

TICK IS CONQUERED: Scientific G-Men Perfect Vaccine Against Rocky Mountain Scourge After Six Experimenters Lose Lives.

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Note—This is the sixth in a series of articles describing the thrilling and jar-reaching work of the “G men of science” in the National Institute of Health, who are conducting profound and perilous studies toward the prevention and control of disease and laying plans for the world-wide warfare against bacteriological forces which shorten and destroy human life.

One of the most dramatic conquests in the history of American medicine was the victory of one of that band of scientific G-men who mix their magic brews in the laboratories of the National Institute of Health in Washington. Under the United States Bureau of Public Health, they are America's advance guard, the shock troops of science, always on call when national health emergencies call them to the field, and the acclaim of their accomplishments has gone around the world.

Hence Dr. R. R. Spencer's thrilling combat with a disease that was striking havoc into the hearts of the ranchers and farmers of the North west, that was making it dangerous for them to go about their daily tasks in the fields and woodlands and was taking a toll of life in almost every instance where it struck, may well be considered one of the outstanding accomplishments of our times. The name of Spencer and Rocky Mountain spotted fever are now permanently associated.

With the modesty of his kind, Dr. Spencer today shrugs away the drama of what he and his little band of helpers accomplished in the small school house in Montana where they had set up their laboratory. But those who know him declare his successful vaccine against the fever of the North West is only the first of the victories against disease that we may be able to chalk up to the credit of this G-man of science in years to come, for he is still in early middle age, and perennially active in the war against disease.

One bulletin that went out from the Health Institute laboratory was prefaced with these words: "To the memory of our fellow laboratory workers, who, while engaged in the study of Rocky Mountain spotted fever, have contracted the disease and died."

Five lost their lives in that fight. And Spencer, in charge, was in the midst of it. That he did not come down with the fever is one of those peculiar quirks of chance which sometimes seem to operate in human lives, for every risk the others took he was ahead of them in taking. For weeks he lived in a crawling pesthole of ticks and larvae, so minute and deadly a man could never be sure he had not been bitten, or that he was not actually coming down with the fever any day between sunup and sundown. For weeks he went nonchalantly about the task of studying, collecting, mashing and breeding ticks in whose bodies thrived the unknown little agent of death.

It was in the Spring of 1922 that word first came from the Bitter Root Valley in Western Montana that hunters and ranchers were dying from a ghastly kind of disease which seemed to spring from nowhere. An appeal sped to the Bureau of Public Health for someone to investigate the strange destroyer and help fight it.

In the foothills of the Western mountains ranchers were deserting their cabins, farms were being neglected. panic was descending upon the citizens of a community where even a walk abroad in the fields often meant bringing back into homes and offices this dreadful malady that in practically every instance meant death. So far as could be judged, it took eight out of every ten. McClintic of the Government Health Service had died of it during the course of investigations and 1 year and 10 days later McCray, a Montana doctor, had followed McClintic while working on a serum he hoped would prove effective as an immunizing agent.

It was into this valley of death that Spencer went with his wife and two small babies in the Spring of 1922, answering the call of the service. He was met there by R. R. Parker, whose business it was to hunt bugs instead of microbes, and Spencer and Parker set up their laboratory in a small, abandoned school house a couple of miles out of town.

Parker had worked for seven years as an entomologist in Montana and had become vitally concerned about this strange fever. You could only get the disease, it appeared. If you had been bitten by a wood tick. There were certain west slope canyons, Parker told Spencer, which it was actually foolhardy to traverse, for practically every one returning from them was taken ill shortly afterward, breaking out in big purple blotches, and dying, oftentimes, in delirium. The brother and sister-in-law of the Governor of Montana had gone there and 10 days after their return both were dead.

Spencer and Parker wanted to find out why no one seemed to catch the plague when they went into the eastern slopes of the Bitter Root Valley, where the ticks, apparently, were no different.

Two practicing physicians of Boise, Idaho—McCalla and Brereton—had first discovered that the wood tick was responsible for spotted fever, and later Ricketts, out from Chicago for his health in the mountains, had been so intrigued by the scientific problem that he had set up a laboratory to study the disease. He had reproduced the fever in guinea pigs and in monkeys. He had brought in ticks from horses, cows, rabbits, bushes and sagebrush that might be infected in nature, and he had proved the source of infection in laboratory experiments later.

Ricketts survived these experiments only to succumb later to typhus in Mexico, where he had gone to aid in the fight against an epidemic of that disease. But he left valuable information upon which Spencer and Parker could base their initial experiments. It was Spencer's job to find something that would keep people from dying of the disease.

McClintic had tried hopelessly to exterminate the rodents of the valley in an effort to eliminate tick hosts. The State tried to get cattle men to dip their cattle and horses. But the ticks were too many for such efforts as these. And McClintic died, meanwhile, of the fever, just as McCray, working on a serum, died soon after. At the Rockefeller Institute, a Japanese helper, studying the possibility of a vaccine, also passed away as a result of his work.

Parker's idea was to find just what kind of a rodent harbored the death dealing virus and transmitted it to ticks. It looked like an impossible assignment in a locality overrun with wild life, but with two other

helpers, Henry Cowan and Salsbury, Parker started out for the hills, while Spencer set to work in the laboratory.

Dragging pieces of white outing flannel along the bushes and brush, Parker and Salsbury made their way through the canyons, collecting ticks just stirring from their Winters sleep. They filled pill boxes with the ticks, and every night when they returned from the hills and valleys, they examined each other for any that might be clinging to their flesh. Spencer's job was to test all these crawling ticks for Rocky Mountain spotted fever. At first, he decided to fasten the ticks upon the shaved surface of a guinea pig and tape them down with adhesive tape, letting them feed and observing if the animal came down with the fever after such inoculation. But he soon discarded this method for a much quicker one.

He conceived the idea of mashing up the ticks and injecting them under the skin of the experimental guinea pigs. He did this to more than 100 guinea pigs. Nothing happened. Not one of the inoculated animals showed so much as a rise in temperature.

Spencer had been keeping a virus of the disease alive in guinea pigs, running the fever virus through live animals—a "hot" virus, the scientific G-men call it. Now he experimented further. He shot some of the "hot" and deadly virus into guinea pigs which had been inoculated, without results, with the mashed ticks. In every instance these guinea pigs were immune from the effects of the virus, while guinea pigs which had not received injections of mashed ticks came down with the disease when similarly treated.

Some of the ticks brought in by Parker, Cowan and Salsbury were put, away, in their pill boxes, in a refrigerator, each lot labeled, and the men sought for some other angle of attack. Then one day Cowan came into the laboratory with a huge mountain goat, and he and a laboratory helper sat down to the task of plucking ticks off the animal. They took more than a thousand from that goat. Unlike the flat, starved wood ticks they had flagged from the bushes, these ticks were engorged with the warm blood of the goat, and Parker and Spencer decided to test this batch to see what happened.

Spencer mashed the engorged ticks as he had mashed the flat ones and shot them into the skins of guinea pigs. But whereas the other guinea pigs, inoculated with the flat ticks, had experienced no ill effects, those inoculated with engorged ticks came down with a temperature of 105 in three days, and the temperature mounted to 106, killing every one of them.

Now this was a real lead for any G-man! Spencer was quick to follow it through. He took some of the flat ticks from the refrigerator and fastened them with adhesive tape onto the shaved surface of a guinea pig's body, letting them feed to engorgement. Then, with his assistants, he picked off the engorged ticks and dropped them into a mortar, grinding them up with salt solution. This solution was shot into healthy, fresh guinea pigs. In three days the animals were down with spotted fever. In a few days more every one of them was dead. They had proved it was the meal of blood that turned a harmless tick into an agent of death!

Spencer told his laboratory workers—one of whom was a young college student bent on becoming a doctor, Bill Gettinger—"Be careful of this stuff. Remember what we have our hands into." Despite the

warning Gettinger came down with the disease, his fever mounting to 105. He died, delirious, in the hospital to which he was taken, and for six nights Spencer had no sleep. When he went back to the laboratory, he tacked a sign over the door: "Persons entering these premises do so at their own risk!"

Spencer and Parker set about raising ticks in their isolated laboratory, and the school house was filled with cages swathed in white cloth, tightly tied at the top to prevent the escape of the dealers of death. The baby ticks were hardly bigger than pin heads. They were never sure some had not got away. These infected baby ticks were watched through a complete life cycle, and they fed them on every kind of animal that inhabited the region, to see if they became deadly with the blood of more than one species. Before Spencer left for Washington with a pill-box labeled ' Lot 2351-B,' the son of the janitor had been bitten and died. [Note: he did recover.]

The ticks in this lot had been kept on ice for 112 days, their last meal having been on an infected animal. When Spencer took them out in the Washington laboratory and ground them up and shot them into guinea pigs, he discovered the fever was not transferred to the animals. Next, he warmed some of this same lot, inoculated guinea pigs with this brew and discovered the fever germs had stirred to life. Making them more deadly, he warmed them and placed them on healthy guinea pigs to feed. He found that in one of these doubly infected ticks there was enough poison to kill 3,000 guinea pigs.

It was then Spencer conceived his idea for a vaccine, made from the hot virus of these ground-up cultivated ticks, mixed with carbolic acid. He tried it first on guinea pigs, vaccinating them with the fluid and later inoculating them with a hot virus of the spotted fever disease. All 10 proved immune to the disease, while unvaccinated guinea pigs, subjected to the same inoculation, promptly died.

Spencer could not wait to see if it would work on a human being. He rolled up his own shirtsleeve and shot a brew of those spotted fever ticks into his own arm. Feeling all right, he took a double dose four days later. It wasn't long before Cowan, working alongside, who had not taken the vaccine, was down with the spotted fever and had followed the other G-men of science into eternity before many days. Out of 75 of these brave men, working in laboratories where the virus was being cultivated, six not vaccinated died. Since Spencer's self-inoculation, individuals who have been vaccinated have been known to come down with mild cases, but none has died. Out of thousands vaccinated not one has had any sign of fever, though they inhabit tick-infected areas. Congress has appropriated money for a fine new laboratory in Bitter Root Valley, and scientific G-men, taking their lives in their hands, breed ticks there now for the vaccine that is used regularly throughout the Northwest. Thanks to Spencer and Parker, the deadly wood tick, "Dermacentor andersoni" is today a saver, instead of a killer, of men.