

CHAPTER FIVE

“Evolving the Arctic Cow”

*Crossbreeding, Disease, and the Demise of
Buffalo National Park, 1926–1939*

IN 1916, THE PARKS BRANCH AND DEPARTMENT OF AGRICULTURE initiated a crossbreeding experiment inside the borders of Buffalo National Park. The purpose of this project was to cross the plains bison with domestic cattle in hopes of creating a new breed—the cattalo¹—that would be more adaptable to the cold Canadian climate and at the same time exhibit a better quality and quantity of beef. The cattalo experiment was unique in the Canadian national parks. It was introduced to the park during an era when hybrid experimentation was taking place in Canada and elsewhere, as early 20th century science tried to improve plants and animals for human use.²

As the Dominion government and the Parks Branch considered these hybridization trials a separate initiative from the bison effort, the cattalo experiment was a deliberate attempt to make the bison at Wainwright useful. This experiment, however, introduced a number of problems and contradictions for the park. The decision to move the experiment to Buffalo National Park not only jeopardized the bison effort in principle, but also posed a threat to the health of the bison herd. The issue of hybridization and concern over the spread of disease resurfaced with the transfer of plains bison north. The government's response to protests, however, shows that while they were aware of the gravity of the issues, this was secondary to finding a quick fix to the problems at the Wainwright bison effort. We are still realizing the consequences of this decision today.

Bison–domestic cattle hybrids were by no means new to the 20th century. The earliest account of this hybrid cross was recorded by Peter Kalm in 1750; he stated that calves of wild cows and oxen were found in Carolina and in provinces south of Pennsylvania. By 1800, such hybrids were said to be common in the northern counties of Virginia.³ Much of the early hybridization between bison and cattle resulted from raising captured bison calves with domestic cattle herds.⁴ In fact, the first hybrid on Michel Pablo and Charles

Allard's ranch occurred because they ranged a bison bull and domestic cow together. Friends of Pablo recalled that he was "enthused over the new creature, and envisioned a profitable future for its kind. Other cattlemen were of like opinion, and carefully planned efforts to raise cattalo were made."⁵ Eventually the Pablo-Allard cattalo herd numbered from 150 to 200 head.⁶

While most early hybrids occurred naturally when captured bison calves were raised with domestic cattle, soon more systematic attempts were undertaken to create a new breed. Beginning his trials in 1815 and continuing for almost thirty years, Robert Wickliffe of Lexington, Kentucky, was one of the first to begin seriously experimenting with hybridizing bison.⁷ In the 1890s, C. "Buffalo" Jones of Kansas and Charles Goodnight of Texas became famous and influential in their efforts in crossbreeding bison.⁸ Jones lost two-thirds of his domestic calves in a severe blizzard during the winter of 1885–86: "I determined to engraft this blood of a hardy race upon our domestic cattle, and secure, if possible, all the hardiness and good sense of the buffalo and the mild disposition of our native cattle."⁹ He devoted the next 20 years to producing a cattalo breed. While his experiments were very costly and suffered many obstacles, Jones successfully bred bison bulls to Galloway, Polled Angus, and range cows.¹⁰ In 1906 he boasted, "Our cattalo company now [has] sixty head of magnificent animals; many of the cows weigh over a ton, and their meat is far more desirable than the choicest beef, while their robes are so much more valuable than the robes of the buffalo, that they cannot be mentioned in the same breath."¹¹

Like Jones, Charles Goodnight also crossed Polled Angus cattle with bison in hopes of developing a new breed.¹² He believed that the infusion of bison blood gave his hybrids several advantages over ordinary range cattle. Cattalo were hardy and able to withstand blizzards. They also had a better survival rate when in a weakened condition because cattalo, like bison, used their forelegs rather than hind feet to rise. Goodnight also believed cattalo to be immune from the diseases that afflicted cattle herds, such as Texas blackleg and Texan fever. In terms of their beef qualities, they consumed less, but put on greater weight than domestic breeds, even under adverse conditions. He reported that his cattalo cut 150 pounds more than the domestic herds, and the meat was of better quality than beef.¹³

While Buffalo Jones boasted that he was the first person to have conducted successful experiments to cross bison with domestic cattle,¹⁴ it appears that, in fact, Colonel Samuel Bedson of Manitoba began his experiments earlier than Jones. In 1880, Bedson, warden at the Stoney Mountain

Penitentiary near Winnipeg, Manitoba, bought eight bison,¹⁵ some of the progeny of the herd that James McKay captured in 1873, with a \$1,000 loan from Donald Smith, Chief Commissioner of the Hudson's Bay Company. He pastured these bison on the prison grounds and later began crossbreeding them with Durham cattle.¹⁶ In 1886, the year Jones claimed to have begun his experiments, naturalist Ernest Thompson Seton, in "A List of the Mammals of Manitoba," praised Bedson's hybrid crosses:

The hybrid animal is [claimed] to be a great improvement on both of its progenitors, as it is more docile and a better milker than the Buffalo, but retains its hardihood, whilst the robe is finer, darker and more even, and the general shape of the animal is improved by the reduction of the hump and increased proportion of the hind-quarters.¹⁷

George Colpitts argues that Bedson's motive behind raising bison and experimenting with hybridization resulted from the food scarcities that began to surface in the West in the 1870s. Bedson believed that the bison-domestic cattle cross was one of the only solutions to solving the food supply problem, which had been exacerbated by the near extermination of the bison. By the 1890s, Colpitts argues, interest in domestication and hybridization waned because of the increase in field crops and animal husbandry, the availability of scientific advice, and the land booms that followed the election of a Liberal administration in 1896.¹⁸ While Colpitts suggests that interest in hybridization ceased because it was no longer needed to maintain stability and social structures in Manitoba, in fact, there was still widespread interest in hybridization in Canada. From the time the Dominion government first acquired bison for Rocky Mountains Park in 1897, the authority administering the national parks, later the Parks Branch, received requests from private individuals to purchase bison for crossbreeding purposes.¹⁹ By 1900, the Dominion government itself became linked to hybridization experiments when Rocky Mountains Park loaned Mossom Boyd, a man from Bobcaygeon, Ontario, an aged bison bull, for use in his private experiments.²⁰

Boyd's cattalo experiment is significant because it was taken over by the Dominion government in 1915 and the herd was moved to Buffalo National Park. Boyd began his hybridization experiment in 1894 when he crossed a purebred bison bull, which he had obtained the previous year from B. C. Winston of Monterey, California, with several different breeds of domestic cows.²¹ The purpose behind his crossbreeding experiments was the same as previous experimenters—to produce a hardier breed of range cattle that would

The cattalo herd at Buffalo National Park. Photo by J. H. Gano.



withstand “the severe climate of our Western Provinces, and also to combine the large carcass and the fine robe of the buffalo with the better beef qualities of the domestic breeds.”²² Of all the experiments up to this point, Boyd’s three-stage process appears to have been the most methodological. The first stage involved crossing bison with domestic cattle. The second stage was to cross the hybrid product from the first stage with a purebred animal of either bison or domestic cattle descent. The final stage, the phase Boyd’s experiment had reached by 1913, involved breeding two animals, both of mixed blood, with each other. Boyd identified the progeny from each stage by a different title. The animal resulting from the first cross was called hybrid buffalo or just a hybrid. In the second stage, the offspring was identified by the percentage of bison blood in the cross (i.e., $\frac{3}{4}$ buffalo). Boyd called only the animals produced in the third stage, where both parents were of mixed blood, cattalo.²³

Initially, Howard Douglas’ interest in hybridization was one of curiosity. In 1903, the superintendent of Rocky Mountains Park sent another bison bull to Boyd for his experiment in exchange for two hybrid bison cows crossed with polled Angus and Gallaway.²⁴ Douglas, agreed to Boyd’s request because he thought the addition of the hybrids would make Rocky Mountains Park unique:

Since the Park is [k]eeping animals for the public interest and amusement these animals might as well be made to serve a further useful purpose[.]

This would be something in line with the work done by Government experimental farms and would distinguish the Banff Park from those in the United [States] in [which] every principal city has a small herd of pure Buffaloes.²⁵

However, the Dominion government’s interest in these experiments soon moved beyond mere amusement. In 1911, the two hybrid heifers were disposed of because F. H. Byshe, of the Department of the Interior, thought the government’s focus should be on developing purebred animals and that the hybrids “detracted from the impression made upon visitors by the pure breeds.”²⁶ However, the slaughter of these two hybrids probably created even more interest in this field of experimentation because of the quality of the meat. Mr. Colebrook, the butcher, was favourably impressed as he had never seen beef so fat.²⁷ In a letter to Parks Branch Commissioner J. B. Harkin, Douglas concluded:

This would go to prove that a cross of this nature would be very beneficial for beef purposes...It would seem to justify a further carrying out of an experiment of this kind...So that taking everything into consideration each one of these animals would realize at least double the price of an ordinary domestic cow.²⁸

This discovery at Banff appears to have piqued the interest of the Parks Branch. In 1912, Harkin thought his department should offer to give a number of young bison to the Department of Agriculture if they were willing to carry out hybrid experiments. He believed these experiments would produce a greater quality beef animal and “might prove very valuable to the country.” He continued, “When there is a possibility of such a result it seems to me that this Department will sooner or later be subject to criticism if it takes no steps on these lines but simply maintains the buffalo for show purposes.”²⁹ By 1918, when the experiment was already in full swing, a copy of a letter, likely penned by Harkin, confirmed the Park Branch’s purpose behind the experiment: “While the buffalo has a very distinct value as it stands...various schemes for making the herd of additional value to the people of the west are under consideration. In the first place experiments in cross-breeding are now being carried on at Buffalo Park for this department by the Department of Agriculture.”³⁰

The cattalo experiment was not only a means to make the bison herd useful, but also an excuse for the Parks Branch to refuse to supply bison to private individuals for their own experiments. The Department of Agriculture had the necessary facilities, equipment, and staff, and if the government undertook its own experiments, Harkin believed this would satisfy the public. Up to this point, neither the United States and Canadian government nor scientific institutions in either country had attempted any crossbreeding experiments, but there had been attempts by private parties in Canada and the United States. While some of the results had been encouraging, some difficulties had been encountered, specifically the deaths of domestic stock used in the experiments. Harkin believed private individuals should not be allowed to conduct experiments because they would not possess the necessary technical information and their failure could taint the government’s experiments.³¹ Unlike the United States government, the Parks Branch had the ability to limit private experimentation in Canada because the Dominion government had a monopoly on bison.³²

Like the Parks Branch, the Department of Agriculture was interested in pursuing the experiment. Officials in that department believed that such trials

“King,” one of the most famous animals produced by the cattalo experiment, was one of the few hybrids from a bison bull and domestic cow cross. Because of the high incidence of mortality among the cows, this cross was discontinued in favour of the domestic bull and bison cow cross. Photo by J. H. Gano.



had great value for the future of the cattle industry and would put their department on the cutting edge of scientific advances in hybridization. E. S. Archibald, who became Director of Experimental Farms in 1919 when J. H. Grisdale moved into the position of Deputy Minister of Agriculture, affirmed:

There is no doubt that the quality of beef and the quantity of high quality beef from these cross-breds is exceptionally good, that the hides will eventually be quite valuable, and that the hardiness of all cattle containing a small percentage of buffalo blood would be increased. Aside from this, this line of hybridizing is one which will give excellent correlative figures for all classes of domesticated animals. At the present time no new work in breeding of an experimental nature is being anywhere undertaken, and this would seem a very desirable field; one which would give valuable data of a scientific character.³³

In 1914, Maxwell Graham, chief of park animals, suggested that perhaps Mossom Boyd's services could be procured to help begin the crossbreeding experiment. That summer, however, Boyd passed away. Since his family was unable to continue his cattalo experiment, Boyd's son G. Cust Boyd, executor of his father's will, approached Martin Burrell, the Minister of Agriculture, to see if the government would be interested in taking over his father's experiment.³⁴ Both the Parks Branch and the Department of Agriculture were interested. The advantage of acquiring Boyd's cattalo was that they could avoid the great expense involved in starting an experiment. Furthermore, by purchasing this experiment, they believed that many of the initial difficulties that Boyd and other experimenters had encountered—the high mortality during calving and the problem of sterility—would have already been overcome. Thus, in December 1915, the Department of Agriculture purchased twenty head, sixteen females and four males of mixed blood, from the estate of Mossom Boyd. These animals were shipped from Ontario to the Experimental Farm in Scott, Saskatchewan, where the herd was held until land was made available at Buffalo National Park.³⁵

This joint venture was to be overseen and funded by the Department of Agriculture, but J. B. Harkin offered the full co-operation of the Parks Branch. He not only guaranteed that land at Buffalo National Park would be turned over to the experiment, but also promised the Department of Agriculture, upon application, any bison needed for hybridizing or crossbreeding purposes.³⁶ The suggestion that the experimental farm be set up at Buffalo National Park seems to have first come from J. H. Grisdale, Director of the Agriculture

Yak were transferred to Buffalo National Park from Rocky Mountains Park in 1919. Yak, believed to be an intermediate species between bison and domestic cattle, were introduced into the hybrid experiment in hopes that it would help counteract the problem of sterility of the male offspring. Photo by William Carsell.



Experimental Farms.³⁷ It was the most practical, cost-effective, and feasible solution for the Department of Agriculture. At Wainwright, there was an endless supply of bison, and, as E. S. Archibald noted, “If Crown land could be used for this experiment the cost of a number of years’ work would be comparatively light and the results would be worth many times the expenditure.”³⁸ Another reason for situating the experiment at the park was because Grisdale feared that “introducing such experimental work” on one of the Dominion’s experimental farms might “discredit [them] in the eyes of the public.”³⁹

The Parks Branch never considered its involvement in the trials as a conflict of interest. They believed the cattalo experiment was a separate operation from preserving the bison. Although both were operating in the same area, and the bison-saving effort was supplying the cattalo experiment with breeding stock, the experiment was to be operated and managed by the Department of Agriculture. Thus for the Parks Branch the set-up was an ideal way to make use of the herd while not jeopardizing its future.

Soon after their arrival at Wainwright, Boyd’s cattalo were exhibiting characteristics that were seen as proof of the animals’ worth and the value of the experiment. In 1920, A. G. Smith stated that they were in first-class condition after the winter despite having never been fed.⁴⁰ In a letter to Archibald he wrote, “There were times coming on toward spring when the crust would get bad that I thought we would have to begin feeding them, but they came through without getting one pound of feed other than what they rustled, and I will venture to say very few animals in the West did that this year.”⁴¹

While Boyd’s cattalo were showing promise, a number of problems with the management of the experiment surfaced almost immediately, which resulted from the two departments sharing the effort. The Parks Branch was responsible for preparing an enclosure before the animals arrived, and then took charge of feeding and caring for them. The cost of running the experiment and the breeding decisions were the responsibility of the Department of Agriculture. In practice, however, the Parks Branch wielded much more power, partly due to the lack of communication between the two departments. Other than herdsman James Wilson, who was hired to look after the cattalo, the Department of Agriculture had no other on-site staff. The others involved in the experiment were park employees: A. G. Smith was paid a salary to oversee the experiment at the park level and the park riders from time to time were called on to help with operations.⁴² As a result, much of the decision making was left with A.G. Smith. In 1918, Smith wrote Harkin: “This experiment if it is to be carried out properly requires something more

than feeding the animals, and I did not understand from you that I was to continue on in charge of these animals after they were transferred. I have given Mr. Grisdale every assistance I could up to the present, but I wish to know what action I am to take in future.”⁴³

It should not be surprising that Smith’s influence went beyond mere animal care. In fact, in 1920 Smith outlined that year’s breeding program. When in March he had not heard yet from Archibald about how the breeding program should proceed that year, he wrote and offered his opinion about how the present animals should be distributed and suggested that two young bison, a male and female, and a heifer bison calf should be added to the experiment. From the correspondence between Archibald and Harkin and A. G. Smith and Archibald, it appears that Smith’s recommendations for the breeding plan had been followed to the letter.⁴⁴ Maxwell Graham, Chief of the Parks Branch Animal Division, was not impressed with the state of operations at the park. Even prior to 1920, he informed Harkin that Smith, by offering his opinions on breeding advice, was overstepping the bounds set out in the original agreement:

These experiments, if so they can be called, have been carried out no more scientifically than were those of long ago under the rough-ready systems of Chas. Goodnight and Buffalo Jones...It appears that we occupy a somewhat invidious position in this matter of the Cattalo experiment. We are responsible, so far as I understand it, for the general care and feeding only of this herd. Such being the case, I do not think our Superintendent should proffer advice as to the technical and expert questions of matings etc., because, as copies of his letters are sent to Head Office we are responsible for his acts and advice, while at the same time we are precluded from advising what steps should be taken in regard to such questions as he now trenches upon.⁴⁵

The trials themselves also faced several setbacks. The most serious was the problem of infertility. By 1925, none of the animals from the Boyd herd had produced any offspring. G. B. Rothwell, Dominion animal husbandman, wrote, “Every effort has been put forth toward the increase of this herd, all combinations of sires have been used, females have been subject to regular examination and treatment by veterinarians expert in the treatment of abnormal genital conditions. In spite of these efforts, no increase has been obtained from the original herd.”⁴⁶ It was not known why the Boyd herd was infertile.⁴⁷ One of the main reasons for purchasing the herd was to avoid the obstacles and

expense involved in the initial stages of the experiment, but the Department of Agriculture and the Parks Branch were forced to start again from scratch and they encountered all the obstacles with the first cross that they had hoped to avoid. The bison male and domestic female cross resulted in a high number of calves that were either aborted or stillborn. The cause of these deaths was attributed to an excessive amount of amniotic fluid. It was called the violent cross because the cows often succumbed as well.⁴⁸ Because of the high incidence of mortality among the cows, however, they discontinued the bison sire and domestic cow cross in favour of the domestic sire and bison cow cross, with which the Dominion government had more success.⁴⁹

While females were common from a first cross and were found to be fertile when crossed with a pureblood bison or domestic bull,⁵⁰ male infertility was a problem that the experiment was never able to overcome. A report in 1955 stated that no fertile bulls resulting from the first cross were ever found.⁵¹ Sterility among males from subsequent crosses was also high. The method followed was to cross the fertile heifers resulting from the first cross and subsequent crosses until a fertile bull was obtained. However, often 7/8 domestic males and occasionally 15/16 domestic males were still found to be sterile.⁵² This setback proved to be a huge problem in view of the fact that the success of the experiment hinged on fertility of both the males and females.

The problem with infertility among the male hybrids was the main reason that yak were introduced into the experiment. Maxwell Graham, in agreement with R. I. Pocock, curator of mammals at the Regent's Park Zoological Collection in London, believed yak, an animal native to Tibet, to be an intermediate species between bison and domestic cattle.⁵³ Rocky Mountains Park had a yak herd on display, and so it was arranged to have some shipped to Buffalo National Park for use in the experiment. In June 1919, two cows, two bulls, and a bull calf were transferred to Buffalo National Park.⁵⁴

The yak had no desirable features and they were only added to the experiment to counteract sterility of the male hybrids.⁵⁵ The objective was to “develop males carrying a maximum of Bison and a minimum of Yak blood, that [would] prove fertile and preponent when crossed on Domestic range cattle.”⁵⁶ In 1923, the park began to see some results from its experiments in hybridizing yak: five heifers and one bull from a yak bull–domestic cow cross, two heifers from a bison bull–domestic cow cross, and one heifer from a yak bull–bison cow cross.⁵⁷ Initially, this new scheme seemed to be making headway, and in 1927, a *Maclean's* article entitled “Evolving the Arctic Cow”

boasted of the strides being made towards developing a cattle breed for the Dominion's more northerly climates.⁵⁸ In 1928, however, it was decided to discontinue experimenting with yak. With the exception of a few hybrid females, the program returned to crossing only bison and domestic cattle because the yak was not considered to have added anything valuable to the experiment.⁵⁹ It is interesting that the introduction of yak into the breeding scenario was never considered an intrusion of non-indigenous species; not until 1937 did Superintendent A. G. Smith express the opinion that the yak should be removed from the park as only native animals should be found in national parks.⁶⁰

While there had been no objections to moving the cattalo experiment to Buffalo National Park, there was much debate within the Parks Branch and between this branch and the Department of Agriculture over the risk that the cattalo experiment posed to the bison in terms of introducing disease. By the 1920s, it was clear that the bison preservation effort at Wainwright was being seriously compromised by the presence of tuberculosis. While there was no evidence of how tuberculosis was introduced into the Wainwright park, it is unlikely that the cattalo experiment was the source, as the first case of tuberculosis at Buffalo National Park was confirmed just before the cattalo herd arrived in Wainwright on 30 December 1916.⁶¹

While there is no way to determine if, or the extent to which, disease was spread by the introduction of the cattalo experiment, in hindsight, the diseased state of the bison herd also posed a great risk to the experiment. Much, however, can be learned about the perceptions of disease at this time through the debates between government officials in the Parks Branch and Department of Agriculture over relocating the cattalo experiment inside Buffalo National Park.

Two people who had serious reservations about moving the experiment to the park because of the danger it posed to the health of the bison herd were C. Gordon Hewitt, the Dominion entomologist, and Maxwell Graham, Chief of Park Animals. In 1916, Hewitt gave a very stern warning about locating the cattalo experiment to Buffalo National Park:

In connection with the proposed experiments on the crossing of the buffalo and domestic cattle I would call your attention to the great importance of taking every precaution to prevent contact between the domestic cattle used in these experiments and the buffalo range. The enclosure in which the buffalo and cattle used in these experiments should, in my opinion, be separated by a double fence from the regular

buffalo range, with a considerable interval between, to avoid not only direct contact but the...possibility of the transference of organic material of any kind from the enclosure to the range. If such precautions are not taken an outbreak of disease among the domestic cattle might result in the decimation of the buffalo, which like all wild animals, are exceptionally susceptible to diseases of domestic animals.⁶²

Although Graham was very much in favour of the experiments, he also expressed concern over moving the cattalo experiment to Wainwright. He granted there was always a certain risk for introduction of disease from outside Buffalo National Park, but felt that the introduction of the animals from Ontario posed an even greater risk, especially since they could be carriers of disease from other herds even if immune themselves. He warned, "I now desire to point out that if such action is taken, the herd of bison, now over 2,000 in number at Buffalo Park, will incur considerable additional risk of becoming infected with some variety of infectious disease." Then, in a prophetic warning he stated, "I would also point out that when an infectious disease is once brought into a large herd, the losses become very high, because it is difficult, if not impossible, to check it after it has once obtained a foothold." He strongly recommended that another area be set aside for the experiment.⁶³

It is clear that J. H. Grisdale, director of Experimental Farms, did not take the warnings about the spread of disease seriously. In reference to Graham's objections about placing the cattalo experiment in Buffalo National Park, Grisdale argued that the arrangement to continue the experiments had been contingent on the availability of land in the park. In a letter to Harkin he wrote, "if it had not been agreed that the herd was destined for Wainwright, to occupy an enclosed portion of the Buffalo Park there, we would not have arranged for its purchase." He continued, "I am of the opinion that the objections raised to the arrangement agreed upon are not really very serious."⁶⁴

Grisdale questioned some of the precautionary measures that had been recommended. He did not see the need to separate the cattalo enclosure from the main bison herd with a double fence when the park itself was only separated from the land outside by a single fence. He also did not consider the cattalo herd any more of a threat than livestock outside the park borders. He stated that all the cattalo had been tested for tuberculosis and any cattle introduced to the experiment would be accompanied by careful quarantine and testing. He had discussed concerns of the cattalo transmitting disease to

the Wainwright bison with the veterinary director general and the pathologist of the Department of Agriculture and both assured him that the risk was practically negligible.⁶⁵

Graham's request for an alternative location for the experiment was ignored. It seems that since the Department of Agriculture had already purchased the herd, plans were already set in motion. They did observe the precautions recommended by Hewitt to protect against the introduction of disease when they built the cattalo enclosure. For example, a double fence was installed around the entire enclosure with a width of 200 feet between the fences.⁶⁶ However, all the measures to ensure that the bison herd was protected from the cattalo were negated when the herd was moved to Wainwright before the area was ready for them. They arrived from Scott, Saskatchewan on the 30 December 1916 and were held in a temporary quarters until January 1918, when the cattalo enclosure was completed.⁶⁷ Further, the temporary enclosure appears to have been separated from the bison herd in the main park by only one fence; on 24 September 1917, a rider recorded in his diary that the gate to the enclosure had been broken by cattalo and bison fighting. Only seventeen of nineteen cattalo were accounted for. Harkin inferred from this and a second diary entry that two cattalo, one a bull, had escaped into the main park.⁶⁸ Furthermore, some of the cattalo were also in contact with other animals in the Visitor's Paddock where they were displayed during the summer months. In the winter, they were moved back to the cattalo paddock.⁶⁹

The reaction to the escape of the cattalo into the main park best illustrates the park's priorities. When informed of the event, Harkin was concerned that the cattalo bull might breed with some of the bison, especially since the escape occurred during breeding season.⁷⁰ This concern suggests that the department did have an interest in maintaining the integrity of the plains bison outside the confines of the cattalo experiment. The escaped cattalo, however, may not have posed much of a threat to the composition of the herd. A number of hybrids existed among the Pablo bison when the Dominion government purchased the herd. Warden Bud Cotton recalled some of the original Montana bison having domestic characteristics. "Lizzie was a lady from the hills of Montana, all buffalo in shape with a beautiful coat of rich, dark brown hair, but showing the strain of her renegade domestic dad in a big Roman nose and light brown eyes."⁷¹ He also remembered:

One outstanding family group—twenty-one head—we christened the Brindles or Ambers. Mother had been shipped in from the Flathead

Reservation and raised her family in the Buffalo Reserve. They were all true buffalo as to shape and size, but distinctly marked with brindle stripes (tiger fashion) which showed beautiful hides. Horns and hoofs were pure amber color. These hides were in great demand, so every roundup any of the strain showing up were cut out for beef and hide.

When the old cow checked in her chips to the hide hunters, the brindle strain disappeared too. Thus, we lost a grand old lady buffalo with a hidden past.⁷²

In 1918, when it was reported that a hybrid cow and her progeny were still roaming in the park, Maxwell Graham responded, "I am surprised to learn that any hybrids are still to be found in our main herd, as very shortly after the creation of this Branch explicit instructions were given to cut out all such [animals], and I remember that not only was this reported as having been done but reports were also received from the Pat Burns Co., praising very highly the beef qualities of these hybrids....If any hybrids are still to be found in our herd at Buffalo Park, these should be cut out and placed in the new Cattalo enclosure."⁷³ However, as late as 1923, Seymour Hadwen, pathologist, found that several animals still exhibited characteristics that were not true to the plains bison:

There are several animals which have yellowish or ambered coloured horns which are not quite the same shape as the typical buffalo. These animals have a quite definite brindling of the hair, especially over the back and shoulders. Darker stripes can be seen running almost circularly around the body and are very much like those one sees in a brindle cow. These animals possibly hark back to some cross with cattle. Another very noticeable difference is in the black line which runs from the hump to the top of the head; it varies very much in width and darkness. If the herd is to be cut down, it would seem desirable to try and eliminate all these animals which do not appear to be running true to type.⁷⁴

Harkin should have been concerned about the potential spread of disease posed by the escaped cattalo. However, this concern was not even mentioned, perhaps because the cattalo herd was considered to be disease-free. Grisdale confirmed the animals had been tested for tuberculosis before they were moved.⁷⁵ However, given that by this time tuberculosis had been discovered in at least one bison in the park herd and was suspected in many others, it is puzzling that there was no concern that the main bison herd might pose a

threat to the experiment.

Once the cattalo herd had been moved to its new enclosure, the trials themselves took precedence over the precautionary measures first adhered to. The cattalo herd was not breeding and Caretaker James Wilson thought it might be because the animals were too heavy. He suggested that if the cattalo were kept in a smaller enclosure they would lose some weight and the situation might improve. A. G. Smith wrote to E. S. Archibald, offering Wilson's proposal that an area between the double fences of the cattalo enclosure be fenced off for this purpose.⁷⁶ The lack of concern over the potential threat of the spread of disease is apparent in the willingness of those in authority at both the Parks Branch and the Department of Agriculture to bend the very guidelines they had established for protecting the main bison herd. Harkin, while restating the importance of the fence to protect against the transference of disease, initially consented to the request. In response to Archibald he wrote:

If there is no other way of overcoming the difficulty which Mr. Wilson's proposal suggests and you could guarantee that no animal which is in the enclosure now or will be in the future, so long as the lane is being utilized in the way suggested, has any communicable disease such a guarantee from you would be sufficient to satisfy me that the health of the buffalo would not be seriously menaced by such a procedure.⁷⁷

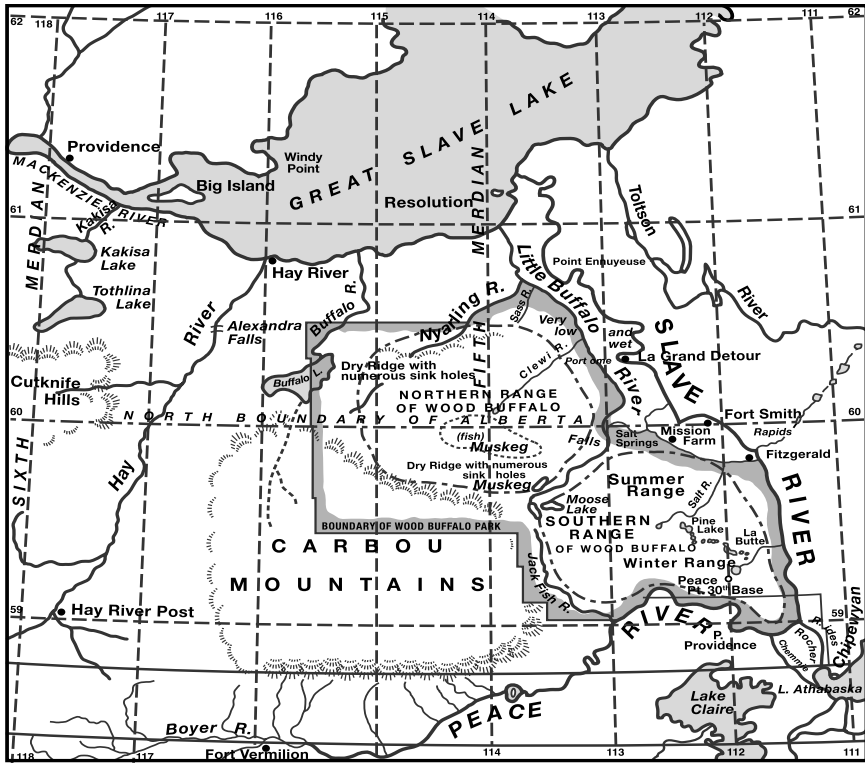
While Harkin was willing to compromise, he certainly showed more concern about the potential transference of disease than E. S. Archibald, Director of Experimental Farms. In response to Harkin he wrote:

While we know of no disease whatever existing or having ever existed in our Cattalo, and think the chance of any such trouble developing are almost negligible, I am afraid it is impossible for any one to give such a guarantee as you suggest and, such being the case, if this is your final decision, and you really cannot see your way to run what would seem to be a very remote risk, we shall have to try and make some other arrangements.⁷⁸

In the end, Harkin informed Archibald that he was not willing to run the risk of using the laneway for a cattalo pen. Yet, it is unclear if Archibald received Harkin's instructions because the letter Harkin wrote to him was never sent.⁷⁹

While it does not seem that tuberculosis was as rampant in the cattalo herd, the disease was eventually found among the cattalo after they moved

A Department of the Interior map showing the ranges of the northern and southern wood bison herds. The plains bison herd from Wainwright was introduced into the southern range as it was believed the two herds would not mix.



to the park. In November 1917, local veterinarian S. E. Wiley examined a seven-year-old cattalo bull, Port Royal, which was in poor condition and anaemic. Although he was unable to make a definite diagnosis, he suspected tuberculosis since the animal had been gradually deteriorating in health for some time and the other animals were in excellent condition. He recommended that a tuberculosis test be given, but it is unclear if this test was performed.⁸⁰ By 1924, a cattalo cow was sent with two bison calves to the research station in Lethbridge for experimental purposes because she had reacted to the tuberculosis test and then needed to be disposed of.⁸¹

In many ways, the transfer of the plains bison north to Wood Buffalo National Park to alleviate the pressure of overpopulation at the Wainwright park paralleled the decision to relocate the cattalo experiment to Wainwright. Both involved the issues of hybridization between two species and the transference of disease. However, the debate surrounding the transfer of plains bison north proceeded quite differently. When the cattalo experiment was moved to Wainwright, there was absolutely no debate over how conducting a crossbreeding experiment in a national park would violate the bison-saving effort and the debate over the potential threat the experiment posed in terms of spreading disease remained within the government circles. Yet when the move to Wood Buffalo Park was publicized, most opposition arose from the public sphere and any opposition that arose in government circles was suppressed. Naturalists and zoologists took issue with the transfer because they believed that the plains bison would both interbreed with the wood bison, obliterating the latter species, and spread tuberculosis to this disease-free herd. Clearly, the Parks Branch had learned little in terms of the potential risks from the experience with the cattalo experiment. Literally no precaution was taken to ensure that the wood bison would be protected from the plains bison. This careless attitude pointed to a deeper crisis: the overpopulation problem. The Parks Branch had been trying to reduce the bison through slaughter, but this method was expensive and they were not realizing any revenue through the sale of the bison products. The decision to send the bison north was made because it was the fastest and most economical way to relieve the pressure on the Wainwright range. The threat that the plains bison posed to the wood bison was secondary to the problems that Buffalo National Park was facing.

The scheme of shipping excess bison to the habitat of the wood bison in the north, first raised by Maxwell Graham in September 1919, was introduced again by H. E. Sibbald, Dominion Parks Inspector, in 1923.⁸² Not long after, W. W. Cory, Deputy Minister of the Department of the Interior,

echoed Sibbald's suggestion stating that instead of slaughtering the bison, it might be a good idea to transfer healthy stock to Wood Buffalo National Park.⁸³ He called a conference on 30 May 1923 to discuss the proposal. Present at the meeting were O. S. Finnie, Director of the North West Territories, J. B. Harkin, Commissioner of National Parks, Dr. Frederick Torrance, Veterinary Director General for the Department of Agriculture, and Superintendent A. G. Smith. Cory also acted as Commissioner of the North West Territories.⁸⁴ Although the tubercular state of the herd was given some attention at the meeting, it was clear that it was not considered serious. Cory asked Torrance for his opinion on whether the Wainwright bison could recover from tuberculosis if transplanted to the Fort Smith area, and whether this move would jeopardize the wood bison. Torrance stated that although some improvement might be noted in less advanced cases, the relocation of such a large number of diseased animals into an area with a herd that was not infected would be extremely hazardous. It is not known whether the potential danger that the two species would interbreed was discussed at this initial meeting. In the end, it seems that the group opted to transplant the bison in a manner which posed the least danger to the wood bison: only young animals should be selected for transport, and the animals would have to pass a tuberculosis test before being shipped north.⁸⁵

On the same day of the meeting called by W. W. Cory, Torrance, perhaps not happy with the final decision, wrote a letter to the Parks Branch and stated his opinion on moving the younger bison north: "This proposition is objectionable from a health point of view, in that it would be almost certain to carry infection to this herd of wood buffalo, which presumably is at present free from this disease."⁸⁶ However, even with this objection, Torrance left the door open for the Parks Branch by suggesting that, "If this proposition were, however, modified and preparation made so that young animals up to the age of yearlings only were transferred, and that these animals were previous to transference submitted to the tuberculin test, so as to eliminate any that reacted, much of the objection would be removed."⁸⁷ He suggested that his branch, the Department of Agriculture, make arrangements for the planning of the necessary enclosures and squeezes and the delivery of the tests.⁸⁸

That Maxwell Graham was the first to suggest the Parks Branch move the bison north to the habitat of the wood bison is surprising given that he knew that the Wainwright herd had tuberculosis and that he had been dead set against relocating the cattalo experiment to Wainwright because of the potential threat of disease. He was not in attendance at the conference and

he was no longer with the Parks Branch when the transfer decision was made.⁸⁹ In 1922, he had taken on a new role as Chief of the Wild Life Division. Nonetheless, in the December 1924 issue of the *Canadian Field-Naturalist*, Graham continued to endorse the proposal of Wood Buffalo Park as the new outlet for the surplus plains bison. Graham, knowing the health status of the Wainwright herd, made no mention of tuberculosis at all in his article,⁹⁰ yet it is clear he knew the dangers that the disease posed. In a 1919 memorandum, he outlined the symptoms and spread of the disease and issued a stern warning that bison exhibiting such symptoms or reacting to a tuberculin test should be slaughtered.⁹¹

Historian John Sandlos shows that Graham was a key proponent of the transfer program. Amazingly, he was able to “dismiss the opinions of leading zoologists, misrepresent the views of his colleagues and ignore expert advice he had received from within the civil service”⁹² despite the fact that he seemed to have knowledge of the danger that the transfer posed. Sandlos cites an internal 1923 memorandum that shows that Graham acknowledged that the risk of infecting the wood bison with tuberculosis was great. To O. S. Finnie he wrote:

It would seem therefore in Doctor Torrance’s opinion we must face a certain risk of infection from the introduction of even young, tested, buffalo coming from the infected herd at Wainwright...Since Dr. Torrance has given his opinion it is hardly proper for me to say more on the matter of possible infection.⁹³

Sandlos argues that, for Graham, the practicality of the project outweighed the risks.⁹⁴ Perhaps the very fact that Graham did not mention tuberculosis in his article indicates that he had some issue with the danger the transfer posed in this regard. However, given that he was no longer with the Parks Branch, perhaps he believed his opinion would have little influence.

While Graham may have had issue with the transfer of a diseased plains bison herd, he showed no serious objection to plains and wood bison interbreeding. In fact, he did not consider the two types of bison to be separate species. Rather, he believed the wood bison, the last wild bison in North America, were and “the finest specimens of their species, superior in pelage, size, and vigour to those of the plains.”⁹⁵ Any difference between the plains and wood bison Graham attributed to the environment they were living in.⁹⁶ To him, the pure wood bison serve a very useful purpose for the parks system.

“The time is approaching” he stated, “when an infusion of new unrelated blood will be needed by our herds in the National parks, and it is only from the northern herds that such infusion can be obtained.”⁹⁷

Given his belief that the wood bison were a purer version of the plains bison and needed to be safeguarded for future use in the national parks system, it is curious that Graham supported a proposal to move a diseased and (what he considered) inferior herd into the wood bison habitat. However, he did not believe that moving the plains bison north would endanger or obliterate the entire wood bison population. There were two ranges for these northern bison, containing two separate herds, which supposedly did not mingle with each other. Graham argued, “Since it is into the southern range only that it is proposed to introduce plains bison from the Wainwright Park, in which range some 1,000 wood-bison are at present established, those bison indigenous to the northern range...will remain inviolate so far as admixture with the introduced bison is concerned.”⁹⁸

Not everyone accepted Graham’s argument. Francis Harper of Cornell University (previously of the Bureau of Biological Survey, Washington, D.C.), using Harry V. Radford’s findings, argued that the two types of bison had distinct characteristics.⁹⁹ He stated, “Interbreeding will undoubtedly take place, and with the introduced Plains Buffalo vastly in the majority, the descendants a few generations hence will naturally have more of the characteristics of the latter than the Wood Buffalo.”¹⁰⁰ He argued that there was no evidence that the northern and southern herds would not mix, because there was no physical barrier preventing contact between the two herds. Thus, there was also a potential for disease to spread.¹⁰¹ Others, like the American Society of Mammalogists, expressed their disapproval of the transfer in subsequent issues of *Canadian Field-Naturalist*. Naturalist W. E. Saunders from London, Ontario, argued:

There are so many examples the world over, of calamitous results arising from the interference of man with native fauna, that one can only suppose that the promoters of this scheme to mix the blood of the two Buffalo, have not sought advice from any student of Natural Science...it would be better to lose the whole Wainwright herd, rather than risk the last remnant of the Wood Buffalo.¹⁰²

William Hornaday, vice-president of the American Bison Society and president of the New York Zoological Park, also raised objections to the move when he learned the Wainwright herd was diseased. He was greatly shocked

to hear that the bison had tuberculosis. In a letter to Francis Harper he stated, “If it is as bad as your informant states—which I certainly hope it is not—then the conditions are indeed terrible. I had not before heard even a whisper to the effect that tuberculosis had found lodgement in the great Canadian herd.”¹⁰³ He considered the proposal to move bison north a fatal mistake, but admitted that there was really nothing anyone outside Canada could do without it being seen as interference.¹⁰⁴

There was also some dissent inside government circles, as was made apparent in a dispute that involved Hoyes Lloyd and Harrison Lewis, Supervisor of Wildlife Protection for the Parks Branch and the Chief Federal Migratory Bird Officer, respectively. Both men were involved with the Ottawa Field Naturalist’s Club: Lloyd was president and Lewis was editor of *Canadian Field-Naturalist*. At the 28 February 1925 club meeting, it was decided to send a copy of Harper’s letter from the February 1925 issue of *Canadian Field-Naturalist* to the Minister of the Interior accompanied by a letter from the club endorsing Harper’s position that plains bison should not be sent north. The outcome of the incident is proof that the government indeed had knowledge of the potential danger in which it was placing wood bison. It also verifies how volatile the proposal had become; the government was not willing to countenance public servants breaking rank. Lloyd and Lewis were informed that they could either resign from the Field Naturalist’s Club or be expelled from the Department of the Interior. Both resigned their positions at the club.¹⁰⁵ Years later, Dr. Lewis told W. F. Lothian that the ultimatum was not conveyed by letter or memorandum, but came by the grapevine from the deputy minister’s office.¹⁰⁶

The decision to send bison north was not changed by the protests; plains bison were shipped north over a period of four years. As had been the case with the cattalo experiment, initial regulations set out to protect the wood bison were compromised. For one, a decision was made to dispense with the tuberculin test since only young bison, one- and two-year-olds, were to be shipped. Initially these young bison were chosen because it was thought that they posed little risk of spreading disease.¹⁰⁷ It is likely that evidence from the 1923 slaughter influenced this decision. All nine of the spring calves killed were free from the disease, and only one of twelve yearlings slaughtered was found to be slightly infected.¹⁰⁸ In his January 1924 report to the veterinary director general, Waddy stated that while the older cows and bulls had “extreme prevalence [*sic*] of generalized tuberculosis,” the bison under the age of five that had been slaughtered in the past

few days had been found to be free from the disease.¹⁰⁹ Thus, it appears none of the animals sent north were tested for tuberculosis.¹¹⁰

Even the policy of sending young bison north was not strictly adhered to, however. When 2,000 bison were rounded up for the transfer in the 1925 season, a number of cows formed a part of this group. O. S. Finnie wired A. G. Smith and stated, "Positively no buffalo over two years can be shipped."¹¹¹ The ratio agreed upon in 1924 had been one male to five females among the yearlings; no two-year-old males were to be shipped. In 1925, the department approved a sex ratio of one male to two females for both yearlings and two-year olds. Finnie considered the male portion proposed for the 1926 shipment, one male to one female for the yearlings and 450 males to 250 females for the two-year olds, excessive and advised that they allow three-year-old females to be added in order to supplement the sex ratio.¹¹² Although it does not appear that any three-year olds were shipped, Warden Ray Sharp recalled that in the last two years, 1927 and 1928, they did not adhere to any ratio; they had to ship anything of the yearlings and two-year-olds in order to get the numbers.¹¹³

In 1932, one of the most scathing comments regarding the transfer of the bison north was made by Thomas Barbour, director of the Museum of Comparative Zoology at Harvard University. In a review for the magazine *Science* of the book *Wild Beasts Today* written by Harold Shepstone¹¹⁴ Barbour stated,

This, one of the most tragic examples of bureaucratic stupidity in all history, was done against the protests of both Canadian and American naturalists who would rather have seen the surplus bison killed. They were known to be infected with bovine tuberculosis and they are certain to interbreed as well as infect the wood bison, which is a far finer animal and one of great zoological interest The book would have done well to have shown up this transfer to the public in its true light as a real tragedy and not as a triumph of conservation.¹¹⁵

In response to the review, J. D. Soper, chief federal wildlife officer of the Canadian Wildlife Service for the Prairie Provinces, confirmed that there had been merit in the warnings given by the naturalists and zoologists:

It is true that the "Wainwrights" were and are still infected with bovine tuberculosis. There can scarcely be any doubt that these animals are interbreeding and infecting the wood bison at the present time; the "Wainwrights" are drifting everywhere and occupying the former

range of the “originals”. The two races have already intermingled to a great extent and almost without question are transmitting tuberculosis one to the other. There are now reports that the “Wainwrights” have even invaded what we have regarded as the “remote northern area” of the park.¹¹⁶

According to park employees at Wood Buffalo National Park, the plains bison herd mingled with the wood bison almost immediately after arriving at the park. William A. Fuller, a mammalogist employed in the Dominion Wildlife Service (later the Canadian Wildlife Service) wrote that in 1950 a professional butcher and a veterinary meat inspector were brought to Wood Buffalo National Park for the annual bison hunt. Fuller worked with the veterinarian and learned how to inspect the animals for tuberculosis. With this knowledge, he continued to inspect bison in the annual kills and his findings revealed that the disease had spread. He gives figures for the incidence of tuberculosis found among the herd from 1952 to 1956: three-quarters of adult and old males tested positive for tuberculosis. On the whole, 38 per cent of males and 40 per cent of females were found to have the disease.¹¹⁷

The lack of judgement displayed by members of the government and the Parks Branch over the introduction of the cattalo experiment and the shipping of plains bison north to Wood Buffalo National Park had far-reaching consequences. The hybridization experiment was certainly a product of the early 20th century and another way to make the bison herd at Wainwright useful. The decision to move the cattalo experiment to Wainwright, however, contradicted the bison-saving effort in principle and set a bad precedent. The involvement of the Parks Branch in this experimental work may explain their apathy towards the decision to introduce the plains bison, a distinct species, into the habitat of the wood bison.

There is no excuse for the Parks Branch’s blatant disregard of the issue of the spread of disease. Zoologists and naturalists voiced their objections regarding the transfer of plains bison north and informed the government of its obligation to the preservation of the wood bison. The Park Branch’s decision to ignore protests raises the question of whether the decision makers had any preservationist ethic at all. The fact that they quashed objections by those within the government circles is proof that the government’s main interest was not the plains bison but rather eliminating its overpopulation burden by removing the problem to a remote area. This quick fix, however, was disastrous. The plains bison interbred and spread disease to the wood bison and the ripple effect from this decision is still felt today.

Notes

1. Cattalo are the progeny resulting from a cross between bison and domestic cattle. While Mossom Boyd, the hybrid experimenter from Bobcaygeon, Ontario, reserved this title for offspring from parents that were mixed blood, the term had also been used loosely to connote hybrids and descendants from one pure parent. LAC, Commissioner to Edmund Seymour, 4 Jul. 1917, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1; Jorgen Nelson, "How Practical Are Cattalo? Buffalos and Domestic Cattle Have Long Been Crossbred," *American Feed and Grain Dealer* 30 (Sept. 1946), 8.
2. For example, the German government was carrying out experiments in crossing the zebu with domestic cattle to create an animal that would be immune to the tsetse fly, and the Department of Agriculture in Russia was experimenting with crossing Russian cattle of the steppes with yak. LAC, W. W. Cory to G. F. O'Halloran, 2 Mar. 1914, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
3. A. Deakin, G. W. Muir, and A. G. Smith, *Hybridization of Domestic Cattle, Bison and Yak* (Ottawa 1935), 5 and Nelson, "How Practical Are Cattalo?" 9.
4. For example, hybrids occurred in the herds of Frederick Dupree and James McKay and Charles Alloway. Coder, "National Movement," 5, 25.
5. Whealdon et al., *I Will Be Meat for My Salish*, 118.
6. Whealdon et al., *I Will Be Meat for My Salish*, 118. Some of their cattalo would have come from C. "Buffalo" Jones's stock. In 1893, Pablo and Allard purchased from Jones eighteen hybrid bison and twenty-six purebred bison. Coder, "The National Movement," 39.
7. Nelson, "How Practical Are Cattalo?" 9.
8. C. J. Jones, "My Buffalo Experiments," *Independent* 60 (1906), 1355.
9. George Bird Grinnell, "The Last of the Buffalo," *Scribner's Magazine* 12 (Sept. 1892), 274.
10. Jones, "My Buffalo Experiments," 1355.
11. *Goodnight's American Buffalo Ranch, Goodnight Texas* (Dallas 1910), 2, 3.
12. Charles Goodnight, "My Experience with Bison Hybrids," *Journal of Heredity* 5 (1914), 199.
13. LAC, C. J. (Buffalo) Jones to J. B. Harkin, 14 Jul. 1917, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
14. Colpitts states that thirteen bison were purchased in 1878. Colpitts, *Game in the Garden*, 58. Coder, however, uses Bedson's own statement that eight bison were purchased. Bedson made this statement eight years after the bison had been purchased. Coder, "National Movement," 5, 49.

15. Colpitts, *Game in the Garden*, 55–57.
16. Thompson, “A List of the Mammals of Manitoba,” 11. This appears to be Ernest Thompson Seton. Colpitts, *Game in the Garden*, 58.
17. Colpitts, *Game in the Garden*, 58–60.
18. LAC, Maxwell Graham to J. B. Harkin, 30 Nov. 1912, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
19. LAC, Howard Douglas to Commissioner, 14 [Feb.] 1912, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
20. LAC, Mossom Boyd, “A Short Account of the Experiment of Crossing the American Bison with Domestic Cattle,” n.d., Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
21. LAC, G. Cust Boyd to Martin Burrell, 21 Jul. 1914, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
22. LAC, Boyd, “Crossing Bison and Cattle,” 189; J. B. Harkin to Edmund Seymour, 4 Jul. 1917, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
23. LAC, Howard Douglas to J. B. Harkin, 14 [Feb.] 1912, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
24. LAC, Howard Douglas to James A. Smart, 15 Oct. 1903, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
25. LAC, F. H. Byshe to Mr. Harkin, 12 Dec. 1911, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
26. LAC, Howard Douglas to A. B. MacDonald, 3 Feb. 1912 and Howard Douglas to Commissioner, 7 Feb. 1912, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
27. LAC, Howard Douglas to Commissioner, 7 Feb. 1912, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
28. LAC, J. B. Harkin to Mr. Cory, 27 Jan. 1912, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
29. LAC, Memorandum to Mr. Mitchell, 29 Apr. 1918, Parks Canada Files, BNP, RG 84, Vol. 982, BU2[548608], pt. 2.
30. LAC, W. W. Cory to G. F. O’Halloran, 2 Mar. 1914, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817; LAC, J. B. Harkin to Mr. Cory, 27 Jan. 1912 and J. B. Harkin to Mr. Cory, 11 Dec. 1912, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
31. LAC, Maxwell Graham to Mr. Harkin, 30 Nov. 1912, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.

32. LAC, E. S. Archibald, Memo Re: Buffalo Cattle Hybrids on the Estate of M. M. Boyd, Bobcaygeon, Ont., 18 Jun. 1915, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
33. LAC, Note from Maxwell Graham, 25 Jul. 1914, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1; LAC, Heaton's Agency to Martin Burrell, 22 Jul. 1914, G. Cust Boyd to Martin Burrell, 21 Jul. 1914, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
34. LAC, J. H. Grisdale to Deputy Minister, Department of Agriculture, 31 Aug. 1914, E. S. Archibald, Memo. re Buffalo Cattle Hybrids on the Estate of M. M. Boyd, Bobcaygeon, Ont., 18 Jun. 1915, Memo. re Cattalo, 5 Jan. 1916, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
35. LAC, Commissioner to E. S. Archibald, 3 Dec. 1915, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1; LAC, Memo. re: Cattalo, 5 Jan. 1916, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
36. LAC, J. H. Grisdale, to George F. O'Halloran, 11 May 1914, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
37. LAC, E. S. Archibald, Memo. re: Buffalo Cattle Hybrids, 18 Jun. 1915, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
38. LAC, J. H. Grisdale to Deputy Minister, Department of Agriculture, 31 Aug. 1914, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817. Up to this point, it appears that trials at the experimental farms had more to do with feeding experiments. LAC, J. H. Grisdale to Mr. O'Halloran, 13 Sept. 1915, Department of Agriculture Files, Cattalo, RG 17, Vol. 1249, 245817.
39. LAC, A. G. Smith to E. Hunter, 10 Mar. 1920, Parks Canada Files, BNP, RG 84, Vol. 54, BU233, pt. 2.
40. LAC, A. G. Smith to E. S. Archibald, 10 May 1920, Parks Canada Files, BNP, RG 84, Vol. 54, BU233, pt. 2.
41. LAC, Director of Park Animals to E. S. Archibald, 4 Jul. 1921, Parks Canada Files, BNP, RG 84, Vol. 54, BU233, pt. 2; LAC, J. H. Grisdale to J. B. Harkin, 29 Oct. 1917 and A.G. Smith to Director, Experimental Farms, 16 Nov. 1917, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1; LAC, E. S. Hopkins to Dr. Barton, 20 Nov. 1939, Department of Agriculture Files, Cattalo, RG 17, Vol. 3456, 30-9-1(1).
42. LAC, A. G. Smith to Commissioner, 22 Feb. 1918, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
43. LAC, A. G. Smith to E. S. Archibald, 24 Mar. 1920, E. S. Archibald to J. B. Harkin, 15 May 1920, and A. G. Smith to E. S. Archibald, 27 May 1920, Parks Canada Files, BNP, RG 84, Vol. 54, BU233, pt. 2.

44. LAC, Maxwell Graham to Commissioner, 1 Mar. 1918, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
45. G. B. Rothwell, *Report of the Dominion Animal Husbandman for the Year Ending March 31, 1924* (Ottawa 1925), 57.
46. The problems associated with the successful breeding of the Boyd herd were attributed to the infertility of the males and to the combined effects of the increasing age of the females, their continually open state, genital abnormalities arising from these conditions, and the high condition of the females due to the good grazing in the enclosures. Rothwell, *Report of the Dominion Animal Husbandman*, 57. It was also suggested that constant moving of the herd (from Ontario to Saskatchewan to Wainwright and between enclosures once at the park) was a reason that the herd was not breeding. LAC, A. G. Smith to A. G. Sinclair, 21 Jan. 1919, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
47. Rothwell, *Report of the Dominion Animal Husbandman*, 56, 59.
48. Nelson, "How Practical Are Cattalo?" 9; LAC, E. S. Archibald to Dr. Grisdale, 29 Jun. 1928, Department of Agriculture Files, Cattalo, RG 17, Vol. 3456, 30-9-1(1).
49. Rothwell, *Report of the Dominion Animal Husbandman*, 56.
50. H. F. Peters, *Range Experimental Farm, Manyberries, Alberta, Progress Report, 1948-1953* (Ottawa 1955), 20.
51. Nelson, "How Practical Are Cattalo?" 9, 27.
52. LAC, Chief of the Animal Division to Commissioner, 15 Mar. 1918, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
53. LAC, J. M. Wardle to J. B. Harkin, 19 Jun. 1919, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1. Yak were first introduced into the national park system in 1909, when the Duke of Bedford presented a small herd to the Dominion government. LAC, E. S. Archibald, *The Yak in Canada*, n.d., Parks Canada Files, BNP, RG 84, Vol. 55, BU241, pt. 1.
54. LAC, "Cross Breeding Experiments at Buffalo Park, Wainwright, Alta," n.d., Parks Canada Files, BNP, RG 84, Vol. 54, BU233, pt. 2; LAC, E. S. Archibald to Dr. Grisdale, 22 Dec. 1923, Department of Agriculture Files, Cattalo, RG 17, Vol. 3456, 30-9-1(1).
55. LAC, "Cross Breeding Experiments at Buffalo Park, Wainwright, Alta," n.d., Parks Canada Files, BNP, RG 84, Vol. 54, BU233, pt. 2.
56. LAC, "Experimental Cross-Breeding of Bison (Buffalo) with Domestic Cattle, Yak, etc.," n.d., Parks Canada Files, BNP, RG 84, Vol. 54, BU233, pt. 2.
57. *MacLean's Magazine*, 15 Jan. 1927, 21, Alan N. Longstaff, "Evolving the Arctic Cow."

58. Deakin, Muir, and Smith, *Hybridization*, 27.
59. LAC, A. G. Smith to Controller, National Parks Bureau, 26 Oct. 1937, Parks Canada Files, BNP, RG 84, Vol. 55, BU241, pt. 1.
60. UAA, T.B. at Buffalo Park between Dec. 1916 to Jan. 1st, 1922, Buffalo National Park Files, 2002-18-4.
61. LAC, C. Gordon Hewitt to J. B. Harkin, 2 Feb. 1916, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
62. LAC, Chief of the Animal Division to J. B. Harkin, 27 Jun. 1916, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
63. UAA, J. H. Grisdale to J. B. Harkin, 5 Jul. 1916, Buffalo National Park Files, 2002-18-4.
64. UAA, J. H. Grisdale to J. B. Harkin, 5 Jul. 1916, Buffalo National Park Files, 2002-18-4.
65. LAC, E. S. Archibald to J. B. Harkin, 2 Jun. 1919 and Commissioner to E. S. Archibald, 9 Jun. 1919, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
66. LAC, A. G. Smith to Commissioner, 3 Jan. 1917 and A. G. Smith to Commissioner, 22 Feb. 1918, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
67. LAC, Commissioner to A. G. Smith, 5 Nov. 1917, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1. The cattalo herd consisted of only nineteen animals; one cow was destroyed shortly after arriving at the park. LAC, Maxwell Graham to J. B. Harkin, 22 Aug. 1917 and A. G. Smith to Commissioner, 18 Sept. 1917, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
68. *Home of the Buffalo*, VHS, with commentary by Ray Sharp (n.d., Battle River Historical Society). The Oct 12, 1927 entry in Davey Davison's diary reads, "I went to Mott Lake Enc. & put the 5 Cattalo into Petersens Enc & headed them south to the Cattalo Enc." BNPFA, Diary of Davey Davison, Jan. 1, 1927 to Jan. 2, 1928, Davison fonds.
69. LAC, Commissioner to Superintendent, Buffalo Park, 5 Nov. 1917, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
70. Cotton, *Buffalo Bud*, 107.
71. Cotton, *Buffalo Bud*, 107–108.
72. LAC, Chief of the Animal Division to Commissioner, 15 Mar. 1918, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
73. LAC, Seymour Hadwen to J. B. Harkin, 21 Feb. 1923, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.

74. UAA, J. H. Grisdale to J. B. Harkin, 5 Jul. 1916, Buffalo National Park Files, 2002-18-4.
75. LAC, A. G. Smith to E. S. Archibald, 26 May 1919, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
76. LAC, Commissioner to E. S. Archibald, 9 Jun. 1919, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
77. LAC, E. S. Archibald to J. B. Harkin, 12 Jun. 1919, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
78. The letter was found in 1920 and believed to have been never sent. LAC, J. B. Harkin to E. S. Archibald, 17 Jun. 1919 and note, anonymous, n.d., Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
79. LAC, S. E. Wiley to A. G. Smith, 3 Nov. 1917, and A. G. Smith to Commissioner, 7 Nov. 1917 and A. G. Smith to Director of Experimental Farms, 12 Sep. 1919, Parks Canada Files, BNP, RG 84, Vol. 52, BU233, pt. 1.
80. LAC, A. G. Smith to A. E. Cameron, 3 Dec. 1924, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
81. LAC, Maxwell Graham to J. B. Harkin, 29 Sept. 1919, Parks Canada Files, BNP, RG 84, Vol. 53, File BU232, pt. 1; LAC, H. E. Sibbald to J. B. Harkin, 17 Jan. 1923, Parks Canada Files, BNP, RG 84, Vol. 52, File BU232-1, pt. 1.
82. There had only been one small experimental slaughter by the time the transfer suggestion arose in 1923, perhaps proof that public opinion was also influential in the formation of this proposal.
83. UAA, Summary of correspondence dealing with the transfer of the buffalo from Wainwright to Wood Buffalo Park, 6 May 1933, Buffalo National Park Files, 2002-18-1.
84. UAA, Summary of correspondence dealing with the transfer of the buffalo from Wainwright to Wood Buffalo Park, 6 May 1933, Buffalo National Park Files, 2002-18-1.
85. LAC, Fred Torrance to W. W. Cory, 30 May 1923, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
86. LAC, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
87. LAC, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
88. W. A. Fuller, "Canada and the 'Buffalo,' *Bison bison*: A Tale of Two Herds," *Canadian Field-Naturalist* 116 (Jan.–Mar. 2002), 152.
89. Maxwell Graham, "Finding Range for Canada's Buffalo," *Canadian Field-Naturalist* 38 (Dec. 1924), 189.

90. UAA, Memorandum from Maxwell Graham, 19 Mar. 1919, Buffalo National Park Files, 2002-18-4.
91. John Sandlos, "Where the Scientists Roam: Ecology, Management and Bison in Northern Canada," *Journal of Canadian Studies* 37 (Summer 2002): 99.
92. Quoted in Sandlos, "Where the Scientists Roam," 100.
93. Sandlos, "Where the Scientists Roam," 100.
94. Maxwell Graham, *Canada's Wild Buffalo: Observations in the Wood Buffalo Park, 1922* (Ottawa 1923), 12.
95. Maxwell Graham, *Canada's Wild Buffalo*, 8. It was believed that once introduced into the environment of the wood bison, the plains bison would begin to take on some of the characteristics of the wood bison. Such was substantiated by J. D. Soper, a naturalist/explorer who was appointed in 1934 as Dominion Wildlife Officer for the Prairies. J. Alexander Burnett, "A Passion for Wildlife: A History of the Canadian Wildlife Service, 1947–1997," *Canadian Field-Naturalist*, 113 (Jan.– Mar. 1999), 13. Soper reported that environmental conditions were affecting the plains bison that had been transferred to Wood Buffalo National Park. He reported, "The 'Wainwrights' are becoming increasingly sturdier, heavier, and [get] darker pelts as the years go by." UAA, Summary of correspondence dealing with the transfer of the buffalo from Wainwright to Wood Buffalo Park, 6 May 1933, Buffalo National Park Files, 2002-18-1.
96. Maxwell Graham, *Canada's Wild Buffalo*, 12.
97. Maxwell Graham, "Finding Range for Canada's Buffalo," *Canadian Field-Naturalist*, 38 (Dec. 1924), 189. It is quite possible that Graham relied on information from a report by F. B. Siebert. During the 1922 boundary survey "on his reconnaissance of the home of the Wood Buffalo," Siebert stated that while it was possible for bison from northern and southern herds to mingle, the two herds did not seem to unite. UAA, Summary of the correspondence on file giving reasons for introducing the Wainwright bison to the Wood Buffalo Park and the representations made by those who were opposed to such action, 1926, Buffalo National Park Files, 2002-18-1.
98. In 1910, Harry V. Radford collected information on the wood bison and its habitat. He also procured a specimen and compared this animal with its plains counterpart. When compared to the plains bison that had been killed by William Hornaday, which held the world record for bison in size and weight, the wood bison was remarkably bigger in proportion; Radford declared it the largest wild animal to be killed in North or South America. LAC, H. V. Radford to Colonel Fred White, 12 Feb. 1910, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.

	<i>Hornaday's plains bison killed 6 Dec. 1896</i>	<i>Radford's wood bison killed 1 Dec. 1909</i>
Total weight	2,100 LBS (EST.)	2,402 LBS
Height at shoulder	5 FT. 8 IN.	5 FT. 10 IN.
Length of head and body to root of tail	10 FT. 2 IN.	9 FT. 7 IN.
Length of tail vertebrae	1 FT. 3 IN.	1 FT. 7½ IN.
Girth behind forelegs	8 FT. 4 IN.	9 FT. 9 IN.
Circumference of muzzle behind nostrils	2 FT. 2 IN.	2 FT. 3 5/8 IN.

99. Francis Harper, "Correspondence," *Canadian Field-Naturalist* 39 (Feb. 1925), 45.
100. Harper, "Correspondence," 45.
101. W. E. Saunders and A. Brozier Howell, "Correspondence," *Canadian Field-Naturalist* 39 (May 1925), 118.
102. LAC, W. T. Hornaday to Francis Harper, 17 Mar. 1925, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
103. LAC, W. T. Hornaday to Francis Harper, 17 Mar. 1925, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
104. Burnett, "A Passion for Wildlife," 12.
105. Lothian, *A History of Canada's National Parks*, 34.
106. UAA, Summary of correspondence dealing with the transfer of the buffalo from Wainwright to Wood Buffalo Park, 6 May 1933, Buffalo National Park Files, 2002-18-1, UAA.
107. LAC, A. G. Smith to Commissioner, 17 Dec. 1923, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
108. LAC, Richard Waddy to Veterinary Director General, 7 Jan. 1924, Parks Canada Files, BNP, RG 84, Vol. 58, BU299-2, pt. 1.
109. UAA, Summary of correspondence dealing with the transfer of the buffalo from Wainwright to Wood Buffalo Park, 6 May 1933, Buffalo National Park Files, 2002-18-1.
110. LAC, Quoted in A. G. Smith to O. S. Finnie, 7 Jul. 1925, Parks Canada Files, BNP, RG 84, Vol. 52, BU232-1 pt. 2.
111. LAC, O. S. Finnie to F. H. H. Williamson, 3 Mar. 1926 and A. G. Smith to the Commissioner, 12 May 1926, Parks Canada Files, BNP, RG 84, Vol. 52, BU232-1 pt. 2.

112. Ray Sharp, interview.
113. Harold Shepstone devotes one chapter of his book *Wild Beasts Today* to the demise and salvage efforts of the Dominion government. He concludes his chapter with details of the transfer of the plains bison from Wainwright. He portrays the scheme in a positive light, stating that the herd at Wood Buffalo National Park would soon be used to supply meat and leather products to Canadians. Harold J. Shepstone, *Wild Beasts Today* (London 1931), 126–34.
114. UAA, Summary of correspondence dealing with the transfer of the buffalo from Wainwright to Wood Buffalo Park, 6 May 1933, Buffalo National Park Files, 2002-18-1.
115. UAA, Summary of correspondence, 6 May 1933, Buffalo National Park Files, 2002-18-1.
116. Fuller, “Canada and the ‘Buffalo,’” 155–56; Burnett, “A Passion for Wildlife,” 15.