D. 1870-1948
PHARMACOLOGIST

United States Public Health Service, 1904-1913
First Chief, Division of Pharmacology,
Hygienic Laboratory, 1904-1913

Demonstration of presence of thyroid hormone in
the blood

Hunt's Test -- acetonitril test for thyroid

Hunt's Reaction -- pathogenesis of exophthalmic
goiter

Toxicity of methyl and ethyl alcohols

Discovery of hypotensive effect of acetylcholine

Reid Hunt was born at Martinsville, Ohio, April 20, 1870, of Quaker ancestry from Virginia. He attended Wilmington College and Ohio University, going later to Johns Hopkins, receiving his A. B. degree in 1891. In 1892 he studied pharmacology in Germany under Binz and Nussbaum, from whom he acquired the foundation of his training in scientific technique. Returning to Baltimore, he received his Ph. D. in physiology under Howell in 1896, concurrently receiving his doctorate in medicine from the University of Maryland. Dr. Hunt spent the next summer in Chicago with Loeb and Stieglitz, applying chemical methods to biological problems, and investigating poisonous plants causing fatalities among cattle in the West. For two years he tutored in physiology in the New York College of Physicians and Surgeons at Columbia University.

In 1899 Hunt went with the Columbia expedition to the Sudan and upper Nile in Egypt to study the Polypterus, considered to be the

ancestral form from which all fish are descended. He then turned definitely to pharmacology as a career and accepted a position with Abel at Johns Hopkins. From 1902 to 1904 he worked in Ehrlich's laboratory in Frankfurt. Ehrlich was then engaged in investigating the relationship to the structure of organic compounds to their physiologic action. Under his influence Hunt began his own important studies on quinine, and it was this association and experience that determined the interests that guided the remainder of his life.

He imbibed Ehrlich's enthusiasm for chemotherapy and began the work on cyanides which led to the discovery of the Acetonitrile Test for thyroid activity, later generally known as the Reid Hunt Reaction. This work was continued after his return from Frankfurt in 1904 to assume the position of the first Chief of the Pharmacological Division of the Hygienic Laboratory.

Here he served during the next ten years and did much of the research upon which rests his permanent reputation as a distinguished pharmacologist. He demonstrated thyroid hormone in human blood and devised methods for the standardization of thyroid substances. He began his researches on the choline compounds, the idea for which may have been germinating since his days with Abel when he noted the depressor effects of choline in the residues

from adrenal extracts. His demonstration of the amazing activity of acetylcholine led to the prompt identification of Loewi's "Vagusstoff" as none other than this compound and so to our knowledge of the humoral transmission of parasympathetic impulses.

His position as Chief Pharmacologist at this time was very important for American medicine. Pure Food and Drug Law enforcement rested largely on the work performed in his laboratory where the case against patent medicines was developed from the scientific point of view. He made his brilliant descriptions of the pharmacology and toxicity of methyl and ethyl alcohols at this time, studies which became of great importance during the prohibition period.

In 1913 he was called to become Professor of Pharmacology at the Harvard Medical School, and in that capacity taught with distinction and continued his important researches. He retired in 1937, continuing to reside in Boston until his death on March 7, 1948. Broadly trained in biology and pharmacology, he combined to an extraordinary degree the ideal research qualities of technical proficiency, imagination, insight and scholarship. He maintained to the last his keen interest in the Medical School and in problems of research which his contributions and discoveries so greatly enriched.

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JOSEPH HOEING KASTLE, Ph. D. 1864-1916
CHEMIST

United States Public Health Service, 1905-1909
First Chief, Division of Chemistry, Hygienic Laboratory,
1905-1909

Oxidases
Chemical tests for blood
Kastle's Reagent (for hydrochloric acid in
gastric contents)

Joseph Hoeing Kastle was born January 25, 1864, in Lexington, Kentucky. He was educated at the State College of Kentucky, receiving a B. S. in 1884, and an M. S. in 1886. He then did postgraduate work at Johns Hopkins from 1884 to 1888, receiving his Ph. D. in 1888. After several years of teaching at the State College of Kentucky, he joined the staff of the Hygienic Laboratory in 1905, organizing the Division of Chemistry of which he was the first Chief. He left the Laboratory in 1909, going to the University of Virginia Medical School as Professor of Chemistry. He died in 1916.

In addition to his pioneer work in oxidases and chemical tests for blood, he was one of the team who conducted the epoch-making studies on the origin and prevalence of typhoid fever in the District of Columbia. The spirit of scientific research he implanted was well followed by his successors.

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See also: Rosenau, reference no. 6.

**JAMES PAYTON LEAKE, M. D. 1881-
EPIDEMIOLOGIST**

United States Public Health Service, 1909-1945

Multiple pressure method of vaccination
Poliomyelitis epidemiology

James Payton Leake was born June 4, 1881, in Sedalia, Missouri. After receiving his A. B. from Harvard in 1903, and his M. D. in 1907, he entered the Public Health Service and made it his entire career. From 1913 to 1922 he was in charge of serums and vaccines at the Hygienic Laboratory. During this period, working with Dr. John Force, he perfected the multiple-pressure method of vaccination, still the accepted method. From 1930 to 1933 he was in the Office of Industrial Hygiene and Sanitation. From 1933 to his retirement in 1945 he specialized in epidemiological studies.

He was a member of many professional organizations: the Society for Experimental Biology, Society of Epidemiologists, (President in 1943), New York Academy of Medicine, member of the American Medical Association Council of Pharmacy and Chemistry, and Secretary of the Basic Science Board of the District of Columbia, from 1929.

"Since 1916 field investigations of poliomyelitis in the Service are largely synonymous with . . . Leake. His study of the 1917 winter outbreak in Elkins, West Virginia . . . was the first comprehensive study of a serious outbreak occurring in the winter. In the report of this study Dr. Leake also made the first

effort to determine what was the normal endemic expectancy of paralytic poliomyelitis. With the exception of the statistical analysis made by Dr. Selwyn D. Collins of data on past history of paralytic poliomyelitis, as derived from the National Health Survey, it remains today the only such estimate in this country." Williams, p. 204

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**KENNETH FULLER MAXCY, M. D., Dr. P. H. 1889-
EPIDEMIOLOGIST**

United States Public Health Service, 1921-1929

Murine typhus, "Maxcy's Disease"

Kenneth Fuller Maxcy was born at Saco, Maine, July 27, 1889. He received his early education at George Washington University, and his advanced professional training at Johns Hopkins, receiving his M. D. in 1915. He was one of the first students in the new School of Public Health at Johns Hopkins, receiving his doctorate in public health in 1921. His first assignment in the Public Health Service was field investigations of malaria in the South.

"While studying malaria, he was attracted by reports of sporadic cases of mild typhus in the eastern and southern United States. He went shortly thereafter to the areas where he could confirm his epidemiologic suspicions -- to Alabama and Savannah, Ga. This was the beginning of his continuous interest in the rickettsial infections. Through careful clinical histories, laboratory studies and epidemiologic data it was learned that typhus fever of relatively mild character and low mortality rate is endemic in the southeastern United States. Dr. Maxcy's inductive synthesis of the evidence excluded the then prevailing concept of human-to-human exposure through the agency of lice. Correctly he reasoned that man is only an accidental intruder in a much broader exchange of the rickettsial parasite. His hypothesis, based on thorough appreciation of biologic principle, stipulated that in all probability the

usual environment of the rickettsia concerned is a rodent, and that from the rodent it is at times taken up by certain parasitic blood-sucking vectors -- fleas, mites, or possibly ticks -- and more rarely still, finds its way through these arthropods to the human host. In the years that followed this hypothesis was thoroughly and laboriously explored by deductive methods and has achieved the position of fact.

"The nearly complete understanding of the ecology of murine typhus as it is now known was first visualized by the keen intellect of Dr. Maxcy. It guided the study of rickettsial disease into new channels and revealed for the first time the life cycle of these infective agents in relation to rats and ectoparasites." Meyer, K. F. (2)

After eight years in the Public Health Service, Dr. Maxcy changed to an academic career, teaching bacteriology and preventive medicine at the University of Virginia, and at the University of Minnesota. Since 1937 he has been at the School of Hygiene and Public Health at Johns Hopkins, succeeding Wade Hampton Frost. Besides his research and teaching, he has edited the new edition of Rosenau's Preventive Medicine and Hygiene.

Biographical references:

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GEORGE WALTER MC COY, M. D., hon. Sc. D. 1876-1952
BACTERIOLOGIST, IMMUNOLOGIST
AND EPIDEMIOLOGIST

United States Public Health Service, 1900-1938
Director, Hygienic Laboratory and National
Institute of Health, 1915-1937

Plague in ground squirrels
Tularemia: discovery of B. Tularensis
Transmission of psittacosis
Leprosy: epidemiology and public health
management

The career of Dr. George Walter McCoy, one of the most fruitful in the Public Health Service, closely parallels the development of scientific research by the Service during the first forty years of this century. Dr. McCoy was born June 4, 1876, in Cumberland Valley, Pennsylvania. After graduation from Northwestern with a B. S. in 1894, he entered the University of Pennsylvania Medical School, receiving his M. D. in 1898. He entered the Public Health Service in 1900, after an internship at Newark City Hospital, and in 1903 was assigned to quarantine duty at Iloilo, P. I. There his interest in plague was aroused. After assignment to the Hygienic Laboratory for instruction and a tour of epidemic duty out of Washington, he was assigned to the U. S. Plague Laboratory in San Francisco, to assist in the investigation of plague in California.

The stature of the Public Health Service in medical research was greatly enhanced in the early 1900's by his work on plague.

More than 100,000 wild rats were examined in the course of his investigations which incidentally resulted in the classification of some 700 tumors in rats. He and Wherry (q. v.) separately identified plague in California ground squirrels. Out of his plague investigations came the discovery, with Chapin, of *B. tularensis*, the cause of tularemia, the "first American disease."

From 1911 to 1915 he was Director of the U. S. Leprosy Investigation Station, and Sanitary Advisor to the Hawaiian Government, at Honolulu. There were started the investigations in leprosy which brought him his reputation as one of the world's foremost authorities on this disease.

His recommendations based on his knowledge and experience played a large part in the establishment of the National Leprosarium at Carville, Louisiana, years later.

He was assigned to the Hygienic Laboratory as Director in 1915, remaining there until his retirement in 1937. In his capacity as Director he contributed much to the development in this country of the general concept of freedom for the individual investigator. He was a strong advocate of the combined field and laboratory approach to disease problems, and insisted on carefully indoctrinating young scientists in the experimental method and always emphasized the necessity for controlled investigation.

As a member of the Committee for the Protection of Medical Research of the American Medical Association for more than twenty years, he provided congressional committees with information on bills introduced by antivivisectionists and antivaccinationists. These presentations did much to obviate the hazards of legislation that would obstruct the progress of scientific medicine. (See nos. 5 and 16 in Bibliography)

One of the responsibilities of the Laboratory involved field investigations of pressing communicable disease problems facing local communities or states, often requiring intensive laboratory studies. Dr. McCoy participated in many such investigations, such as those in influenza, postvaccinal tetanus, post rabies-treatment paralysis, undulant fever, cerebrospinal meningitis, amoebic dysentery, and poliomyelitis.

When he retired from the National Institute of Health in 1937, his superiors said of him: "The solid position of the National Institute of Health in the field of scientific research is largely due to Dr. McCoy.... His scientific ability and judgment are exceptional."

He then assumed the dual post of Director of the Department of Preventive Medicine and Public Health of the State University of Louisiana, and Director of Epidemiological Investigations of Leprosy, New Orleans. Upon reaching retirement age in 1947 he was appointed

Professor Emeritus, having served as Acting Dean of the Medical School since 1945.

During his career Dr. McCoy received many honors, among which were the Sedgwick Memorial Medal in 1931. He gave the Cutter Lecture at Harvard in 1916, the Charles Franklin Craig Lecture in 1937. He was made a Fellow of the American College of Physicians in 1923, and was President of the American Epidemiological Society, of the American Association of Physicians and of the Washington Academy of Sciences. He was on the National Board of Medical Examiners, the Standards Commission of the League of Nations, the Public Health Special Advisory Committee on Leprosy, and served on various committees of the National Research Council.

From 1947 to his death in 1952 he resided in Washington, contributing occasional scientific papers, and monographic articles on plague and leprosy to standard texts. His last publication was the obituary notice for Maurice I. Smith, which was published after McCoy's own death.

Dr. Charles Armstrong, in the obituary published in Science, summed up the esteem and respect felt for Dr. McCoy by his contemporaries, associates and students: "...a great man, an able investigator, a foresighted administrator, an inspiring teacher, and an unimpeachable government official, who by his versatility contributed

much to the health of the world." Condensed from a biography by Charles Armstrong. [unpublished]

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RALPH ROBINSON PARKER, Ph. D., LL. D., D. Sc. 1888-1949
ENTOMOLOGIST

United States Public Health Service, 1921-1949
Director, Rocky Mountain Laboratory, 1928-1949

Tularemia infection in ticks
Rocky Mountain spotted fever

Ralph Robinson Parker, born in Malden Massachusetts, February 23, 1888, was educated in entomology at the Massachusetts Agricultural College, where he received his doctorate in 1915. After some years studying ticks in various parts of Montana, Parker was appointed a special expert in the Public Health Service in temporary charge of the Rocky Mountain Laboratory. From then on, until his death 28 years later in 1949, he was either in actual charge of operations of the laboratory or taking a leading part in them.

The problem of Rocky Mountain spotted fever had become largely one of how to develop existing knowledge in order to bring about a reduction in the extent of infection. Parker devoted his efforts to extending the areas of control, systematizing methods of decreasing the tick population, and learning more about the factors influencing the propagation of the infection in ticks.

In 1922 R. R. Spencer was assigned to take charge of the Laboratory, and for six years he and Parker collaborated in a wide variety of studies on spotted fever and other diseases. The collaboration is most noteworthy, because it resulted in the development of a vaccine,

prepared from infected ticks, which was capable of immunizing human beings against the fever. Spencer prepared the first vaccine during the winter of 1923-1924 while he was at the Hygienic Laboratory and was himself the first person to be inoculated. Subsequently he and Parker were able to demonstrate its effectiveness in experimental animals and in humans.

While Parker's initial interest was the relationship of ticks to spotted fever, his scientific curiosity was tremendous, and during the course of an unusually productive career he turned his attention to a wide variety of diseases to which he was wont to refer as "diseases of nature", by which he meant diseases of indigenous animals communicable to man, usually via arthropods.

In 1923, Parker, Spencer and Edward Francis published the first report of tularemia in ticks, indicating that this infection could be contracted from sources other than direct contacts with rabbits or bites of deerflies. Plague was recognized in Montana for the first time in 1935, as a result of work of the staff of the Laboratory. With his colleagues he described the rickettsial disease of the tick Amblyomma maculatum in 1939, and was engaged up to the time of his death in studying the relationship between this disease and spotted fever.

As the manufacture of Rocky Mountain spotted fever vaccine

became a major operation at the Hamilton Laboratory, which was the only source of such material for many years, Parker was impressed with the fact that the procedure was cumbersome and expensive and should be improved. He was instrumental in getting Herald R. Cox to join the staff of the laboratory to investigate this problem, with the result that Cox developed the chick embryo type of vaccine which is now the standard method of immunization against spotted fever.

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MILTON JOSEPH ROSENAU, M. D. 1869-1946
EPIDEMIOLOGIST

United States Public Health Service, 1890-1909
Director, Hygienic Laboratory, 1899-1909

Anaphylaxis
Standardization of biological products
Typhoid fever in the District of Columbia
Text-book: Preventive Medicine and Hygiene

Dr. Rosenau was born in Philadelphia, January 1, 1869. After graduating as a doctor of medicine from the University of Pennsylvania, he did postgraduate work in France, Austria and Germany. He joined the U. S. Public Health Service in 1890, and spent twenty very profitable years in that service. He was Director of the Hygienic Laboratory from 1899 until he left the Service in 1909, and, with Dr. John F. Anderson and other associates, laid the foundation stones of the National Institute of Health.

"Reports of Rosenau, Lumsden and Kastle and other workers of the Public Health Service (1907) on typhoid in the District of Columbia are notable in several respects. They were the first long-time studies of an endemic disease in the United States; they were comprehensive in that they included case investigations, [in the first investigations of the general public for the purpose three typhoid carriers were found] sanitary engineering surveys, and bacteriological and chemical studies of water, ice, milk, and other foods; and they directed attention to the importance of insanitary conditions and contact in the spread of typhoid, especially in the warmer months." *

*Top, F. H., ed. The history of American epidemiology. St. Louis, Mosby, 1952. p. 95.

His work in anaphylaxis was a pioneer and very important study, and his program for the standardization of biological products has been of international influence. At the presentation of the Sedgwick Memorial Medal of the American Public Health Association in 1934, E. Jordan said:

"The award is made on the basis of Dr. Rosenau's long and fruitful career in the field of public health, for his remarkably successful 10-year administration of the Hygienic Laboratory, where he carried out pioneer investigations on anaphylaxis, for his practical work on disinfectants, and on the pasteurization of milk, for his numerous original contributions to bacteriology and epidemiology, for his wise and inspiring participation in cooperative research upon influenza, pneumonia, and poliomyelitis, and especially for the service he has rendered public health workers throughout the world by his classic book, Preventive Medicine and Hygiene."

In 1909 Dr. Rosenau was invited to come to Harvard Medical School to inaugurate the first full-time chair of preventive medicine in an American medical college. He continued as an advisor to the Public Health Service, and took an active part in national and international public health affairs. At the time of his death he was President-elect of the American Public Health Association. He aided in the founding of three graduate schools of public health

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Anaphylaxis

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Typhoid fever studies

The studies on typhoid were begun by Rosenau, Lumsden and Kastle, joined later by Anderson. After Kastle and Rosenau left the Service in 1909, Lumsden and Anderson, with Frost, completed the studies. Taken collectively they represent one of the most valuable contributions to epidemiology by Americans. Their effects were far-reaching. A number of young officers were trained in the methodology of the science and prepared for valuable service in connection with many other diseases.

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**LOUIS SCHWARTZ, M. D. 1883-
DERMATOLOGIST**

United States Public Health Service, 1906-1947

Dermatitis and melanosis due to photosensitization
Textbook: Occupational Diseases of the Skin

Louis Schwartz was born in New York City, July 4, 1883. He received his M. D. from Jefferson Medical College in 1905, and entered the Public Health Service in 1906. Between 1928 and his retirement in 1947, he was identified with investigations in dermatoses, first in the Office of Dermatoses Investigations, then as Chief, Dermatoses Section, Industrial Hygiene Division, from 1937.

His textbook, written with Louis Tulipan, is regarded as the authority on industrial dermatology and has gone through several editions.

Dr. Schwarz, with a colleague, Dr. H. R. Foerster, of Milwaukee, was the first in this country to identify pitch dermatitis and melanosis, due to photosensitization by coal tar derivatives.

He is a Diplomate of the American Board of Dermatology and Syphilology, and of the American Board of Preventive Medicine and Public Health. He is a Fellow of the American Public Health Association, of the Industrial Medical Association, of the New York Academy of Medicine, and a member of several other professional organizations. Since his retirement he has been in private practice, lecturing

at Johns Hopkins, and acting as consultant to the Public Health Service.

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3. A textbook of occupational diseases of the skin. With Louis Tulipan. Philadelphia, Lea and Febiger, 1939. 799 p. First edition.

ATHERTON SEIDELL, Ph. D. 1878-
CHEMIST

United States Public Health Service, 1907-1939

Preparation of antineuritic vitamine
Chemistry of thyroid
Solubility of inorganic and organic compounds

Atherton Seidell was born in Hartwell, Georgia, December 31, 1878. He received a B. Agr. and a B. S. from Georgia in 1898 and 1899, his M. S. from George Washington University in 1901, and a Ph. D. from Johns Hopkins in 1901. He served as assistant chemist in the Bureau of Soils, U. S. Department of Agriculture from 1900 to 1905, then in the Bureau of Chemistry in 1905-1906.

He entered the Public Health Service as a chemist in the Hygienic Laboratory in 1907, remaining there until his retirement in 1939. Dr. Seidell became well known for his work on the solubility of inorganic and organic compounds, and on the chemistry of thyroid, with Reid Hunt, (q. v.). He did pioneer work in research on the chemistry of vitamins, particularly compounds from brewer's yeast. His concentration of the antineuritic substance is listed as one of the chief discoveries relating to vitamins, and his articles on the subject were reprinted in foreign journals.

Dr. Seidell was made an Officer of the Legion d'Honneur, and an Ufficiale del' Ordine della Corona d'Italia. He is a member of many professional societies, among them the Washington Academy of

Sciences, the Chemical Society of Washington, (president 1919), and the Society of Biological Chemists. He was an Honorary Consultant of the Army Medical Library, and after retirement became interested in the utilization of microfilm in medical research and in the indexing of medical literature.

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See also: Hunt, references no. 6, 7, and 8.

MAURICE ISADORE SMITH, M. D. 1887-1951
PHARMACOLOGIST

United States Public Health Service, 1920-1951

Smith method of assaying ergonovine
Jamaica-ginger paralysis

Maurice Isadore Smith was born November 17, 1887, in Russia and became a naturalized citizen of the United States at the age of 10. He attended school in New York, receiving his B. S. degree from the College of the City of New York in 1909; his medical degree was granted by Cornell University Medical School in 1913. He then taught pharmacology at the University of Michigan and at the University of Nebraska.

In 1920 he joined the staff of the pharmacology division of the Hygienic Laboratory. Thereafter, except for a brief period as director of the Glandular and Pharmaceutical Department of Lederle Antitoxin Laboratories, he devoted his entire professional career to Government service. Judged by the number and quality of his publications over a period of thirty years, he found it a satisfying and productive field of labor. During the greater part of this time he served as physiologist representative on the Basic Science Board of the Commission for Medical Licensure of the District of Columbia.

Aside from the high quality of his work in pharmacology, one is impressed by his versatility. In addition to pharmacological studies he contributed to advancement in the field of surgical shock, the

sulfones, drug standardization, selenium toxicology, chemotherapy, vitamins, antibiotics and tuberculosis. Perhaps the best example of Dr. Smith's interest in different fields of research is to be found in his work on Jamaica-ginger paralysis, the "jake paralysis" that afflicted many thousands of people in midwestern and southwestern states early in 1931. After his studies had shown that this condition was due to one of the several esters of tricresyl phosphate contained in an adulterated extract of ginger sold for beverage purposes, the investigation led him directly into the field of epidemiology. He made a trip into the geographic area where there was a particularly well defined outbreak of the disease and made an investigation of an epidemiological character that would have done credit to the scientist specializing in epidemiologic studies.

His range of interests is reflected in the number of scientific societies of which he was a member -- among others the American Association for the Advancement of Science, Society for Experimental Biology and Medicine, Trudeau Society, Society of Pharmacology and Experimental Therapeutics, Physiological Society, and the Washington Academy of Sciences.

Those who knew Dr. Smith best would agree that he was a careful, gifted, scientific worker, an inspiring teacher, a faithful, devoted public servant, and a stimulating associate. He died January 26, 1951.*

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**ROSCOE ROY SPENCER, M. D., hon. Sc. D. 1888-
BACTERIOLOGIST AND IMMUNOLOGIST**

United States Public Health Service, 1914-1947

Vaccine against Rocky Mountain spotted fever

Roscoe Roy Spencer was born in King William County, Virginia, July 28, 1888. He received his M. D. degree at Johns Hopkins in 1913, after pre-medical studies at Richmond. He joined the Public Health Service in 1913. In 1915 he assisted Dr. Fricks at Victor, Montana, in the tick control program. He acted as Sanitary Advisor to the Navy Department in 1917-1918, and was officer in charge of bubonic plague suppressive measures at Pensacola and New Orleans during 1919-1921. He was in charge of the Rocky Mountain spotted fever investigations from 1922 to 1928. After some years spent in research in medical bacteriology, he became assistant chief of the National Cancer Institute in 1937, chief in 1943, remaining until his retirement in 1947.

Among many achievements probably the most notable was his development, with R. R. Parker, of the vaccine against Rocky Mountain spotted fever, in 1922. The successful development of a vaccine against this disease was a great step forward in the control of infectious diseases and a boon to the populations of tick-infested areas. The dramatic story of his highly effective working team and

the development of the vaccine is ably told by Dr. R. C. Williams in his history, (reference no. 3, below).

In 1930 his exhibit on this disease won the American Medical Association's gold medal at its convention in Detroit.

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CHARLES WARDELL STILES, Ph. D., D. Sc., LL. D., hon. M. D.
1876-1941
ZOOLOGIST

United States Public Health Service, 1902-1931

Hookworm disease
Index Catalogue of Medical and Veterinary Zoology

Charles Wardell Stiles was born in Spring Valley, New York, 1876; his family hoped he would carry on the tradition and become a Methodist minister, but after a year at Wesleyan College (1885) he went to Europe to prepare for a scientific career. He studied at the Collège de France, the Universities of Berlin and Leipzig, the Trieste Zoological Station and Pasteur Institute. He specialized in medical zoology, including the study of parasitic worms.

Stiles returned to the United States in 1891, "hookworm conscious." He was appointed consulting zoologist in the Bureau of Animal Industry of the Department of Agriculture.

"On May 10, 1902, he described a new species of hookworm and named it the Uncinaria americana, or Necator americanus (Stiles). The worms had been noted before -- for example, by Lutz, in Brazil in 1888 -- but Stiles was the first to recognize that they were of a distinct species. His work, though based in part on a study of specimens sent from Porto Rico by Ashford, was also greatly aided by a case described by Allen J. Smith in 1901 and another by T. A. Claytor in the same year. About the same time Claude A. Smith and H. F. Harris were reporting cases from Georgia, and a little later Harris surmised that much of

the anemia in certain southern states was due, not to malaria, as had been previously thought, but to hookworm disease. Stiles' work left no longer any doubt that there were extensive areas in the United States in which existed severe hookworm disease produced by the new type of worms." (2)

At this time Stiles was transferred to the Hygienic Laboratory as Professor of Zoology. There he remained until 1931. With the approval and support of Surgeon-General Wyman he made trips through the South, finding evidence of hookworm infestation.

"A very gradual awakening to the importance of hookworm disease in the United States followed the 1902 discoveries... The period between 1910 and 1913 was marked by the entrance of various state boards of health into the fight. These were assisted in their work by voluntary health organizations, one of the first of which was the Rockefeller Sanitary Commission, established in 1909 for the purpose of combating hookworm disease... The United States Public Health Service interested itself extensively in the technical side of hookworm control, and under the direction of Dr. Charles Wardell Stiles conducted much valuable research work and many special surveys." (2)

While connected with the Department of Agriculture, Dr. Stiles was instrumental in the organization and publication of the Index Catalogue of Medical and Veterinary Zoology, compiled from the index cards begun by Albert Hassall. The Hygienic Laboratory later took over the publication of the parasite or subject catalog, and the host catalog. These catalogs were a major contribution to zoological nomenclature.

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ARTHUR MARSTON STIMSON, M. D. 1876-1953
BACTERIOLOGIST AND EPIDEMIOLOGIST

United States Public Health Service, 1902-1941
Chief, Division of Scientific Research, 1922-1930

Leptospiroses
Rabies

Arthur Marston Stimson was born in Rome, New York, November 30, 1876. He received his medical degree from Long Island College of Medicine in 1898 and joined the Public Health Service in 1902. He served as Chief of the Division of Scientific Research from 1922 to 1930, turning in 1930 to heart disease investigations which he conducted until his retirement in 1941.

During the early years of the Hygienic Laboratory some of its officers had the opportunity to study rabies and the Pasteur treatment in Europe and some experimentation was done after their return. By 1906 the question of the prevalence of the disease in animals and the exposure of persons to the bites of dogs had become so acute that action by the Public Health Service became necessary. In the United States the so-called Pasteur institutes managed by former students at the Paris Institute were the only places offering preventive inoculations. These were widely separated and the prohibitive cost of long distance travel prevented treatment and resulted in many unnecessary deaths.

Dr. Rosenau placed Dr. Stimson in charge of the study. After reviewing all existing literature on rabies, Dr. Stimson developed a treatment based on Pasteur's original method. This was administered to patients who applied at the Laboratory beginning April 29, 1908.

A method of preserving glycerinated spinal cords of rabbits and shipping portions adapted to the preparation of emulsions to State health laboratories was devised. This practice continued until 1921, when biologics manufacturers developed a satisfactory service.

Two surveys on the prevalence of rabies in man and animals in the United States were conducted as an adjunct to the Laboratory's work, one in 1908 by Dr. John W. Kerr and Stimson, the other in 1911 by Dr. Stimson alone.

During administration of the vaccine to patients at the Laboratory, Dr. Stimson observed and described for the first time a skin eruption at the inoculation site, which was apparently an allergic phenomenon. Several cases of paralysis resulting from the use of the Pasteur preventive treatment itself also were noted. These initial observations were the basis for researches carried on 30 years later at the National Institute of Health, resulting in markedly improved rabies treatment.

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CARL VOEGTLIN, Ph. D., hon. Sc. D. 1879-
PHARMACOLOGIST

United States Public Health Service, 1913-1943
Chief, Division of Pharmacology, 1913-1940

Action of arsenicals
Chemotherapy

Carl Voegtlin was born in Basle, Switzerland, July 28, 1879.

He received his Ph. D. at Freiburg, after studying at Basel, Munich and Geneva. Coming to the United States after a stay in England, he first taught at the University of Wisconsin, in 1904, then at Johns Hopkins University from 1904 to 1913. He was Chief of the Division of Pharmacology at the Hygienic Laboratory from 1913 to 1940, succeeding Reid Hunt. He remained with the Public Health Service until his retirement in 1943, becoming director of cancer research in 1937, and then Chief of the National Cancer Institute from 1938 to 1943.

His research activities covered many areas: metabolism, function of the parathyroid, anaphylaxis, vitamins, chemotherapy of arsenicals, biochemistry of cancerous and normal tissues, among others. Although his name is better known in connection with cancer research, carried on for the most part after 1937, he devoted much of his time while in the Division of Pharmacology to the problems incident to the standardization and control of arsenical drugs, used

during this period as antisypilitics.

His career brought him many honors: he was President of the Society of Pharmacology and Experimental Therapeutics, 1927-1930, of the Association for Cancer Research, 1941, and of the Academy of Medicine of Washington, 1938. He gave the Herter Lecture at the New York University Medical College in 1938. After his retirement he lectured in pharmacology at the University of Rochester, and was connected with the Manhattan Project as a consultant.

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WILLIAM BUCHANAN WHERRY, M. D. 1874-1936
BACTERIOLOGIST

United States Public Health Service, 1908-1909, 1917

Discovery of sylvatic plague in California ground
squirrels

First identification of tularemia in man

William Buchanan Wherry was born in India of missionary parents, December 23, 1874. He received his B. A. from Washington and Jefferson College in 1897, and entered Rush Medical College, receiving his M. D. in 1901. After teaching at the University of Chicago, as assistant to E. O. Jordan, he accepted an appointment to the Government Laboratories at Manila, P. I., where he remained until 1905. There he received his baptism, personal and scientific, in tropical diseases. He also met George McCoy, who was on quarantine duty at Iloilo, and who was becoming interested in plague. Wherry wrote home: "Dr. McCoy is much interested in pathology, and as he is a good clinician, we frequently go out in the afternoons to look over the plague, cholera and smallpox patients."

His appointment at the Oakland (California) Medical School in 1907 brought him in contact again with Dr. McCoy and with plague. Wherry, in addition to his medical school duties, was appointed bacteriologist to the San Francisco Health Board. The plague epidemic brought him the additional appointment as a "temporary acting

assistant surgeon in the Public Health and Marine-Hospital Service in the United States for duty in Oakland, California, in connection with the suppression of bubonic plague, with compensation at the rate of two hundred dollars, beginning April 15, 1908." These appointments

"---gave him the opportunity to use his Philippine experience in the study of plague, rats and fleas in connection with plague in California and to make the discovery of sylvatic plague in California ground squirrels, a discovery of lasting significance in the epidemiology of that dread pestilence." (3)

In 1909 he joined the faculty of medicine of the University of Cincinnati, but continued his investigative work in plague. He kept in communication with McCoy, who, with Chapin, had isolated the organism B. tularensis in 1911. In 1913 Wherry, assisted by Lamb, recognized an eye infection in a patient as identical with this disease of California ground squirrels, and first identified tularemia in man.

Wherry remained at the Medical School of the University of Cincinnati until his death in 1936.

In 1917 he was again associated briefly with the Public Health Service. He was refused admittance to the regular army and to the medical corps, but, in a letter, he says: "I came on to the Hygienic Laboratory July 7 at the request of McCoy. I am 'doing my bit' for

250.00 a month! I was to have done about six pieces of work but so far have spent all my time helping on the problem of the standardization of anti-meningococcus serum." (2, p. 214). Although asked to become a member of the National Advisory Health Council by Surgeon-General Cumming in 1935, he was forced to refuse, for reasons of health.

"He was preëminently interested in the etiology and ecology of disease. Prevention and control intrigued him even more than discovery of etiological factors or therapeutics. He filled a unique place in American bacteriological history. His missionary forebears and the altruistic atmosphere of his youth left a lingering influence on his attitude toward his mission in life. His collaborators always got the leading place in authorship of papers." (3)

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