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UNIVERSITY OF SASKATCHEWAN RADIOCARBON DATES V

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This series reports some of the measurements made since publication of the previous list. Equipment and methods are described in Saskatchewan II.

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SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

Sharp Hills series

Peat from Sharp Hills, Alberta (51° 21′ N Lat, 114° W Long). A glaciofluvial deposit apparently laid down by an englacial stream emerging from retreating ice, consisting of stratified sand and gravel with till inclusions. Samples coll. ca. 20 ft apart in gravel 15 to 20 ft below ground level. Coll. 1963 and subm. by J. G. Nelson, Univ. of Calgary, Calgary, Alberta.

S-204. Sharp Hills, peat **>35,000**

S-205. Sharp Hills, peat **33,500 ± 2000**
31,550 B.C.

General Comment (J.G.N.): dates are 1st from Erratics Train area of Alberta, and are much greater than expected.

S-206. Carstairs, Alberta **26,700 ± 1400**
24,750 B.C.

Peat from outwash deposit S of Carstairs, Alberta (51° 20′ N Lat, 114° 10′ W Long) occurring in scattered particles and lens-like masses up to 3 ft long and over 1 ft wide. Coll. 1963 and subm. by J. G. Nelson. *Comment*: like S-204 and S-205, date is from Erratics Train area of Alberta. Although appreciably younger than S-204 and S-205, is still older than expected.

S-212. Edmonton, Alberta **170 ± 70**
A.D. 1780

Wood from toe of slip contained in slump block on S bank of N Saskatchewan R., Edmonton, Alberta (53° 36′ 5″ N Lat, 113° 18′ 40″ W Long). Coll. 1963 by W. T. Painter; subm. by S. R. Sinclair, Univ. of Alberta, Edmonton, Alberta. *Comment* (S.R.S.): age of sample relates it to others in immediate area where age can be determined by patterns of tree growth. Ultimate aim is piecing together history of slumping of valley's slope.

S-213. Red Deer River Valley, Alberta >33,000

Charcoal from kame moraine upstream from Ya Ha Tinda ranch in Red Deer valley (51° 38′ N Lat, 115° 50′ W Long). Recovered as fragments ca. 10 to 15 ft below surface, from mixture of stratified sand and gravel. Coll. 1962 by J. G. Nelson; subm. by C. P. Gravenor, Research Council of Alberta, Edmonton, Alberta. *Comment* (J.G.N.): 1st date from downstream part of alpine valley in E-central Alberta ca. 15 mi downstream from Drummond Glacier, located in headwaters of Red Deer R. Date is greater than expected.

S-215. Edmonton, Alberta >33,000

Wood from Saskatchewan Sands and Gravels of Edmonton area, Alberta (53° 29′ 30″ N Lat, 113° 35′ W Long). Sample found at depth 73 ft below surface. Sand layer is 45 ft thick overlain by 8 ft till and 30 ft Lake Edmonton deposits of silt and clay. Coll. 1962 by L. A. Bayrock; subm. by C. P. Gravenor. *Comment* (L.A.B.): Saskatchewan Sands and Gravels believed to be Pleistocene but older than 33,000 yr.

Marsden series, Saskatchewan

Carbonaceous silt (probably buried soil) 4 ft below surface, under till, near Marsden, Saskatchewan (52° 53′ N Lat, 109° 54′ W Long). S-228 and S-228B are organic fractions taken from different locations. S-228A is carbonate fraction from same sample as S-228B. Coll. 1963 by D. L. Delorme; subm. by E. A. Christiansen, Saskatchewan Research Council, Saskatoon.

S-228. Organic fraction 21,000 ± 800
19,050 B.C.

S-228A. Carbonate fraction 18,000 ± 450
16,050 B.C.

S-228B. Organic fraction 19,200 ± 400
17,250 B.C.

Comment (E.A.C.): dates part of weathering interval prior to last glaciation which took place ca. 18,000 yr ago in Marsden area.

S-229. Allan, Saskatchewan >34,000

Wood in unoxidized till 24 ft below surface near Allan, Saskatchewan (51° 56′ N Lat, 106° 04′ W Long). Coll. 1964 by I. W. Tweddell; subm. by E. A. Christiansen.

Batoche Ferry series, Saskatchewan

Carbonaceous material in stratified drift over till and under aeolian sand near Batoche Ferry, Saskatchewan (52° 46′ N Lat, 106° 08′ W Long). Coll. 1964 and subm. by E. A. Christiansen.

S-233. Charcoal or coal >32,000

From Fluvial sand over till and under A-horizon (S-234).

S-234. A-horizon **8100 ± 120**
6150 B.C.

Overlain by 24 ft aeolian sand. *Comment* (E.A.C.): because sample S-233, which was derived from datable surficial, stratified drift, is beyond datable range, carbonaceous material is interpreted as reworked coal. Sample S-234 dates deposition of overlying aeolian sand.

Old Wives series, Saskatchewan

Samples from SE of Old Wives, Saskatchewan (50° 56′ N Lat, 105° 59′ W Long) underlain by minimum of 2 ft exposed unoxidized clay. S-235 is marl from S ditch of road in 1 ft interlaminated clay and marl, overlain by 3 ft unoxidized clay and 1 ft till. S-236 is organic material from N ditch of road in 1 to 2 in. sandy layer, overlain by 7 ft till. Exposures show structural deformations probably caused by collapse of lacustrine sediments on melting of stagnant ice. Marl contains following ostracode species: *Candona acutula, C. candida, C. compressa, C. renoensis, Cyclopris ampla, Cypridopsis vidua, Limnocythere trapeziformis, Potamocypris smaragdina, Notodromas monacha, Dolerocypris fasciata.* Coll. 1964 by D. L. Delorme; subm. by W. O. Kupsch, Univ. Saskatchewan, Saskatoon.

S-235. Old Wives, marl **12,000 ± 180**
10,050 B.C.

S-236. Old Wives, organic **9400 ± 160**
7450 B.C.

General Comment (W.O.K.): samples are considered from same stratigraphic unit but S-236 more reliable (Delorme, 1965, p. 66-68). Date is minimum for deglaciation.

S-239. Biggar, Saskatchewan **9200 ± 150**
7250 B.C.

Marl at 9 in. depth from 20 in. thick lacustrine calcareous silty clay exposed in hummocky moraine near Biggar (51° 27′ N Lat, 107° 59′ W Long). Unit contains following ostracode species: *Candona acutula, C. candida, C. compressa, C. rawsoni, Cyclocypris ovum, C. ampla, Cypridopsis vidua, Ilyocypris gibba, I. bradyi, Limnocythere trapeziformis, Potamocypris smaragdina.* Coll. 1963 by D. L. Delorme; subm. by W. O. Kupsch. *Comment* (W.O.K.): date is minimum for deglaciation (Delorme, 1965, p. 80-84).

S-241. Ormiston, Saskatchewan **15,200 ± 260**
13,250 B.C.

Silty marl near Ormiston, Saskatchewan (49° 54′ N Lat, 105° 27′ W Long). Sample 2 ft 4 in. from top of 3 ft 2 in. horizontal silt layer, overlain successively by 3 ft gravel, 4 ft dipping silt layer, and 4 ft till. Silt believed deposited in lake close to glacier ice, with final melting of buried ice causing high dips of strata and sliding or flow of upper till

on top. Deposit above lower silt regarded as kame or kame-eskerine complex. Lower silt contains following ostracode species: *Ilyocypris gibba, I. bradyi, Candoma causdata, S. renoensis, C. acutula, C. candida, C. compressa, C. rawsoni, Cypridopsis vidua, Cyclocypris ovum, C. ampla, Limnocythere trapeziformis, L. ceriotuberosa, Cyprinotus glaucus, Cytherissa lacustris.* Abundant gastropods and charophytes. Coll. 1963 by D. L. Delorme; subm. by W. O. Kupsch. *Comment* (W.O.K.): date is minimum for deglaciation. Dead ice believed present when sampled unit was deposited (Delorme, 1965, p. 63-65).

S-242. Crestwynd, Saskatchewan **5500 ± 120**
3600 B.C.

Marl from 21 in. thick silty calcareous clay at surface of swell of moderately undulating terrain near Crestwynd (50° 10′ N Lat, 105° 20′ W Long), believed deposited near edge of superglacial lake on surface of wasting glacier. As stagnant ice melted original attitude of strata was disturbed. Unit contains following ostracode species: *Candona acutula, C. rawsoni, Cyclocypris ampla, Ilocypris gibba, Limnocythere trapeziformis.* Coll. 1963 by D. L. Delorme; subm. by W. O. Kupsch. *Comment* (W.O.K.): date should be minimum for deglaciation, but is believed too young considering other evidence (Delorme, 1965).

Sturgeon Lake series, Saskatchewan

Samples from terrace cut-bank along N side of Sturgeon R., Saskatchewan at E end of Sturgeon Lake (53° 25′ N Lat, 106° 00′ W Long). Two main stratigraphic units in section (1) Member B 2 ft 6 in. of interbedded calcareous sands and clays grading into marl of varying purity, overlying (2) Member A over 7 ft 8 in. predominantly of marl with interbedded calcareous sands and clays. Beds are horizontal, and a disconformity separates Member B from Member A, distinctly ocherous near top. Both members contain abundant gastropods, charophytes, diatoms, and following ostracodes: *Candona acutula, C. decora, C. distincta, C. compressa, C. ohioensis, C. rawsoni, Lymnocythere staplini, L. trapeziformia, Cyclocypris ampla, C. ovum, Cypridopsis vidua, Potamocrypris pallida, Cyprinotus salinus.* Coll. 1963 by D. L. Delorme; subm. by W. O. Kupsch.

S-244. Marl **5900 ± 100**
3950 B.C.

From Member B, 1 in. below soil.

S-243. Marl **9100 ± 150**
7150 B.C.

From Member B, 2 ft 6 in. below soil, above unconformity.

S-253A. Marl **8950 ± 150**
7000 B.C.

From mixed marl and charcoal from Member A, 5 ft 2 in. below soil; above base of exposed section.

S-253B. Charcoal **8550 ± 130**
6600 B.C.

From mixed marl and charcoal from Member A, 5 ft 2 in. below soil; 5 ft above base of exposed section.
General Comment (W.O.K.): S-253A (marl) and S-253B (charcoal) agree with date of lower marl. Age of S-243, which dates time local drying produced ocherous staining at unconformity, is probably too great. All dates are post-glacial for this area (Delorme, 1965, p. 102-106).

S-245. Houghton, Saskatchewan **>27,000**

Wood chips from sandy clay and gravel 480 to 520 ft below surface from rotary testhole, overlain by drift, mainly till (51° 13′ N Lat, 107° 55′ W Long). Coll. 1962 by R. E. Creelman; subm. by E. A. Christiansen.

S-246. Kyle, Saskatchewan **12,000 ± 200**
10,050 B.C.

Mammoth bone 0 to 4 ft below surface in oxidized clayey, fossiliferous sand near Kyle, Saskatchewan (50° 50′ N Lat, 108° 07′ W Long). Coll. 1964 by T. Kehoe; subm. by E. A. Christiansen. *Comment* (E.A.C.): scattered skeletal remains and contorted pond deposits in which mammoth was buried indicate that remains were disturbed during melting of stagnant ice after mammoth died 12,000 yr ago.

S-247. St. Brieux, Saskatchewan **>33,000**

Wood 27 ft below surface in well presumably below uppermost till (52° 34′ N Lat, 104° 50′ W Long). Coll. 1951 by A. Coquet; subm. by E. A. Christiansen.

S-248. Matador, Saskatchewan **11,620 ± 130**
9670 B.C.

Organic clay, probably A-horizon, 1 ft thick underlying 4 ft of massive clay and overlying 5 ft of contorted clay and till (50° 44′ N Lat, 108° 02′ W Long). Coll. 1964 and subm. by E. A. Christiansen. *Comment* (E.A.C.): dates inundation of soil by glacial lake in which overlying clay was deposited.

S-249. Floral, Saskatchewan **>33,000**

Carbonaceous silt overlain by 2 weathered zones 156 to 184 ft below surface (52° 05′ N Lat, 106° 27′ W Long). Coll. 1964 and subm. by E. A. Christiansen.

S-251. Wandsworth, Saskatchewan **34,000 ± 1800**
32,050 B.C.

Carbonaceous clay overlying 2nd weathering zone 232 to 252 ft below surface (52° 54′ N Lat, 106° 37′ W Long). Coll. 1964 and subm. by E. A. Christiansen. *Comment* (E.A.C.): dates 2nd last glaciation.

S-252. Alvena, Saskatchewan **33,500 ± 2000**
31,550 B.C.

Carbonaceous silt 183 to 189 ft below surface from sidehole core below single till (52° 36′ 30″ N Lat, 106° 03′ W Long). Coll. 1964 and subm. by E. A. Christiansen. *Comment* (E.A.C.). dates weathering interval prior to last glaciation.

Frenchman's Flat series, Saskatchewan

Samples from alluvial fine sand, silt, and clay of local S Saskatchewan R. flood plain S of Saskatoon, Saskatchewan. Coll. 1963 and 1964 and subm. by L. E. Hodgins, Univ. Calgary, Calgary, Alberta.

S-261. Frenchman's Flat, depth 3 ft **1450 ± 70**
A.D. 500

Charcoal and organic soil from S end of flood plain (51° 47′ N Lat, 106° 45′ W Long).

S-262. S Frenchman's Flat, depth 4 ft **1950 ± 85**
A.D. 0

Charcoal and organic soil from same section as S-261.

S-263. S Frenchman's Flat, depth 7 ft 2 in. **2980 ± 75**
1030 B.C.

Charcoal and organic soil from same section as S-261.

S-264. C Frenchman's Flat **540 ± 75**
A.D. 1410

Horizontal log under 8 ft of alluvium in central part of flood plain (51° 57′ N Lat, 106° 47′ W Long).

S-265. C Frenchman's Flat **450 ± 60**
A.D. 1500

Charcoal layer under 4 ft 6 in. of alluvium, about 100 yards S of S-264 site.

S-266. C Frenchman's Flat **1035 ± 60**
A.D. 915

Bison bones under 8 ft of alluvium (51° 54′ N Lat, 106° 45′ W Long). *General Comment* (L.E.H.): samples date parts of local but morphologically significant flood plain and give rates of sedimentation of overbank flood deposits. Range of dates indicate main river channel has been relatively stable for at least 3000 yr, and are minimum for earlier postglacial degradation and aggradation. S-266 is maximum for Pike Lake (large ox-bow) which probably also post-dates S-264 and S-265.

S-267. Marsden, Saskatchewan **33,000 ± 2000**
31,050 B.C.

Carbonaceous lens in noncalcareous, oxidized till 3 ft below surface beneath uppermost till (52° 49′ N Lat, 109° 49 W′ Long). Coll. 1965 and

subm. by E. A. Christiansen. *Comment* (E.A.C.): dates weathering interval prior to last glaciation.

Slave River Delta series, North West Territories

Samples from S end of modern Slave R. Delta (61° 15′ N Lat, 113° 20′ W Long), from 10 ft high bank near beginning of 1st distributary channel (Jean R.). Coll. 1965 and subm. by N. J. McMillan, Tenneco Oil and Minerals Ltd., Calgary, Alberta.

S-268. Slave River Delta, peat **2725 ± 115**
775 B.C.

From 4 in. bed in vertical bank of Jean R. 8 ft below ground level.

S-269. Slave River Delta, wood **2215 ± 95**
265 B.C.

Enclosed in stratified silty clay 4 ft below ground level in bank of Slave R. 0.2 mi W (downstream) from S-268. *Comment*: dates help establish sedimentation rate and growth of Slave R. Delta.

S-273. Wolfe, Saskatchewan **>34,000**

Carbonaceous silt 79 ft below surface in 2nd weathering zone (52° 15′ N Lat, 108° 27′ W Long). Coll. 1965 and subm. by E. A. Christiansen.

S-274. Paynton, Saskatchewan **>35,000**

Coal or charcoal 85 ft below surface in sand from sidehole core below till (52° 56′ N Lat, 108° 54′ W Long). Coll. 1965 and subm. by E. A. Christiansen. *Comment* (E.A.C.): stratigraphic position suggests carbonaceous material is datable, but because date beyond datable range sample is presumed reworked coal.

Garry Island series, North West Territories

Wood samples from 3.3 m section of peat and from underlying lake silt above ice-thrust Pleistocene sediments at elev. 30 m above sea level on Garry Island, North West Territories (69° 31′ N Lat, 135° 47′ W Long). Face of peat was cleaned off to permafrost and wood obtained from frozen ground. Coll. 1964 and subm. by D. E. Kerfoot and J. R. Mackay, Univ. of British Columbia, Vancouver.

S-276. Wood 1.9 m depth from peat **9500 ± 150**
7550 B.C.

S-278. Wood 2.3 m depth from peat **11,300 ± 190**
9350 B.C.

S-277. Wood 3.7 m depth from silt **11,700 ± 250**
9750 B.C.

Comment (J.R.M.): as underlying icy beds are nearly vertical, permafrost has been present continuously for at least 11,700 yr. Peat overlain by 0.8 m of soil, moved downslope by solifluction.

Pike Lake series, Saskatchewan

Buried soil "A" horizons from 30 ft high sand dune NW of Pike Lake, Saskatchewan (51° 56′ N Lat, 106° 50′ W Long). Seven dark carbonaceous horizons, each 2 to 16 in. thick and clearly separated from other horizons by "clean" eolian fine sand, were exposed in road cut at depths ranging from 20 ft to 5 ft below crest of dune. (Minor horizons at 15 and 11 ft are not dated.) Coll. 1964 and subm. by L. E. Hodgins, Univ. Calgary, Calgary, Alberta.

S-281. Pike Lake dune, depth 20 ft **3510 ± 70**
1560 B.C.

S-282. Pike Lake dune, depth 16 ft **3470 ± 70**
1520 B.C.

S-284. Pike Lake dune, depth 10 ft **2400 ± 70**
450 B.C.

S-285. Pike Lake dune, depth 9 ft **2450 ± 70**
500 B.C.

S-286. Pike Lake dune, depth 5 ft **820 ± 60**
A.D. 1130

General Comment (L.E.H.): buried soils indicate periods of well-established vegetation and stabilized dunes, and relatively moist conditions. Intervening clean sand accumulations indicate periods of dune building and relatively dry conditions. Thickness of organic horizons dated by S-281 (6 to 9 in.) and S-286 (6 to 16 in.) and organic content of S-286 horizon are greater than those of other horizons and reflect longer periods of moist conditions and dune stability. Some accumulation of sand may have occurred during soil development.

S-287. Meridian Ferry, Saskatchewan **2270 ± 70**
320 B.C.

Wood 11 to 12 ft below surface from augerhole under 11 ft of flood plain silt adjacent to N Saskatchewan R. (53° 36′ N Lat, 109° 59′ 30″ W Long). Coll. 1965 and subm. by E. A. Christiansen. *Comment* (E.A.C.): dates postglacial flood plain deposition.

S-288. Banks Island, North West Territories **>34,000**

Canon bone of *Ovibus moschatus* from gravel bar on Bernard R., North West Territories (73° 23′ N Lat, 121° 54′ W Long). Coll. 1963 and subm. by W. J. Maher, Univ. Saskatchewan, Saskatoon. *Comment*: evidence for existence of Wisconsin refugium on unglaciated islands of W artic Archipelago is inconclusive. (Savile, 1961; Porsild, 1955). Date tends to substantiate existence of refugium.

Borgarfjördur series, W. Iceland

Marine shells from silts with angular stones (id. as silt-tills) from S shore of Borgarfjördur inlet (64° 32′ N Lat, 21° 46′ W Long). Coll. 1964 and subm. by I. Y. Ashwell, Univ. Calgary, Calgary, Alberta.

S-289. Efri-Hreppur **12,100 ± 250**
10,150 B.C.

Shells (*Tellian calcarea, Mya truncata, Saxicava arctica*) in silt-till matrix, 21 to 26 m above present sea level, capped by glacio-fluvial gravel.

S-290. Ardalur **12,100 ± 150**
10,150 B.C.

Shells (*Chlamys islandica, Nucula tenuis, Astarte montagui, Cardium fasciatum, Tellina calcarea, Mya truncata, Saxicava pholadis, Saxicava arctica Margarita groenlandica*) in silt-till matrix, 25 to 30 m above present sea level, capped by glacio-fluvial gravel. Some shells broken.

S-291. Grjoteyri **12,800 ± 220**
10,850 B.C.

Shells (*Tellina calcarea, Mya truncata, Saxicava arctica, Neptunea? antiqua, Trophon clathratus*) in silt-till matrix, showing signs of occasional layering, 15 to 21 m above present sea level, glacio-fluvial shingle above, with further silt-till containing shell fragments at 31 to 33 m. Shells in dated sample often broken. *Comment* (I.Y.A.): all 3 dates compare closely with 2 earlier samples I-1824a and I-1825, the former at 111 to 135 m, the latter at 16 to 24 m above present sea level. All found along 8 km line at foot of Skardsheidi-Hafnarfjall massif, in same types of matrix. Ashwell suggested (1967) that material was dropped from floating ice-shelf. Disturbance and breaking of shells may indicate that parts of deposit were moved, or that stones falling from shelf above were responsible for damage.

Quill Lake series, Saskatchewan

Gyttja from 12, 17, and 27 ft below water surface in Quill Lake, Saskatchewan (51° 48′ N Lat, 104° 19′ W Long). Coll. 1966 and subm. by E. A. Christiansen.

S-292. Gyttja 27 ft below water surface **11,000 ± 150**
9050 B.C.

S-293. Gyttja 17 ft below water surface **5970 ± 85**
4020 B.C.

S-294. Gyttja 12 ft below water surface **3500 ± 85**
1550 B.C.

Comment (E.A.C.): linear relationship between depth intervals and age suggest uniform sedimentation of rate of 1 ft in 500 yr. S-292 indicates that area was deglaciated more than 11,000 yr ago.

S-295. Howe Sound, British Columbia **5770 ± 150**
3820 B.C.

Shell material dredged from sea bottom in Howe Sound, British Columbia (40° 20′ N Lat, 123° 19′ W Long), enclosed in gravelly glacial till with 41% water content. Coll. 1965 and subm. by J. W. Murray,

Univ. British Columbia, Vancouver. *Comment* (J. W. M.): material was dredged from submarine ridge (depth 25 m), dating from unknown stade of Pleistocene at mouth of Howe Sound, a fjord on coast of SW British Columbia. Date may be derived either from mixture of older Pleistocene and Recent shells or from unmixed assemblage. The latter is favored because no living benthic invertebrates have been dredged from locality. Geologic evidence indicates submarine ridge is much older than 5770 yr, but since formation, ridge has existed as relic topographic high on sea floor, essentially free from additions of terrigeneous sediments. Benthic shell fish apparently flourished on ridge top 5770 ± 150 yr ago and have remained unburied up to present.

S-296. Saskatoon, Saskatchewan **8160 ± 125**
6210 B.C.

Carbonaceous gray, clayey silt, or ablation till (A-horizon) 4 in. thick, overlain by 18 in. of massive, clean sand in excavation at Saskatoon, Saskatchewan (52° 08′ N Lat, 106° 40′ W Long). Coll. 1966 and subm. by E. A. Christiansen. *Comment* (E.A.C.): dates deposition of surficial sand.

S-297. Saltcoats, Saskatchewan **>33,000**

Wood from sand 90 to 236 ft in cuttings from testhole overlain by 40 ft of silt and 40 ft of till near Saltcoats, Saskatchewan (51° 03′ N Lat, 102° 05′ W Long). Coll. 1966 and subm. by E. A. Christiansen.

S-298. Maple Creek, Saskatchewan **2000 ± 70**
50 B.C.

Charcoal under 9 ft of clay and 11 ft above Gap Creek bed near Maple Creek, Saskatchewan (49° 51′ N Lat, 109° 36′ W Long). Coll. 1966 by G. C. Watson; subm. by E. A. Christiansen. *Comment* (G.C.W.): dates use of fire pit and predates deposition of overlying clay.

S-299. Foxdale, Saskatchewan **>33,000**

Wood from sand in testhole 115 to 120 ft below surface overlain by till near Foxdale, Saskatchewan (53° 25′ N Lat, 106° 20′ W Long). Coll. 1966 by G. Riddle; subm. by E. A. Christiansen.

Evesham series, Saskatchewan

Carbonaceous silt and clay over till near Evesham, Saskatchewan (52° 29′ N Lat, 109° 57′ W Long). Coll. 1965 and subm. by E. A. Christiansen.

S-300A. Carbonate fraction 6 ft below surface **14,670 ± 240**
12,720 B.C.

S-300B. Organic fraction 6 ft below surface **15,850 ± 225**
13,900 B.C.

S-401A. Carbonate fraction 3 ft below surface **12,725 ± 135**
10,775 B.C.

S-401B. Organic fraction 3 ft below surface **18,000 ± 275**
16,050 B.C.

S-402A. Organic fraction 1 ft below surface **4100 ± 100**
2150 B.C.

S-402B. Organic fraction 1 ft below surface **5230 ± 100**
3280 B.C.

Comment (E.A.C.): close agreement of S-300A and B suggests dates are acceptable. S-401A is also acceptable date because it is stratigraphically higher and therefore younger. S-401B, however, does not fit stratigraphic sequence and is therefore unacceptable. S-402A and B were run on separate portions of same sample. Difference in measurements suggests material is not homogeneous. Because glacial lake in which samples 402A and B were deposited must predate Quill Lake date (S-292, 11,000 yr B.P.) it is concluded that 402A and B were contaminated by recent carbon through soil-forming processes. S-300A and B show glacier retreated from area more than 15,000 yr ago.

S-404. St. Denis, Saskatchewan **>35,000**

Carbonaceous silt, probably gyttja, 86 to 88 ft below surface in side-hole core from testhole under 86 ft of till near St. Denis, Saskatchewan (52° 09′ N Lat, 106° 12′ W Long). Coll. 1966 and subm. by E. A. Christiansen. *Comment* (E.A.C.): carbonaceous silt was deposited more than 35,000 yr ago.

II. ARCHAEOLOGIC SAMPLES

Gull Lake series, Saskatchewan

Charred wood from prehistoric bison drive site, Gull Lake Site (EaOd-1), on escarpment of Missouri Coteau, 6 mi S of Gull Lake, Saskatchewan (50° 00′ 15″ N Lat, 108° 32′ 20″ W Long). Forty-eight stratigraphic layers, with sub-layers, many containing butchered bison bone, were distinguished in 18 ft of deposits. Top 8 layers contained Plains Side-notched points, pottery, and artifacts of period ca. A.D. 1600 to mid-19th century. Layers 15 to 24b contained Prairie Side-notched points, pottery, and artifacts of period A.D. 700 to A.D. 1300. Site excavated in 1953, 1960, and 1963 by Saskatchewan Mus. of Nat. History. Two C^{14} dates have been determined for Layers 21 and 24b (S-150, 1165 ± 80 and S-149, 1220 ± 80, Saskatchewan III). Coll. 1963 and subm. by T. F. Kehoe, Saskatchewan Mus. of Nat. History, Regina.

S-254. Layer 26 **1290 ± 60**
A.D. 660

S-255. Layer 31a **1740 ± 60**
A.D. 210

S-256. Layer 34 **1900 ± 65**
A.D. 50

Comment (T.F.K.): Layer 26 contained many butchered bison bone, Timber Ridge Sharp-eared variety of Avonlea points, and no pottery. Layer and date considered termination of Avonlea occupations. Layer 31a contained bone, no pottery, and Gull Lake ("classic") variety of Avonlea point; considered beginning of Avonlea at site and in region. Layer 34 contained lense of charcoal and single bell-shaped limestone pestle; considered to pre-date Avonlea occupations and bison drive complex.

Walter Felt series, Saskatchewan

Charcoal from layers of prehistoric bison drive and occupation site, Walter Felt site (EcNm-8) on escarpment of Missouri Coteau, 8 mi S of Mortlach, Saskatchewan (50° 20′ 34″ N Lat, 106° 05′ 40″ W Long). Twenty stratigraphic layers, with sub-units, were distinguishable in 5 ft of deposits. Top 4 layers contained Plains Side-notched points, check-stamped pottery, many butchered bison bones, and artifacts of proto-historic period (ca. A.D. 1700 to and including white contact). Coll. 1962 and 1965 and subm. by T. F. Kehoe.

S-280. Layer 4 **400 ± 40**
A.D 1550

S-203. Layer 6 **700 ± 80**
A.D. 1250

S-202. Layer 7 **1260 ± 70**
A.D. 690

S-201. Layer 10 **1535 ± 80**
A.D. 415

S-260. Layer 10 **1535 ± 90**
A.D. 415

S-200. Layer 13 **1610 ± 70**
A.D. 340

S-279. Layer 15b **2430 ± 90**
480 B.C.

General Comment (T.F.K.): layer 6 contains Prairie Side-notched points and probably indicates terminal period for these points, before Plains Side-notched points superseded them. Layer 7 contains earlier Prairie Side-notched points and correlates with beginning of Late Woodland period at Gull Lake site. Layer 10 contains Samantha points with no recognizable cognate forms or other dated localities in N Plains. Layer 13 yielded Middle Woodland pottery and Besant points similar to if not identical with Besant points at Mortlach site (Wettlaufer, 1955) (S-22, 1580 ± 150, McCallum, 1955). Layer 15b yielded Pelican Lake points,

no pottery, and compares to Level 4 (2230 ± 100, S-49a, Saskatchewan III) at Long Creek site. S-280 dates triangular points and check-stamp pottery from bison bone pit near drive site.

Glen Ewen Burial Mound series, Saskatchewan

Charcoal samples from man-made burial mound 14 mi S of Glen Ewen, Saskatchewan (49° 01′ N Lat, 101° 58′ 20″ W Long). Conical mound is 50 ft in diameter, 1.5 ft high, with 4 linear mounds about 12 ft wide radiating from it for as much as 600 ft and terminating in conical mounds. Coll. 1959 and subm. by T. F. Kehoe.

S-258. Charred wood **1220 ± 70**
A.D. 730

From planking covering a burial chamber beneath central tumulus.

S-259. Charred wood **1110 ± 90**
A.D. 840

Assoc. with secondary single flexed arm burial on periphery of central mound.

General Comment (T.F.K.): S-258 dates construction of mound and compares favorably with similar Late Woodland burial mounds in Plains region, and with beginning of Late Woodland occupation at Gull Lake site, Saskatchewan (S-149, 1220 ± 80, Saskatchewan III). Secondary burial dated by S-259 is probably intrusive, post-dating mound construction.

Kenney series, Alberta

Charcoal from hearths at Kenney site, near Brocket, Alberta, 45 mi W of Lethbridge, Alberta on flood plain on E bank of Pincher Creek (49° 33′ N Lat, 113° 45′ W Long). Three stratified occupation layers asoc. with developed (Ah) soil profiles. Coll. 1964 by B. Reeves; subm. by R. G. Gorbis, Univ. of Calgary, Calgary, Alberta.

S-270. Layer 4, 12 in. depth **355 ± 60**
A.D. 1595

Contains potsherds and small notched projectile points.

S-272. Layer 8, 30 in. depth **1600 ± 115**
A.D. 350

Contains Besant points. *Comment* (R.G.F.): determinations for upper and lower layers (4 and 8) are consistent with previous age estimates. Most pottery in Alberta is no more than 500 yr old; Layer 4 seems typical. Besant components similar to Layer 8 have been dated for Old Women's Buffalo Jump, Alberta (1650 ± 60, S-90, Saskatchewan III), and for Mortlach and Walter Felt sites. Saskatchewan (1580 ± 159, S-22, McCallum, 1955, and 1610 ± 70, S-200, this list).

S-403. Moon Lake, Saskatchewan **5000 ± 90**
3050 B.C.

Burnt bone 5.5 ft below surface from seasonal campsite near Moon Lake, Saskatchewan (52° 02′ N Lat, 106° 47′ W Long). Assoc. with

7 small Oxbow-type projectile points. Coll. 1966 by I. D. Dyck; subm. by Z. S. Pohorecky, Univ. Saskatchewan, Saskatoon. *Comment* (Z. S. P.): controlled excavation of 196 sq ft at this unicomponent cultural site shows Oxbow settlement pattern for 1st time, not camp-circle around campfire but fan-shaped camp-triangle est. 600 sq ft. Flint-knapping, butchering, bone-smashing, hide-scraping, and food-preparation (mainly *Bison*, some goose, also carnivore) were activities of 5 to 9 persons, each with place in trianguloid area, fanning outward and SE from windbreak, evidenced by 4 post-holes 14 to 22 in. apart, arranged in arc against prevailing NW wind. Hearth 2 ft NE of post-hole pattern and N of camp-area, which was downwind and W of campfire's smoke. Springs were 3/8 m S and E of campsite. Tiny tools predominate, including 12 end-scrapers (10 tiny), 1 tiny side-scraper, 2 tiny blades, 2 bone scrapers, 1 chisel, 1 chopper.

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