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DID THE FOLSOM BISON SURVIVE IN CANADA?

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I

In 1927 a wave of incredulous surprise swept the archeological world. The discovery, at Folsom, New Mexico, of the bones of a supposedly extinct Ice Age bison in association with implements of human manufacture, shook to its foundations the theory of conservative archeologists that man had been a late arrival in America. Instead, a series of discoveries scattered over the High Plains region of the United States has revealed that man reached the American continent in time to see the last of the giant mammals of the Ice Age—the mammoth, the huge and lumbering sloths and the now extinct American horses and camels. All this is now archeological history. The specialist no longer scoffs as the earth continues to yield up evidence of these thinly scattered mammoth hunters remotely ancestral to the American Indians of to-day. The sole question not entirely answered to the archeologist's satisfaction, as yet, is the exact date at which the last of these extinct animals disappeared. And since these early people hunted the huge buffalo of the time with marked success, particular interest has lingered about these long-horned relatives of our familiar American bison of to-day.

The American bisons of the late Ice Age are known primarily from skulls and various fragments of the body skeleton recovered over a wide range of territory in the United States. That they averaged somewhat larger in size than the existing buffalo is well known. Differences in horn and skull structure among different types have resulted in at least the tentative setting up of several distinct species, some of which were apparently in existence at the same time. Some of these types undoubtedly constitute valid species. In the case of others, however, different observers may have been too liberal in the description of new species on the basis of inadequate material which, at best, may have represented only local varieties or races. It is possible also that certain of these co-existing types may have mixed or interbred, thus increasing the problem of systematic assignment. Furthermore, sex differences may have played a part in confusing the paleontologist. No really authoritative and complete study of these bison, in spite of their growing importance to the archeologist, has been made in recent years.

The common tendency of late has been to term most of the bison recovered with Folsom or Yuma archeological remains as *Bison taylori*. As so used, however, it must be remembered that the appellation *taylori* probably includes animals which some years before the Folsom controversy would have been termed *Bison antiquus* or *Bison occidentalis*. *Bison taylori* was described by Hay and Cook from the original Folsom quarry at Folsom, New Mexico. There is no doubt that it was somewhat larger and more powerfully horned than the existing American bison. It was, however, closely related to the latter form which succeeds it at some undetermined point within either very late glacial or early Recent time. In other words, at a point in years anywhere from perhaps 15,000 to 8,000 years ago.

It is quite likely that these big animals were adjusted to cooler Ice Age conditions and failed to hold their range with the onset of postglacial warmth and drouth. The existing bison may have been a successful southern variant of this stock. Adjusted to enduring a dryer and hotter prairie environment, it may have flooded in over the range once held by the larger and more formidable species.

Bison taylori in this case may have survived longer toward the north where he could have intruded into areas once covered by the great ice-sheets. Because of inadequate investigation of the vast Canadian wilderness, our information here is almost entirely speculative at present. The story which we have presented so far is one whose essential outlines are accepted by all archeologists at least in so far as it concerns discoveries within the United States. It is within this northward area, then, that a certain degree of mystery presents itself—a mystery which has seemingly escaped the eye of those very students who have been struck by man's association with an extinct ice-age animal in the High Plains region of the United States.

II

When the first voyageurs explored the wilderness of the Canadian Northwest they found bison ranging over most of the upper part of the Mackenzie Basin. As time passed and the acquaintance of the white man with the North American game animals increased, many hunters began to express the view that the northern Canadian bison were somewhat distinct in size, pelage and habits from their relatives, the Plains bison. On the whole they were regarded as a larger and more rugged variety of the southern form. An early quotation from Sir John Richardson (Fauna Boreali-Americana 1829) will illustrate the trend in the literature:

> **The bison which frequent the woody parts of the country [near Great Slave Lake] form smaller herds than those which roam over the plains, but are said to be individually of greater size.**

Finally, in 1897, the paleontologist, S. N. Rhoads, clearly defined the wood bison as a subspecies (*Bison bison athabascae*) of the better known Plains bison (*Bison bison*), and supplied its scientific description.[1] Since that time there has been little attempt to challenge the form as a valid variety of *Bison bison.*

Some of the early descriptions of these big animals, though lacking metrical expression, are not without interest and may well serve to introduce the features which will later demand our attention with reference to the paleontological past. Though variations and misstatements exist in the descriptions, there is considerable emphasis, particularly in the earlier accounts, upon large size and greater length of horn "nearly twice the length of the plains' ones and much straighter."[2]

The naturalist, Ernest Thompson Seton, in 1914, describing a large bull which he was able to examine in Canada, speaks of the "immense horns long and curved," of the "enormous bulk, evidently larger than any Plains buffalo and much like an aurochs."[3]

When Rhoads in 1897 gave his description of the type, he pointed out that "In athabascae the relative length of the horns and horncores to the size of the skull is about the same or even greater than in antiquus. . . ." Though endeavoring to establish distinctions,

[1] S. N. Rhoads, "Notes on Living and Extinct Species of North American Bovidae," *Proceedings of the Academy of Natural Sciences of Philadelphia*, Vol. 49, pp. 492–500, 1897.

[2] *Ibid.*, p. 497, quoting H. I. Moberly. Also see C. Gordon Hewitt, "The Conservation of the Wild-Life of Canada," p. 124. Scribners, New York, 1921.

[3] E. T. Seton, "Lives of Game Animals." Doubleday Doran, N. Y. 1929. Vol. III, Pt. 2, p. 707.

Rhoads concludes that "the weight of evidence favors their position between *B. bison* and the most recent fossil species."[4] *Bison antiquus,* of course, is one of those types of late Pleistocene bison suspected of association with early man in America. In fact, in the eyes of some paleontologists, *Bison taylori,* the bison found at Folsom, New Mexico, is really only a varietal form of *antiquus.*[5]

In spite of these tantalizing statements, which could easily be multiplied by scanning the literature, a marked confusion seems destined at the present time to obscure forever the true affinities of the northern bison. The tragedy happened in the following manner: The northern bison, just as in the case of their Plains' relatives, became steadily reduced in numbers throughout the nineteenth century. At one time in the eighteen eighties or nineties, they were definitely threatened with complete extinction. Just how close they came to disappearance is not known,[6] though estimates have ranged as low as fifty head.[7] In 1893 the first laws were passed to protect the animals and, though inadequately enforced, they served to relieve the situation. A small upswing in numbers took place during the following years.

In 1925, however, the Canadian government carried out a policy which, though well intentioned in terms of game conservation, has served to make a complete investigation of the original character of *B. bison athabascae* exceedingly difficult. Large shipments of Plains bison were introduced into Wood Buffalo Park, a tract of land in Northern Alberta roamed over by the last of the northern bison.[8] Hence, at the present time, the two varieties are inextricably intermingled. One of the tragedies of this situation lies in the fact that save for a few measurements on the type skull as given by Rhoads, no authentic measurements exist in print. It is true that a few measurements have been given of skulls collected since the introduction of the Plains bison into the Wood Buffalo preserve, but it is obvious in these instances that the strain represented is uncertain.[9] Moreover, they were collected before the archeological and paleontological problem which we are approaching had become significant enough to center attention upon what was needed in the way of information.

III

Now what has this remote bison remnant to do with the archeological past in which we are interested? Primarily this. In the first place, no attention has been given in archeological or paleontological literature to the position and range of this variety of bison during the maximum southward stand of the Wisconsin ice which represents the last glacial advance of the closing Pleistocene or Ice Age. If *Bison bison athabascae* existed during this period its range may well have projected downward into the

[4] Rhoads, *op. cit.,* p. 500.

[5] E. H. Barbour and C. Bertrand Schultz, "Paleontologic and Geologic Consideration of Early Man In Nebraska," *Bulletin Nebraska State Museum,* Vol. 1, pp. 434–435, 1926.

[6] H. M. Raup, "Range Conditions In the Wood Buffalo Park of Western Canada with Notes on the History of the Wood Bison," *Special Publication of the American Committee for International Wild-Life Protection,* Vol. 1, No. 2, p. 5, 1933.

[7] J. A. Allen, *Bulletin American Museum of Natural History,* Vol. 13, p. 67, 1900.

[8] A formal protest was made by the American Society of Mammalogists. Prophetically, the protest reads in part as follows: "Interbreeding would take place between the races of Plains Buffalo and Wood Buffalo, so that the distinctive characteristics of the Wood Buffalo would be lost in a few generations, and in this way the largest and noblest game animal of North America would pass out of existence as such." A. B. Howell, *Canadian Field Naturalist,* Vol. 39, p. 118, 1925.

[9] Raup, *op. cit.,* p. 19, 33. Also J. Dewey Soper, *Journal of Mammalogy,* 23: 144, 1942.

United States because its historic range would have been largely ice-covered.

Under these circumstances, there is a very genuine possibility that its bones might appear in the western deposits where the traces of early man in America are now in the process of discovery. Because of its size, irrespective of whether we regard it as directly related to the extinct form *Bison taylori,* limb fragments of this bison might easily be attributed to the extinct form. From this standpoint alone the animal deserves more attention than it has yet received in the literature.

The writer has repeatedly emphasized that where identifiable skull fragments are lacking, as is often the case in cave deposits and sand "blow out" sites in the West, limb or other fragments may be the only means of establishing the presence of bison. If these fragments are associated with Folsom or Yuma points, there has been a strong tendency to assume automatically—particularly if the size of the limb bones is reasonably large—that the bison represented is the same type known from Folsom, New Mexico, or the Lindenmeier site at Fort Collins, Colorado. Now most certainly there is every reason for regarding this as a reasonable assumption. Nevertheless, so long as the skull is missing, *absolute, positive identification is impossible.* The fragments of the body skeleton of the late Pleistocene bison overlap in measurements upon the normal range of *Bison bison,* and do not differ enough morphologically that they can be separated, at least so far as present knowledge goes, on the basis of non-metric characters.

Allen recognized this fact many years ago when he wrote:

> The female of the larger extinct species, judging from the sexual differences seen in the living species, would apparently about equal in size the male of the smaller one, and hence it is difficult to positively, specifically assign such specimens as detached teeth or single bones of the extremities.[10]

Only where sufficient long bones are present to derive data capable of statistical manipulation might something be done on the basis of metrics alone. Yet even here the necessary comparative data have not been adequately compiled. Statistical developments in paleontology with the notable exception of the work of Simpson[11] and a few others have lagged. The zoologist Richards stated no less than the simple truth when he said, "Taxonomic description of species is usually insufficiently quantitative. . . . Even where linear measurements are given they are not usually recorded in a form suitable for analysis. Standard deviations are rarely calculated even where averages are recorded."[12]

In the light of these technical difficulties which we have just reviewed, it would appear that there exists a reasonable possibility that *Bison bison athabascae* represented, at least in a mixed form, the last of that Ice Age bison which early man had hunted in the western plains. If that bison as represented by the form or varieties variously designated as *taylori, antiquus* or *occidentalis* was adjusted to cooler and more forested conditions, it may, under the rising temperature following the ice-retreat, have moved along the fringe of the receding ice toward the north. At the same time its near relative or actual mutant, the existing Plains bison, may have infiltrated into its former range. This latter animal, doubtless better adjusted to postglacial warmth and dry

[10] J. A. Allen, "The American Bisons: Living and Extinct," *Memoirs of the Museum of Comparative Zoology,* Harvard University, Cambridge, Mass., p. v, 1876.

[11] G. G. Simpson, *American Journal of Science,* 239: 785–804, 1941.

[12] O. W. Richards, "The Formation of Species," in G. R. de Beer, "Evolution: Essays on Aspects of Evolutionary Biology," Oxford Press, 1938, p. 96.

prarie conditions, continued to flourish into historic time. The big Woodland bison, perhaps originally representing the *taylori* type, mixed and intergraded somewhat with the Plains bison in the northern areas. It suffered a brief period of isolation when the southern bison were exterminated and then, due to the renewed introduction of numbers of Plains bison, was tremendously diluted as a type. This dilution is not likely to have been entirely a product of late mixture, unfortunate though the latter has proved. In the days of the great herds it is not likely that there was a complete dichotomy between two such closely related forms.

The few measurements given by Rhoads of a specimen collected before the 1925 introduction of Plains bison into the preserve, fall within the range of measurements recorded for individual fossil remains of specimens of *taylori* and *occidentalis* here in the United States. Unfortunately no extended series of measurements of early specimens exist, and no early skulls are figured. Most of the few records available are of the living body and are not directly comparable to the osteological measurements of the paleontologist. Mystery clothes both the disappearance of the big bison hunted by Folsom Man and the shadowy northern form whose description, at least in some instances, sounds suspiciously similar. Because of the undoubted intermingling, however, both early and late, the situation is not one which promises easy clarification.

Nor must the thesis of this paper be taken opportunely as justification for dismissing the antiquity of the Folsom and related cultures. Folsom Man knew other extinct Pleistocene beasts besides *Bison taylori.* In addition, even if we had final and decisive proof of the relationship of *taylori* to *Bison bison athabascae,* or could show the actual survival of the former in the northern woodland within recent centuries, we would not have altered the possible antiquity of Folsom Man. Rather, by relating the shifting bison ranges to the glacial events of the terminal Pleistocene we may profitably consider whether so marked a modification of the type of bison within the High Plains area of the United States can be reasonably divorced from a direct relationship to the climatic changes of that period. It is by no means without interest that the only documented discovery of both *Bison bison* and *Bison occidentalis* in a deposit which may represent the contemporaneous existence of both forms is from a peat bog in Minnesota surmounting Wisconsin drift.[13] Here, perhaps, is the big glacial form fading northward and here is *Bison bison* coming in. Interestingly enough, one or two of what seem to be the most recent survivals of the late Pleistocene bison have been reported from Canadian areas.[14]

Only more extended exploration of the Canadian wilderness and the intensive comparison of its fossil bisons will illuminate the whole problem. Until that time, however, a question must exist as to whether the "extinct" Folsom bison lingered on into historic time, at least as an attenuated and mixed remnant on the northern fringe of that great continental bison range which the early travelers described as "making the earth one robe."

[13] Frank Leverett, "Quaternary Geology of Minnesota and Parts of Adjacent States," *U.S.G.S. Professional Paper* No. 161, p. 144, Washington, 1932.

[14] O. P. Hay, "The Pleistocene of the Middle Region of North America and Its Vertebrated Animals," *Carnegie Publication* No. 322A, Washington, 1924, p. 200.