Note

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A 9000-YEAR OLD WAPITI *(Cervus elaphus)* SKELETON FROM NORTHERN ALBERTA, AND ITS IMPLICATIONS FOR THE EARLY HOLOCENE ENVIRONMENT*

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ABSTRACT A complete and fully articulated adult male wapiti (*Cervus elaphus*) skeleton was recovered from the 50 m terrace of Smoky River, near Watino, Alberta. A collagen-based date on antler gave an age of 9075 ± 305 yr BP (S-2614). The local terrace sequence features three benches, and two previously described fossil sites are placed within it. The importance of the find is that it indicates an environment at 9000 yr BP similar to the present. A brief review of local deglaciation precedes discussion of the paleontology.

RÉSUMÉ *La découverte dans le nord de l'Alberta d'un squelette de wapiti* (Cervus elaphus) *âgé de 9000 ans et son impact sur la reconstitution de l'environnement au début de l'Holocène.* Un squelette complet et entièrement articulé d'un wapiti adulte a été retiré de la terrasse de 50 m de la rivière Smoky, près de Watino, en Alberta. Le collagène du bois de l'animal a fourni une datation au radiocarbone de 9075 ± 305 BP (S-2614). La série de terrasses locales présente trois niveaux, et deux sites de fossiles déjà décrits auparavant y sont reliés. Les restes de l'animal démontrent que le milieu était, il y a environ 9000 ans, semblable à celui d'aujourd'hui. On présente également un bref compte rendu de la déglaciation locale.

INTRODUCTION

Vertebrate paleontology has, as one of its goals, the reconstruction of past environments. The environment in the wake of a retreating glacier is interesting because the readvancing plant and animal communities are in flux; the timing of events in this context is also important. Vertebrate paleontology frequently provides information useful in both reconstructing and dating past events. Thus, the discovery of an articulated wapiti (*Cervus elaphus*) skeleton near Watino, Alberta, bearing a bone collagen age of 9075 ± 305 radiocarbon yr BP (S-2614), has significance for studies of the early postglacial period in the area south of Peace River town.

PREVIOUS QUATERNARY STUDIES IN THE AREA

TAYLOR (1960), ST-ONGE (1972), and MATHEWS (1980) discussed the formation and drainage of proglacial lake systems in the southern Peace River District, including the locality of the wapiti skeleton near Watino, Alberta. Glacial Lake Fahler (*sic*; official spelling is FALHER) drained through Lesser Slave River valley to the east by 10 700 ± 170 yr BP (GSC-1093) according to ST-ONGE (1972), and by that date, "...The area south of Peace River and of the town of Peace River became available for occupation by terrestrial plants and animals" (CHURCHER and WILSON, 1979:73).

Consistent with this date for the demise of Lake Fahler I are two dates on bison (*Bison*) bone from gravel pits in the "second terrace" at Watino: 10 200 ± 100 (GSC-2895) and 10 200 ± 100 (GSC-2902) yr BP (CHURCHER, 1984). Another bone date from a "high terrace" on the west bank of the river at Peace River is 9880 ± 130 yr BP (GSC-2865)—a minimum for local deglaciation (JACKSON and PAWSON, 1984:13).

Considering the usual reservations on dates from fluvially redeposited bone, a ^{14}C collagen assay on the autochthonous remains of the Watino wapiti should yield a reliable date for deposition.

GEOLOGY OF THE WAKALUK QUARRY

The wapiti site (Fig. 1, point E) is located in terrace fill on the east bank of Smoky River about 4.5 km south of Watino, Alberta. On the inside of a large bend, the terrace is the "middle terrace" of three at this location (Fig. 1a, b).

The skeleton rested on a medium-grained, light olive brown sand (2.5Y 5/4; Munsell Soil Color Chart) that dips several degrees eastward, away from the present river. Conformably overlying the sand and encasing the skeleton was a finer, silty, olive sand (5Y 5/3). The full thickness of the lower sand stratum was not exposed. The upper, silty sand was 2.14 m thick (estimated from photographs), and was itself overlain by at least 1.03 m of coarse fluvial gravels and sands. It was hard to judge the gravel's thickness at the open pit but it must have been more than 1 m thick judging by the survey results. (Fig. 1b; points E and F are separated by more than 6 m vertically.)

A land survey was commissioned to tie the site into a geodetic bench mark at Watino (Fig. 1a, point A). The resulting valley section, though not on a strict traverse, is given in Fig. 1b. The section shows that the "lower terrace" stood

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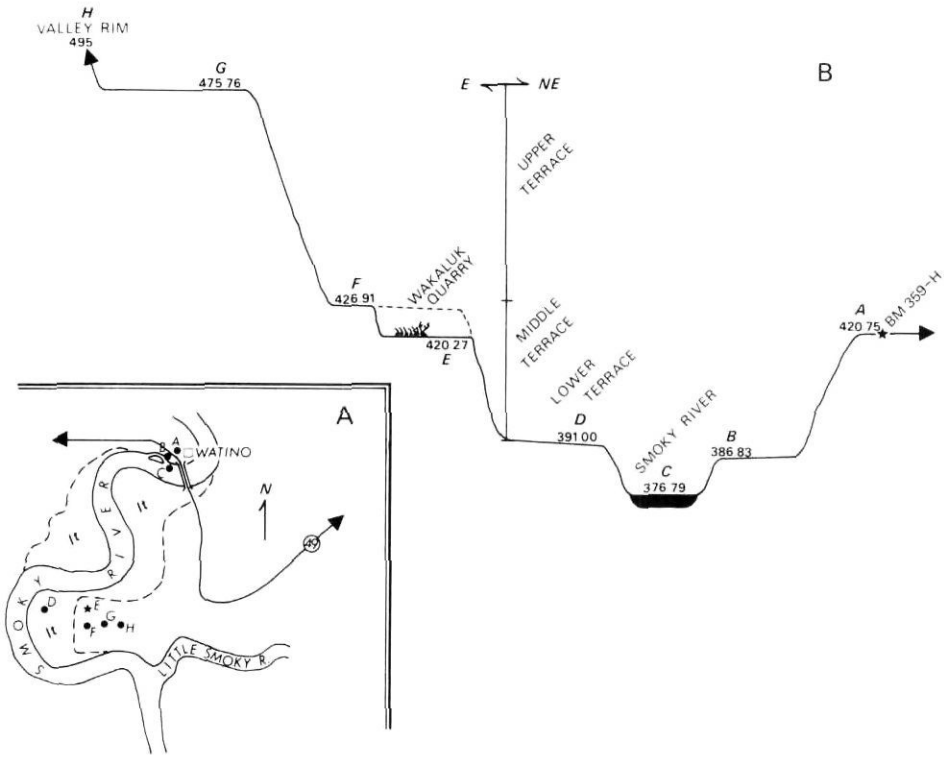

FIGURE 1. The Wakaluk fossil site. 1a) Sketch map of Smoky River, near Watino, Alberta showing physical features of the river course: *lt*: the lower terrace; dashed line—the margin of the middle terrace; A: benchmark No. 359-H; B: the "Watino" site; E: the Wakaluk site. The distance between A and E is about 4.5 km. 1b) A transect of Smoky River valley illustrates elevations (in metres a.s.l.) of the terraces. The horizontal dimension does not represent the irregular traverse (A-D and D-H roughly) of the survey, as seen in Figure 1a.

Le site fossilifère de Wakaluk. 1a) Carte schématique de la rivière Smoky, près de Watino, en Alberta, montrant les principales caractéristiques physiques de son tracé: lt: la basse terrasse; la ligne pointillée montre le rebord de la terrasse moyenne; A: la borne géodésique n° 359-H; B: le site fossilifère de Watino; E: le site fossilifère de Wakaluk. La distance entre A et E est d'environ 4,5 km. 1b) Profil transversal de la vallée de la rivière Smoky montrant les altitudes des terrasses (en mètres). Le profil n'est pas une représentation fidèle de la ligne transversale irrégulière du levé (A-D, D-H) telle qu'on l'aperçoit sur la figure 1a.

14 m above the April, 1985 water level in the river; the "middle terrace" stood about 50 m above the river and 35 m above the lower terrace; the "upper terrace" stood 99 m above the river.

CORRELATION OF AREA SITES

The survey ties in two other fossiliferous sites at Watino. The top of the "Watino site" (WESTGATE *et al.*, 1972) lies at about 387 m a.s.l. (Fig. 1b, point B) which approximates the level of the lower terrace on the Wakaluk property (at 391 m a.s.l.). Published finite dates from the classic site range from 43 500 to 27 400 yr BP (WESTGATE *et al.*, 1972) but several unpublished dates (Westgate, pers. comm., 1985) are considerably younger. It may be that the site is located in a buried channel and this produces uncharacteristically old dates for this lowest terrace. An overview of the entire suite of biological, geological, and tephrochronological data is eagerly awaited.

The second site relating to the survey is the "Pucci pit" (CHURCHER and WILSON, 1979), at about 420 m a.s.l. (from NTS map 83 N/12) on the western limits of Watino. The datum approximates the level of the Wakaluk wapiti stratum (*i.e.*, the "middle terrace"). Pucci's pit has yielded a small collection of vertebrate fossils, mostly horse, and produced the aforementioned ^{14}C date on bison bone collagen of 10 200 yr BP. Thus, the middle terrace deposition took place partly over the period from 9000 to 10 200 yr BP. The "upper terrace" at Wakaluk, which is not so conspicuous as the others, may then equate to the "oldest terrace levels ... estimated to date from about 10 500 or more years ago on the basis of the chronocline ... of *Bison* described by Wilson (1978) and St-Onge's (1972) chronology" (CHURCHER and WILSON, 1979:73).

EXCAVATION AND RECOVERY OF THE SKELETON

The skeleton was discovered by quarry operator, George Wakaluk as the loaded sand in December, 1984. He enjoined Drs. Bert Hunt and Desh Mittra of the Science Department, Grande Prairie Regional College (GPRC), Grande Prairie, Alberta to excavate the remains. Hunt contacted me at the Provincial Museum (PMA). Early in January, 1985, Hunt arranged to have "about 15 feet" of overburden removed and on 9 January, I viewed the site and the excavations that had uncovered the hind quarters and head, and advised postponement of further work till spring thaw.

Late in April, the remains were excavated from semi-frozen ground (Fig. 2a, b). In some instances pasty, the bones were carefully removed and taken to GPRC where broken elements were glued and the whole stabilized. The skull and skeleton have now been cast for display at the PMA. The specimen is catalogued as P85.10.1 in the Quaternary Paleontology collection of the PMA.

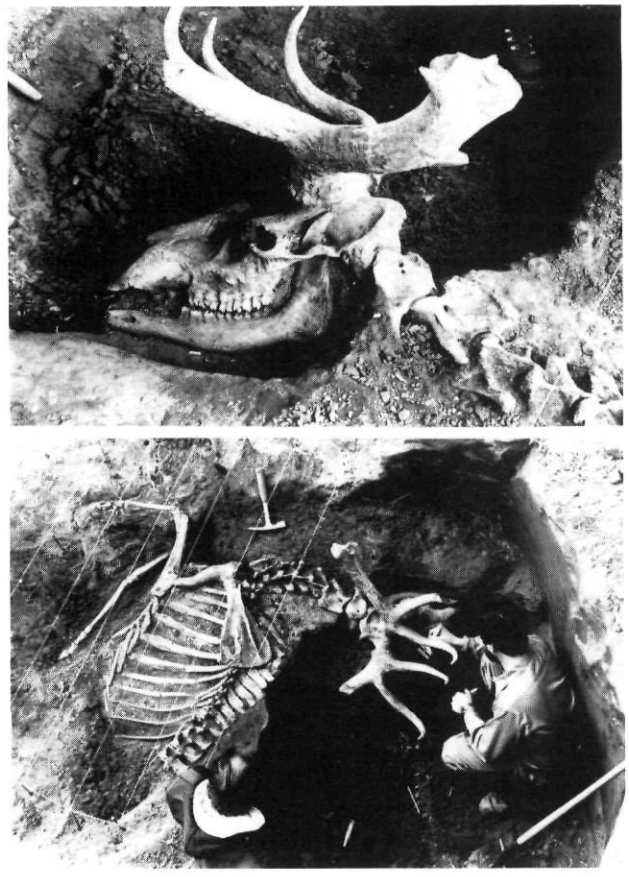

FIGURE 2. The Wakaluk wapiti *in situ*. 2a) The skull lacks the right antler (below) beyond the bez tine; the left antler, although broken in several places, is nearly whole (not illustrated). 2b) The carcass lies on its right side, fully articulated.

Le wapiti de Wakaluk in situ. *2a) La plus grande partie du bois droit (en-dessous) est absente; le bois gauche, brisé en plusieurs morceaux, est à peu près complet (non illustré). 2b) L'animal, entièrement articulé, repose sur son flanc droit.*

PALEOENVIRONMENTAL CONSIDERATIONS

The most impressive feature of the Wakaluk wapiti is the tight articulation of the skeleton which lay on its right side in a typical death pose with the neck arched backward. The underlying right shoulder was dislocated post-mortem and a few of the phalanges and sesamoids were lost during the loading of sand. The bones lay on a sandy stratum that dipped slightly eastward; no bone penetrated that sand. Noteworthy was the loss of the right antler above the bez tine; absence of the antler suggests loss prior to deposition. Otherwise the skeleton was complete.

Clearly, the lack of disturbance and the definite sedimentary change indicate expiry of the animal in a fluvial environment with nearly immediate burial by over 2 m of silty fluvial sands. That the skull sported a fully developed rack suggests a winter death. One scenario that fits these taphonomic data is that of a solitary stag attempting to cross the frozen river in early winter and falling through thin ice to drown. In the ensuing spring flood, sands and silts quickly buried the animal just off the main channel and protected it from disturbance. Ecologically the wapiti is adaptable and, although found in many habitats, is most often found in open areas such as prairies, marshy meadows, and river flats, and only rarely in coniferous forests (BANFIELD, 1974).

Thanatocoenoses such as that inferred for the Wakaluk wapiti rarely produce fossil pollen. Analysis of soil samples from around the antler produced expected results: a few tens of highly degraded, unidentifiable palynomorphs with one questionable spruce (*Picea*) pollen grain (C.E. Schweger, University of Alberta, Edmonton, pers. comm., 1985). Normally, early postglacial pollen assemblages in this area would be dominated by *Picea* pollen (Schweger, pers. comm., 1985).

Fossil wapiti from Alberta are not common. The best preserved example is the Milan wapiti from near Three Hills (SHACKLETON and HILLS, 1977). It apparently bogged down in soft pond or lake sediments about 9600 yr ago [9630 ± 300 yr BP (GSC-1894); 9670 ± 160 yr BP (I-8579); both are uncorrected dates]. Isolated wapiti antlers have been recovered from several Edmonton area localities in Late Wisconsinan—early Holocene contexts (PMA specimens, to be reported later). Wapiti fossil remains have also been noted from Peace River and from near Grande Prairie (CHURCHER and WILSON, 1979). The Wakaluk animal is morphologically indistinguishable from modern wapiti and of comparable size. A later study will compare morphometrically the Wakaluk and Milan specimens with modern representatives.

CONCLUSIONS

The Wakaluk wapiti is an ideal time datum for the 50 m terrace on Smoky River near Watino. It is too late, however, to indicate onset of local deglaciation. Environmental clues are vague but conditions at the time may not have been much different from today's.

The area is relatively rich in Quaternary fossils, but study has been limited. Fossil sites along the eastern slopes of the Rockies, from the Crowsnest Pass in the south to Peace River in the north, should in future provide a fuller description of events and conditions during early Holocene deglaciation.

ACKNOWLEDGEMENTS

Grande Prairie Regional College generously granted funds and the use of facilities for the project, and are here gratefully acknowledged. Dr. Bert Hunt, then Head of the Science Department, deserves much of the credit for obtaining the support. He acted as intermediary and expediter; he arranged the stripping of the site, the land survey, and the manpower. Dr. Desh Mittra, of the same department, assisted in excavating and was helpful in the geological interpretations. Both men were deeply involved in the later conservation of the bones in the lab at GPRC. I thank Dr. C.E. Schweger, University of Alberta, for screening the pollen samples. Technician, Dale McInnes (PMA), was involved at all stages of the effort and is currently preparing casts for display. Most important, however, was the public spirit of George Wakaluk. He initially

alerted the scientific community to the important find and then cheerfully and enthusiastically joined us in the fieldwork. Excavation proceeded under a permit issued to me by the Alberta Paleontological Advisory Committee. I also thank C.R. Harington and an anonymous reviewer for their comments.

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