



Mystery of the Buffalo Boom

[crickets]

[footsteps]

[chime plays]

[music plays]

[NARRATOR:] When a young biologist named Tony Sinclair arrived in Tanzania's Serengeti National Park in the mid-1960s, he was confronted by a mystery. The numbers of buffalo and wildebeest were increasing very rapidly.

[TONY SINCLAIR:] For a large mammal, they just don't do that sort of thing.

Seeing such a fast rate of increase meant that there had to be some underlying cause, and we laid out the alternative possibilities.

[NARRATOR:] The sizes of animal populations are usually limited either by food supply or predators. It fell to Tony to figure out whether either of these had recently changed in the Serengeti.

[SINCLAIR:] First we looked at food. Buffalo and wildebeest eat grass, and the growth of grass is determined by rainfall. I looked at rainfall records back to the 1930s, but I didn't find any recent increase in rainfall. So an increase in the amount of grass seemed unlikely.

[NARRATOR:] Tony next considered predators. Lions and hyenas are the main predators in the Serengeti. Had there been a decrease in the number of predators?

[SINCLAIR:] If anything, their numbers had been increasing, not decreasing. That ruled out a decrease in death by predation. Something else had to be affecting the buffalo and wildebeest population.

[NARRATOR:] What else might explain a decrease in death? There was another possibility to consider.

[KIM VANDERWAAL:] Wild animal populations are constantly being hit by all sorts of diseases. But there's one in particular that had a catastrophic impact on wild animal populations in Africa.

In 1890, what happened for the first time was the introduction of a new disease into Africa.

[SINCLAIR:] Rinderpest is a virus that is actually very closely related to measles that cattle get, and they die from it. Turns out that wild animals that were closely related to cattle, like buffalo and wildebeest, they also suffer from this disease.

[VANDERWAAL:] The spread of rinderpest in Africa was one of probably the worst epidemics that the world has ever seen. It spread like a wave, very rapidly from the northern part of Africa all the way down to southern Africa within the course of probably around a decade. In the course of this great cattle plague, we estimate that

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probably around 90 to 95% of all hooved mammals in Africa, wild and domestic, disappeared as a result of rinderpest.

[SINCLAIR:] Half the population of Ethiopia died because of rinderpest. Not because they were killed by rinderpest, but because they starved from all of their animals dying.

[VANDERWAAL:] Sporadic outbreaks, both in cattle and in the wildlife populations, occurred for the next five or six decades.

[NARRATOR:] Tony learned that a program was launched in the early 1960s to vaccinate cattle against rinderpest. He wondered whether that vaccine might have also indirectly affected wildlife. To find out, he looked at blood samples that virologists had collected from buffalo and wildebeest throughout the 1960s.

[VANDERWAAL:] If an animal has antibodies in its blood, that means that that animal, at some time in its life, had been exposed to the virus.

[NARRATOR:] Some of the blood samples had antibodies to rinderpest, while others did not. So Tony wanted to know — is there a connection between exposure to the virus and the boom in the buffalo and wildebeest populations?

[SINCLAIR:] It occurred to me that we needed to know something about the age of the animals that we were getting these samples from.

[NARRATOR:] The ages of the animals, along with the antibody data, would help Tony pinpoint when they were exposed to rinderpest. Luckily for Tony, the virologists had kept the skulls of the buffalo from which they collected blood. Tony used those skulls to determine the animals' ages.

[SINCLAIR:] To get exact measures of age, we use the teeth. As teeth grow, they lay down layers inside the tooth. They're called dentine layers. And they put down more in the good season when they're getting a lot of food. And they put down less when they're getting very little food. And you can read those layers just like you would look at tree rings. And count them and tell exactly what age they are.

This is a very old animal, 17 years old.

[NARRATOR:] Tony used each buffalo's age to determine the year it was born. Then, he looked at the fraction of animals born in a given year that had antibodies to rinderpest.

[SINCLAIR:] There was a clear pattern, a very clear pattern, that all those born before 1964 had the antibodies, all those afterwards did not have the antibodies. We also had to study the wildebeest because we knew that they were increasing. And so we turned our attention to them, applied the same techniques, and found exactly the same answer as we had for the buffalo.

[music plays]

[NARRATOR:] The mystery of the incredible rise in buffalo and wildebeest numbers had been solved. Rinderpest had been suppressing the populations, but once the vaccination program eliminated the disease in cattle, rinderpest also disappeared from Serengeti's wildlife. And that's when the buffalo and wildebeest boomed.

[music plays]