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BOLIVAR: “KILLER” ELEPHANT OR ABUSED PACHYDERM?

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Abstract. “Bolivar” was a male Asian elephant (*Elephas maximus*) which was presented to the Philadelphia Zoo in 1888 by Adam Forepaugh and lived there until 1908. Bolivar was known as a “killer” because he killed at least two men, one of whom offered the elephant a lighted end of a cigar and his trunk was badly burned. The man tried to repeat the “cute joke” and Bolivar grabbed him and crushed his skull. The elephant was kept in confinement, apparently in conditions which might best be described as “inhumane”. He died, according to postmortem pathological report, from arthritis, cardiac, hepatic and splenic lesions. In this paper I hypothesize that the pathological findings were only symptoms of a much deeper problem — an apparent behavior of excessive grinding of his teeth, and in doing so, he destroyed the joints between the mandible and the cranium. It is proposed that the isolation, continuous chaining with lack of usual physical activity led to this behavior.

HISTORICAL BACKGROUND

“Back in the days when great tuskeders were supposed to be the most satisfactory acquisitions for a menagerie, some of them behaved so badly that their names are remembered with shudders. There were Hannibal, Tippoo-Sahib, Columbus, Bolivar, Mogul, Pizzaro, Romeo, Virginius — all bad bulls. Hannibal and Tippoo-Sahib were the earliest, and Hannibal was among the worst” (Murray, 1956, p. 260).

It was a dramatic moment on December 25, 1888 when Adam Forepaugh (who worked for James E. Cooper; Murray, 1956, p. 237) marched the famous “killer” elephant Bolivar to the Zoo in Philadelphia to present him as a Christmas gift from his Forepaugh’s Circus. The elephant was believed to have been about 27 years old, and it was reported that he had killed two men prior to his arrival in Philadelphia (Benedict, 1936). It is not clear whether the title “killer” (Anonymous, 1908a) was bestowed onto him before or after he arrived at Philadelphia Zoo. Nineteen years and seven months later on July 31, 1908, probably late in his fifth decade, Bolivar died. The diseases leading to his death were disclosed in the following necropsy report (cf. Wood, 1988) which was preceded by the following note: “Has been rheumatic and losing flesh, but there were no special symptoms before 6 a.m. this morning, when he was found down and unable to get up.” Pathological Diagnosis: Chronic Polyarthritis, Chronic [Interstitial] + myocarditis, Parenchymatous nephritis, [Chronic Hepatitis (Cirrhosis)], Chronic tuberculosis of lungs partly encapsulated, Pigmentation of the spleen {note: listing in [] were not included in Fox’s report cited in Benedict 1936, p. 109}.

METHODS

Some eighty years later, being privileged to examine the cranium and mandible of Bolivar at the Academy of Natural Science in Philadelphia, I noted some pathology that the postmortem examiner (Herbert Fox, cited in Benedict 1936, pp. 108-112) had only mentioned in passing: “...the condyles of the mandibles are uneven” (p. 112). The purpose of this report, therefore is to provide detailed analysis of

Bolivar's condyles in the context of the available updated information and the experience I have gained from examining 100 crania and about equal number of mandibles of proboscidean taxa: American mastodons (*Mammot americanum* — 35 specimens), mammoths (*Mammuthus primigenius* — 10), and living elephants (55), African elephants (*Loxodonta africana*) and Asian elephants (*Elephas maximus*).

RESULTS AND DISCUSSION

The condyles of the mandible of Bolivar differed dramatically from those of elephants (Asian and African), and mammoths and mastodons, that I have examined (see also Lippman and Shoshani, 1990). The temporomandibular joints (the hinge area between the mandible and the cranium) were practically destroyed through what might anthropomorphically be described to have been an "extremely painful process" during the last years of Bolivar's life.

Comparing the condyles in Figs. 1, 2, 3, and 4 to those of other proboscideans, it is evident that the smooth roughly ovoid areas are absent in the lower jaw of Bolivar. Instead, the articular areas present rough surfaces which are devoid of normal articular surface of condyles. In living elephants, there are on each side of the head double concave cushions that fit snugly between the mandibular condyle and the fossa on the cranium. These cushions are made from tough connective tissues and provide protection from erosion and smooth movements for these important hinges (see Shoshani *et al.*, 1982, p. 21 for details and fig. 9 there for illustration). In Bolivar not only were these cushions destroyed but so much of the subcondylar bone (bone below the head of condyles) was eroded away that the three ridges that support the condyles are now visible on the remnant of each joint. On the photos they seem to simulate excess growths. That these result from erosive processes is suggested by the remarkable differences between the right and left condylar remnants. The surface of the right subcondylar area (Fig. 3) is very much rougher than that of the left (Fig. 4) and there is a depressed area on the postero-lateral aspect which measured 4 to 6 mm below the rest of the surface area. On the medial aspect of the surface is a raised indurated spheroidal section which is about 4 cm. in diameter.

In my examination of the cranium and mandible of Bolivar I found no manifestation of overt malocclusion that might have led to this joint destruction. In order to better understand the pathological signs, I requested copies of the biological data available in the archives of the Philadelphia Zoo. Some pertinent history, clippings, correspondence, the above cited necropsy report, as well as some verbal information was graciously provided by the Superintendent of Animal Services, Mr. David Wood (cf. 1988). From these sources we learn that Bolivar's keeper, Eph Thompson, was dying of tuberculosis even as the elephant lay down in his cage for the last time. Thompson was probably aware of the elephant's disease. The arthritis may well have been the result of the cold dank climate in which he was confined for over 20 years. The cardiac, hepatic and splenic lesions could have been secondary to tuberculosis.

An inexperienced observer might conclude from Bolivar's symptoms that arthritis was an etiological factor. Long experience in the field of arthritis as well as extensive studies of temporomandibular conditions leads me to categorically disagree with this easy explanation. The history of the nature of his harsh-conditioned captivity, the enchainment of this strong-willed animal, and the experiences at the hands of his keepers impel one to consider the possibility that continuous stress over many years may have generated habitual rage-grinding and excessive masticatory peruses that led to this pathology.

Forepaugh, a rival of P. T. Barnum in the circus business, presented Bolivar to the Philadelphia Zoo as a publicity stunt. He had killed two men and had become a liability. The "killer elephant" was kept in such extreme restriction that animal lovers were up in arms about the inhumane treatment at the turn of the century.

In a letter dated October 11th 1902 from the President of the Women's Pennsylvania Society for the Prevention of Cruelty to Animals to Arthur Brown, the Superintendent of the Philadelphia Zoo, one member, Caroline Earle White, pleaded for the death of Bolivar to free him from "cruel imprisonment" (White, 1902). But others had other solutions. Thus, according to the *Journal of Zoophily* among many letters on the subject one reader wrote (Anonymous, 1908b).

"For some time past the readers of the "Evening Bulletin" have taken up the subject of the treatment of Bolivar, the elephant at our Zoological Gardens, and in their letters to the editor have advanced many astonishing ideas. The most practical letter appeared in the issue of August 16th, and we therefore reprint it for our readers: "...There is no occasion either for continued inhuman treatment of Bolivar or to take his life... Bolivar ... [should have been able].. to get about and to lie down and get up at will... dispense with galling chains and the ...ankus, that terrible pronged implement used by keepers to 'subdue' an angered elephant. It is only man's inhumanity to these noble beasts which causes their violent displays of temper that occasionally result in loss of human lives..." (Signed) Hugh Manity.

In an article that appeared the day after Bolivar's death, the newspaper *The North American* (August 1st 1908) reflected the local pride in the size of Bolivar as well as the widespread resentment over the cruel conditions of his captivity:

Bolivar, the biggest of elephants, died yesterday in his prison house at the Philadelphia Zoological Gardens. He never had a rival in captivity except Jumbo, and Jumbo, while taller, was lighter than Bolivar. The Philadelphia monster weighed six tons*. For twenty years the big fellow had been confined within a small enclosure at the Zoo, and for twelve or fifteen years he had not been allowed even to pass out of his cell into the little yard. One foot shackled with a big chain, he stood there all day long, year after year, his huge bulk swaying from side to side, his clumsy feet scuffling slowly on the floor. He was kept a prisoner because he wasn't safe. Bolivar began to show signs of old age two or three years ago. But it was not until a couple of days ago that his appetite fell off. Until then, day and night, he kept up his swaying and his munching of hay, for a healthy elephant eats nearly all his wakeful hours. The only signs of illness were rheumatism, which sometimes caused the venerable monster great suffering. But last Thursday afternoon he began to show unmistakable signs of illness. As evening approached he lay down, and it was for the last time. He died two days later.

* At the age of about 24 years, Jumbo, an African elephant, was reported to be approximately 3.5 meters (11 feet) tall at the shoulder and weighed about 6.5 tons (13,000 pounds); see Shoshani *et al.*, 1986, p. 110.

Apparently it was the maltreatment he received at the hands of a cruel and insensitive man that started Bolivar on the path which humans refer to as "bitterness" and "rage". The reporter (Anonymous, 1908a) noted that Bolivar's "murderous rage" dated from the spring of 1888 when one of the civilized observers of the "wild animal" offered him as one would offer an animal a tasty morsel, the lighted end of a cigar. The unsuspecting elephant took the flaming tobacco into the end of his trunk and was promptly rewarded with a bad burn. As the man repeatedly tried to repeat the "cute joke" Bolivar grabbed him with his trunk, dashed him to the ground and stamped on his skull. He became a "killer".

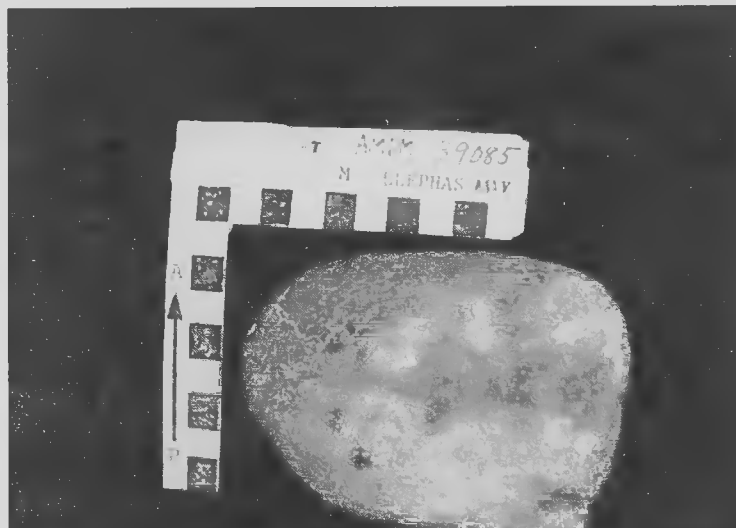


Figure 1. Skull of an African elephant [American Museum Natural History (New York) = AMNH 54085], showing normal to slightly eroded mandibular condyles.



Figure 2. Close up of a perfectly rounded and smooth, normal mandibular condyle of an Asian elephant [AMNH 39085].



Figure 3. Closeup of "Bolivar's" (Asian elephant) right mandibular condyle, showing extremely abnormal erosion and irregular articular surface.

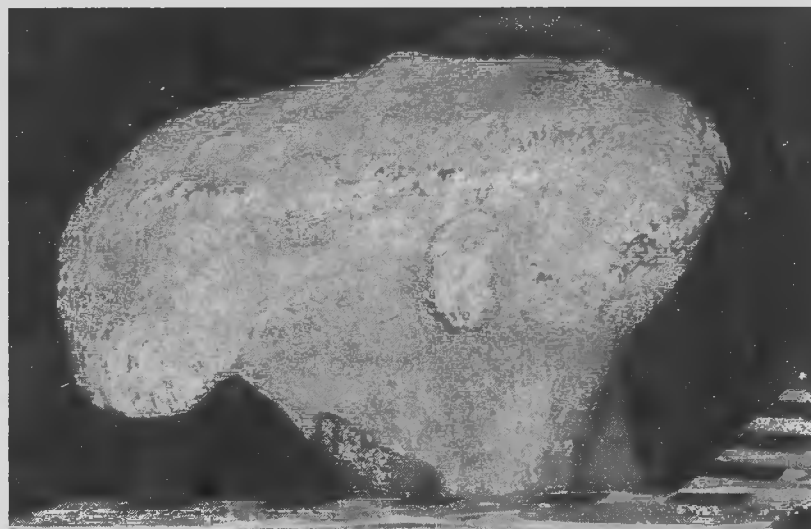


Figure 4. Closeup of "Bolivar's" left mandibular condyle, showing roughened articular surface, excess bone deposition, and some "lipping" (enfolding of bone downward as in an overhang on a roof, see left side of picture).

In the wild, elephants usually do not inflict terror. People, on the other hand, slaughter these and other animals. When kept under "humane" conditions (for example, as approved by the American Association of Zoological Parks and Aquariums) they will work and survive with few disturbances. When held in zoos, Asian elephant males have often been intractable (this usually occurs when they are in musth — a condition associated with heightened aggression, and high levels of male hormones). Females have also been known to be aggressive, attack their keepers and kill their infants. Frederick (1953, p. 20) who was Curator of Mammals of the Philadelphia Zoo, noted that the female Asian elephant "Young America" ["...the very first American baby elephant" born in captivity (Philadelphia Zoo) to "Hebe"; "Young America" is also called "Columbia"] lived 25 years "...but was finally killed because of viciousness", and that in America at least, "almost invariably, zoo elephant mothers attempt to kill their babies...". An incident which happened in June 1990, at the San Diego Wild Animal Park, San Diego, California, appears to confirm these earlier observations. In that incident, a female Asian elephant which gave birth to a male calf, named "Omar", was seen attempting to step on it, bite it, and kick it back and forth between her feet. "There's no doubt that she meant to do the baby harm" Park spokesman Tom Hanscome was quoted as saying in Lubrano's (1990) article. The report in Zoonooz (Anonymous, August 1990) appears to imply that "Connie", Omar's mother, rejected him because she was inexperienced with, and had never witnessed, a birth. It is

possible that in the case of Connie and Omar this interpretation is correct. Alternatively, I suggest that we should seek a deeper and a better understanding of animal psychology, for it is possible that being in captivity (no matter how good the conditions are) is in itself a major factor in the animal's behavior, in this case, rejection of an offspring. Or perhaps this rejection behavior is a result of a combination of factors which are beyond our comprehension.

Many animals attempt to escape from captivity once separated from their natural habitats. This is especially galling when they are caged and confined in shackles. These conditions possibly incited Bolivar to vent his rage and fury on whatever he could. In this case, I suggest that he impotently ground his teeth and destroyed his own temporo-mandibular joints in the process.

Humans kept under conditions of isolation in prison with a lack of usual physical activity and restricted sensory and emotional inputs and outputs will often suffer from depressive states, and severe diseases that may dramatically shorten their lives. The rage engendered by Bolivar's treatment — the cigar burn in an extremely sensitive spot, and the subsequent restrictions — could only have made him more susceptible to infections, to rheumatic diseases, and to the pathological rage-grinding that led to the destruction of the joint surfaces of his mandibular joints.

CONCLUSIONS

The cold wet climate of a zoo along the Schuylkill River in Philadelphia could well have contributed to the genesis of diseases in an animal more suited for tropical and subtropical conditions. The totality of the pathological conditions shows that he was basically a strong animal with strong immunities. As for the "chronic interstitial myocarditis," "chronic hepatitis," and "pigmentation of spleen" conclusions are best held in reserve: doubts are valid in view of the medical knowledge of the time.

It is unlikely that we will witness a "deja vu" of a case similar to that of Bolivar. Twentieth century humane societies and animals right activists are too vociferous — although some are extreme in their actions, they have contributed to the betterment of facilities and treatment of captive animals. The story of Bolivar reanalyzed here from a different perspective, is a case in point; it emphasizes that "killer animals" should not be "judged and incarcerated" before detailed investigation is carried out. Modern technologies can provide us with means with which to restrain animals humanely and/or to allow them to move freely in well protected enclosures.

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