

THE PEARCE- SELLARDS *Series*

TEXAS MEMORIAL MUSEUM : THE UNIVERSITY OF TEXAS : NUMBER 1

JUNE 1, 1963

Fossil Bears from Texas

BY BJÖRN KURTÉN

Illustrations by Hal M. Story

The Pearce-Sellards Series

TEXAS MEMORIAL MUSEUM, THE UNIVERSITY OF TEXAS

It has become increasingly clear in the past few years that there was a growing need for an occasional, miscellaneous series of papers in which original studies of collections and field investigations of the Museum could be published. Many such reports are too brief for use in the *Bulletin* of the Texas Memorial Museum, yet are too long for many scholarly or scientific journals. Consequently, we are delighted to be able to inaugurate this series, each number of which will be issued separately.

The Pearce-Sellards Series, as other Museum publications, is financed solely by profits from the Museum's sales counter.

The title, *The Pearce-Sellards Series*, seeks to commemorate the first two directors of the Museum, both now deceased: J. E. Pearce, Professor of Anthropology, University of Texas, whose efforts were in large part instrumental in establishing the Texas Memorial Museum; and Dr. E. H. Sellards, who was director of the Museum from the time the doors were opened in 1939 until his retirement in 1957. If these papers can maintain the standards of excellence these men set, the success of this series is assured.

W. W. NEWCOMB, JR.
Director

Table of Contents

	PAGE
Introduction	3
Discussion	
<i>Ursus americanus amplidens</i> Leidy	3
<i>Tremarctos floridanus</i> (Gidley)	9
<i>Arctodus cf. pristinus</i> Leidy	11
Conclusions	12
References	14

List of Illustrations

FIGURE		PAGE
1	Lateral view of fossil bear skull from Friesenhahn Cave, Bexar County, Texas	4
2	Ventral view of fossil bear skull from Friesenhahn Cave	5
3	Dorsal view of fossil bear skull from Friesenhahn Cave	6
4,A,B	Occlusal and lateral views of M ₃ of <i>Tremarctos floridanus</i>	9
4,C,D	Occlusal and lateral views of M ₂ of <i>Tremarctos floridanus</i>	9
5,A,B,	Occlusal and lateral views of left M ₂ of <i>Arctodus cf. pristinus</i>	11
5,C,D	Occlusal and lateral views of left M ₃ of <i>Arctodus cf. pristinus</i>	11
6	Map showing sites that yielded bear remains	13

List of Tables

TABLE		PAGE
1	Skull dimensions in <i>Ursus americanus</i>	7
2	Dental dimensions in <i>Ursus americanus</i>	8
3	Limb bone dimensions in <i>Ursus americanus</i>	8
4	Dimensions of second and third lower molars in <i>Tremarctos floridanus</i> and <i>Arctodus pristinus</i>	10
5	Location of Pleistocene Bears in Texas	13

Fossil Bears from Texas

BY BJÖRN KURTÉN

Institute of Zoology, University of Helsingfors, Finland

INTRODUCTION

This paper is a description of the remains of fossil bears in the Bureau of Economic Geology of The University of Texas and in the Texas Memorial Museum, which were studied during a stay in Austin in June, 1959.¹ The study mainly concerns skulls, mandibles, and teeth. Limitation of time precluded a thorough sorting of postcranial materials, the listing of which may therefore not be complete.

All of the material is evidently of late Pleistocene age and represents three species of bears: the living black bear, *Ursus americanus*; the extinct North American spectacled bear, *Tremarctos floridanus*; and an extinct short-faced bear of the genus *Arctodus*. The sites that have yielded bear remains are the Friesenhahn Cave, Bexar County; the Saltillo Cave, Edwards County; the Longhorn Cavern, Burnet County; the so-called Clamp's Cave, San Saba County; and the Ingleside Gravel Pit, San Patricio County (Fig. 6).

Drs. John A. Wilson and Ernest L. Lundelius provided most generous help and hospitality. The study is part of a research program sponsored by the Rockefeller Foundation through the American Museum of Natural History, and by the Finnish State Commission of Natural Science.

DISCUSSION

Ursus americanus amplidens Leidy

Ursus amplidens Leidy, 1853

Ursus optimus Schultz, 1938

Ursus americanus gentryi Skinner, 1942

Type.—A fragmentary lower jaw with M_3 and associated M^1 , described by Leidy (1856).

Type locality.—Pine Ridge, near Natchez, Mississippi; Pleistocene.

Diagnosis.—A black bear averaging markedly larger than the living form.

Friesenhahn Cave. TMM Nos. 933-3441, skull (Figs. 1, 2, 3); 933-718 and 933-719, upper canines, probably belonging to the skull; 933-2543, M_3 ; 933-2544, M_1 ; 933-2545, P_4 ; 933-2616, scapho-lunar; 933-726, calcaneus.

¹ Abbreviations used to identify collections are: BEG—Bureau of Economic Geology; TMM—Texas Memorial Museum; USNM—United States National Museum.

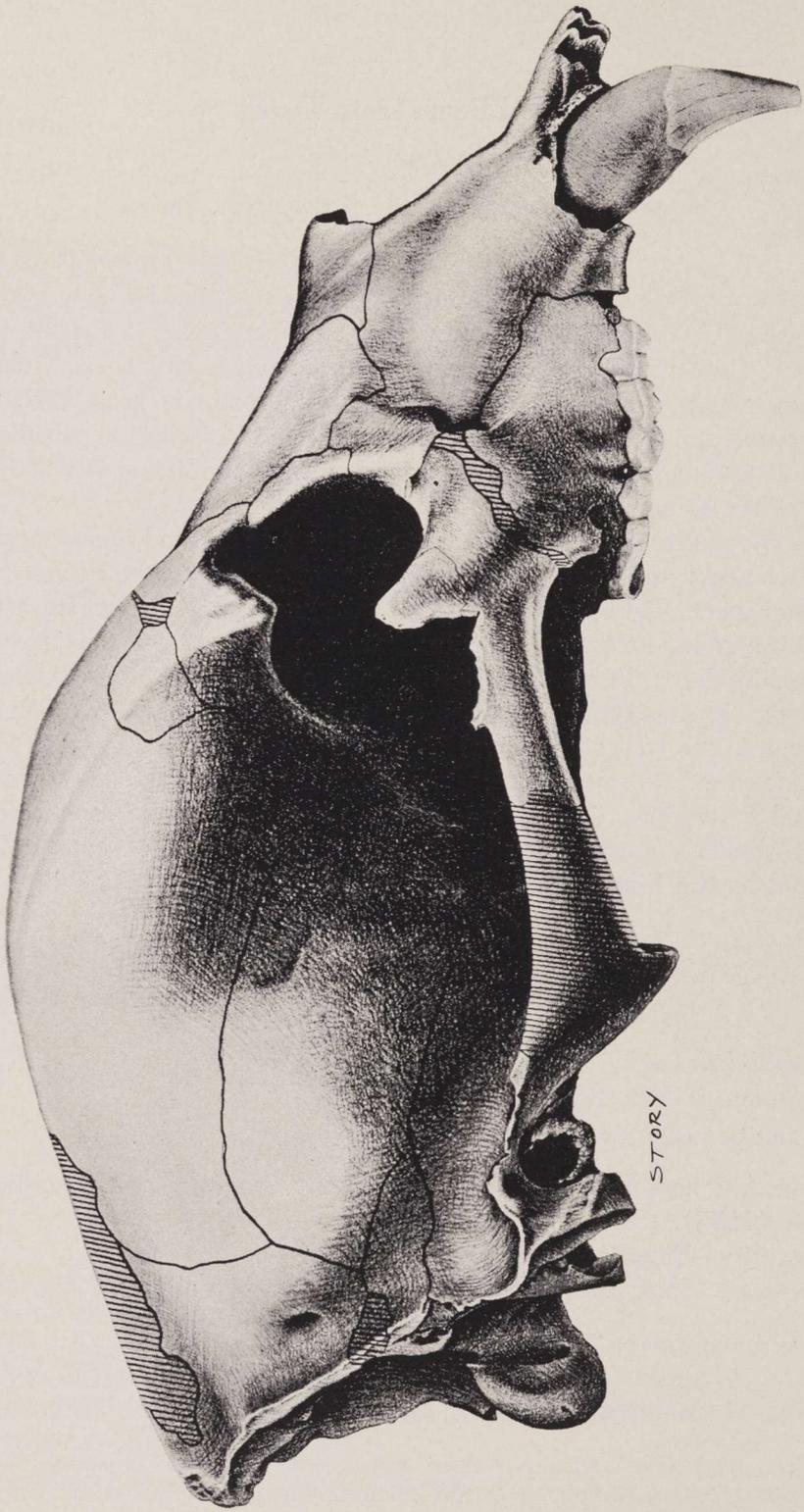


Fig. 1. Skull of Fossil Bear (lateral view) from Friesenhahn Cave, Bexar County, Texas.

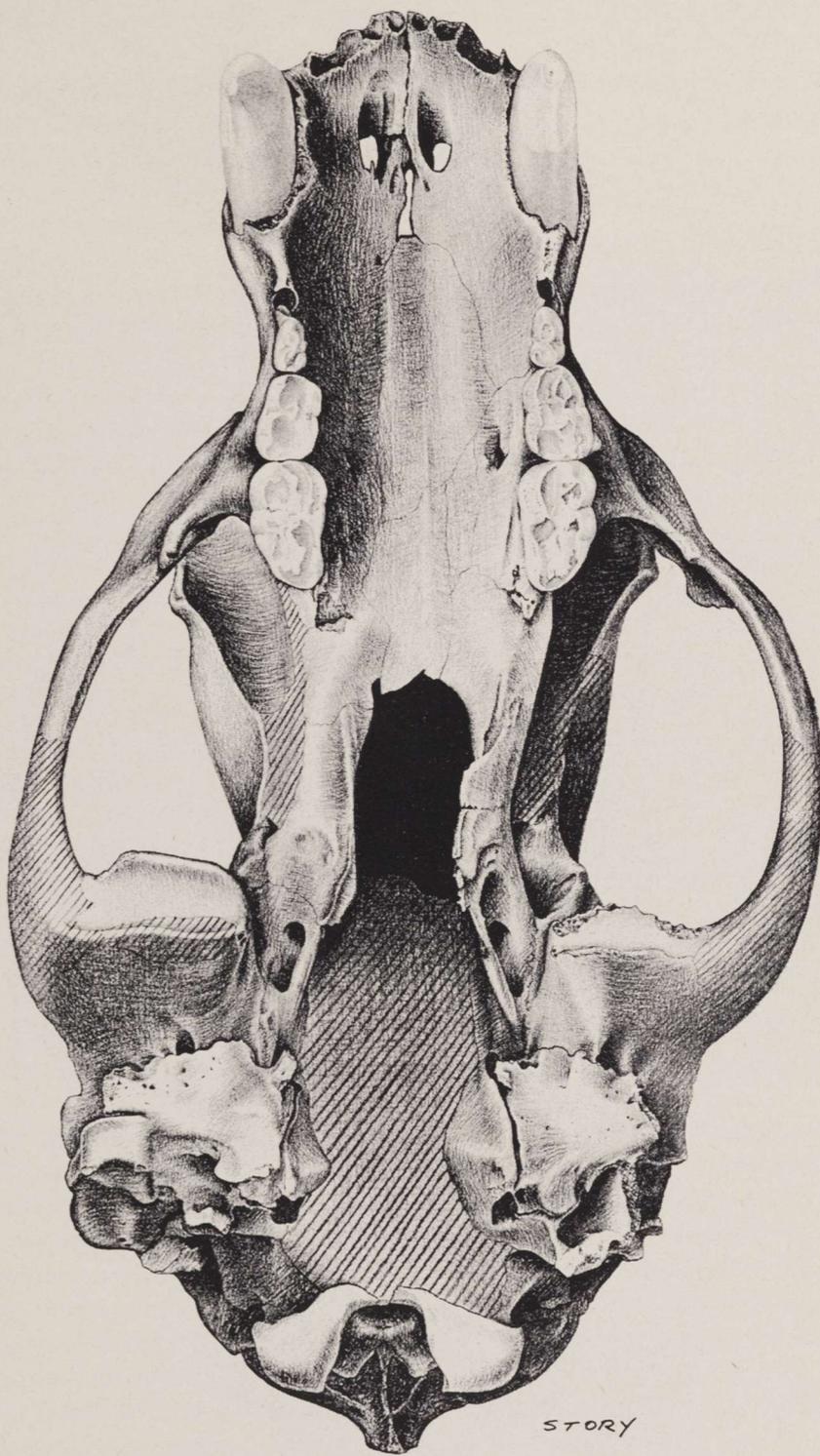


Fig. 2. Skull of Fossil Bear, ventral view.



Fig. 3. Skull of Fossil Bear, dorsal view.

Longhorn Cavern. BEG. No. 40279 61, calcaneus; BEG 40279 138, half skull.

Saltillo Cave. BEG 40561-1, right and left lower jaws of one individual; BEG 40561-2, right side of braincase; BEG 40561-3, humerus; BEG 40561-4, proximal end of femur.

Clamp's Cave. TMM 1295-51, and TMM 1295-52, two lower jaw fragments of different individuals.

Remarks.—The three skulls, from Friesenhahn, Longhorn Cavern, and Saltillo, are all of large animals with a basal length of about 300 mm. (Table 1).

TABLE 1
Skull dimensions in *Ursus americanus* (millimeters)

	Friesen- hahn 933-3441	Longhorn Cavern	Florida	Recent Florida	Mexico	Mexico
Basal length	293	---	257	245	235	240
Condylbasal length	309	306	270	260	246	253
Prosthion-inion length	334	---	---	---	---	---
Rostral breadth	78	---	60	59	57	54½
Breadth across M ²	80	81	67	68	68	68
Postorbital processes, breadth	113	---	83	83	83	83
Depth at anterior end of nasals	57	52	45	46	46	41
Depth at postorbital processes	108	---	84	75½	80	77

The length of the Saltillo specimen cannot be directly measured, but the distance from the inion to the apex of the right postorbital process is 196 mm. in this specimen; in the skull from Friesenhahn it is 205 mm. These dimensions are close to those of the fossil black bears from McKittrick (Schultz, 1938) and the Samwel Cave, whereas the skull from Papago Springs Cave (Skinner, 1942) is smaller and perhaps may represent a female individual.

The Recent black bear skulls used for comparison are all much smaller. Table 1 shows the dimensions of a small number of specimens from the southern part of the species' range (Florida and Coahuila). According to the data available to me, these do not differ appreciably in mean dimensions from more northern types. It is true that some exceptional specimens in the living population reach dimensions comparable to those of the fossils. The Boone and Crockett Club Record lists some specimens that rival the Friesenhahn skull in length, though none of them attains the size of the McKittrick skull. These prize specimens, however, are highly selected distal variants.

Similarly, the teeth (Table 2) and limb bones (Table 3) are markedly larger, on an average, than the Recent black bears. Morphologically, how-

TABLE 2

Dental dimensions in *Ursus americanus* (millimeters)

	Friesen- hahn	Longhorn Cavern	Saltillo	Clamp's Cave	Clamp's Cave	Type <i>U. amp- lidens</i> Leidy	Recent mean (ca. 25-30 individuals)
P ⁴ length	13.5	14.0	---	---	---	---	11.85±0.13
breadth	8.6	9.4	---	---	---	---	8.56±0.13
M ¹ length	21.3	20.2	---	---	---	21	17.82±0.20
breadth	15.8	15.4	---	---	---	---	13.18±0.20
M ² length	30.3	31.0	---	---	---	---	26.23±0.29
breadth	17.8	16.9	---	---	---	---	14.33±0.19
P ₄ length	10.0	---	9.8	---	---	---	9.33±0.13
breadth	6.0	---	5.6	---	---	---	5.27±0.09
M ₁ length	21.9	---	18.9	21.7	---	---	18.86±0.24
breadth	10.6	---	9.2	10.4	---	---	9.05±0.14
M ₂ length	---	---	20.2	22.1	22.6	---	19.98±0.26
breadth	---	---	13.1	13.2	13.2	---	12.02±0.20
M ₃ length	18.2	---	16.3	13.8	---	19	15.04±0.24
breadth	14.0	---	13.5	13.7	---	14	11.59±0.17

TABLE 3

Limb bone dimensions in *Ursus americanus* (millimeters)

	Friesenhahn	Longhorn Cavern	Saltillo	Recent	Recent
Humerus, length	---	---	308	255	240
Scapho-lunar, width	39.2	---	---	35.2	31.5
Femur, shaft width	---	---	34	26.9	28.7
Calcaneus, length	74	85	---	70	63

ever, they are indistinguishable from the living form. The same is largely true for the skulls, though that from Friesenhahn (Figs. 1, 2, 3) is unusually high-vaulted (which is also true of the McKittrick specimen). This may well be due to an allometric growth pattern, and be simply a by-product of the large size.

Pleistocene representatives of living species are frequently found to average larger than their living descendants. This is particularly true for the bears, which are extremely plastic in size (Kurtén, 1959). There is thus no reason for a specific separation between the Pleistocene and Recent black bears.

These remarks apply particularly to the black bears of the last or Wisconsin glaciation. The forms of Illinoian date from the Cumberland Cave and the Conard Fissure are distinguished by somewhat smaller size and a slightly more primitive dentition with large carnassials and small back teeth; these

early black bears are still very close to the second-glaciation, or Elster, *Ursus thibetanus kokeni* from China, which is likely to be the ancestral form. The earliest record for *Ursus americanus* in North America appears to be that from the Port Kennedy Cave (Hibbard, 1958), dating from the Yarmouth; I have not seen this material, and there is no good description. It may be tentatively suggested that the early (Yarmouthian and Illinoian) black bears of America might be regarded as a distinct subspecies, for which the name *Ursus americanus vitabilis* Gidley, 1914, is available (type locality, Cumberland Cave).

As regards the Wisconsin forms, the proper procedure at present seems to be to take the earliest name and use it as a subspecific designation. This is *Ursus amplidens* Leidy (1853). As the name indicates, the form was distinguished from the Recent black bears by the large size of the teeth (Table 2). The cotype jaw was noted to be unusually shallow; probably this is due to immature age.

Tremarctos floridanus (Gidley)

Arctodus floridanus Gidley, 1928.

Tremarctos mexicanus Stock, 1950.

Type.—USNM 11833, partial skull and mandible.

Type locality.—Melbourne, Florida; late Pleistocene.

Diagnosis.—A *Tremarctos* of somewhat larger size than the living *Tremarctos ornatus*, and with much more robust limb bones.

Ingleside. BEG Nos. 30967–1031, M_3 (Fig. 4,A,B); 30967–1880, M_2 (Fig. 4,C,D).

Remarks.—These two teeth (Fig. 4) agree perfectly with tremarctine material from Seminole Field and Melbourne, Florida, and the San Josecito

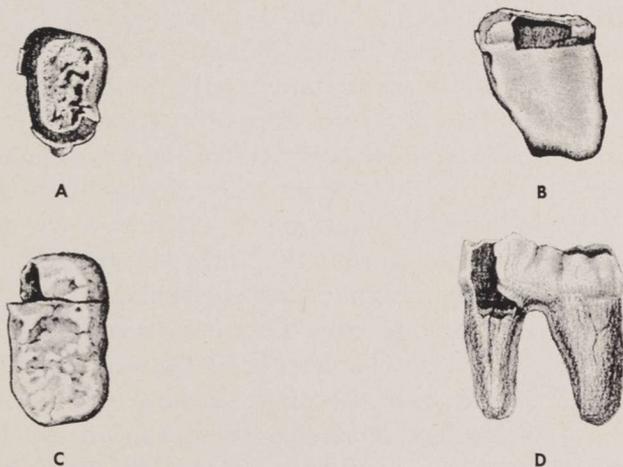


Fig. 4. Occlusal (A) and lateral (B) views of M_3 ; Occlusal (C) and lateral (D) of M_2 , *Tremarctos floridanus*.

Cave, Mexico. The second lower molar is diagnostic; though its size is about that of *Ursus americanus*, the subrectangular outline with nearly straight sides and truncated ends, the high anterior region, and the flat crown profile distinguish it completely from the black bear.

TABLE 4
Dimensions of second and third lower molars in *Tremarctos floridanus* and *Arctodus pristinus* (millimeters)

	M ₂		M ₃	
	Length	Breadth	Length	Breadth
<i>Tremarctos floridanus</i>				
Ingleside (isolated)	22.2	13.2	16.0	11.8
Seminole (isolated)	21.5	12.3	15.2	11.7
	21.6	12.0	-----	-----
	21.9	12.5	-----	-----
	22.7	13.1	-----	-----
	24.0	12.8	-----	-----
San Josecito (in jaws)	21.5	12.3	14.6	11.7
	21.6	13.0	16.3	12.8
<i>Arctodus pristinus</i>				
Friesenhahn (isolated)	28.9	19.2	20.4	16.2
	-----	-----	20.3	16.2
Potter Creek (in jaws)	28.8	19.8	19.5	15.9
	28.5	19.7	20.3	16.1
(isolated)	28.5	19.9	19.0	16.2
	28.7	20.0	-----	-----
	29.2	19.5	-----	-----
	29.7	19.6	-----	-----

Gidley placed this species in *Arctodus* (which genus was then generally held apart from *Arctotherium* and *Tremarctotherium*), and Stock (1950) was the first to recognize its closer affinity with the spectacled bears. There can be no doubt about the very close relationships between *Tremarctos ornatus* and *Tremarctos floridanus*. Except for size and some slight differences in relative proportions, the two have identical dentitions. They differ, however, in the build of the limb bones, which are very slender in the South American form, and quite surprisingly robust in the North American. The difference between the two species may in some respects be analogous to that between the brown bears (*Ursus arctos*) and cave bears (*Ursus spelaeus*) in Europe during the Pleistocene. A striking character is, for instance, the high elevation of the jaw articulation relative to the plane of the cheek teeth (Stock, 1950; Figs. 1, 2, 3). This is also characteristic of the European cave bear.

I see no justification for a specific separation of the Mexican material from that of Florida. Dental morphology and dimensions are the same in both, and

both, furthermore, have very heavy limb bones. The Texan record links the two previous ones together and indicates that there was a continuous species range. Future studies might reveal a subspecific distinction between the Mexican and Floridian populations, but the material available to me does not warrant such a procedure.

Arctodus cf. pristinus Leidy

Arctodus pristinus Leidy, 1854.

Arctotherium simum Cope, 1879.

Ursus haplodon Cope, 1896.

Arctotherium yukonense Lambe, 1911.

Arctotherium californicum Merriam, 1925.

Dinarctotherium merriami Barbour, 1916.

Type.—A second lower molar, described in Leidy, 1860.

Type locality.—Ashley River Pleistocene bed, near Charleston, South Carolina; Pleistocene.

Diagnosis.—Medium size to very large arctodont bears; upper cheek teeth relatively smaller and, particularly, narrower than in the large South American species.

Friesenhahn Cave. TMM Nos. 933–2156, left M_2 (Fig. 5,A,B); 933–2205, left M_3 (Fig. 5,C,D); 933–2963, right M_3 .

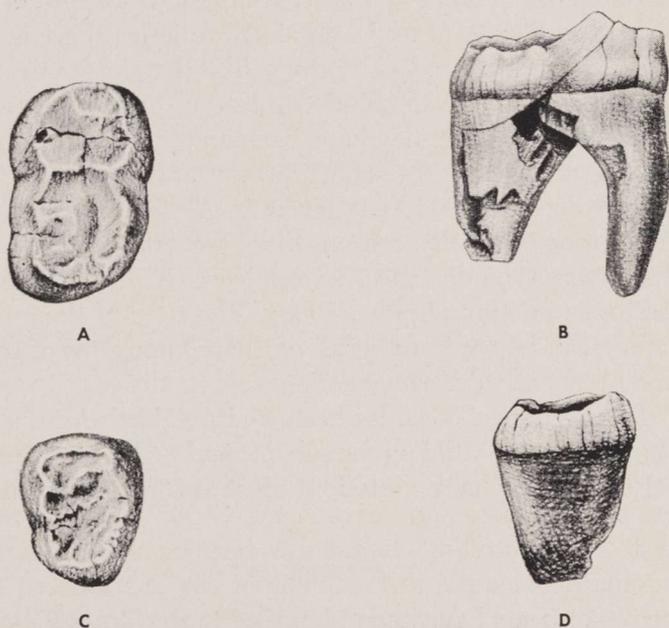


Fig. 5. Occlusal (A) and lateral (B) views of M_2 ; Occlusal (C) and lateral (D) views of M_3 , *Arctodus cf. pristinus* Leidy.

Remarks—The teeth are unworn, though the roots are closed, and may well represent a single individual. In size they resemble the grizzly bear (*Ursus arctos*), but they are easily distinguished from that form by the following characters: M_2 with oblique hind border (buccal side produced posterad), simple and nearly flat occlusal field, high front end, protoconid and metaconid forming a low transverse ridge interrupted by a narrow notch in the center; M_3 high-crowned, ovoid in outline, and with nearly smooth occlusal field. These teeth resemble in all respects some of their homologues in the material from Potter Creek Cave, the type locality of *Arctotherium simum* Cope.

The North American short-faced bears have been variously placed in the genera *Arctodus*, *Arctotherium*, *Tremarctotherium*, *Dinarctotherium*, *Tremarctos*, and *Ursus*. Clearly, their closest affinities lie with the South American "Arctotherium" (*Pararctotherium*), with which they may be regarded as congeneric; the generic name *Arctodus* takes precedence. Kraglievich (1926) points out a number of differences between the North and South American forms, which must be regarded as distinct species, but not distinct genera as Kraglievich inferred.

That *Arctodus*, *Tremarctos*, and the late Tertiary *Plionarctos* form a natural group seems also evident, the last-mentioned being ancestral (Thenius, 1958).

The South American fossil arctodonts apparently represent at least three species, ranging in size from the gigantic *Arctodus bonariensis* (Gervais) through the moderately large *Arctodus pamparus* (Ameghino) to the very small *Arctodus brasiliensis* (Lund). In North America there is some local or temporal size differentiation, but nothing like that in South America, and apparently not more than that found within the single species *Ursus arctos* (Kurtén, 1955; 1959). There may have been an oscillation in size, in rapport with the climatic changes, of the same type as that found in *Ursus arctos*. The largest North American arctodonts occur in Alaska and in the (Illinoian-glacial) Hay Springs. For this reason, there seems no possibility at present of recognizing more than one species from North America. The name of this becomes *Arctodus pristinus* Leidy. Though the type of the species is but a single M_2 , there can be no doubt at all of the relationships of this very characteristic and excellently described and figured tooth.

Some of the other species names bestowed on North American arctodont bears may be found to be valid on the subspecies level. The proper subspecific allocation of the Friesenhahn arctodont must await further studies.

CONCLUSIONS

Three species of bears have been identified in the Texas Pleistocene. They are a large black bear, referred to the subspecies *Ursus americanus amplidens* Leidy; a large spectacled bear, *Tremarctos floridanus* (Gidley); and a me-

dium sized short-faced bear, tentatively placed in *Arctodus pristinus* Leidy. Their geographic distribution is as follows (Fig. 6):

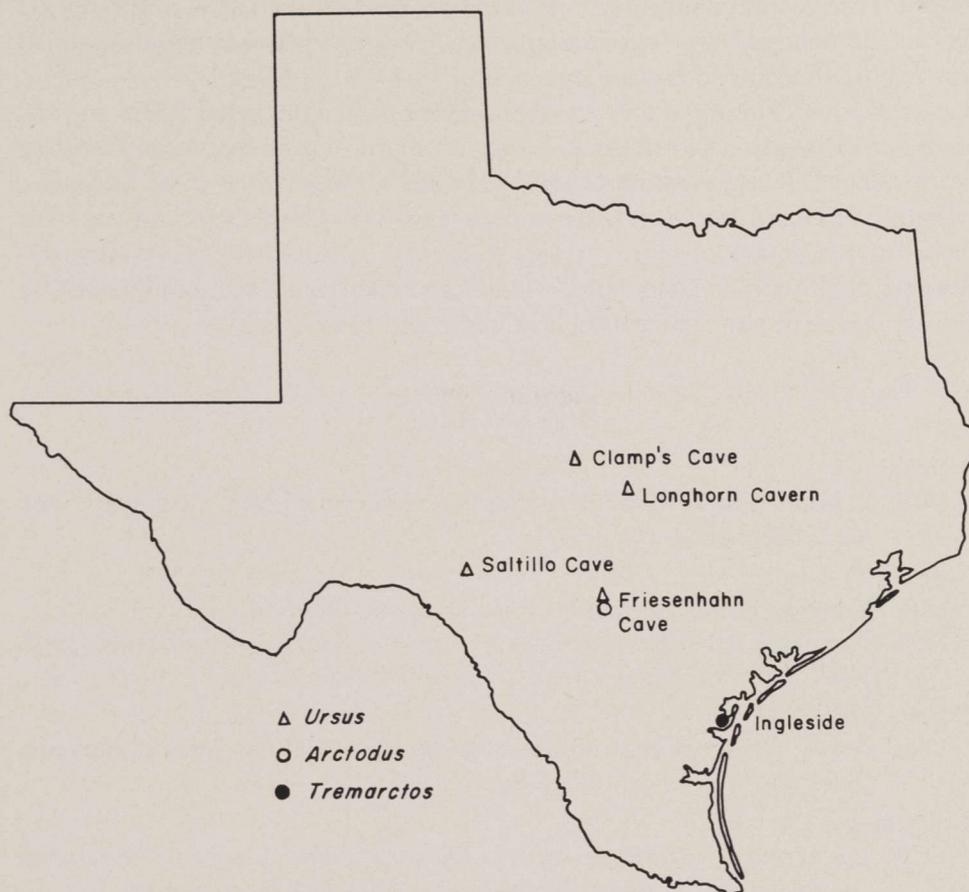


Fig. 6. Map showing sites that yielded bear remains.

TABLE 5
Location of Pleistocene Bears in Texas

	<i>Ursus americanus amplidens</i>	<i>Tremarctos floridanus</i>	<i>Arctodus pristinus</i>
Friesenhahn Cave	x	---	x
Longhorn Cavern	x	---	---
Saltillo Cave	x	---	---
Clamp's Cave	x	---	---
Ingleside	---	x	---

All of these occurrences are of late Pleistocene age.

Of the three species found in the Pleistocene of Texas, *Ursus americanus* and *Arctodus pristinus* were widely distributed in North America, and may be said to form a northern element in the fauna. *Tremarctos floridanus*, in

contrast, may have been an immigrant from the south, since its known range extended from Mexico along the Gulf Coast to Florida. Areas of overlap between these two faunal groups are found in Mexico and Texas, and partially in Florida, where *Ursus americanus* and *Tremarctos floridanus* are present but *Arctodus* seems to be lacking.

The factors bringing about the extinction of the spectacled bears and the short-faced bears in North America are obscure, but competition from the black bears (*Ursus americanus*) and grizzlies (*Ursus arctos*) may have contributed. No fossil *Ursus arctos* is known from Texas, however, and very few from the remainder of North America. It may be noted that *Arctodus*, evidently a highly predaceous form, would have been much more influenced by the extinction of large game animals than would *Ursus arctos*.

REFERENCES

BARBOUR, H.

1916. A giant Nebraska bear *Dinarctotherium merriami*. Neb. Geol. Surv., Vol. 4, pt. 26, pp. 349-353.

COPE, E. D.

1879. The cave bear of California. Amer. Nat., Vol. 13, p. 791.
1896. New and little-known mammalia from the Port Kennedy bone deposit. Jour. Acad. Nat. Sci., Phila., Vol. 48, pp. 378-394.

GIDLEY, J. W.

1928. A new species of bear from the Pleistocene of Florida. Jour. Washington Acad. Sci., Vol. 18, pp. 430-433.

KRAGLIEVICH, L.

1926. Los arctoterios norteamericanos (*Tremarctotherium*, n. gen.) en relacion con los de Sud America. An. Mus. Nac. Hist. Nat. Buenos Aires, Vol. 34, pp. 1-16.

KURTÉN, B.

1955. Sex dimorphism and size trends in the cave bear, *Ursus spelaeus* Rosenmuller and Heinroth. Acta Zool. Fennica, No. 90, pp. 1-48.
1959. Rates of evolution in fossil mammals. Cold Spring Harbor Symp., Vol. 24, pp. 205-215.

LAMBE, L. M.

1911. On *Arctotherium* from the Pleistocene of Yukon. The Ottawa Naturalist, Vol. 25, pp. 21-26, pl. 1-3.

LEIDY, J.

1853. [Descriptions of *Ursus amplidens*]. Proc. Acad. Nat. Sci. Phila., Vol. 6, p. 303.
1854. [Remarks on *Sus americanus*, or *Harlanus americanus*, and on other extinct mammals.] Proc. Acad. Nat. Sci. Phila., Vol. 6, pp. 89-90.
1860. Description of fossil vertebrates. In F. S. Holmes, Post-Pleistocene fossils of South Carolina, pp. 99-122.

MERRIAM, J. C.

1911. Note on a gigantic bear from the Pleistocene of Rancho La Brea. Univ. Calif. Pub., Bull. Dept. Geol., Vol. 6, pp. 164-166.

SCHULTZ, JOHN R.

1938. A late Quaternary mammal fauna from the tar seeps of McKittrick, California, Pub. Carnegie Inst. 487, pp. 111-215.

SKINNER, M. F.

1942. The fauna of Papago Springs Cave, Arizona. Bull. Amer. Mus. Nat. Hist., Vol. 80, art. 6, pp. 143-220.

STOCK, C.

1950. Bears from the Pleistocene cave of San Josecito, Nuevo Leon, Mexico. Jour. Washington Acad. Sci., Vol. 40, pp. 317-321.

THENIUS, E.

1959. Ursidenphylogense und Biostratigraphie. Zeitschr. Säugetierkunde, Vol. 24, pp. 78-84.

Museum Publications

Funds for publication of the *Pearce-Sellards Series* as well as all other pamphlets and booklets are derived solely from the proceeds of the Museum's sales counter. Profits, if any, from Museum publications are used to issue additional papers.

MUSEUM NOTES

No. 3. <i>Twice-Told Tales of Texas</i> (2nd Edition, February, 1959)30
No. 4. <i>Texas Through 250 Million Years</i> (Reprinted March, 1958)20
No. 6. <i>Texas Memorial Museum, A Guide</i> (Revised and retitled September, 1957)30
No. 7. <i>Sulphur, the Story of a Vital Element</i>15
No. 8. <i>The Skeleton of Yellowhouse Canyon</i>20

BULLETINS OF THE TEXAS MEMORIAL MUSEUM

No. 1. <i>Mylohyus nasutus, Long-nosed Peccary of the Texas Pleistocene</i> , by Ernest L. Lundelius, Jr.	1.00
No. 2. Part 1. <i>The Friesenhahn Cave</i> , by Glen L. Evans. Part 2. <i>The Saber-toothed Cat, Dinobastis serus</i> , by Grayson E. Meade . . .	1.00
No. 3. <i>A Bibliography of the Recent Mammals of Texas</i> , by Gerald G. Raun	1.00
No. 4. <i>Handbook of Texas Archeology: Type Descriptions. A Cumulative Series</i> (Published jointly by the Texas Archeological Society and the Texas Memorial Museum. Not available in exchange) . .	6.00
No. 5. <i>Salvage Archeology of Canyon Reservoir: The Wunderlich, Footbridge, and Oblate Sites</i> , by LeRoy Johnson, Jr., Dee Ann Suhm, and Curtis D. Tunnell	2.00
No. 6. <i>The Ethnography and Ethnology of Franz Boas</i> , by Leslie A. White	2.00

Texas residents must add two per cent sales tax for orders over 24 cents.

Contributions and Bequests

Contributions and bequests to the Texas Memorial Museum may be made in securities, money, books, or collections. They may, if desired, take the form of a memorial to a person or a cause, to be named by the giver. Contributions to the Museum are allowable as deductions in computing net income for the federal income tax.