

## UNIVERSITY OF SASKATCHEWAN RADIOCARBON DATES III

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The third series of  $C^{14}$  measurements made at the University of Saskatchewan is reported in the present list. The equipment and methods have been described previously (Saskatchewan II). The modern reference standard was 0.950 times the activity of the NBS oxalic-acid standard. The activity of the wood standard used previously corresponded to  $0.955 \pm 0.009$  of the NBS standard, so that no corrections are required to the previous date lists to bring them into line.

### ACKNOWLEDGMENTS

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### SAMPLE DESCRIPTIONS

#### I. GEOLOGIC SAMPLES

**S-32. Lake Savane Bog, Mont Tremblant Park  $7800 \pm 300$**

Basal peat from 16 ft depth in a bog ( $46^{\circ} 27' N$  Lat,  $74^{\circ} 28' W$  Long, 1400 ft alt), 2 mi SE of Lake Savane, Mont Tremblant Park, Quebec. The peat overlies a basal layer of sand. Coll. July 1954 by J. E. Potzger, A. Courtemanche, A. Legault and F. Hueber; subm. by A. Courtemanche, Service de Biogéographie, Province de Quebec, Canada. *Comment*: gives minimum date for deglaciation and beginning of peat formation in the Park region.

**S-34. Creek Cypres Bog, Mont Tremblant Park  $8180 \pm 320$**

The deepest organic layer overlying a thin layer of rock flour in a bog ( $46^{\circ} 37' N$  Lat,  $74^{\circ} 10' W$  Long, 1300 ft alt), 12 ft deep, near Creek Cypres, Mont Tremblant Park, Quebec. Coll. 1952 by J. E. Potzger and A. Courtemanche; subm. by A. Courtemanche. *Comment*: Creek Cypres is near Lake Savane; the dates of S-32 and S-34 are in excellent agreement and should date the same events.

**S-33. Lake Icebound Bog, Ungava  $2980 \pm 175$**

Basal peat from a bog ( $53^{\circ} 59' N$  Lat,  $70^{\circ} 23' W$  Long, 1900 ft alt), 39 in. thick, near Lake Icebound, central Ungava. Sample gives a minimum age for deglaciation of central Ungava. Flint (1957) pointed out that "a large highland center of outflow covered the Quebec-Labrador highland and may have persisted longer than any of the others, perhaps as late as 3,000 yr B.P." Coll. July 24, 1954 by J. E. Potzger, A. Courtemanche and A. Legault; subm. by A. Courtemanche.

**S-94. Holland, Manitoba  $3200 \pm 70$**

Wood from deep gully leading into Assiniboine River Valley ( $49^{\circ} 42' N$

Lat, 98° 50' W Long, 960 ft alt). Sample taken from a zone 1 ft thick of poorly sorted sand and gravel 6 ft above bottom of gully. Zone overlies till and underlies ca. 150 ft of much disturbed clay and silt. Coll. June 1959 by D. H. Pollock; subm. by G. L. MacKenzie, Prairie Farm Rehabilitation Adm., Regina, Canada. *Comment*: two separate portions yielded  $3150 \pm 80$  and  $3250 \pm 70$ . The age does not correspond to inundation of the area by Glacial Lake Agassiz, as was first suspected. Rather the age indicates when slumping of lacustrine sediments into the gully buried organic debris in the creek bed and displaced the creek from its course.

**S-96. Outram, Saskatchewan 27,750  $\pm$  1200**

Wood from near Outram, Saskatchewan (49° 10' 30" N Lat, 103° 19' W Long). Sample was found in a core derived from an intertill deposit of fine-grained sand at a depth of 170 ft below ground surface, and immediately below the lower of two tills. Coll. August 1959 by D. L. Delorme; subm. by E. A. Christiansen, Saskatchewan Research Council, Saskatoon, Canada. *Comment*: it is believed that the date of the wood in the sand is the approximate date of the lower, overlying till (Christiansen and Parizek, 1961).

**S-97. Kenaston, Saskatchewan 10,150  $\pm$  200**

Wood from near Kenaston, Saskatchewan (51° 33' N Lat, 106° 01' W Long). Sample was in a core derived from an unoxidized, organic-rich zone at a depth of 145 ft and presumably underlies the uppermost till sheet in the area. Coll. March 1959 by M. Sundin; subm. by E. A. Christiansen. *Comment*: date suggests that the sediment is correlative with that at Herbert, Saskatchewan (S-41, 10,000  $\pm$  300, Saskatchewan II). The till overlying the organic-rich sediment is believed to be of Valders age (Christiansen, 1961).

**S-110. Dinsmore, Saskatchewan 10,300  $\pm$  140**

Conifer wood from 14 ft below surface in gyttja above till (51° 06' 40" N Lat, 107° 29' 30" W Long). Coll. 1930 by J. H. Grant; subm. by E. A. Christiansen. The result gives information on the period when conifers grew in this area. Grasses on uplands and shrubs in depressions are native to the area at present. *Comment*: date suggests that this sediment is correlative with those dated at Kenaston (S-97, 10,150  $\pm$  200) and at Herbert (S-41, 10,000  $\pm$  300, Saskatchewan II).

**S-111. Gregherd, Saskatchewan >30,000**

Wood chips from sand beneath till in a well at a depth of 300 ft below surface (51° 06' N Lat, 104° 30' W Long). Coll. 1958 by J. Gerrard; subm. by E. A. Christiansen. *Comment*: because the uppermost till in the Gregherd area is correlative with the uppermost till in the Kenaston area (S-97, 10,150  $\pm$  200) (Christiansen, 1961a) a date of >30,000 in the Gregherd area must date an older glaciation.

**S-117. Buffalo Pound Lake, Saskatchewan >32,000**

Pelecypod shells from a fine-grained fluvio-lacustrine sand which lies between the second and third till beneath surface (50° 43' N Lat, 105° 35' W

Long). The shells were not broken, suggesting that they had not been transported. Coll. August 1960 by P. P. David; subm. by E. A. Christiansen. *Comment*: the outer layers of the shell material were dissolved in dilute acid and discarded. However, since stratigraphic investigations relate all the drift in this section to the last glaciation of the area (Christiansen, 1961) the advance of which is given by the Kenaston date (S-97) at  $10,150 \pm 200$  yr B.P., it is believed that the Buffalo Pound date is too old.

**S-122. La Ronge, Saskatchewan 5050  $\pm$  80**

Wood from bog sediments 7 ft 3 in below surface and 9 in above underlying silty clay ( $55^{\circ} 36' N$  Lat,  $105^{\circ} 17' W$  Long). Coll. August 1960 by J. S. Maini; subm. by E. A. Christiansen. *Comment*: date marks beginning of return of vegetation to the La Ronge area following the last deglaciation.

**S-123. Galilee Junction, Saskatchewan 10,900  $\pm$  700**

Marl sample from ablation drift of last glaciation in this area ( $49^{\circ} 55' N$  Lat,  $105^{\circ} 33' W$  Long). The marl is part of a series of sediments in a thrust-moraine area, and has been deformed along with ice-contact till, gravel, sand, silt, and clay. Coll. September 1960 by R. R. Parizek; subm. by W. O. Kupsch, Univ. of Saskatchewan, Saskatoon, Canada. *Comment*: date is minimum for glacier ice covering the Missiouri Coteau in this area.

**S-127. Spalding, Saskatchewan > 34,000**

Wood from till at depth 221-224 ft encountered in boring near Spalding, Saskatchewan ( $52^{\circ} 17' 30'' N$  Lat,  $104^{\circ} 25' W$  Long). Stratigraphy suggests that till is the lowest of three till sheets. Coll. November 1960 by C. Bakke; subm. by E. A. Christiansen.

**S-128. Crane Valley, Saskatchewan 10,800  $\pm$  300**

Charcoal from glacial-lake silt and clay, contorted by ice thrust near Crane Valley, Saskatchewan ( $49^{\circ} 48' N$  Lat,  $105^{\circ} 32' W$  Long). Coll. summer 1960 by R. R. Parizek; subm. by E. A. Christiansen. *Comment*: sample dates the third deglaciation in the Willow Bunch area. Because the Galilee Junction marl (S-123,  $10,900 \pm 700$ ) and the lake clay at Crane Valley are believed correlative, the close agreement of the two dates suggests that dates from marl deposited in small ponds in this area may be reliable.

**S-99. Port Mann, British Columbia 7300  $\pm$  120**

Detrital peat from 42 ft below floodplain S of Fraser River, 1000 ft E along C. N. Railway from center line of proposed Port Mann bridge near New Westminster, British Columbia ( $49^{\circ} 13' N$  Lat,  $122^{\circ} 48' W$  Long). Sample collected from borehole by Shelby tube. The peat layer, 33 ft below mean sea-level, has been traced for more than 2,000 ft on S side of Fraser River and was encountered in borings N of the river. The peat is overlain and underlain by alluvial silt; it contains pollen (id. by J. Terasmae, Geol. Survey of Canada) indicative of the hemlock-Douglas fir forest characterizing the region today. Coll. 1959 by R. A. Spence at the request of W. H. Mathews, Dept. Geol., Univ. of British Columbia, Vancouver; subm. by Geol. Survey of Canada, Ottawa.

*Comment:* the peat layer appears to have accumulated on a former floodplain rather than below water level in an abandoned river channel. If this interpretation is correct, the date records a sealevel stand ca. 40 ft below present mean sealevel. Also dated by Geol. Survey of Canada (GSC-2, 7600  $\pm$  150, Geol. Survey of Canada I).

**S-100. North Bay, Ontario 9570  $\pm$  150**

Peat from depth 180-190 cm in North Bay bog (46° 27' N Lat, 79° 28' W Long). Coll. September 1959 by J. Terasmae; subm. by Geol. Survey of Canada. *Comment:* date is minimum for deglaciation of the region of the North Bay outlet, and agrees with other dates pertaining to late-glacial events in this part of Ontario (Terasmae and Hughes, 1960).

**North Saskatchewan River series**

Wood and marl (with *Bison occidentalis*) from marl layer 20 ft thick overlying floodplain sand and silt (52° 25' 33" N Lat, 114° 16' 38" W Long). Coll. 1959 by L. A. Bayrock; subm. by C. P. Gravenor, Research Council of Alberta, Edmonton, Canada.

**S-140. Marl, 11 ft above base of marl 10,600  $\pm$  300**

**S-107. Wood, 10 ft above base of marl 7350  $\pm$  100**

**S-106. Wood, base of marl 8150  $\pm$  100**

*Comment:* if the age of the wood corresponds to the time of marl formation, the North Saskatchewan River must have been cut to almost its present level some 8,000 yr B.P. implying rapid cutting after deglaciation. This would also represent one of the latest occurrences of *Bison occidentalis*. The greater apparent age of the carbonate fraction of the marl suggests alteration of the C<sup>14</sup> content.

**S-116. Caribou Mountains, Alberta 8600  $\pm$  100**

Peat from the Caribou Mountains (59° 00' N Lat, 115° 15' W Long), taken from the base of frozen peat 11 ft thick immediately overlying till. Coll. September 1960 and subm. by C. P. Gravenor. *Comment:* dates beginning of post-glacial accumulation of peat and is minimum for deglaciation of the Caribou Mountains, 1500 ft above surface.

**S-115A. Scarborough, Ontario 5550  $\pm$  70**

Charcoal from buried soil in stratified sand (43° 42' 15" N Lat, 79° 14' 20" W Long). Soil consists of silt and sand containing charcoal, bones and molluscs. It is overlain by 3 ft of stratified fine sand, leached to 22 in. during formation of modern soil profile. The fossiliferous sand overlies successively, a calcareous silty sand and a shoreline of Lake Iroquois. Bones collected in the layer have been identified as gray fox by C. S. Churcher, Royal Ontario Mus. Coll. July 1960 by A. Dreimanis, R. C. Ostry and P. F. Karrow; subm. by A. Dreimanis, Univ. of W. Ontario, London. *Comment:* date is not in agreement with initial assumption that all terrace deposits were of Lake Iroquois age. Fossiliferous sand is now believed to be part of a small alluvial fan built on the

Lake Iroquois terrace by a stream flowing from a small valley cut in a nearby Lake Iroquois bluff. A second portion of wood from the same locality, S-115B, dated  $5240 \pm 100$ .

**S-138. High Prairie, Alberta 2500  $\pm$  170**

Mixed organic matter and mud from depth 93 in. High Prairie, Alberta ( $55^{\circ} 28' N$  Lat,  $116^{\circ} 30' W$  Long). The sample was the eighth and lowest carbonaceous layer found in drilling into delta of Heart River in Lesser Slave Lake. Coll. October 1960 by R. Deepröse, Alberta Dept. of Agric., Edmonton, Alberta; subm. by C. P. Gravenor. *Comment*: date indicates that delta was active 2500 yr ago. No evidence of a climatic or base-level change was found.

**S-129. Riding Mountain National Park, Manitoba 9570  $\pm$  130**

Wood sample from Wilson Creek Experimental Watershed, Riding Mountain National Park, Manitoba ( $50^{\circ} 43' N$  Lat,  $99^{\circ} 38' W$  Long). Sample from stump of *Picea glauca* at base of 8 ft thick limmic peat deposit overlying Valders drift and under 9 ft terrestrial peat. Coll. September 1960 and subm. by J. C. Ritchie, Univ. of Manitoba, Winnipeg. Peat has yielded a pollen diagram which, judging by this date, is post-Valders. Despite differences in % composition between vegetation and pollen spectrum, the vegetation is assumed to be similar to today's.

## II. ARCHAEOLOGIC SAMPLES

### Long Creek series, Saskatchewan

Charcoal samples from archaeological site (Wettlaufer and Mayer-Oakes, 1960) in the Long Creek Valley ( $49^{\circ} 1' 50'' N$  Lat,  $103^{\circ} 0' W$  Long). Nine levels of occupation have been recognized from the surface to depth 12 ft. Coll. by B. Wettlaufer, B. McCorquodale, A. Swantson and B. Shier; subm. by B. Wettlaufer, Saskatchewan Mus. of Nat. Hist., Regina.

**S-49a. Long Creek, Level 4 (Upper) 2230  $\pm$  100**

Upper Level 4. Associated culture: Pelican Lake.

**S-49b. Long Creek, Level 4 (Lower) 3710  $\pm$  70**

Lower Level 4. Associated culture: Pelican Lake.

**S-63a. Long Creek, Level 5 (Upper) 3370  $\pm$  115**

Upper Level 5. Associated culture: Hanna.

**S-63b. Long Creek, Level 5 (Lower) 4520  $\pm$  170**

Lower Level 5. Associated culture: Hanna.

*Comment*: the sequential discrepancy between S-49b and S-63a was discussed by Wettlaufer and Mayer-Oakes (1960).

**S-50. Long Creek, Level 7 4620  $\pm$  150**

Level 7. Associated culture: Oxbow.

**S-52. Long Creek, Level 8 (upper) 4620  $\pm$  80**

Level 8 (Upper). Associated culture: Oxbow.

- S-53. Long Creek, Level 8** **4650 ± 150**  
 Level 8. Associated culture: Oxbow.
- S-54. Long Creek, Level 8 (Long Creek)** **5000 ± 125**  
 Level 8. Associated culture: Long Creek.
- S-55. Long Creek, non cultural** **> 30,000**  
 From 29 in. below Level 8, in sterile zone.

#### **Old Woman's Buffalo Jump series, Alberta**

Materials from a buffalo jump ca. 50 mi S of Calgary, Alberta (50° 28' N Lat, 113° 53' W Long). Material from Layer 17, 10 ft below surface, consisted of burned hair, hide and bones. Layer 25, ca. 15 ft below surface, consisted of burned and unburned bone in soil matrix. The carbon residues remaining after acid treatment were used for measurement. Coll. October 1958 and subm. by R. G. Forbis, Glenbow Foundation, Calgary, Canada.

- S-90. Layer 17, Square B-O** **1650 ± 60**
- S-91. Layer 25, Square B-O** **1840 ± 70**

*General comment:* dates are stratigraphically concordant with each other and with dates for Layer 13, 1100 ± 80 and 1020 ± 80 (S-87, S-89, Saskatchewan II). Layer 17 contains projectile points similar to if not identical with Besant points at Mortlach site (Wettlaufer, 1955) dated 1580 ± 160, (S-22, McCallum, 1955). Diagnostic specimens from Layer 25 appear to have no known cognate forms at the Mortlach site or in other dated localities in the Northern Plains.

#### **Courtenay, Vancouver Island series**

Charcoal samples from a man-made mound, 2 ft high, 1 mi NW of Courtenay (49° 42' N Lat, 125° 0' W Long). Coll. summer 1959 and subm. by Katherine Capes, Nat. Mus. of Canada, Ottawa.

- S-102. Courtenay, 12-18 in. below surface** **1650 ± 70**
- S-103. Courtenay, 2.5-3 ft below surface** **3750 ± 80**

*General comment:* the considerable age difference between these samples is not explained. Sample S-48, charcoal from a similar site 2 mi distant gave 4550 ± 200 (Saskatchewan II).

#### **Courtenay Midden series, Vancouver Island**

Middens 1 mi NW of Courtenay (49° 42' N Lat, 125° 0' W Long). Coll. summer 1959 and subm. by Katherine Capes.

- S-104. Tsolum River Midden** **400 ± 60**

Charred wood from bottom layer of midden 3 ft thick overlain by 3.5 ft of river silt covered by forest.

- S-105. Sandwich Midden** **380 ± 70**

Charcoal from shell midden 2-3 ft thick, covered by trees ca. 100 yr old.

Sample from fire pit 8-24 in. below surface. *Comment*: dates and the associated artifacts accord with the age ( $660 \pm 130$ ) and cultural complex of S-20 (Saskatchewan II) from Stselax Village, British Columbia.

**S-108. Pickering Township, Ontario 835  $\pm$  70**

Charcoal from Miller site ( $43^{\circ} 52' N$  Lat,  $79^{\circ} 05' W$  Long). Sample from fill in a shallow pit at depth 20 in., overlain successively by a thin lens of clean sand and another pit fill. Coll. August 1959 and subm. by W. A. Kenyon, Royal Ontario Mus., Toronto, Canada. *Comment*: this is the first  $C^{14}$  date for the Glen Meyer aspect.

**S-109. Hungery Hall Reserve, Ontario 760  $\pm$  60**

Charred log from Burial Mound 2, Hungery Hall Reserve ( $48^{\circ} 49' N$  Lat,  $94^{\circ} 42' W$  Long). Sample from log covering of a burial chamber below a low mound. Charring probably resulted from a fire in connection with the burial ceremony after construction of the tomb but prior to erection of the mound. Coll. August 1959 and subm. by W. A. Kenyon. *Comment*: this is the first date on the Rainy River mounds, probably the work of some prehistoric Siouan-speaking group.

**Fraser River Canyon series, British Columbia**

Charcoal from site (Dj Ri3) on E bank of Fraser River near Yale, British Columbia ( $49^{\circ} 33' N$  Lat,  $121^{\circ} 24' W$  Long). Upper 32 ft include 11 soil zones, of which seven are culture bearing. Samples S-61 and S-47 (Saskatchewan II) date 5th and 7th soil zone from surface downward at  $7350 \pm 150$  and  $8150 \pm 310$ . Coll. 1959 and subm. by C. E. Borden, Univ. of British Columbia, Vancouver.

**S-112. Fraser River Canyon, UBC-11 2360  $\pm$  60**

Charcoal from 3rd soil zone, 6-5 ft below surface. This stratum contains thin, ground-slate knives similar to those found at site Di Ri 1, 17 mi down-river and dated  $2270 \pm 100$  (S-62, Saskatchewan II).

**S-113. Fraser River Canyon, UBC-12 9000  $\pm$  150**

Charcoal from the 9th soil zone 25 ft below surface and 5 ft below the 7th soil zone. The layer contained vegetable food remains, stake holes and artifacts including a projectile point. S-113 represents the earliest  $C^{14}$ -dated evidence of human occupation in British Columbia.

**S-119. Southampton, Ontario 2480  $\pm$  60**

Charcoal from a refuse pit at depth 16-36 in. and overlain by 14 in. of plough zone, at site on Saugeen River near Southampton ( $44^{\circ} 30' N$  Lat,  $81^{\circ} 22' W$  Long). Cultural material is unstratified, early Middle Woodland, with no other culture present. Coll. June 1960 and subm. by J. V. Wright, Nat. Mus. of Canada, Ottawa.

**Chamberlain series, Saskatchewan**

Charcoal from two zones, separated by 12 in. of sterile sand, silt, and clay with pebbles at an archaeological site near Chamberlain, Saskatchewan ( $50^{\circ}$

50' N Lat, 105° 31' W Long). Both zones were associated with pottery and organic matter. The sterile sediments suggest a change in climate. Coll. November 1960 by D. M. Lane; subm. by E. A. Christiansen.

**S-121. Upper zone** **260 ± 50**

**S-120. Lower zone** **780 ± 50**

#### **Gull Lake series, Saskatchewan**

Charcoal from a prehistoric bison-drive site near Gull Lake, Saskatchewan (50° 00' N Lat, 108° 30' W Long). The site has at least 16.5 ft of occupation material. Layer 21 and Layer 24b below it and 9 ft below the surface, contained quantities of butchered-bison bone and stone artifacts. These were overlain by a sterile zone, above which were upper layers of bone. Coll. summer 1960 and subm. by T. F. Kehoe, Saskatchewan Mus. of Nat. Hist., Regina.

**S-150. Layer 21** **1165 ± 80**

**S-149. Layer 24b** **1220 ± 80**

*Comment:* layer 21 contained bones of *Bison bison athabascae* but apparently no pottery; Layer 24b contained charred bones of butchered bison (race undeterminable), stone projectile points later than the Classic Avonlea, and apparently no pottery. Probably therefore the samples date occupations of non-ceramic, bison-hunting peoples of the Late Prehistoric Plains Period (small side-notched point tradition). For preliminary reports see Stephenson (1961) and Kehoe and McCorquodale (1961).

### III. TROPOSPHERIC RADIOCARBON

The C<sup>14</sup> content of wheat seeds grown in the yr 1952-1961 have been determined. Samples were obtained from (1) wheat grown at the Research Branch, Dominion Experimental Farm, Scott, Saskatchewan (52° 23' N Lat, 108° 50' W Long), and (2) wheat grown at the Field Husbandry Dept., Univ. of Saskatchewan, Saskatoon (52° 27' N Lat, 106° 38' W Long).

The seed was from spring wheat, which develops primarily in July and August. C<sup>14</sup> content should reflect the tropospheric content of C<sup>14</sup> during this period. The changes in C<sup>14</sup> content are expressed in terms of the quantity  $\Delta$ , with respect to 95% of the NBS oxalic-acid sample (Broecker and Olson, 1961). Since mass-spectrometric facilities are not available,  $\Delta$  was calculated by assuming the value of  $\delta C^{13}$  to be -25‰, the average previously observed for such samples.

*Comment:* values for 1952 and 1953 indicate the magnitude of the Suess effect in this region. As has been observed previously (Tauber, 1960; Broecker and Olson, 1960; Godwin and Willis, 1961), the C<sup>14</sup> content has risen following nuclear-weapons testing, reaching a maximum in 1959. The high value of  $\Delta$  in that yr is characteristic of that observed in northern latitudes (Tauber, 1961). In the period 1959-61 there was an appreciable drop to a value of 235, due to mixing in the troposphere and into the oceans.



<i>Sample No.</i>	<i>Year</i>	<i>Location</i>	$\Delta$
S-301.	1952	Scott	$-26 \pm 8$
S-302.	1953	Scott	$-28 \pm 8$
S-303.	1954	Scott	$-4 \pm 8$
S-309.	1954	Saskatoon	$-12 \pm 8$
S-304.	1955	Scott	$-9 \pm 10$
S-311.	1955	Saskatoon	$5 \pm 10$
S-305.	1956	Scott	$73 \pm 6$
S-306.	1957	Scott	$107 \pm 7$
S-310.	1958	Saskatoon	$184 \pm 11$
S-313.	1958	Scott	$176 \pm 10$
S-308.	1959	Scott	$290 \pm 10$
S-316.	1959	Saskatoon	$320 \pm 10$
S-314.	1960	Saskatoon	$285 \pm 10$
S-315.	1960	Scott	$244 \pm 11$
S-317.	1961	Saskatoon	$232 \pm 10$
S-318.	1961	Scott	$238 \pm 10$

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