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Keynote Address

A Brief History of Human/Predator Conflicts and Potent Lessons

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Abstract: From the outset, humans evolved with severe conflict with wildlife, but which they mastered with great ingenuity. We are the only primate that can exist on the ground with large predators, day and night, and are not dependent on climbing trees or cliffs for security. Consequently, we regressed in climbing adaptations and body strength. Without that mastery over predators, there would have been no human evolution. This mastery led to a transfer of resources from predators and competitors to our self, followed very early by dispersal out of Africa into Europa and Asia. The archaeological record keeps hinting at predator-free conditions. At the end of the last glaciation, megafaunal extinctions generated new challenges for humans, as the virtual absence of mega-herbivores profoundly changed the ecosystems, as fires replaced herbivores in consuming vegetation. Also, wolves escaped extinction, but not their enemies and competitors. Consequently, since the natural limitations on their numbers had been diminished, wolves had to be controlled, and native people rose to the task. Only in societies with disarmed citizens were wolves a menace, and legislation that frees wolves from human control eventually recreates that very menace. North America's Pleistocene native wildlife survived under extremes in predation, such as was not experienced in Eurasia or Africa. Consequently, our native wildlife being quick and accurate learners, readily habituates and are very good at taking advantage of us. Problem wildlife may be created by humans' irrational wishes that conflict with the biology of a species. This is well illustrated by current efforts at wolf conservation here and in Europe, where the unintended consequence is the assured destruction of the wolf as a species.

Key Words: anthropology, *Canis lupus*, conservation, human evolution, human safety, North America, predation, predator control, wolves

PREDATION AND HUMAN ORIGINS

Humans, from the outset, had a profound relationship with predators. We evolved the ability to survive, day and night, on the ground in the absence of trees, despite being surrounded by large predators (Geist 1978). We are the only primate to do so. How does a day-active ape, with a weak musculature (Bozek et al. 2014) and regressed climbing abilities (Oxnard 1975), with poor to mediocre night vision, incapable of hard biting (Zink and Lieberman 2016), disarmed and harmless, a fat and historically tasty morsel for predators (Hart and Sussman 2009), survive on the ground with many night-active predators? And survive night after night for decades, despite menstruation, births, the crying of babies, snoring, or the scent of wounds acquired accidentally in the course of daily activity? And predators *do* zero in on wounds! How did we evolved long hours of deep sleep? And what does one do when meeting predators during daylight where there are no trees to climb? What did we do to survive and thrive, that hundreds of primate species failed to achieve in millions of years, in so gigantic a continent as Africa? Moreover, there were more than twice as many large predator species in African then as there are today (Trevor and Palmqvist 2007). Finding ways to reliably escape large predators on the ground, night and day, was thus the crucial first step in human evolution.

Some 2 million years later, we still pay close attention to predators and we do so for a good reason, because during our pre-human history we evolved as prey (Kortland 1980, Geist 1989, 2008). As a field biologist, I have always taken for granted that humans were potential prey (Geist 1978). Recently, it appears that anthropologists have now also focused humans as prey (Hart and Sussman 2009). However, their emphasis on our tree-bound relatives is not terribly relevant, as humans did not evolve like primates, but like large terrestrial herbivores.

It was our ancient fate to be killed and eaten and our primary goal to escape such. It still is, and our brain still allows fear to take control in threatening situations, diminishing rational decisions (Johnson 2003). And predation is terrifying, and not only to humans (Patterson 2004, Zanette et al. 2011). Evolutionary psychologists have made a good case that we are pretty well hard-wired to identify and interpret predators, beginning at an age at which we have barely learned to speak. John Vaillant, in his excellent book *The Tiger* (Vaillant 2010), in which he attempts to come to grips with our relationship to large predators, reviews the work of Richard Coss and Clark Barrett with children and their recognition of predators (see Penkunas and Coss 2013, Barrett 2015). At a very early age we develop remarkable abilities to distinguish between friend and foe, based on

seeing but a fraction of either. Joshua New and colleagues discovered that our visual monitoring system is markedly biased towards noticing animals, as opposed to cars or wheelbarrows (New et al. 2007). Spotting danger early was at a premium in our ability to avoid predators systematically, day in and day out. Millions of years as prey can leave such an innate residue or atavism, which includes among others a justified fear of darkness Packer et al. 2011).

However, we did more than merely survive. Right after our appearance, we dispersed beyond Africa deep in to Europe (Lordkipanidze et al. 2013, Coulthard et al. 2013) and Asia (Hazarika 2007), predators notwithstanding. We conquered two continents virtually at once. And we began to alter the biota around us. The giant tortoises of Africa now disappeared (Schüle 1990). As Lars Werdelin showed (Tollefson 2012, Werdelin 2013, Werdelin and Lewis 2013), the medium-sized omnivorous/piscivorous carnivores disappeared with the appearance of *Homo erectus*. That is, we quite likely wiped out the midsection of the African predator guild, leaving only the small and the large predators. Soon to follow were our competitors, the giant baboons of which find butchered remains (Shipman et al. 1981), and the robust *Australopithecus*. African biodiversity declines from then on (McKee 2001). *Homo erectus* is notoriously associated with proboscidians (Ben-Dor et al. 2011). And of the many species of such, only two survived. In the process of becoming human, we did much more than turn the table on carnivores. A fundamentally new life-form had appeared.

The process of becoming human entailed changing adaptations from those of the treed savanna to those of the treeless steppe. It had consequences. The new foraging concept was to search for *hidden foods*: Geophytes (tubers, corms, roots), bone marrow, brain, burrowing and hidden animals etc. Foraging for plant foods during the long dry-season required means of getting at roots and tubers buried in hard steppe soils. One needs a digging tool, most likely a stout, tough digging stick. Wooden digging sticks, unfortunately, do not fossilize, but long bone splinters used to dig through termite nests do (d'Errico et al. 2013). And if hominids could shape one, they could shape the other! They certainly had the skills and the tools for that, including hand axes (Lepre et al. 2011). Digging for geophytes allowed *Homo* to maintain a significant amount of food from C3 photosynthesis plants, where as our large-bodied hominid competitor *Paranthropus* fed largely on above-ground C4 grasses and sedges (de Menocal 2016). Since brain-size and tool complexity are related (Stout 2016), it suggests that the large-brained *Homo* was more involved in tool making than the small-brained *Paranthropus*.

A stout, hard digging stick is a virtual *miracle tool*, good for more than digging, and available to almost all sexes and ages. It can be used to dig for roots or burrowing animals, knock down fruits and bird nests, kill prey disabled by wildfires, brain new-born antelope and predator cubs quickly and *silently*, and strike a threatening predator over the head. A group of *Homo erectus* surrounding a predator had the enormous advantage of distracting the predator while a well-positioned member struck its head with precision. Moreover, the sharpened digging stick could be also be used to spear some prey hiding in a tree-hollow, or pin down a big catfish in the shallows. It can be used to strike someone hostile over the head, or to merely discipline him. Increase the size of the digging stick and one has a club, a deadly weapon, requiring a non-trivial social adjustment for daily use. Lengthen it and you have a spear to impale prey, enemies, or competitors. Throw it and it becomes a javelin, a potentially lethal long-distance weapon. The new way of hunting, by hitting naive prey with a long digging stick over the head, was thus likely to be not only productive, but safe. Unlike carnivores, we did not need to make body-to-body contact with the prey. We could hit it over the head at a safe distance. No prey species was prepared for that. This was a totally new hunting method – safe and productive, as the prey was naive and completely vulnerable. In the face of this novelty, the African and also Eurasian biota were helpless. They had not evolved defenses against the novelty of club-wielding, observant, intelligent, and cooperating hominids. Killing neonates silently by striking them over the head prevents attracting both, defending adults and alert predators. It is supported by the exceptional ability of humans at silent stalking (Geist 1978, Merker 1984), as well as by our keen vision and our "periscope body structure" (Geist 1978) that allows both, spotting predators and killing opportunities at a maximum distance. Species that cashed their young would be primary victims of this hunting for neonates, leaving behind large-bodied species whose young are always in adult company, such as the highly social modern elephants, hippos, buffaloes or the calf-protecting rhinos.

Clearly, Pleistocene extinctions originated already with *Homo erectus* (Edmeades 2013 and personal communication). The uniqueness of the digging stick, a tool, as an instantly stunning or killing weapon, also required a novel control over weapons, one outside of Darwinian evolution, namely *societal* control. Killing or stunning prevented retaliation by the victim. That is uniquely human and not found in animal combat. Retaliation by the victim controls the evolution of animal

combat (Geist 1966, 1978:77). Consequently, *Homo erectus*, merely to survive, required some morality and a social conscience.

The real prize from our ability to defy large predators on the ground, day and night, was not access to the open treeless steppe, but access to water edges away from trees. With trees present along water edges, our competitors, the robust *Australopithecus* and the giant baboons, could displace us, as they could find security from predation at night in the trees. Access to the edges of shallow waters such as ponds, lakes, creeks, and rivers opened up an abundant food supply – even more so if we removed competitors. The large collection of butchered remains of aquatic and water-edge species, such as the "bear otter" (*Enhydriodon dikikae*), the severe reduction in the biodiversity of medium-sized generalized carnivores at the time of our appearance (Tollefson 2012, Werdelin 2013), the accumulation of hand-axes along old shorelines, the high association of humans and sedges (Dominy 2013), plus the many human attributes linked earlier to the "aquatic ape" hypothesis (Moore 2012), support this view. We were so attached to abundant water, that it precluded in us the evolution of water conservation.

Granted the foregoing, it should not surprise that in the next million years one finds archaeological sites that show only the marks of human butchering and no marks of predators, such as the mid-Pleistocene Schoeningen site in Germany that included 19 *intact* horse skulls Thieme 1997). Beginning with the time we turned human and turned the table on predators, we began to shape and impoverish the biota around us. No harmony here between Man and Nature.

MEGAFAUNA AND HUMANS IN NORTH AMERICA

However, North American gigantic Pleistocene predators may have stifled humans from colonizing the interior of the continent (Geist 1989, Frison 2004, Turner et al. 2013, Peacock 2013). After all, we colonized North America very late. Here the giant predatory short-faced bear *Arctodus simus*, has been singled out for special attention (Peacock 2013, Neiburger 2014). There is now evidence for humans of the first post-Toban "out of Africa" migration (Melanesian) reaching the interior of South America (Skoglund et al. 2015). They thus failed to colonize North America's interior. However, the second post-Toban wave did enter the interior of North America, but only after a hiatus of about 1,600 years. That's the time span between the migrants reaching Mexico (Battaglia 2013) about 14,800 Calendar Years ago (Goebel et al. 2008, Dillehay et al. 2015) and the Clovis radiation northward into North America's interior from 13,200-12,900

Calendar Years (Waters et al. 2007). The earliest humans had a hard time making a living, as reflected in the hyper masculine skeletons of men showing much combat injury and the small skeletons of woman showing malnutrition and domestic abuse (Hodges 2015). It suggests food scarcity (Walker 2001). Hunting would have been all but impossible for a kill would quickly attract severely stressed large predators (Van Valkenburg and Hertel 1993, Van Valkenburg 2009, Binder and Van Valkenburg 2009, Van Valkenburg et al. 2015). As expected, direct evidence for humans hunting mega-fauna is very scarce (as it is in Australia in a similar scenario. Johnson et al. 2016), and what there is, appears to be very selective: only six from 36 genera show sign of human utilization (Waters et al. 2015). No "Blitzkrieg" that! The way for people to merely survive in the presence of mega-carnivores was to torch the landscape, making the burnt enclaves unattractive for carnivores. They acted much as California natives did in order to keep away grizzly bears and traded poor food for security (Vande Pol 2016). Consequently, from 14,800 -13,700 there is in the interior of the continent an massive increase in soil charcoal attributed to human activity (Robinson et al. 2005), and a concomitant decline in mega-herbivores as revealed by decline in the dung bacteria *Sporomiella* (Gill et al. 2009; Robinson et al. 2005, Robinson and Burney. 2008). That's long before the advent of the successful Clovis hunting culture around 13,000 years ago and the megafaunal collapse at the beginning of the Younger Dryas Cold Spell (12,800 -11,200 Calendar Years, Haynes, C. V. jr. 2008). An increase in soil charcoal attributed to humans occurred already at 14,800 CY, at the beginning of the Bølling-Allerød Interstadial, long before the blossoming of the short-lived Clovis hunting culture. And what happened in North America probably happened some 30,000 years earlier in Australia (Miller et al. 1999, 2005, Johnson et al. 2016). Humans had to worry about the huge (seven meters plus) cursorial land-crocodile *Quinkana* with its *T. rex* jaws and slicing teeth, the equally armed huge monitor lizard *Varanus priscus,* an ambush predator, or the small-brained marsupial lion *Thylacoleo.* People must have set fire liberally to create secure enclaves. It appears that on both continents humans did not hunt, but torched the mega-fauna into extinction.

For a relatively short time Clovis hunters shared the landscape with remnants of the native American mega-fauna. Then the Younger Dryas Cold Spell (12,800-11,200 before present) exterminated both, the Clovis Culture and the last of the North American mega-fauna. Into the ecological vacuum moved Siberian species besides humans such as elk, moose, grizzly bear, and grey wolves. However, the long *super-predation* left a mark on North American survivors such as

deer, pronghorns, black bear, cougar, coyote, and raccoon. They are all highly capable of learning and thoroughly taking advantage of humans. Wildlife, native or not, flocks into cities to avoid predation as well as to exploit rich food sources. As our settlements become refuges from predation, they also attract hungry predators. Note the long-standing studies on coyotes fitting themselves into urban ecosystems (Timm et al. 2004, Timm and Baker 2007).

Today, the totality of the North American landscape is "unnatural", and has been ever since humans destroyed most of the native American Pleistocene megafauna. Our landscapes are now largely forested, which is *unnatural* in the presence of five species of tree-crunching ground-sloths, two species of mastodons, mammoths, two species of horses, plus scrub-clearing shrub-oxen, forest musk-oxen, bison, deer, camels, two species of llamas, four species of pronghorns, tapirs, pampatheres and glyptodonts. As the mega-fauna declined leaving less and less evidence of their presence in the soil via faecal bacteria (Robinson et al. 2005, Gill et al. 2009), plants proliferated due to the reduced grazing and browsing. The under-used plant communities became fuel for severe wildfires, as recorded via charcoal deposits in the soil (Robinson et al 2005). That almost certainly forced humans to adopt sophisticated fire practices, followed by landscape-level horticulture (Warren 2016) and the "civilizing" of the continent. This served strictly *human* needs. Here large mammals played an insignificant part, as native people were primarily keystone predators who removed much of the large mammal fauna for food and security (Kay et al. 1995, Kay 2007). There may have been, however, some deliberate husbanding of mountain sheep (Matheny et al. 2007). At least, that's how I interpret the petroglyphs based on my research on mountain sheep (Geist 1971). However, with the massive die off of North American native people beginning in the 16th century (Mann 2006, Llamas et al. 2016), wildlife numbers, freed from human predation, exploded in numbers and spread geographically (Roe 1972), giving the false impression that North America was always a "wilderness" full of wildlife. That is, "wilderness" is an artefact of Europeans colonizing North America.

PLEISTOCENE EXTINCTIONS FREE THE WOLF FROM ITS NATURAL ENEMIES

Neanderthal people did kill wolves (Klein 1973), but wolves in central and northern Eurasia did not decline dramatically until the arrival of modern humans there some 40,000 years ago (Zhenxin Fan et al. 2016). It appears that the conflict with grey wolves began right there, and has continued ever

since, with humans generally, but not always, getting the upper hand (Freuchen 1935, Graves 2007, Moriceau 2014). That the modern newcomers were interested in wolves is revealed by archaeological findings suggesting early domestication of wolves (Germonpré et al. 2009, Ovodov 2011, Bocherens et al. 2013; Shipman 2014). This is theoretically possible because the Upper Palaeolithic reindeer economy was a luxury economy as reflected in human physical development, brain size, health (Geist 1978, Ruff et al, 1997, Formicola and Giannechini 1999) and population growth (Klein 1969, 1973, Mellars and French 2011). A luxury economy is expected to produce a lot of waste that would have attracted wolves, setting the stage for domestication as proposed by Coppinger and Coppinger (2001).

In general, it was not in the interest of native people living off the land from wildlife to exterminate wolves entirely. Large, uncontrolled populations of wolves inflicted intolerable, life-threatening damage (Graves 2007, Granlund 2015, 2016) especially to people that made a living hunting big game. However, a few wolves could be quite beneficial. They kept down the meso-predators (Ripple et al. 2013) the little fellows, the mink, ermine, otter, skunk, foxes, or raccoon's, which, if not controlled, rapidly increased in numbers and wiped out easy-to-get fish and waterfowl resources. So, native American people developed a tolerance and mythology about wolves**.**

Pleistocene extinctions killed many large predators, but wolves survived. They were now freed from predation by the largest of cats and predacious bears, and thus free to multiply and disperse. Humans and wolves have had a very long joint history in Eurasia. We learn from history that without controls, humans and wolves cannot co-exist. Our evolutionary history already suggests that we usually dominated and controlled predators. In case of the wolf, it was done most likely by limited killing of pups at denning sites, as is done on Baffin Island in Canada's Arctic until today. To this, one might add the skilfully snaring of whole packs. Wolves are a problem primarily where, historically, humans were disarmed and the wolves were free to multiply.

One cannot uphold the view that wolves are harmless in the face of centuries of recorded experience to the contrary. In pre-revolutionary France, Moriceau (2007) identified over 3,000 deaths by wolves. During the 18th century in a county in northern Italy, there were some 90 cases of human mortality from wolf attacks (Oriani and Comincini 2002). In Eastern Europe numerous cases of wolves killing humans have been collected (Pavlov 1982, 2007, Stubbe 2008). Most of them occurred in Belarus in the 19th century, and in the Western Urals from 1945-1949. However, contemporary wolf attacks and killings of people also have occurred. There is the ignored killing

of 5-year-old Marc Leblond on Sept. 24, 1963 north of Baie-Comeau, Quebec, Canada (McNebel 1963). Kenton Carnegie was killed on November 8, 2005 in Saskatchewan, Canada (Geist 2008). Candace Berner, a 32-year-old teacher, was killed by a pack of wolves at dusk on March 8, 2010 on the Alaska Peninsula within a mile of the village of Chignik Lake (Butler et al. 2011). Lethal wolf attacks are recorded from Russia (Pavlov 1982, Graves 2007, Stubbe 2008), Finland (Teperi 1977, Lappalainen 2005), Sweden (Connolly 2000), Germany (Flemming 1749, Brehm 1952, Müller-Using et al. 1975), Iran (Baltzard and Ghodssi 1954), Afghanistan (Stewart 2004:123, Anon. 2005), India (Jahala and Sharma 1997, Jahala 2003, Rajpurohit 1999), Korea (Neff 2007), Uzbekistan (Blua 2005), Japan (Walker 2005), Greenland (Freuchen 1935), and other countries (Linnell et al. 2002). Peter Freuchen, an explorer of Greenland, in *Arctic Adventure* (1935) reports that he lost a companion to wolves (pp. 23, 329, 332); he had harrowing experiences with wolves trying to break into his cabin (pp. 16-19); he shot a wolf stalking his children (pp. 347-348), and his outpost could not be provisioned by dogsled as every attempt was halted by wolf attacks. He reported an observation made by a long-time resident and hunter in Greenland: where there are wolves, there are no people and vice versa! And while details in Hazaribagh, Northern India, may be different (Rajpurohit 1999), the causes of wolf predation on humans are much the same: scarcity of prey or opportunity to kill livestock, and *de facto* protection of wolves that allowed wolves a systematic targeting of peoples as prey, mainly children. Not to be forgotten is the wolf as one of the *Beasts of Battle* in old Nordic, Germanic, and English literature, and its massive depredation of the dead and wounded on battlefields, even in the 20th century (Kabel 1915, Anon. 1917). Ironically, while there are good publications in North America about bears being dangerous to humans (Herrero 2002, Stringham 2002, 2007, 2009), such detailed analyses for wolves are missing. Among modern nations Japan is unique in having had a history in which wolves were supported and venerated by disarmed peasants as a means of warding off deer and wild boar that destroyed agricultural crops. However, faced with the horror of rabid wolves, Japan exterminated wolves by 1905 (Walker 2005).

SETTLED LANDSCAPES DESTROY WOLVES AS A SPECIES VIA HYBRIDIZATION

Dogs and wolves have lived side-by-side for at least 12,000 years (Coppinger and Coppinger 2001) with hybridization being limited, as normal wolf packs destroy dogs and hybrids, as well as competing canids. Settled landscapes, however, attract smaller canids such as coyotes and jackals,

which thrive on agriculture, while dogs abound. Simultaneously, lone colonizing wolves, or lone wolves from a dismembered pack in search of company, accept dogs or other canids as mates. Consequently, wolves in settled landscapes, via hybridization, slowly but surely turn into nondescript mixtures. This is not a hypothesis, but a fact. Currently, Eastern wolves hybridizing with coyotes and dogs are turning into "coywolves" (Adams et al. 2003, Monzón et al. 2014, von Holdt et al. 2016). Based on the analysis of 437 coy-wolves, their DNA was found to contain about 66 percent wolf, 25 percent coyote and 10 percent dog (Monzon et al. 2014). This hybrid is not a Darwinian species like the wolf or the coyote, but an indirect artefact of human activity. Some introgression of dog genes into wolves in North America is quite ancient (Anderson et al. 2009). While the re-introduced Mexican wolves currently show no trace of hybridization, older specimen do show evidence of hybridization with coyotes (Hailer and Leonard 2008). And more recently a Mexican wolf female and here hybrid pups were destroyed by the USFWS after the female failed to abandon dog company (Cart 2011). A similar case occurred in Oregon. Nor is the hybridization of wolves and dogs confined to North America, but is also found in Eurasia (Godinho et al. 2011, Moura et al. 2014, Kopaliani et al. 2014, Zhenxin Fan et al. 2016) and Africa (Gotelli et al. 1994).

Wolves and dogs, their closeness genetically not withstanding, are not the same animals. The statement that thy are the same *species* is erroneous as species are defined not by *phylogeny*, but by their *adaptations*. Thus their embarrassing closeness in genetics not withstanding, chimpanzees and humans are very different species. Similar genes can produce vastly different species, nowhere better illustrated, than by the closeness genetically of hippo-pigs and whales (Thewissen, et al. 2007). One does nothing for whale conservation by protecting pigs, any more than one conserves wolves by conserving dogs or wolf/dog hybrids. Wolf-dog hybrids lack the large brain of the wolf, they give birth at all the wrong times of the year, their jaws lack the bite-force of wolves, they lack the keen ability of observation-learning typical of wolves, they waste time and energy on useless chases after prey, and they are no match at problem solving compared to wolves (Urdell 2015). The whole attack sequence of wolves has been disassociated in dogs, to serve human needs. Wolf mothers feed pups by regurgitating food, which dogs do not. Hybrids lack the specialized paws of wolves that allow the grey wolf to kill and consume prey while swimming, to scramble onto ice flows or cross raging rivers, or allow them to travel securely on

steep sun-crusted snow in the mountains. Moreover, wolves and dogs deviated not only profoundly in adaptation when dogs specialized as commensals of humans (Coppinger and Coppinger 2001, 2016), but also differ genetically by the "Belyaev effect" once such dogs became human companions (Bodio 2016, Coppinger and Coppinger 2016), as well as by the idiosyncratic breed modifications of subsequent domestication. There are profound differences in social adaptations between wolves and dogs (Frank and Frank 1987). Also, feral dogs do not revert to ancestral type as do feral domestic pigeons or pigs, while some dogs differ genetically from wolves more than jaguars differ from leopards (Bodio 2016). And had hybridization of grey wolves and coyotes been a success when the species met some 14,000 years ago, then there would be no coyotes alive today! Protecting hybrids, as well as exposing wolves to hybridization with dogs in settled landscapes, does nothing to preserve wolves. On the contrary, it is a certain way to destroy the wolf as a natural species.

It begs the question: Is the destruction of both, the "big wolf" and the "little wolf" our goal for wolf conservation? In Europe, so-called "wolves" with paws diagnostic of golden jackals are turning up in Italy, Switzerland, France, and even Germany. Unfortunately, current legislation to protect wolves in the U.S. and European Union are not only good examples of ignoring both, history and science, but destine the wolf to extinction by fervent environmentalism. The grey wolf can only be conserved as a species where it can live in packs, while free from contact with humans and dogs. This suggests a vital wildlife conservation function for military and atomic reserves.

SOME PREDICTIONS FROM HISTORY

Allow me to assemble what history tells us about wolves entering a populated, productive countryside. This includes also my personal observation of misbehaving wolf packs on Vancouver Island. In a nutshell: if wolves are allowed full legal protection to expand within settled landscapes, they will first deplete wildlife severely, then turn to livestock, then enter increasingly human habitation in search of food, and finally they will begin targeting humans (Geist 2007) in exactly the same fashion as coyotes target children in parks (Carbyn 1989) and people in suburban southern California (Timm et al. 2004). Children are all around vulnerable (Penteriana et al. 2016). Moreover, these wolves will bring with them diseases, such as the dreaded hydatid disease, via the dog tapeworm *Echinococcus granulosus* (Foreyt et al. 2009).

Wolves, like coyotes but not dogs, are observation learners (Coppinger and Coppinger 2001) that take their time investigating and exploring a new prey visually before making contact and finally attacking. It may not come that far, however, if wolves attack sufficient numbers of leashed dogs and thereby raise the urban public's fears. Big, well-fed wolves are not the problem, small starvation wolves are. Note that the laws of the Province of Saskatchewan completely protected wolves that had brazenly habituated to camp garbage, as only licensed trappers were allowed to kill wolves. These wolves attacked people and killed a brilliant young scientist, Kenton Carnegie. He was an environmentalist and a vegetarian, who apparently believed that the "harmless wolf myth" was based on science (Geist 2008, 2009, Teague 2008). It is not! He did not appreciate an attack by two wolves on two camp inmates and ignored the warning of residents. When he went out alone from camp, he was killed by three wolves. Kenton Carnegie is likely not the only victim of the "harmless wolf hypothesis." So was 24-year-old wildlife biologist Trisha Wyman, who was killed on April 18, 1996 by a captive wolf pack in Ontario. In a long phone conversation with Professor Erich Klinghammer of Wolf Park, Battle Ground, Indiana, he related that he had been called in as an expert witness to the Wyman case. He discovered that there was great surprise at her death, as wolves are not supposed to attack people. Here, as in similar tragic cases, the classical work on how to behave around wild and socialized wolves as carried out in Wolf Park (Frank 1987), had been ignored. And that is what probably killed a 30-year-old woman, a keeper in the wolf pen of Kolmardens Djurpark (The Kolmarden Zoo) outside the city of Norrkoping, Sweden. The pack, which she had raised, turned on her. There had been a previous a similar incident: a captive pack of 9 wolf hybrids, kept as pets, killed its owner, Sandra L. Piovesan, of Salem Township, Pennsylvania, on July 17, 2006. It was reported that Ms. Piovesan treated her wolves like children, and said as much when neighbors asked about them: "they (*the wolf-hybrids*) give me unqualified love" (Fuoco and Harlan 2006).

THE MYTH OF THE HARMLESS WOLF

One can trace the origin of the American myth about the "harmless wolf" to a respected Canadian biologist, Dr. C. H. 'Doug' Clarke (Clarke 1971). He investigated the killing of people by wolves in Europe, and concluded that while such attacks were real, rabid wolves essentially caused them all (Rutter and Pimlott 1968, Mech 1960). However, in exonerating healthy wolves, Clarke did not use evidence from Europe, but rather he fell back on his personal experience with

the Canadian *continental wilderness* wolves, which, as is widely acknowledged and which I can vouch for personally, are notoriously shy of humans. In short, if healthy Canadian wolves did not attack people, then such attacks by wolves in Europe must be by rabid wolves. Bites by rabid wolves before the days of modern medicine were always lethal (Moriceau 2007, Graves 2007). However, Clarke failed to notice that in the early days, *survivors* of wolf attacks could not have been bitten by rabid wolves. Moreover, the famous man-killing wolves Clark described in his essay were not rabid. It is puzzling why Clark did not see the distinction between attacks by rabid as opposed to healthy wolves, whereas others who examined much the same material, such as scientists, historians, and even laypersons, clearly did differentiate such (Oriani and Cominici 2002, Moriceau 2007). Friedrich von Flemming (1749:113) in his encyclopedia volume on wildlife and hunting in Germany, even described how the tracks and habits of rabid wolves differed from those of healthy wolves. Clark's conclusions were picked up by North American wolf biologists, who, due to language and cultural barriers, and premature insights based on *young* captive wolves, did not investigate historical material. (In his review of wolf attacks on humans, the Russian academician Mikhail P. Pavlov singles out three North American scientists who advanced the view that wolves were harmless, Graves 2007:176). Nor did North American wolf biologists investigate the circumstances that made these wolves virtually harmless in the 20th century. In essence, it was severe prosecution of wolves by trappers and by northern and native residents, plus the widespread areal poisoning of wolves, the bounties paid for wolves, the professional predator control officers hired to keep wolves out of settled areas, and the year-long open season on wolves. All this contributed to wolves being scarce, wildlife very abundant, attacks on livestock a rarity, and attacks on humans unheard of. It also virtually extinguished hydatid disease.

To the above, one must add two factors. The first was the global impact of the very popular book *Never Cry Wolf* by a famous Canadian author, Farley Mowat, which depicted wolves as harmless, lovable mouse-eaters (Mowat 1963). While Canadian biologists did not fall for this prank (Banfield 1964, Pimlott 1966) the literati did and still do, despite the work being revealed as fiction (Goddard 1996). Secondly, the Soviet Union suppressed information about wolf attacks and played up the image of the harmless wolf. The Russian scientist and academician Mikhail Pavlov disclosed the matter in his book on wolves (Pavlov 1982). His work, upon translation into Norwegian, was denounced with furor by environmentalists, leading to the responsible ministry

destroying the translation. It was subsequently published in Swedish (Pålsson 2003). An English translation of Chapter 12 of Pavlov's book, done by Dr. Leonid Baskin, his wife Valentina, and U.S. biologists Mark McNay and Patrick Valkenburg, lingered unpublished, as no publisher accepted it, until it was included as an appendix in Graves' book on Russian wolves (Graves 2007). The myth of the harmless wolf has multiple origins.

According to the German philosopher Georg Wilhelm Friedrich Hegel as well as Mahatma Gandhi "*We learn from history that we do not learn from history.*" If so, then we face an irony: the gray wolf is now destined for assured destruction through misguided conservation efforts that are ignorant of history.

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Adendum

Richard Chacon was so kind to send me one of his books, and I at once read a chapter of his, and in so doing, looked at a picture of a peccary killed with poisoned darts. And something went click. You may recall that up to that point I suggested that newcomers entering North America some 14,000 years ago protected themselves against the mega-carnivores, as had California

natives right into modern times by torching the landscape against grizzly bears, as had Australians some 30,000 years earlier against the huge terrestrial crocodile and equally big, nocturnal and stealth-hunting varanids, both armoured, by the way, as protection against intra-specific combat. Spears would bounce off! Fire and torching was the only way out. And in North America it led to concomitant charcoal built-up in the soil and a decline in the gut bacteria, indicating a decline in the mega-fauna. I noted that the first wave of humans to enter North America failed, but that the second wave succeeded, but only after some 1,500 years of trying, while living an absolutely miserable, fearful life as evidenced by analyses of skeletons and lately of remains in the Paisley caves in Oregon. So, what led to the break out via the Clovis technology (and Haskett technology!) into the interior of North America? What led to that short-lived luxury culture in which they killed in the closest of proximity multiple mammoths and stacked surplus mammoths parts into heaps, caches, and decorated each heap with the skull and tusks of one of the mammoths they killed? Northern natives did much the same with surplus caribou they killed. Caching meat by Clovis hunter indicates that marauding large predators were no problem. Also, they were no longer afraid of mega-predators. And not only that, they may have even killed the largest predator of them all, *Arctodus simus*, as evidenced by cuts on *Arctodus* bones of Clovis age in an archaeological site in Texas. What had happened that people went from rags to riches, from fear to bravado, from stasis to rapid continental expansion? A real break through had happened and not once, but twice, with the Clovis and Haskett technologies, and later, in South America, with the similar fish-tail point technology? The answer had been around, actually, for over a decade. Stimulated by Richard Chacon's paper, I searched and found that a professor in Texas, David Jones, had published a book, detailing his meticulous research into arrow poison technologies in North America. It was so sophisticated, so widespread, and so common in use, that he thought it may reach back into the earliest entry of humans into North (and South) America. Now, the severe grazing pressure during the Pleistocene in North America by its diverse mega-herbivores, would have led to severe selection for plants against being eaten, one of them would be the evolution of effective toxins. So effective was that Pleistocene selection, that the most poisonous tree in the world grows in southern North America, the mancheneel tree, now sparse and endangered in Florida, along with poison ivy, poison oak and poison sumac. The poison of the Sandbox tree (*Hura crepitans*) is half a million times more toxic than potassium cyanide. It grows in tropical Mexico, which is the apparent origin of the Clovis culture. Note that the 14,000 year old coprolites in the Paisley caves are so filled with plant fibres, that at least two papers doubted that they were faeces passed by humans. They were! It shows that these poor people were experimenting with the properties of an unknown, more often than not – toxic - flora. The people were, after all, Siberians. David Jones suggested that the Clovis points were designed not for exsanguination of massive elephants, but for deep penetration into soft tissues, while carrying poison in the grooves. I think he was right, and it gets even better. The Clovis points were hafted to a short, detachable fore-shaft, which in tun was mounted on a long shaft, and in total hurled with an at-atl. That's a classical poison carrying system, quite similar in principle to what the Wata, a tribe of African elephant hunters used. The difference is that the Wata used a long, heavy arrow propelled by a massive bow. They aimed the fatal shot low into the small intestines of an elephant. Here, the poison on the detachable fore-shaft began to dissolve in gallons of omental fluid, from where the poison was taken up by square yards of omental and intestinal tissue, leading in minutes to death through heart failure. The dosage of poison on one fore-shaft was enough to kill 70 elephants. The matter was clinically investigated by Ian Parker, himself a famed elephant hunter, who also duplicated the

plant poisons, much to the approval of Wata hunters! Since Clovis hunters made multiple kills, it appears, that their poison, or whatever technique they used, was even more potent than that of the Wata. And how would they kill a giant bear? Probably by keeping it at bay with fire brands – as California natives did with grizzly bears – then throwing a poisoned spear or two low into his gut, and the big bear was dead in minutes – if that long! After all, the Clovis hunters had now in hand a "miracle weapon". How potent that miracle weapon was, is illustrated by Aleut killing bow-head whales. All that was required was one poisoned lance with a detachable, poisoned blade. The whale apparently exhibited instant agony, and either drowned within 24 hours or beached itself with some commotion. Drowned whales drifted onto shore, which had been calculated by the hunters. Two kayaks with two men each went out to hunt, but only one threw the lance. The whale's reaction could damage the hunter's kayak, which is why the second crew stood by. Imagine the size of the lance, and the size of the whale. The poison came from the root of *Aconitum*, the monks-hood or wolf's bane. However, the trick to effectiveness was to find a substance to add to the poison, or a process, which opened up the blood vessels so that the poison had quick, ready access to the circulatory system. The Aleut kept the process of making the poison from the roots of Aconitum a close secret, and shrouded it all in obscure ceremony. The Clovis culture, as well as most of the maga-fauna, came to an abrupt end during the Younger Dryas cold spell. However, the giant *Bison antiquus* survived and became now the subject of mass killing by hunters armed with a poison spear blade, the Folsom point, a bit smaller than the Clovis point. That was possible because the giant bison, apparently, confronted hunters in musk ox like fashion. So, hunters, armed with poison spears, could wipe out whole groups which stood their ground. That lasted about a millennium and after that the big brave bison changed into the small dwarf bison that ran away from hunters. Since running after fleeing bison with a poison spear is useless, the Folsom culture collapsed. The bison continued its decline in size, presumably because of the spread of the tougher, less nutritious C4 grasses, which happen to be fire followers. After all, before humans entered the continent, the native mega-fauna kept down the vegetation and there was little fuel for fires. After mega-faunal extinctions the built up of fuel caused big fires, and humans – like it or not – had to develop skills in managing landscapes with fire. So, during the Pleistocene, little carbon deposits in the soil; during the Holocene massive carbon deposits in the soil. Fire replaced mega-herbivores as a consumer of vegetation. After the Clovis culture in North America, there followed the fish-tail point culture in South America. Both cultures lasted about 500 years, respectively, and came to an end with the respective mega-fauna. In North America the younger Dryas Cold Spell was so severe, that the North American cougar died out. Current cougars in North America are from immigrants from South America. Ditto for the jaguar. So, the mega-fauna of the Americas was eliminated largely with fire and toxins.

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