Canyon Creek Schoolhouse Laboratory 100th Anniversary Timeline

The U.S. Public Health Service and Rocky Mountain Spotted Fever

Timeline 18941955

1894 | 1899 | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1917-1918 | 1918 | 1919 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1930 | 1931 | 1932 | 1935 | 1936 | 1937 | 1942-1948 | 1948 | 1949 | 1955

1894

The town of Canyon Creek opened its schoolhouse to students.

1899

Dr. Edward E. Maxey of Boise, Idaho, published the first clinical description of Rocky Mountain spotted fever (RMSF) and attributed the disease to melted snow water.
Maxey, E. "Some observations on the so-called spotted fever of Idaho." *Medical Sentinel*, 7(1), 1899, 733-438.

1901

The Montana State Board of Health was created.

1902

Dr. G. T. McCullough published on 36 cases of RMSF in Bitterroot.

SPRING: Dr Albert F. Longeway, Secretary of the Montana State Board of Health, arranged for Drs. Louis A. Wilson and William M. Chowning of the University of Minnesota to study RMSF in the Bitterrroot Valley area. They noted that the disease was limited to the west side of the river, identified the wood tick as the probable vector, and the Columbian ground squirrel as the infected animal host for the ticks. Then tentatively identified a protozoa as the infectious agent. They also reported the clinical and pathological syndromes.
Wilson, L.B.; Chowning, W.M., "Studies in Pyroplamosis hominis. (Spotted fever or tick fever of the Rocky mountains.)." *Infectious Diseases,* 1, 1904, 31-57.

JUNE: U.S. Public Health Service (PHS) Surgeon General Walter Wyman sent Dr. Julius O. Cobb to Missoula, Montana, to investigate RMSF. He joined the work of Wilson and Chowning.
J. O. Cobb. "The so-called "spotted fever" of the Rocky Mountains—A new disease in Bitter Root Valley." *Public Health Reports (1896-1970)*, Vol. 17, No. 33 (August 15, 1902), pp. 1868-1870. Download PDF (497 kB)

1903

Dr. John F. Anderson, Assistant Director of the Hygienic Laboratory (precursor to the National Institutes of Health) was sent to the Bitterrroot at the request of Dr. Thomas Tuttle, Montana Board of Health. Anderson published a 50-page pamphlet providing confirmatory evidence to the work of Wilson and Chowning, adding his own observations and drawings, and probably coined the name “Rocky Mountain spotted fever.” Anderson sent ticks to the Hygienic Laboratory for study as RMSF vectors. The taxonomic identification as *Dermacentor andersoni* was assigned to these ticks.
J.F. Anderson. "Spotted Fever (Tick Fever) of the Rocky Mountains." *Hygienic Laboratory Bulletin 14*, July 1903. Download PDF (21 MB)

Robert A. Cooley becomes the Montana State Entomologist.

1904

Dr. Charles W. Stiles, Chief, Division of Zoology of the Hygienic Laboratory, was sent to the Bitterroot valley. He published a detailed report in 1905 that he could not find a protozoa in RMSF patients' blood as described by Wilson and Chowning. Because he could find no protozoa, Stiles was skeptical of the tick as a vector.

1905

MAY: Dr. Lucien P. McCalla and H. A. Brereton, of Boise, Idaho, transmitted RMSF to two volunteers by tick bite with a tick removed from a patient with the disease. This was the milder version of the disease and both volunteers survived. Their work was not published until 1908.
L.P. McCalla, H.A. Brereton. “Direct Transmission from Man to Man of the Rocky Mountain Spotted (Tick) Fever,” Medical Sentinel, 16, 1908, 87-88.

1906

Dr. Howard T. Ricketts of the University of Chicago, attracted by the controversy created by Stiles' report, came to Missoula, Montana, with some financial support from the American Medical Association and counties in the Bitterroot Valley. Dr. Willard V. King, a PHS officer detailed to Montana at the same time, worked in close collaboration with Ricketts. Between 1906 and 1908, Ricketts and King demonstrated conclusively that the tick was a vector of RMSF, and that RMSF could be transmitted from man to guinea pigs and monkeys. They also presented evidence that humans were accidentally infected (they were not the ticks' intended meal) and suggested that RMSF might be controlled by reducing ticks on large animals through dipping and on small animals through extermination.
H.T. Ricketts. "Observations on the Virus and Means of Transmission of Rocky Mountain Spotted Fever." *The Journal of Infectious Diseases*, Vol. 4, No. 1 (Jan. 1, 1907), 141-153. Download the PDF. (1.2 MB)

1909

King was joined by Clarence Birdseye and the pair made major contributions on ecology of the tick-host cycle.

1910

Dr. Howard Ricketts died in Mexico of the typhus that he was studying there.

1911

The Montana Bureau of Entomology, Bureau of Survey, and the Agriculture Experiment Station began coordinating studies on control of RMSF by King, Birdseye, Arthur H. Howell, and M.H. Spaulding.

Dr. Thomas B. McClintic was sent by the PHS to start a tick control program by cattle dipping of livestock and exterminating gophers. Because the Montana State Board of Health bypassed Robert Cooley, Entomologist of Montana State University, who had promoted the existing efforts, there was rivalry, duplication, and animosity. This led to the creation Montana Board of Entomology in 1913, with Cooley named as Montana State Entomologist.

1912

McClintic died of RMSF enroute to the Hygienic Laboratory in Washington, D.C.

Dr. Lundsford D. Fricks was sent by the PHS to replace McClintic at the Victor, Montana, laboratory.

1913

Montana State Board of Entomology is created with $5,000 appropriated for RMSF research and control. The State Board and the U.S. Public Health Service debate priority and eventually do research in different parts of Montana.

The Montana tick control program begins with livestock dipping and the shooting and poisoning of gophers.

George H. Cowan becomes a field worker for the Montana State Board of Entomology. He will be its longest-serving employee at his death in 1924.

1914

Entomologist Ralph R. Parker, a Massachusetts State College graduate student, came to Laurel, Montana, to study flies and transmission of typhoid fever.

1915

Dr. Roscoe R. Spencer, a PHS officer, worked in Victor, Montana, on tick control to curb RMSF.

1916

Cooley set up tick laboratory in Powderville, Montana. He arranged for Parker, who then had his Ph.D., to head the laboratory and study RMSF.

1917

Parker was reassigned by Montana Board of Entomology to Musselshell, Montana to investigate an outbreak of RMSF.

1917-1918

During World War I, the PHS suspended support to RMSF research in Montana, assigning officers to support the military.

1918

Parker moved his work to the RMSF research laboratory in Victor, Montana, in the Bitterroot Valley.

1919

Dr. Simeon B. Wolbach, Harvard University, who began investigations in 1916, published confirmation of Ricketts' observations on the cause of RMSF—bacteria carried by ticks—and established the bacterium as one of a new genus designated "Rickettsiae" by Dr. Rocha Lima in 1916. Wolbach named the RMSF bacterium *Rickettsia rickettsii*.
S.B. Wolbach. "Studies on Rocky Mountain Spotted Fever." Journal of Medical Research, 41 (1919), 1-197.

1921

APRIL: Canyon Creek and Hamilton, Montana, voted to consolidate their schools in Hamilton, leaving the Canyon Creek schoolhouse empty.

JUNE: After the deaths of prominent Montana State legislator Tyler Worden (died June 12) and his wife Mattie Candice Landers Worden (died June 6) from RMSF, the U.S. Congress mandated that the PHS return to its research on the disease. Dr. Thomas Parran was sent to Montana to discuss how the PHS and the State of Montana could cooperate. Parker was employed by PHS to continue his RMSF studies and Dr. Roscoe R. Spencer was sent by the PHS to work with him.

George Cowan was made Deputy Chief of Tick Control work at the laboratory.

AUGUST: The announcement was made that the RMSF laboratory would be moving to the Canyon Creek schoolhouse.

SEPTEMBER: The laboratory moved into the old Canyon Creek schoolhouse to focus its research on RMSF. The laboratory was identified as a PHS organization under Spencer, although Parker handled the day-to-day affairs and research when Spencer was in Washington, D.C. at the Hygienic Laboratory conducting RMSF experiments there.

1922

JUNE 30: William Gittinger, laboratory assistant, died of RMSF at age 22.

Wolbach published on cultivation of RMSF and typhus rickettsia in tissue cultures. These were explants of infected guinea pig tissues.

1923

The Montana Board of Health held first conference on RMSF. Dr. Hideyo Noguchi of the Rockefeller Institute described a vaccine he had tested. But when the vaccine was tested on humans, it was soon abandoned because of serum sickness.

A mountain goat with thousands of engorged ticks is taken by George Cowan at the Canyon Creek Schoolhouse laboratory. These ticks, picked off and sent with Spencer to Washington, D.C. for research, jump-started the development of a vaccine for RMSF.

1924

Dr. Frederick Breinl of Czechoslovakia reported a typus vaccine produced by phenol treatment of the gut of infected ticks.

In the Hygienic Laboratory in Washington, D.C., Spencer developed an experimental vaccine using phenol and conducted animal efficacy studies in guinea pigs.

MAY 24, 1924: Spencer inoculated himself in Washington, D.C. with the experimental vaccine that had protected the guinea pigs. He felt no ill effects.

SUMMER 1924: Back in Hamilton, Montana, Spencer worked with Parker to further perfect the vaccine. Spencer showed that his post vaccination serum could protect guinea pigs while his pre-vaccination could not. Parker and Cooley took the vaccine.

OCTOBER 29, 1924: George H. Cowan, deputy chief of tick control work, died of RMSF.

NOVEMBER 28, 1924: Spencer's and Parker's first report on the RMSF vaccine is published in *Public Health Reports*.
R. R. Spencer and R. R. Parker. "Rocky Mountain Spotted Fever: Experimental Studies on Tick Virus." *Public Health Reports (1896-1970)*, Vol. 39, No. 48 (Nov. 28, 1924), 302. Download the PDF. (1.27 MB)

1925

FEBRUARY: Spencer and Parker conducted efficacy and safety tests of the vaccine on monkeys.
R.R. Spencer and R.R. Parker. "Rocky Mountain Spotted Fever: Vaccinations in Monkeys and Man." *Public Health Reports*, 40 (41), (October 9, 1925), 2159-2208. Download the PDF. (5.5 MB)

Two quarts of vaccine, at estimated cost of $20 per dose, were produced in the Canyon Creek schoolhouse laboratory. Then followed the immunization of 34 people, mostly lab workers.

APRIL 1925: A cattle-dipper for the Montana State Board of Entomology came down with RMSF a few days after being vaccinated, but he recovered. Four other people in the Bitterroot Valley who also got RMSF at the same time, but had not been vaccinated yet, all died. From this unplanned experience, Spencer and Parker learned the time required to gain immunity after vaccination: 10 days.

1926

The experimental RMSF vaccination program in Bitterroot Valley and Idaho took off. The initial reports were that in the Bitterrroot, the vaccine did not reduce number of cases but did reduce the severity of the disease and number of people who died. In Idaho, where the disease was milder, the vaccine reduced the number of cases. It became apparent that an annual immunization would be necessary.

1927

The increasing demand for the RMSF vaccine led the Montana State Board of Entomology to request funds from the state legislature for a new building. The State of Montana appropriated $60,000.

MARCH 23, 1927: A special meeting of the Bitterroot Valley Chamber board was held March 23rd 1927 with the purpose that the Hamilton Chamber purchase block 19 Pine Grove addition and deliver it free to the board to become the site for the new laboratory. The motion carried without opposition. The Chamber wired the result to the board in Helena.

1928

Arthur LeRoy Kerlee and Spencer investigated the Weil-Felix reaction as a possible diagnostic test for RMSF.
A. L. Kerlee and R. R. Spencer. "Rocky Mountain Spotted Fever: A Preliminary Report on the Weil-Felix Reaction." *Public Health Reports (1896-1970)*, Vol. 44, No. 4 (Jan. 25, 1929), 179-182. Download the PDF. (399 kB)

FEBRUARY 14, 1928: Arthur L. Kerlee died of RMSF. He had not received the full vaccine course.

MAY 1928: Building One of the "Montana Research Laboratory" was completed and the PHS leased the building from the State of Montana. The laboratory produced 34,000 doses of vaccine. Spencer was recalled to the Hygienic Laboratory in Washington, D.C., and Parker became the laboratory's director.

1930

MAY 26: The Ransdell Act, signed by President Herbert Hoover, created the National Institute of Health (singular) (NIH) out of the Hygienic Laboratory. The Act also authorized new funds and buildings and called for the PHS (of which the NIH is a part) to enlarge its work on RMSF and other tick-borne diseases. The same year, the State of Montana adopted a resolution calling for the purchase of Building One by the federal government and assumption of the work at the laboratory because the vaccine was needed all over the United States and the State of Montana should not have had to bear all of the costs itself.

1931

The U.S. Congress appropriated $75,000 to purchase the Building One laboratory and $75,000 to build a new wing to increase vaccine production.

1932

The federal government paid the State of Montana $68,757 so that the Building One Laboratory became an NIH field station on February 3, 1932 and was renamed the Rocky Mountain Research Laboratory (RML) (it became plural in 1982). An additional building for vaccine manufacture was begun.

1935

MARCH: Lloyd C. Douglas published his book “Green Light” with a highly fictionalized and inaccurate version of RMSF research wrapped in a love story with religious overtones.

Drs. Ida Bengston and Rolla Dyer of the NIH published a report on the cultivation of RMSF rickettsia in developing chick embryo. This followed earlier reports by Dr. Ernest Goodpasture and others on use of the technique for the growth of viruses.
I.A. Bengtson, R.E. Dyer. "Cultivation of the Virus of Rocky Mountain Spotted Fever in the Developing Chick Embryo." *Public Health Reports (1896-1970),* Vol. 50, No. 43 (Oct. 25, 1935), pp. 1489-1498

1936

Dr. Herald R. Cox joined RML to find a simple method to produce vaccines and perfected the method of using chicken embryos (eggs), publishing on this in 1938. One bacteriologist and two technicians could now prepare 40 to 50 liters of vaccine a week. The technique was also useful in producing other vaccines and is still used for some vaccines. After Cox’s innovation, the cost per dose of RMSF vaccine went from $20 to $1.

1937

MARCH 28: The Washington Star published “Tick is Conquered,” Lucy Salamanca, describing in some detail the work on RMSF and Spencer and Parker’s development of the vaccine.
L. Salamanca. "Tick is Conquered: Scientific G-Men Perfect Vaccine Against Rocky Mountain Scourge After Six Experimenters Lose Lives." *Washington, D.C. Sunday Star*, March 28, 1937. Download the transcript. (75 kB)

RML became part of the Division of Infectious Diseases, NIH.

“Green Light” premieres as a movie starring Errol Flynn. The plot included the main character testing the RMSF vaccine on himself.

1942-1948

RML produced RMSF, typhus, and yellow fever vaccines for use by the U.S. military during World War II. Additional buildings built to enable this effort.

1948

At NIH, the Division of Infectious Disease became the National Microbiological Institute (NMI) and the RML became a part of NMI’s intramural research program. NMI staff who moved to RML included Dr. Carl L. Larson, who followed Parker as Director in 1949; and Drs. John F. Bell, Edgar E. Ribi, Samuel Salvin, William Hoyer, and Charles Sheperd.

1949

RML stopped making the RMSF vaccine, when commercial pharmaceutical companies took over production.

1955

NMI became the National Institute of Allergy and Infectious Diseases.