

The Great Kill

The poor affrighted animals were eddying about in a crowded and confused mass, hooking and climbing upon each other; when the work of death commenced. – George Catlin, 1832–39

Probably not many people have spent time wondering what they would do if they had a time machine, but most archaeologists have. It is the ultimate weapon: the invention that will put us all out of work. Before that happened, hopefully we would get a chance to try it out, to act as some kind of quality control specialists, to take it for a test drive. Imagine the range of answers you would get if you were to ask archaeologists where they would go if they had one trip in a time machine. Some would be on hand for the carving and erection of an Easter Island statue. Some would be deep underground in the Valley of the Kings in the burial chamber of King Tutankhamen as his funeral procession arrived. Others would set up their lawn



A stampeding bison herd was a powerful force on the landscape that could be felt, heard, seen, and smelled over great distances. (Courtesy Jim Peaco, U.S. National Parks Service)

Imagining Head-Smashed-In

The precarious situation of hunters positioned along the end of the drive, where the herd finally appreciated the nature of the trap, is almost impossible to imagine. (Courtesy Shayne Tolman)

† “Still their advance is somewhat frightful,” Gregg wrote in the 1830s, “their thundering rumble over the dry plain ... puffing like a locomotive engine at every bound, does at first make the blood settle a little heavy about the heart.” In 1811 Henry Brackenridge observed, “Late in the evening we saw an immense herd in motion along the sides of the hill ... The sound of their footsteps, even at the distance of two miles, resembled the rumbling of distant thunder.” Despite being two miles from a large herd, Palliser records, “They were in such numbers that their peculiar grunt sounded like the roar of distant rapids in a large river, and causing a vibration also something like a trembling in the ground.”



chairs on the Salisbury Plain, soaking up the action as the massive rocks of Stonehenge were raised into place. More than a few would recline on Capitoline Hill to watch the birth of Rome. I'd be standing at the edge of the cliff of Head-Smashed-In Buffalo Jump as a herd of stampeding bison bore down on the precipice. And if I only get to do this once, let it be a big herd.

My favourite scene in *Dances with Wolves* isn't the dramatic buffalo hunt or the panoramas of majestic Great Plains scenery (much as I appreciated these) but a more subtle moment. The character Kevin Costner portrays, John J. Dunbar, is asleep on the ground in his little shack of a home on the prairie. Gradually, a low rumbling sound comes through the theatre speakers. The camera pans past trembling glasses, cups, bottles. As Dunbar stirs, everything in the cabin starts to shake more violently. The rumbling builds to a thunder and the audience begins to shake too. Suddenly aware that his life is in imminent danger, Dunbar rushes outside to find a huge herd of stampeding buffalo bearing down.

This part of the film, at least, isn't your usual Hollywood fabrication. There are numerous testimonials from early fur traders, hide hunters, and pioneers attesting to the sheer physical chaos of a thundering bison herd.† The ground really did shake, apparently for kilometres around. And just like in the movies, an experienced Native scout could put his ear to the ground, listen carefully for a moment, and declare buffalo nearby. Sometimes entire camps and crews of

European hide hunters were obliterated in a tidal wave of brown fur. Such is the power of the pounding of hundreds, if not thousands, of massive hoofs. This is where I'd go if I had a time machine – to the moment and the place of thundering hoofs.

The terminal moments of a great buffalo drive were without parallel in the events of world prehistory. Nowhere else, on any continent at any time, did human beings kill such a staggering amount of food in a single moment. For sheer raw power, unbridled danger, nail-biting suspense, and rampant drama, there may be nothing in the archaeological record that can match the final few seconds of a herd of stampeding buffalo arriving at the edge of a steep cliff. Right there alongside them, standing maybe less than a metre or two away from an out-of-control freight train of biomass, unprotected except for their knowledge of what the animals should do under most circumstances, was a small group of vulnerable, ancient hunters.

Leap of Faith

A dreadful scene of confusion and slaughter then begins, the oldest and strongest animals crush and toss the weaker; the shouts and screams of the excited Indians rise above the roaring of the bulls, the bellowing of the cows, and the piteous moaning of the calves. The dying struggles of so many huge and powerful animals crowded together, create a revolting and terrible scene.
– Henry Youle Hind, 1856–57

It should be obvious that the term *buffalo jump* is a serious misnomer. Bison didn't jump from the cliff into the air. They fell, they stumbled, they sailed, they rolled, they were pushed, but they most certainly did not jump. Still, it's a great name for this type of site and no doubt will be with us for a long time to come. As I noted at the end of the previous chapter, a series of events and circumstance conspired to ensure that the final stretch of the buffalo drive would end in success. The downhill run to the cliff helped hide the existence of the cliff until the last moment and made it especially difficult for the front-heavy animals to turn or stop. A curve in the route of the drive likewise veiled the precipice and kept the animals preoccupied with following the apparent course of escape. But all this trickery and advantage was about to end. The herd was now in full stampede, hunters swarming in from behind, others hazing from the sides.

Imagining Head-Smashed-In



Perhaps the most preposterous depiction of a buffalo jump has a comic book he-man figure about to club a panicking buffaloo over the cliff, while the trusty steed of a moutre hunter prances a mere metre from the precipice. Painting by William R. Leigh. (Courtesy Buffalo Bill Historical Center, Cody, Wyoming; 13.69)

As bison galloped, their heads and shoulder humps rocked up and down, a characteristic of stampeding bison that led early Europeans to compare them, quite appropriately, to the swells of the ocean. A veritable sea of brown hair and ominous black horns rolled toward the cliff like a huge dark wave.

As the final metres flew under hoof, consider this. Bison are wild and intelligent animals. They did not survive millions of years of evolution by being stupid. They emphatically did not willingly or carelessly throw their bodies into the empty abyss that lay waiting one step beyond the shelf of rock. And no matter how many tricks had been played on them, how much they had been deceived, and how well the cliff edge was hidden, eventually they saw it. The leaders of the stampede at some point sensed the imminent danger that lay ahead (and the better designed the jump, the later this happened). If they were so smart, so well adapted to survival, why didn't they stop at the last moment, why didn't they charge into the ranks of frail humans, easily crushing them beneath their hoofs, and run to freedom to live another day?

Ancient hunters had planned and designed everything for this one moment, to ensure there would be no escape. One of the most



The next-most preposterous rendering of a buffalo jump is Alfred Miller's 1837 painting, in which a wave of bison stretching to the horizon pours mindlessly into a gaping chasm in the earth. If these animals were ever to be seen again it would be as hamburger. The mounted hunters are themselves moments away from a deadly plunge. (Courtesy Library and Archives Canada/C-000403)

important things they did was to wait until the very last moment to start the full stampede. As described previously, a mixed herd of bison will only run in a tight group formation for a short distance before some members – old, young, weak, sick, or a few obstinate bulls – start to drop out of the race. Even the most fit, run over a considerable distance, will start to stagger into a line of charging animals, rather than a tight pack. And a pack is what is desired, even necessary, when the herd arrives at the edge of the cliff. It is thought that if a *line* of two hundred bison arrives at the edge of a cliff, you end up killing none of them, but if a *pack* of two hundred arrives, you kill them all. Obviously there is little in the way of actual data to back this up, but the theory is compelling.

Bison herds have recognized leaders (usually females). All the animals know who the leaders are and will turn to them in times of trouble to see what the leaders are doing. If the leaders run, then they all run.[†] European hide hunters quickly recognized this fact and made a point of aiming their long rifles at the leaders first, knowing this would put the rest of the group in disarray, giving the hunters more time to pick off additional animals. Aboriginal hunters wanted the leaders to lead, but they wanted them to guide the entire herd as one unit. Because bison are indeed fast, agile on their feet, and intelligent, hunters knew that when the leaders finally did see the edge of the cliff, they would do everything in their power to avoid it, including crashing through the people stationed along the end of the drive lanes. The only hope of avoiding this stall was to have a great mass of animals arrive at the same time. As the leaders approached the cliff,

[†] In his engagingly written book, *American Bison: A Natural History*, Dale Lott captures the instinct of the bison to run as a group: “Be a bison. A bison cow on the run, adrenaline soaring, heart racing, hooves flying. On the run from what? From whatever the bison all around you are running from. Something scared them, and the voice of your species’ experience tells you that when others run, safety lies in running with them. Being left behind is dangerous; so you run, simultaneously spurred and reassured by the pounding hooves beside you, before you, behind you. Predators can’t come through another bison, so hold your position and run.”

Imagining Head-Smashed-In

There are no living eyewitnesses to describe the sights, sounds, and smells of a herd of bison plunging from a steep cliff. (Courtesy Shayne Tolman)



sensed the danger, and tried to turn, the mass of animals following immediately behind crashed into them, bowled them over, pushed them sideways, forward, rolling, falling. When running as a tight pack, only the leaders saw the danger; the others followed blindly on the tails of those in front. As the leaders tried to stop or turn, it was the crush of those right behind that ensured a wave of bison would go cascading over the edge of the cliff.

Lewis and Clark were among the few European explorers to appreciate this critical aspect of the drive. Describing the final moments of a buffalo jump, as the herd is brought to the brink of the precipice, they noted, "it is then in vain for the foremost to retreat or even to stop; they are pressed on by the hindmost rank, who seeing no danger but from the hunters, goad on those before them till the whole are precipitated and the shore is strewed with their dead bodies."

Everybody should have something that they think about when they turn off the lights at night and stare up at the dim outline of the ceiling. I have often tried to picture the sights, sounds, and smells of a mighty herd of bison plunging from a high rock precipice. The

panic of the leaders as they finally realized the terrible fate in front of them; their frantic efforts to dig their hoofs into the earth, shift their weight, move to the side; the chaos of trailing animals slamming into the sprawling leaders, tumbling over them; the surge of twisted, contorted, bellowing brown bodies plunging from the precipice; the flailing of legs, searching in vain for purchase in the air as animals somersaulted from the precipice; the sickening thud of bodies slamming into the soft earth; the horrible bellowing of those first animals as they were hit again and again by more bison piling on top of them; the mound of thrashing, writhing brown bodies that formed beneath the cliff; the final wave of animals sailing into this mass of moving flesh, bouncing off, tumbling to the sides. It adds up to a pretty heavy night of ceiling staring.[†]

Palliser provides riveting testimony of the final moments of a mass bison kill. Marching with his 1857–60 expedition, he heard in the distance “the bawling and screaming of an immense [Indian] camp, all in a high state of excitement.” Approaching, he discovered the Natives had succeeded in driving (curiously, during the night) a large herd of bison into a wooden pound and were now engaged in the slaughter. “The scene was more repulsive than pleasant or exciting,” he wrote, for into the corral were “crammed more than 100 buffalos, bulls, cows, and calves.”

A great number were already killed, and the live ones were tumbling about furiously over the dead bodies of their companions, and I hardly think the space would have held them all alive without some being on the top of the others, and, in addition, the bottom of the pound was strewn with fragments of carcasses left from former slaughters in the same place.

Confined to the pound, the terrified animals “run round and round violently,” Palliser reported, and noted with curiosity that Natives claim the animals always circled “with the sun,” that is, clockwise (east to west) within the corral. Fifty years earlier Daniel Harmon noted the same curiosity, substantiating it with the assertion that this “I have frequently seen myself.” Palliser then describes how “Indians, even mere boys and young girls,” were stationed on the walls of the corral, “all busy plying bows and arrows, guns and spears, and even knives, to compass the destruction of the buffalo.” Faced with a large kill, one can imagine how hunters ran low on ammunition. Palliser witnessed chilling efforts to retrieve weapons:

[†] Hind must have had some sleepless nights as well. Witness his harrowing account of the final, grisly moments of a bison pound: “A sight most horrible and disgusting broke upon us as we ascended a sand dune overhanging the little dell in which the pound was built. Within a circular fence 120 feet broad, constructed of the trunks of trees, laced with withes together, and braced by outside supports, lay tossed in every conceivable position over two hundred dead buffalo. From old bulls to calves of three months old, animals of every age were huddled together in all the forced attitudes of violent death. Some lay on their backs, with eyes starting from their heads, and tongue thrust out through clotted gore. Others were impaled on the horns of the old and strong bulls. Others again, which had been tossed, were lying with broken backs two and three deep. One little calf hung suspended on the horns of a bull which had impaled it in the wild race round and round the pound.”

Imagining Head-Smashed-In

After firing their arrows they generally succeeded in extracting them again by a noose on the end of a pole, and some had even the pluck to jump into the area and pull them out with their hands; but if an old bull or a cow happened to observe them they had to be very active in getting out again.

At a buffalo jump, the plunge from the cliff is far from the end of the excitement. Once the waterfall of flesh had ceased, a bizarre scene faced the hunters waiting below; a mound of seething brown fur, moving like some giant organic pyramid. Many bison, of course, were dead on impact or crushed to death by those who followed them. But many, especially the later arrivals, survived the fall but were in varying stages of injury: some had broken limbs, some had broken ribs, necks or backs. Some, by the sheer luck of the draw, managed to land and roll in such a way as to avoid injury entirely. The scene below the cliff would truly have been one of controlled chaos. People running frantically around the mound of animals trying to kill the wounded and yet avoid being killed; bison stumbling, rolling, dragging themselves from the pyramid, and the few fortunate ones, dazed and confused, up and running for freedom. All this demanded immediate attention. Wounded bison had to be quickly dispatched to prevent injury to the hunters and so the butchering could begin. Unscathed buffalo had to be chased down and killed. No matter how big the kill, no matter how many animals already lay dead and dying, any survivors had to be pursued and killed.

Paul Kane's beautiful but inaccurate rendering of the final moments of a buffalo pound shows several hunters reclining restfully along the lanes and at the entrance to the pound as the herd thunders past. (Courtesy Royal Ontario Museum)



Overkill?

Nothing of the buffalo was wasted and every possible part was eaten even to the predigested vegetable food from the stomach and the soft inner part of the hoofs. – Regina Flannery, on the Gros Ventre, 1953

The savages wage a merciless war on [the buffalo]; it can be said that they waste a great many. For instance, the Osage leave from one hundred to one hundred and fifty pounds of excellent meat on every carcass. – Victor Tixier, 1840

One of the most frequent public enquiries I deal with has to do with the issue of Aboriginal hunters as the original ecologists. Were they careful stewards of the land and its resources, or wanton exploiters of its resources? Buffalo jumps figure prominently in this debate, because they are sometimes portrayed as examples of great waste on the part of ancient hunters. Surely there must have been times when many more bison were killed than were needed or could be used. When especially large herds were brought to the cliff, was there an effort to reduce the size of the kill, recognizing that not all the animals were needed and leaving some for future kills? Did the hunters try to stop the drive after a great number were already dead or, alternatively, let the survivors of the jump run to freedom? The answers to these questions are complex and require us to look at cultural values and beliefs in a way very different from that in which we are accustomed.

Most of us think of hunting as a matter of choice, that hunters can choose to shoot an animal or choose not to, with the decision hinging on a variety of immediate contingencies. For Aboriginal people living on the Great Plains, hunting wasn't a choice. It was the basis of life. This is why Native hunters went to such extraordinary lengths to orchestrate great communal kills, such as buffalo jumps. Most non-Aboriginal people living in modern society are divorced from actually having to hunt for a living and were raised with Western-based ideas of science and conservation. We are taught to separate the human from the animal and natural world, that humans stand alone at the pinnacle of the chain of life, that humans alone possess great cognitive powers, allowing us to appreciate and understand the world around us. Animals, plants, rocks, and water – the earth itself – lack these cognitive powers. People schooled in this fashion, which includes me, tend to think that this is the way the whole world is, just as we surely

believe that all people on earth see the colour blue in the same way or count from one to ten just as we do.

It is no easy matter to appreciate that people all over the world, and for all time, have found and embraced different ways of perceiving the reality of the universe around them. It is a humbling experience to realize that other cultures have devised their own unique answers and solutions to the puzzles that have challenged humankind: thunder and lightning might be the voice of spirits rather than a discharge of energy; perception of colour can be conditioned by your culture; some natives of the Amazon jungle count one, two, and three, and no further.

The belief system of Aboriginal inhabitants of the Plains differs from that taught by Western science. Rocks, plants, animals, water, earth, and sky belong to one world, along with people. These non-human parts of existence have powers and abilities that are unknown in contemporary western teachings. Rocks, special ones in special places, might have their own power and be revered, respected, and included in the ceremonial world. Animals were viewed as having many of the same abilities as people: they were sentient beings, conscious and perceptive of the world around them, and most importantly, were connected with the spirit world. The survival of people, the success of future hunts, depended on maintaining a sense of harmony with the spirit world. This in turn had many implications for how hunts were conducted and how animals were treated. How many animals were needed at any one time to feed the people? The question is what was the proper way to conduct a hunt so that the spirit world was kept in balance, thus ensuring that future hunting efforts would be successful?

Perhaps the best example of putting these beliefs into practice came at the end of the buffalo jump, when wounded and unscathed animals were attempting to escape. At this moment, in the case of a large kill, the hunters could choose to ignore these surplus animals, letting them live for a future kill. But they did not. Universally across the Plains, bison-hunting cultures made every effort to kill all the animals brought to the trap, be it a jump, pound, or other type of communal kill. They did this regardless of whether or not they had just killed ten, one hundred, or one thousand animals. They didn't do this because they were bloodthirsty or wasteful, even if at times it meant that they could not use all of the slain animals. They did it because

their belief system dictated that it had to be done. To the Plains hunters, bison possessed many of the same attributes as people. Buffalo were aware of the world around them, perceived the behaviour of humans, and recognized patterns of actions and their consequences.

Despite being well aware of their own wanton slaughter, many Europeans roundly condemned Plains Indians for overkill and waste.[†] Yet a few perceived that something more complex was at work. Alexander Henry, on the Plains at the beginning of the nineteenth century, wrote that at the end of the drive, “not one of the whole herd do they allow to escape; large and small, fat and lean, all must fall, to prevent alarming other herds.” On the Plains at about the same time, John Bradbury came across a group of bison skulls that had sage stuffed into the eye sockets and nostrils. When he asked for an explanation, his Native guides told him this was done to “prevent them [the skulls] from apprising the living buffaloes of the danger they run in approaching the neighbourhood.”

Native beliefs about hunting and killing may be best expressed by Thomas Woolsey, who, describing a buffalo pound operation in the mid-1800s, made a critical observation regarding hunters not allowing any animals to escape:

They could easily shoot such as they mean to take and let the rest go off again, but the Indians maintain that if this was done, the same buffalo could never be taken a second time and that they would also make known to others the deception that had been practised upon them.

As I have tried to convey in these pages, a tremendous amount of effort, and spiritual belief, went into planning, organizing, and executing communal kills. And a great amount of trickery and deception was employed in making sure the kill succeeded and that people were unharmed. All the animals brought through the jaws of the trap have now experienced this deception. They had seen how they were repeatedly tricked and, in the belief of the hunters, they were not about to forget it.

All the bison had to be killed because they now knew too much. They knew the secrets of the trap. Survivors would mingle back into other herds and spread the knowledge of how they had been deceived. Future attempts at driving bison to a kill were doomed to failure if survivors were allowed to escape and join up with unsuspecting herds. Plains hunters tried to kill all the animals brought to the jump

[†] Supreme in this regard had to be Edward Harris. He frequently referred to being “ashamed” and that he “regretted” his senseless slaughter of bison, adding that for one hunt “we had no means of carrying home the meat and after cutting out the tongues we wended our way back to camp, completely disgusted with ourselves and with the conduct of all white men who come to this country.” Yet on the way back from that very hunt he joined in another because “the temptation was too strong.” But a callousness developed, and he perked up with the realization that “ere long our consciences became pretty well scar[r]ed and we had no more feeling at the death of a Buffalo Bull than at the demise of a Towhee Bunting, such you know is human nature all the world over.” John Audubon, travelling with Harris, likewise lamented, “What a terrible destruction of life, as it were for nothing, or next to it, as the tongues only were brought in, and the flesh of these fine animals was left to beasts and birds of prey, or to rot on the spots where they fell. The prairies are literally covered with the skulls of the victims.” [emphasis in the original].

because they had to ensure their own future and that of the generations to come, and ensure that bison would continue to be successfully tricked into stampeding to the brink of a cliff. It was not an option, not a decision of conservation or waste; it was the crux of survival. The challenge is to respect the belief systems of people raised and taught in ways vastly different from ourselves and not to judge them by standards as remote from their culture as driving buffalo over a cliff is to ours. The killing continued so that the people themselves could continue.

There are also strictly practical reasons for hunters to kill all the animals at the great communal kills. Wounded, disoriented, enraged bison are not to be taken lightly. They posed a serious threat to men, women, and children stationed at the kill sites. Dispatching the wounded or panicked animals eliminated this threat. The situation during the final moments at a buffalo pound was quite different from those at a jump. Animals are fully contained in a pound, and it would have been impossible for the hunters to venture into the confines of the corral and commence butchering while angry, thrashing buffalo were alive. In 1857 John Palliser noted just this issue when he witnessed the killing of all the bison in a Cree pound, commenting, "The scene was a busy but a bloody one, and has to be carried on until every animal is killed to enable them to get to the meat."

Over thousands of years of communal bison killing, across the entire Great Plains, every conceivable scenario must have transpired. Some efforts to round up and drive bison failed completely. The missionary Robert Rundle watched as several attempts by the Cree to impound bison went wrong, the herds "rushing off in a contrary direction to that of the mouth of the pond [pound]." Sometimes the herd arrived at the cliff or pound entrance, only to break through the drive lanes and ranks of people. Audubon recorded, "It happens sometimes however, that the leader of the herd will be restless at the sight of the precipices, and if the fence is weak will break through it, and all his fellows follow him, and escape." Certainly there must have been times when people stationed along the drive route were trampled, wounded, and killed, and the herds ran to freedom. Sometimes the animals poured over the cliff and a few lucky survivors bounded up and quickly bolted beyond the reach of pedestrian hunters armed with bows and arrows. All these examples of animals escaping would later figure into explanations of why some kill episodes failed. Animals



who knew the secrets of the trap had spread this knowledge to previously inexperienced herds.

European eyewitnesses describe incredible scenes of bison herds escaping from attempted pounds and jumps (for sheer drama, failed buffalo drives must have been just as exciting as successful ones). None of these accounts are more evocative than that by Alexander Henry:

But this method sometimes proves dangerous; for if the leading buffalo, on coming to the edge of the precipice, is not entirely exhausted, she may refuse to make the leap, suddenly turn about, and break through the ranks, followed by the whole herd, carrying before them everything which offers to obstruct their progress. No effort of man suffices to arrest a herd in full career ... and thus lives are sometimes lost, as the natives standing near the precipice, to form the ranks and see the buffalo tumble down, have no time to get out of the way.

To Europeans, such occurrences were proof that conditions were wrong or that Native hunters had made some kind of practical mistake; to Aboriginal hunters, something had gone very wrong in their communion with the spirit world. Likely, the buffalo had become aware of the trap, survivors of previous drives had mingled back

George Catlin's painting of a Mandan village shows buffalo skulls on the roofs of many of the huts, signifying a spiritual connection between people and the buffalo that kept the herds from wandering too far. (Courtesy Smithsonian Institution)

Imagining Head-Smashed-In

into new herds and spread the alarm. So, whenever the killing could be done, it was done. The hunting strategy and belief system of the ancient people of the Plains was clearly a successful one; it supported their way of life for thousands of years without leading to a decline in numbers of bison.

Assertions that any group of people have always acted in a certain way should be regarded with grave suspicion. Plains hunters acted according to the contingencies of the moment: how many people were on hand to drive the game; how many animals were killed; how many mouths there were to feed; how many relatives would visit soon after the kill; what the weather was like; how far camp was; how many hands were available to butcher and transport the spoils of the kill. Certainly there were times when more buffalo were killed than could be used, and masses of food were sometimes left wanting. Many times, every scrap of every carcass was meticulously scrounged, hoarded, and savoured. Some Aboriginal and non-Aboriginal people believe it is a disservice to Native heritage to state that sometimes more bison were killed than were needed. In my opinion, such assertions show a lack of understanding of both the deeply spiritual and profoundly practical world of Aboriginal buffalo hunters of the Plains. It seems to me always a disservice to relegate rational and spiritual people to the status of robots, acting in machine-like fashion without regard to contingencies, deeply held cultural beliefs, and common sense.

The multitude of people who had worked to drive and contain the herd during the final stampede must have rushed to the edge of the cliff to view the results of their efforts. (Courtesy Shayne Tolman)



Drop of Death

Whilst the buffaloes were being driven in, the scene was certainly exciting and picturesque; but the slaughter in the enclosure was more painful than pleasing. – Paul Kane, 1840s

I once had the opportunity to work with an artist who was commissioned by the National Film Board of Canada to paint a series of images that described the operation of a buffalo jump from start to finish. It was a great opportunity for me, as I was able to have all my half-baked ideas about how events transpired fixed forever in a series of illustrations. It's funny how having your theories painted into a scene that is photographed and made into a production seems to lend credence to the story, as if this magically removes ideas from the realm of conjecture and puts them into some higher state of fact. As the artist and I worked through the story, we eventually arrived at the moment when the bison had finished pouring over the cliff. I knew what I wanted the next scene to be. So many times I had placed myself imaginatively at the edge of the cliff during those final dramatic moments and wondered what everyone involved with the drive would do. The answer seemed obvious. We'd all rush to the edge and peer over, to see the spoils of our actions and to watch the second stage of frenetic activity about to begin. So the artist painted a line of hunters staggered along the cliff, looking down on the writhing mass of bodies and the chaotic scene unfolding below.

Steeped in the belief that all bison had to be killed to avoid future failures, the action at the bottom of the cliff would have indeed been frantic. Wounded bison are not something to make light of. They are certainly aware that their lives are at stake and that the time to fight is now or never. While the healthy ones may still use flight as their prime defence, injured ones no longer have this option and will stand and fight to the death. Their massive heads and deadly horns make formidable weapons, so that even a stationary animal must be treated with extreme caution. Hunters probably gave the animals a wide berth, circling around them to loose arrows or hurl long stone-tipped darts into the vulnerable parts of their bodies. Getting an arrow or dart through the thick hide of a buffalo is no easy chore at the best of times (if there was such a thing). In many places the hide is over a centimetre thick, in some places closer to two. Great force and precision are required to place a shaft and stone tip in a spot where

Imagining Head-Smashed-In



Wounded bison were exceedingly dangerous and sometimes took revenge on men and horses. Note the arrow in the lower chest cavity of the bison and the archer aiming another in this vulnerable location. Painting by George Catlin. (Courtesy Bruce Peel Special Collections Library, University of Alberta)

† The difficulty of killing bison is legendary. There are many accounts like that of the Earl of Southesk who relates this story: “I fired both barrels of my gun right at the centre of his forehead. There was no result, no more than if a clod of earth had struck him: the bull continued in the same position, glaring at me with savage eyes; the densely matted hair on his thick skull had completely defied the penetrative force of a smooth-bore.”

it will actually do any serious damage. Many shots could be wasted, hitting animals where the tip simply bounced off bones or where no vital organs lay hidden.† The favoured target was the lower front of the chest cavity, just behind the forelegs. The lungs are situated here, and when they are punctured the buffalo is suddenly unable to hold any breath and suffocates within minutes. Writing in 1840, Victor Tixier recounts how a wounded bison “vomits torrents of blood and falls to its knees before sinking to the ground.”

How many people waited beneath the cliff for the herd to arrive is of course conjecture, just as it is with respect to the numbers involved with the drive. But reason suggests that hundreds would have been present on and around the bench beneath the cliff. Perhaps fifty men in their prime (between 15 and 30 years old) swarmed around the seething mass of bison, firing arrows and darts into those still able to stand or walk. Several hundred women, children, and elders waited in relative safety for the killing to cease and the butchering to begin.

Bison that plunged from the precipice and emerged relatively unscathed were perhaps less dangerous than the wounded, but in many ways they were more troublesome. These were the few, perhaps a dozen or so at each kill, that had landed on top of others, rolled and bounced in a fortuitous manner, and through sheer luck, suddenly found themselves standing at the sides of the pyramid of bodies. Initially disoriented and in shock, the instinct to run would soon have kicked in. Uninjured bison were probably the primary target of the waiting hunters, who knew that seriously wounded animals

would not be going anywhere. As the dazed buffalo began to bolt from the kill site, the hunters knew they posed a serious threat to future hunts.† They must have run after them from many directions, trying to encircle them and prevent a full-blown gallop to freedom. Fifty armed men swarming around the kill site firing a barrage of arrows and darts had a pretty good chance of catching most animals most of the time. But undoubtedly there were times when a few escaped.

As the uninjured were brought under control, attention must have returned to the mound of carcasses. Animals too wounded to stand posed little danger and were likely dispatched with heavy stone clubs, made with grooved mauls tied on to long wooden handles. These were swung hard against the front of the skull, smashing in the bones and exposing the brain cavity – not only to kill the wounded beasts, but also to allow access to the brain, an organ much desired for the subsequent chore of tanning hides. Skulls are poorly preserved at Head-Smashed-In and are also conspicuously rare, but other buffalo jumps on the northern Plains clearly show this pattern of smashing in the skulls.

Many of the injured would pose a serious threat. Some would have been standing but, wracked with broken bones or internal injuries, would be unable to move. Others would have been capable of short movement, head-swinging, and kicking. All of these were probably killed from a distance, peppered with arrows or darts until they fell.

Eventually the great slaughter was over. The bodies of one hundred, two hundred, or more bison lay mounded up beneath the shadow of the jump. A few dozen others lay as dark spots scattered on the golden prairie, crumpled where they made their final stand. The dust from the thundering stampede and from the subsequent flurry of killing probably still hung in the air, swirling in the vortex of the cliff and then slowly drifting out over the plains. Blood, a rusty crimson colour, flowed into the dark earth, turning the slope into a sticky, soggy mess. Imagine the smells in the after moments of a great bison kill: the dank, churned earth; the pungent hide and hair; the stench of vomit and feces that erupted from the dying; the faint metallic smell of blood and death. I wonder if there might have been an eerie silence, at least for a few moments as the final buffalo expired. But I suspect this was short lived and was followed quickly by shouts, cheers, whoops, and the celebratory exclamations of people who know they have ensured their survival, at least until the next great herd is brought to the jump.

† While most accounts agree with Edwin James that the efforts of the buffalo “are to the last directed solely towards an escape from their pursuers,” there are many harrowing accounts of bison fighting to the end. John Audubon reports that hunters are sometimes “trampled and gored to death” by wounded, enraged bison. Peter Fidler, in 1793, likewise asserts that bison “will run their horns into the Horse & kill it upon the spot” and that hunters are occasionally killed. Incredibly, Fidler recounts how some Native hunters “narrowly escape ... by springing astride upon the animals back & there remaining until he either kills it with a knife, or until it is quite fatigued, when he jumps off and runs away as fast as possible.”

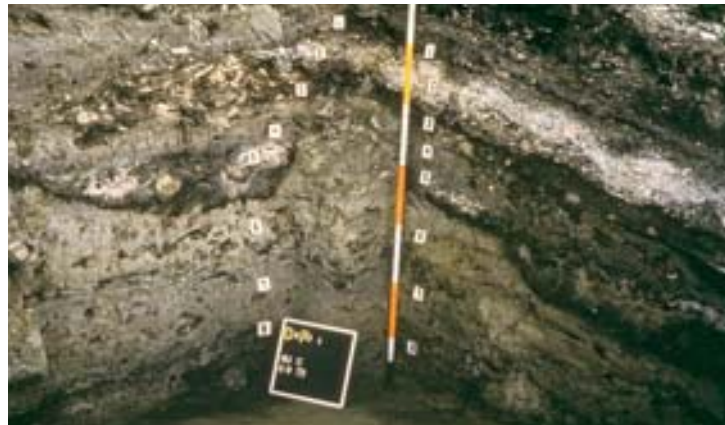
Bones on Fire

The surrounding country is all on fire. – Daniel Harmon, 1804

There is a curious thing found at many of the buffalo jumps across western North America. For reasons still puzzled over by archaeologists, many of the layers of bones found at these sites have been burned. As you excavate down through successively deeper and older layers of buffalo bones beneath the cliff, the thick deposits of bones show clear evidence of having been burned. Sometimes the bones are charred a deep black colour. Sometimes they are so completely fired that they become almost pure white – what archaeologists call calcined. Heavily burned layers of bones are found at Head-Smashed-In and at the nearby Calderwood jump and many other mass kill sites. It is not true of all jumps, or of all layers at each jump, but it shows up enough to raise suspicion and generate questions.

There are two possible explanations. First, the bones may have been fired during the course of natural prairie fires. Wild fires were a constant part of the natural and cultural environment of the Plains. Raging prairie fires were lit by lightning, by campfires out of control, and also intentionally by Native people for a wide variety of reasons that had to do with sensible management of their environment. Undoubtedly, over the six-thousand-year history of Head-Smashed-In, fires swept across the landscape countless times.

Most of these prairie fires don't generate a great deal of heat. The wind whips the fire through the grassland at great speeds. The grass cover burns down to the stalks, essentially the end of available fuel,



Excavations by Brian Reeves at the Head-Smashed-In kill site revealed prominent white layers of burned bone in the walls. (Courtesy Brian Reeves)

and the fire moves on. Very little heat penetrates the ground. Even objects lying on the ground, such as bones, would not reach very high temperature during a prairie fire. Certainly, prairie fires were horrific for the animals roaming the Plains, yet it seems unlikely that a fire sweeping across the Plains could cause bones to combust and burn.

But the bone layers at Head-Smashed-In are not out on the open prairies. They are nestled up against the lee side of a high cliff, protected from the wind. The grass here is tall and luxurious, watered by the abundant seeps and springs that flow through the sandstone bedrock. The same water and protection has fostered a rich growth of Saskatoon berry bushes and other brush beneath the cliff. A fire here, especially in the dryness of autumn, might burn hotter and for much longer. Would it be enough to cause the fresh, greasy bones of a recent kill event to burn? No one knows. Certainly with bits of bison hair lying around, and the spilled contents of the guts and splattered fat, it might be ripe for catching fire.

There is a second possibility. The sheer frequency of burned bone layers at buffalo jumps suggests deliberate activity by human beings. Might fires have been intentionally lit and, if so, what was the purpose? The theory goes that the organic and grease-rich layers of a recently abandoned jump might have been purposely torched by the hunters just as they were preparing to depart the site. The reason behind this has to do with the overwhelming stench that must have emanated from any buffalo jump. Unless a jump was used in mid-winter, within days the whole kill site would become a putrid pool of decaying buffalo parts. The stomach contents and guts of a hundred or more animals had been emptied into the dirt. Tufts of hair and bits of skin were everywhere. And, of course, thousands of discarded bones lay scattered around.

Bones may not look like very useful fuel for a fire, but they are chock full of grease and fat. Grease, as we all know, is highly flammable when brought near a fire. Although it was by no means a preferred fuel, there are numerous accounts of Aboriginal people burning buffalo bones as a source of heat, especially in emergency situations.[†] Bones, rich in fat and with chunks of meat still clinging to them, would have begun to putrefy soon after the butchering commenced, adding to the stench of the kill site.

So what's the big deal about a stinky site? It's hard to imagine that ancient hunters were especially sensitive to it; after all, they lived

[†] Camped on the open prairie, Maximilian, Prince of Wied, wrote, "There was no wood at all; but we threw fat and marrow-bones into the fire, by way of fuel." And for the Plains Cree, Mandelbaum reports, "On wet days a buffalo skull was smeared with grease and set afire. The skull kept an even heat for a long time."

† Once again, the literature helps inspire the imagination. In 1793 Peter Fidler passed a used bison pound said to contain the remains of 250 buffalo: “When the Wind happened to blow from the Pound in the direction of the Tents, there was an intollerable stench of the great number of putrified carcasses, &c. on which account the reason of our leaving it.” Some sixty years later, Hind graphically described the residue of a Cree pound: “It is needless to say that the odour was overpowering, and millions of large blue flesh flies, humming and buzzing over the putrefying bodies was not the least disgusting part of the spectacle.”

‡ The Assiniboine were known to leave special openings in the pound walls to allow dogs in to help clean up the mess. George Catlin reported an unbelievable one thousand dogs were on hand to clean up the carcasses at a bison pound.

their entire lives surrounded by the spoils of butchered animals that fed, clothed, and housed them. Archaeologists doubt that bison kill sites were torched because the noses of the hunters were offended. Rather, it has everything to do with cleaning up the site so that it might be used again in the near future.

The stench that comes from one or two massive putrid carcasses on the prairies is bad enough. The stench of dozens, possibly hundreds, of buffalo in a smallish space is unimaginable.† More important than the sheer number is the clumped effect of a mass kill. A single carcass on the prairie will be cleaned up in short order by wind, rain, sun, insects, birds, and coyotes. Within a few weeks there will be little left. But the remains of a hundred carcasses packed close together, especially in a protected area, such as the lee side of a tall cliff or the confines of a wooden pound, produce a cumulative effect that the elements and scavengers can't clean up as efficiently.‡ Body parts, hair, and guts will remain hidden, rotting, for months if not years. This probably won't win us many admirers, but archaeologists have actually studied this phenomenon, charting the long-term decay of massed carcasses killed in catastrophic events (such as drownings or lightning strikes). I'm almost embarrassed to admit that we know of what we speak.

Given that a mass kill site will continue to steep in its own fetid remains for months, possibly years, it is reasonable to speculate what effect this might have on future attempts to use the jump. True, the wind typically blows over the jump and across the mass kill, keeping the smell from swirling back into the gathering basin. But the wind doesn't always blow from this direction; sometimes it is just the opposite, coming from the east over the kill and blowing directly into the basin. Of course no Native group would attempt a buffalo drive on such a day, but imagine the effect it might have on herds grazing behind the jump. Likely it would cause herds to flee the area, abandoning precisely the ground where Native people want them for the next hunt.

Henry Youle Hind might have been alluding to this fact when in 1857 he noted that the Cree were constructing a new pound, having abandoned the old one “on account of the stench which arose from the putrefying bodies.” I suspect that it was not the effect of the stench on the hunters that caused the Cree to move, but, rather, their knowledge that no more herds could be driven into the rank old one.



Two matching lower leg bones from a bison show heavy charring at one end but not the other. Presumably one end of the legs had been placed in a fire. (Courtesy Royal Alberta Museum)

At the Gull Lake bison kill site in Saskatchewan, the excavator Tom Kehoe observed a repeating pattern of heavily burned layers of buffalo bones capped by unburned layers, which in turn were overlain by deposits of soil without any bone in it. Kehoe advanced the reasonable hypothesis that the burned layers had been torched by hunters because they knew they would return soon for another kill, and the overlying unburned bones were the residue of their second kill. That the upper layer of bones was not burned was explained by arguing that the hunters intended to abandon this site and move elsewhere in their territory for a period of time, thus removing the need to go through the laborious process of torching the kill site. The overlying deposits of soil lacking any bone conform to the idea that the site was unused for an extended time.

The problem with a burned layer of bones at a buffalo jump is that there is ample evidence of burning but none to inform us of what lit the fire. We can't, so to speak, identify the smoking gun. We can only state with certainty that a high proportion of jumps and other mass kills exhibit deposits of bone that have been fired. It is possible that the grease-rich ground and thicker grass cover of the kill site caused a natural fire to burn more intensely, causing even the discarded bones to ignite. But more reasonable is the likelihood that Aboriginal

hunters lit the whole hillside on fire, as they left the site. By starting an intentional fire, they could manage it by first lighting the grass and brush cover, then throwing bones into an already roaring fire. Our experiments in my field camp, discussed later, indicate that it is exceedingly difficult to simply light bones on fire, but toss them into an existing fire and they burn quite well. I suspect that this is what the users of Head-Smashed-In and other jumps did, and they did it in order to ensure that the site would be ready for use the next time that people came in search of the buffalo.

Let the Butchering Begin

The process of cutting up a dead Buffalo would rather astonish our butchers.
– Edward Harris, 1840s

All that had happened up to this point in our story wasn't so much the result of hard work as it was a careful application of craftsmanship and ingenuity. True, the buffalo runners had a strenuous job, and pursuit of escaping bison must have been an intense and often frustrating chore. But these tasks pale in comparison to that which lay ahead. As the several hundred people gathered once again as a single group, they would have gazed upon a mountain of brown carcasses with a certain amount of melancholy, knowing that the really hard work was still to come. At times, when a great number of animals had been killed, their butchering duties must have seemed overwhelming. For the mountain of flesh, bones, and hide that lay in a steaming pile had to be transformed into products not only usable but, most importantly, storable.

If an average kill consisted of about one hundred cows (and a few bulls), each weighing some 450 kilograms (990 pounds), and a mix of another fifty calves and juveniles with an average weight of 250 kilograms (550 pounds), the vast heap of carcasses would weigh in at about 60,000 kilograms (132,000 thousand pounds). That's about the weight of one and a half bowhead whales. Put another way, picture twenty-five full-sized pickup trucks in a tangled pile beneath the cliff. Some kills involved more than one hundred and fifty bison, some less. But whatever the total, there was a staggering amount of animal products. How would you even begin to go about disentangling and processing this enormous bulk?

Think of an assembly line. We are familiar with the meaning from our own culture, and the term denotes order, system, control, and process. At first blush it doesn't seem to be the kind of image we conjure up of ancient hunters faced with a throng of dead animals. If a movie was ever made of the event, the butchering would certainly be pictured as a primitive and bloodthirsty feeding frenzy – an orgy of gluttony as hunters swarmed over the mound, ripping bodies open, consuming still-beating organs, drenching themselves in blood.† It might make good cinema, but it wouldn't make any sense.

Of course there was some celebratory snacking just after the kill. People needed strength and nourishment in the aftermath of their efforts. Indeed fresh organs were among the choice pieces; they are, after all, loaded with nutrition. Most commonly mentioned as items consumed immediately, meaning raw, are the liver, kidney, stomach, heart, lungs, and marrow from the massive leg bones. "A hearty meal," Edwin Denig reported for the Assiniboine, included consumption of raw cow's nose. Colonel Richard Dodge reports, with his usual flair, that the lucky hunter "betakes himself to what is to him a most perfect repast. The smaller entrails go first, but he is not satisfied until bowels, stomach, liver, and not unfrequently, heart and lungs have all disappeared before his astounding appetite." While most immediate post-kill snacking was to satisfy hunger and provide quick energy, some was based on the practicalities of avoiding spoilage. As Buffalo Bird Woman told Wilson, the kidneys were eaten immediately "and while still warm, as they soon spoiled; indeed, they could hardly be kept over night."

These treats would have been a brief moment of indulgence, satisfying some initial cravings but contributing little to the overall need to render the mound of carcasses. That would come only with a concerted effort by all the people acting in an orderly, systematic fashion and driven by a single purpose – to get the most food and by-products from the heap of carcasses before it was too late, before the whole hillside turned into a stinking, rotting, putrid mess. An assembly line may be a concept of our industrial society, but I am convinced that it is also an apt description of what took place beneath the cliffs of Head-Smashed-In many thousands of years ago.

It is important to remember that buffalo jumps are communal kills. Hundreds of people came together to make these events a success. In our society, hunting is a highly individualistic activity. People

† No doubt the film-makers would seize upon descriptions such as Alexander Henry's: "Here I observed the filthy manners of these people in feasting on the raw entrails of buffalo. The paunch, livers, kidneys, fat, testicles, gristle, marrow-bones, and several other pieces, they hand about and devour like famished wolves, whilst blood and dung stream down from their mouths; it was disgusting to see them." They would likely ignore Lewis and Clark's description of their own men feeding on raw animal parts "which we are accustomed to look with disgust... one of [the men] who had seized about nine feet of the entrails was chewing at one end, while with his hand he was diligently clearing his way by discharging the contents at the other."

† The situation was somewhat different for solitary kills and those made by small groups of people. In these situations, individuals were more closely identified with specific carcasses. We know, for example, that arrows were often marked with personal designs. Yet even under these circumstances there was strong social pressure to share food. All families knew that their success one day might be matched by that of another family in days to come.

may go out with a few friends, but ultimately it comes down to a single hunter framing an animal in the crosshairs of his scope and pulling the trigger. *Mano-a-mano* is part of the appeal. It is an epic battle between the stalker and the stalked, and when it is over, individual credit and ownership are paramount. Credit for the kill is a matter of intense personal pride, having strong implications for who is entitled to what parts of the animal and also who does the work (or pays the costs) of butchering and transporting the carcass. If you shot the animal, these matters are your responsibility.

But there is no yours or mine at a buffalo jump. Hundreds of people collectively found the distant herds, tricked them into the drive lanes, stampeded them to the cliff, killed them below the jump, and butchered the remains. There is no individual stamp on any carcass, no crosshairs, no silver bullet. Communally they were rounded up and killed; collectively they were butchered and distributed. Given the extraordinary co-operative social organization that had to exist for the jump to take place, it would be absurd to think of the spoils as individual property, as if people could sort through the hundreds of carcasses and somehow say they were more responsible for the death of certain animals.†

Plains Aboriginal societies were known to be generally egalitarian in nature, meaning simply that there was equality between people. Things were shared, and no one person or group had some inherited or Creator-given right to more or less than anyone else. The buffalo carcasses piled at the base of the jump belonged to everyone. And everyone had to pitch in to turn them into usable food and materials for the good of the entire group.

There were some inequities. Various tribes had their own traditions of rewarding key people. Grinnell informs us that the Blackfoot divided up the results of the kill “among the people,” but that “the chiefs and the leading warrior [received] the best and fattest animals.” An Assiniboine informant to Robert Lowie reported that the buffalo runners received the fattest animals, and Henry (the elder) said that chiefs were given the tongues. There were acts of great generosity and magnanimity, with reciprocal expectations attached. Henry (the younger) wrote that Cree pound masters (ceremonial leaders of the event) partitioned out the spoils of the kill to all the people and “gives each tent an equal share, reserving nothing for himself. But in the end he is always the best provided for; everyone is obliged to send

him a certain portion." If a family was unhappy with the share they received, the fluid nature of Plains culture provided a simple solution: "no one will complain," eyewitness Daniel Harmon records, but "should any be displeased with their share, they will decamp, and go and join another party."

In thinking about how the butchering must have been done, it seems reasonable to believe that there must have been an ordered system to dismembering the spoils of the kill. Random, idiosyncratic behaviour of individuals simply doing as they please just doesn't make sense. There are both biological and social imperatives that argue for the application of a common system to the butchering of the buffalo carcasses: biological in that there are critical attributes of fresh-killed animals that must be recognized and acted upon, social in that people shared a common goal of maximizing the return of their efforts. The two imperatives merged to suggest a method to the madness of butchering a mountain of slaughtered beasts.

A mound of a hundred or more dead animals must have been a staggering sight to behold. Just moments before, these buffalo had been grazing in the gathering basin, ingesting and ruminating, perhaps drinking from a local pond or stream. Although they are dead, not much has really changed. This may sound implausible, but think for a moment: their hearts have stopped beating and blood is no longer flowing through their veins, but other than that, little has changed. Their bodies are still composed of meat, fat, organs, bone, and hide. Their stomachs are still full of the last meal of grass, their intestines packed with digested food, their body temperature unchanged from just moments before. Adding to that, something we can call the "pyramid effect" (the fact that the bodies are piled in one great mound) creates a whole different set of biological relationships than would have been had the carcasses been strewn over a wide area. The most important of these relationships involves heat.

Bison Hide as Insulator

The skin is in some places of incredible thickness, particularly about the neck, where it often exceeds an inch. – Samuel Hearne, 1772

The body temperature of living bison is much like our own, about 37° C (98.6° F). But we, most decidedly, are thin skinned. When we die, our body temperature begins to decline rapidly, because (unless

† There are a number of chilling accounts of buffalo hunters, Indians and whites alike, surviving savage winter storms by gutting out bison carcasses and crawling into the protective hide covering (though they later faced the unpleasant task of trying to pry their way out of the frozen shell). Humans were not alone in seeking refuge inside a bison. John Audubon wrote of a Native hunter who approached a buffalo carcass only to discover, to his dismay, an angry grizzly bear hunkered down inside.

we are wearing a winter parka) there is little in the way of insulation to retain our body heat. Not so with bison. They have dense coats of hair and extremely thick hides that act as astonishing insulators.† A series of somewhat bizarre experiments were conducted at Elk Island National Park, where calves of several large mammals were put in a specially designed refrigeration chamber. The tests included yak, bison, and Scottish Highland cattle – all considered cold-adapted species – and Hereford cattle. Temperature in the chamber was lowered to -30° C (-22° F) and the metabolic response of each animal was measured. All but the bison showed a marked increase in metabolic activity; that is, subjected to extreme cold, they increased their metabolism to burn more energy in an effort to raise body temperature. We humans would do the same. Not bison. Incredibly, subjected to -30° C temperatures, buffalo showed a lowering of metabolism. As it got colder, bison slowed their metabolic rate.

What this tells us is that bison are supremely adapted to cold weather. They have evolved over countless millennia to save, rather than burn up, their body energy reserves. Animals that increase their metabolism to fight off a sudden cold spell are trying to get through the moment, hoping for better times to come; bison, by lowering their metabolism, illustrate an evolutionary adaptation to the inevitability of future cold spells, saving critical body reserves for the many difficult times that still lie ahead. It is an approach to life on the rugged Great Plains that has served the bison well since time immemorial. And it relates directly to how and why ancient Aboriginal hunters went about butchering the mound of flesh in the manner they did.

Here's an obscure fact to impress friends at cocktail parties: bison have about ten times more hair per square inch of hide than do modern cattle. Bison hair is thinner than that of cattle, but is much denser. The thick hide combined with this dense coat of hair makes bison an insulating machine engineered over millennia of evolution to conserve heat. Another research project at Elk Island National Park dramatically illustrated the insulating properties of bison hide. One of the wildlife biologists, Wes Olson, was using infrared (heat sensitive) equipment while doing an aerial census of park animals. It was winter, with sub-zero temperatures and fresh snow, and Wes was picking up the heat signals of moose and elk. But he hardly found any bison, despite a large herd resident in the park. He noticed, however, that the infrared screen was showing some amorphous, faint crescents



A bison's hide is such an effective insulator that it is common to see snow build up on the animals – not enough heat escapes the hide and dense hair to melt the snow. (Courtesy Johane Janelle.)

of heat. When he re-inspected these spots, he discovered they were bison lying in the snow. Their exposed bellies, the only parts, not covered with hair, were causing the faint crescent signals. The rest of the animal was not letting out enough heat to be detected by the infrared equipment.

Importantly for our story, none of the evolutionary characteristics of an insulating hide abandoned the buffalo as they lay dead

on the slopes beneath Head-Smashed-In. The carcasses on the outer portion of the mound would have been exposed to the cool air of the season, but, even then, their amazing insulating properties would have prevented much heat loss. Those buried under the bodies of their colleagues would have been completely sheltered from any cooling effects and probably would have experienced virtually no loss of heat over the hours and even days that followed. The importance of this is that, as we all know, heat spoils food.

Lacking refrigeration, in the aftermath of the kill hunters faced a serious biological imperative. The mound of carcasses had to be fully butchered and processed into usable food in short order or else become waste through spoilage. If a great majority of the food supply were allowed to waste, the tremendous effort that went into orchestrating the kill would have been in vain. The pressing need was to counteract the awesome insulating properties of the bison hide.

I once witnessed first hand the remarkable insulating qualities of bison hide, only in a reverse kind of way – keeping the cold in. We were filming a movie that was to be shown inside the new interpretive centre at Head-Smashed-In and needed some dead bison. We had a frozen bison carcass delivered to us in a Budget rent-a-truck. It was September: gorgeous fall days of warm daytime sun and cool evenings. For five days we filmed with this animal, tossing it over the cliff, hauling it back up for an encore. At the end of the shoot it lay on the grass beneath the cliff, of no further use to the crew. A young Piikani man, Willy Big Bull, asked me if he could take the head. He was going to have it mounted.

We walked up the slope together, Willy armed with a large axe. Willy was a big, powerful man, muscular, and a black belt karate instructor. He took a mighty swing with the axe and struck the neck of the bison. Though this happened several decades ago, the image is still vivid. The axe hit the neck and stopped; it just stopped. The handle of the axe shuddered in Willy's hands, and he let go of his grasp, shaking his hands in pain. The sharp metal bit had penetrated the hide maybe a centimetre. Despite lying out five days in fine fall weather, the hide had insulated the carcass such that it was still nearly completely frozen. Willy wedged the axe free from the carcass, and we headed back down the slope together. There would be no more swings of the axe that evening.



The first order of business was probably cutting the hide off dead bison, to allow heat from the carcass to escape. (Courtesy Shayne Tolman)

Back to the Assembly Line

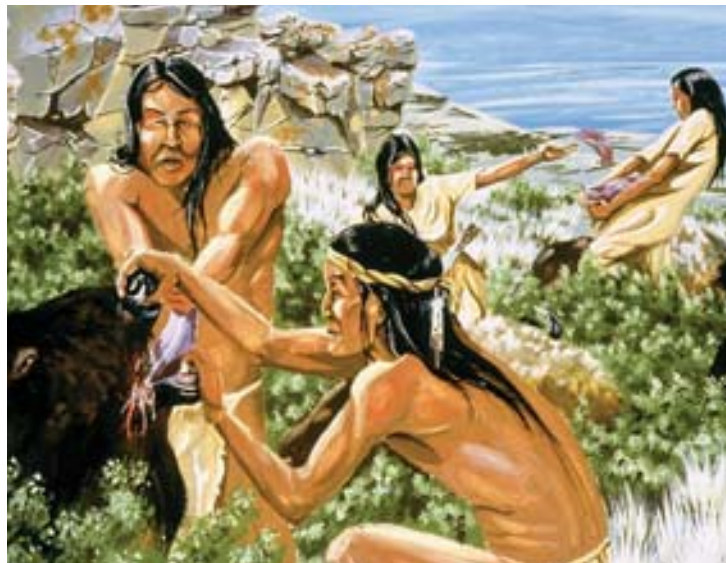
Willy Big Bull failed because the insulating properties of the hide and the dense coat of hair prevented the cold from coming out of the buffalo carcass. Conversely, ancient hunters needed to let the heat out from the bodies of the dead bison. This is why we think that they went about it in assembly-line fashion. If your approach to the task was to select one carcass at a time and butcher it completely, you would be spending a great deal of time doing a thorough job on a few carcasses, while others waited untouched. Those in the waiting queue sat stewing in their internal body heat, the hide and coat of hair ensuring that this heat escaped only ever so slowly.

A lot of internal body heat comes from the acids in your stomach, reacting with the food you eat, producing the heat that keeps us alive and warm. The dead bison at the base of the buffalo jump had not long before been grazing on the fine grasses of the gathering basin. The digestion of these grasses by stomach acids continued to produce heat long after the animals were dead, so to avoid losing a great deal of the catch through spoilage, the primary goal would be to stop the production of heat from within the bison carcasses and to release as much of the internal heat as possible. When bison hunting in the 1800s, Colonel Richard Dodge recognized, "These animals spoil very quickly if not disembowelled."

Imagining Head-Smashed-In

From a balloon hovering above, the scene at the base of the sandstone escarpment probably looked much like an anthill, with small hunters clamouring on and around the mound of massive carcasses. If our suspicions are correct, the first order of business would have been to pull that mound apart, separating the bodies so they could begin to cool down. Bison are much too heavy to drag very far, so hunters would have worked first on those near the edge of the kill. Breaking the peripheral animals into more easily moved parts made space for the next batch of carcasses to be pulled from the pile.

Of the animals that could be butchered first, we suspect that the priority was, again, to cool down each individual carcass. The best way to do this was to get the hide, that powerful insulator, off the body. Using sharp stone knives and the points of spears and arrows, the hide was cut through and peeled away from the underlying fat and meat. The naked bodies, streaked red and yellow from bloody meat and grizzled fat, were left on the splayed hides to keep the meat clean. Then the stomach cavity was cut open and the steamy contents spilled out onto the grassy slope. At this point, fresh, cool air could circulate around the outside of the flesh and through the inside of the chest cavity. These two steps, removing the hide and emptying the stomach, were most crucial in cooling down the carcasses, ensuring that the greatest possible amount of food was saved for future use.



Tongues, the most esteemed part of the buffalo, were invariably removed early in the butchering process. (Courtesy Shayne Tolman)

Once a group of animals was exposed in this manner, the hunters probably returned to the kill pile to begin the same procedures with the next batch. Another group must have started butchering the exposed carcasses. Teams of people worked together, the chores being too strenuous and the parts too heavy for individuals. The prized ribs were chopped off with heavy stone axes. Huge legs were disarticulated at the joints. The massive head was severed and pushed aside. As the carcasses dwindled in size they became more manageable and could be rolled over. The pronounced hump of bison, formed by elongated spines of thoracic vertebrae, is composed of a delicious mix of meat and fat and was one of the most sought after parts of the animal. These were chopped off at the base of the vertebrae. Internal organs and the great balls of precious fat that surround them were sliced from the body cavity, some of them to be consumed immediately. Most importantly, the bluish-black tongue – the single most esteemed part of a bison carcass – was severed from within the jaws.[†] Tongues were so highly regarded that they were often saved for special post-hunt ceremonies and were presented as a sign of respect to revered elders and to those most responsible for the success of the hunt (ceremonial specialists, buffalo runners).

That Natives were highly skilled in the task of dismembering the game is to be expected. Edwin James observed, “In the operation of butchering, a considerable knowledge of the anatomical structure of the animal is exhibited, in laying open the muscles properly, and extending them out into the widest and most entire surfaces, by a judicious dissection.” Father Lewis Hennepin witnessed buffalo butchering in the 1600s, before metal tools were widely available: “It was no small matter of Admiration to see these Savages flea [flay] the Bull, and get it in pieces; they had neither Knives nor Hatchets ... and yet did it dexterously with the Point of their Arrows.” There are numerous accounts from European visitors to the Plains of the details of cutting up a buffalo carcass. A succinct version comes from Daniel Harmon:

The Natives generally cut up the body of an animal into eleven pieces, to prepare it for transportation to their tents, or to our forts. These pieces are the four limbs, the two sides of ribs, the two sinews on each side of the back bone, the brisket, the croup, and the back bone. Besides these, they save and use the tongue, heart, liver, paunch, and some part of the entrails. The head, they carry home, the meat which is on it they eat; and the brains they rub over the skin, in dressing it.

[†] The muscle tissue of the tongue is composed of about 20 per cent fat, far more than any other piece of meat in a bison carcass. Accordingly, Natives and non-Natives alike regarded it as the choicest piece of the buffalo. Palliser waxed eloquent on its savoury nature: “Well do I remember how these tongues addressed themselves to the feelings of us hungry hunters ... They sent forth an appeal more eloquent than the language of a Demosthenes; true the tongues were silent, but they were fat! When well boiled they are delicious, the rind then peels off, and they become tender, plump, and juicy.” Josiah Gregg was more concise: “But what the tail of the beaver is to the trapper, the tongue of the buffalo is to the hunter.” Samuel Hearne astutely observed, “What is most extraordinary, when the beasts are in the poorest state, which happens regularly at certain seasons, their tongues are then very fat and fine.” This explains many of the historic accounts of kills where the tongue alone was taken.

Imagining Head-Smashed-In

Slowly, methodically, the buffalo carcasses were taken apart. The hunters must have been a sight. Hands, arms, legs, and feet caked in sticky blood and slippery grease. There would hardly be any point in washing up; the race against spoilage dictated plunging immediately into the next available carcass. And so the work continued, probably around the clock, as much as the light from fires would permit. Like flesh-eating beetles, ancient hunters swarmed over the mass of hide and flesh, gradually picking the kill apart, spreading it further to the sides, reducing great carcasses to manageably sized portions. As the pieces piled up on the fresh hides, it was time for the operation to move to the next phase of work, and to a whole new place. It was time for the work to shift to the great camp that lay waiting on the immense prairie below the buffalo jump.