

QUEBEC RADIOCARBON MEASUREMENTS I

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The present list reports ^{14}C measurements made in our laboratory from December 1972 to December 1973.

Benzene is synthesized on a Picker benzene synthesizer. The carbon of the samples is first oxidized to CO_2 , either by acid attack or by dry (furnace) combustion. Carburation is then performed with 14 to 16 mesh lithium metal shots ($\text{Na} < 0.005\%$). A vanadium activated catalyst** is used for final benzene synthesis, with typical yield of 80% for the whole process. The counting solution is prepared by adding 1ml of scintillator solution, PPO and POPOP in toluene, to 4ml of benzene obtained from the synthesis. The ^{14}C activity is measured with a Picker, Liquimat 220, liquid scintillation spectrometer. Samples are generally counted for a total of 1200 to 1500 min by 40-min periods, successively, with a background and a modern standard.

Radiocarbon ages are calculated using the ^{14}C half-life of 5570 years with 95% activity of NBS oxalic acid as a modern standard. The ages obtained are given as years before present, BP, with AD 1950 as present reference. The given precision is obtained from a one standard deviation, 1σ , criterion. When the net count for a sample is smaller than 3 times its own imprecision, then an age "older than" is calculated by raising this net count by 1.5 times its imprecision. The result is presented with the ">" sign.

As this is our first publication on ^{14}C measurements, we wish to establish our credibility by presenting in Table I, some cross-check samples with other laboratories. These particular results have been selected so as to cover a wide age range with each laboratory.

ACKNOWLEDGMENTS

We gratefully acknowledge the invaluable advice of J Evin and G Marien, Institut de Physique Nucléaire, Lyon—Ly, J Terasmae and H Melville, Brock University, St Catharines, Ontario—BGS, M A Tamers, Nova University, Florida, H A Polach, Australian National University—ANU, J J Stipp, University of Miami—UM, and S Kim, Radiation Corporation. W Blake, Jr, Geological Survey of Canada—GSC and R M Chatters, Washington State University—WSU, have also supplied check samples.

SAMPLE DESCRIPTIONS

All the ages given in the following list are from geologic samples coll within the province of Quebec during field seasons 1971 to 1973. The A series samples were subm by P LaSalle and are assoc with the Cham-

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plain Sea, corresponding ice front evolution, landsliding, and the La-flamme Sea area isostatic rebound. The B series samples were coll by J Lebuis, Exploration Géol, Min Richesses Naturelles, and co-workers, and are assoc with isostatic rebound and glacier retreat in Gaspé peninsula highlands and adjacent coastal areas.

TABLE 1
Interlaboratory cross checks

QU no.	QU date	Other lab no.	Other date	Ref	Sample
QU-34	270 ± 70	ANU-1301	290 ± 80	unpub	Wood
QU-81	1090 ± 100	ANU-829	1100 ± 70	unpub	Charcoal
QU-82	15,520 ± 380	ANU-948	15,560 ± 240	unpub	Shells
QU-29	4160 ± 170	IVIC-268	3990 ± 70	R,1967, v 9	Shells
QU-30	840 ± 120	IVIC-862	750 ± 70	R,1973, v 15	Charcoal
QU-12	1880 ± 120	Ly-25	1870 ± 170	R,1969, v 11	Charcoal
QU-13	4630 ± 140	Ly-97	4550 ± 140	R,1971, v 13	Charcoal
QU-14	8510 ± 260	Ly-160	8660 ± 160	unpub	Wood
QU-15	11,360 ± 460	Ly-277	11,250 ± 250	R,1971, v 13	Wood
QU- 5	5500 ± 170	BGS-174	5460 ± 100	unpub	Wood
QU- 9	23,520 ± 760	BGS-19	22,650 ± 230	unpub	Wood
QU- 6	8700 ± 120	GSC-313	8680 ± 140	R,1966, v 8	Shells
QU- 9	23,520 ± 760	GSC-108	24,500 ± 500	R,1963, v 5	Wood

A Samples

Champlain Sea series

QU-3. St-Pierre-Les-Becquets >39,200

Wood from a type sec of St-Pierre, freshwater fluvial and organic sediments, L Laroche farm (46° 29' 25" N, 72° 12' 00" W) (Gadd, 1960). Age is minimum for the St-Pierre interval; several dates were obtained on the St-Pierre peat, some "finite", in the 65,000 range, by DeVries, Groningen Lab (Gadd, 1972).

QU-20. St-Nicolas 11,260 ± 290

Shells (*Mya truncata*) found *in situ* (46° 41' 48" N, 71° 27' 18" W) at + 70m. Shells were coll in shallow-water marine sediment assoc with ice-contact drift. Date agrees with age of barnacles from same pit (GSC-1476: 11,200 ± 170) and is minimum for emergence of site (LaSalle *et al*, 1975).

QU-98. St-Nicolas 11,120 ± 220

Shells (*Balanus hameri*) coll in ice-contact drift of glacio-marine origin S of St Lawrence R (46° 41' 55" N, 71° 27' 25" W) at + 60m. This

date agrees with others obtained on equivalent material in Quebec City area: GSC-1232: $11,110 \pm 160$, GSC-1295: $11,200 \pm 160$, and GSC-1476: $11,200 \pm 170$. It implies debris-laden floating ice in the St Lawrence channel, preceding building of the St Narcisse Moraine (LaSalle *et al*, 1975).

QU-93. St-Henri-de-Lévis 12,230 \pm 250

Shells (*Hiatella arctica*) coll in interstratified, faulted, fluvio-glacial gravel and Champlain Sea marine clay deposited as a buried moraine ($46^{\circ} 38' 15''$ N, $71^{\circ} 08' 00''$ W) at + 104m. Faulting appears related to collapse. Date is minimum for deglaciation of area S of St Lawrence R near Quebec City. Age is also minimum for retreat of the ice front from the Highland Front Moraine position (Gadd, 1964).

QU-94. Ste-Croix-de-Lotbinière 10,700 \pm 200

Shells (*Hiatella arctica*, *Macoma balthica*) coll in what appears to be NE extension of the Drummondville moraine (Gadd *et al*, 1972). Shells, in shallow-water marine sediment ($46^{\circ} 37' 10''$ N, $71^{\circ} 40' 30''$ W) at + 84m, indicate reworking of moraine summit by Champlain Sea. Date is minimum for emergence of the +84m contour. Age is also minimum for the emplacement of the Drummondville moraine.

QU-5. Québec 5500 \pm 170

(*Pinus* sp) ($46^{\circ} 51' 00''$ N, $71^{\circ} 13' 45''$ W), + 15m

QU-95. 5130 \pm 210

(*Alnus* sp) ($46^{\circ} 48' 15''$ N, $71^{\circ} 17' 45''$ W), + 10m

QU-96. 5160 \pm 210

(*Pinus* sp) ($46^{\circ} 50' 10''$ N, $71^{\circ} 13' 30''$ W), + 10m

QU-5, -95, -96 are samples of wood, coll in sediments of St Charles R estuary, probably buried by sideward shifting of river channel. Dates are minimum for emergence of the sites.

QU-97. Beauport 10,650 \pm 240

Shells (*Hiatella arctica*) coll in Champlain Sea Littoral sediment ($46^{\circ} 51' 30''$ N, $71^{\circ} 12' 30''$ W) at + 58m. Shell bed is max 4m thick. Age is minimum for emergence of site.

QU-99. St-Agapit 400 \pm 100

Wood from A horizon of buried Podzol in dunes ($46^{\circ} 33' 15''$ N, $71^{\circ} 30' 00''$ W) at + 100m. Age indicates late reactivation of dunes, the result of lumbering.

Landslides series

QU-2. St-Jean-Vianney 4400 \pm 150

Wood from temporary stream ($48^{\circ} 29' 45''$ N, $71^{\circ} 13' 45''$ W) at + 100m, after landslide of May 4, 1971. No dates in this range for landsliding have been previously reported in the area. Wood must have been transported from bog on terrace above, by sliding and stream action. Date of 4460 ± 140 , I-6003, was obtained on same specimen.

QU-100. Port-Alfred 7000 ± 260

Wood from A horizon of soil (48° 19' 42" N, 70° 53' 30" W) at + 46m buried under marine clay disturbed by sliding. Landslide scars are numerous; date indicates earliest landslide activity recorded in area of Laflamme Sea.

QU-6. Alma 8700 ± 120

Shells (*Hiatella arctica*) coll in beach sand (48° 31' N, 71° 38' W) at + 130m, of the Laflamme Sea. This date agrees with GSC-313: 8680 ± 140, from equivalent sample, and gives minimum age for emergence (LaSalle, 1965).

*B Samples***Gaspé series****QU-42. Square Fork River 11,000 ± 340**

Gyttja from base of core coll with Livingstone sampler in kettle in fluvio-glacial sediments downstream from moraines (48° 35' 10" N, 66° 16' 10" W) at + 180m in central Gaspé. Age is minimum for deglaciation of Square Fork river valley.

QU-47. St-Joachim-de-Tourelles 15,330 ± 1350

Gyttja from base of core coll with Livingstone sampler in lake on calcareous bedrock (49° 07' 50" N, 66° 19' 40" W) at + 415m. Date probably not significant because of possible contamination of sediment by old carboniferous matter dissolved and incorporated by organisms.

QU-83. Ste-Félicité 13,580 ± 350

(48° 52' 40" N, 67° 23' 00" W), + 21m

QU-84. 13,450 ± 470

(48° 53' 00" N, 67° 22' 00" W), + 15m

Shells (*Hiatella arctica*) from a glacio-marine diamicton deposited by calving into St Lawrence estuary. Dates are minimum for local deglaciation. Shells also date marine invasion.

QU-85. Capucins 13,540 ± 300

Shells of several marine species from stony marine clay of the Goldthwait Sea (49° 02' 30" N, 66° 52' 00" W) at + 68m. Date is minimum for deglaciation and marine invasion.

QU-107. Ste-Anne-des-Monts 11,700 ± 190

(49° 07' 40" N, 66° 27' 25" W), + 42m

QU-108. 9230 ± 150

(49° 07' 15" N, 66° 32' 30" W), + 23m

QU-109. 9300 ± 180

(49° 07' 20" N, 66° 31' 00" W), + 18m

Shells (*Mytilus edulis*) from shore facies sediment of Goldthwait Sea. Dates are maximum for emergence.

QU-146. Matane**2380 ± 90**

Shells of several marine species coll *in situ* from shore facies sediments (48° 48' 50" N, 67° 36' 20" W) at + 7m, on the Micmac terrace (Goldthwait, 1911). Date is maximum for emergence.

QU-152. Matane**2260 ± 110**

Shells (*Mya* sp) from shore facies sediment (48° 50' 40" N, 67° 33' 35" W) at + 6m on the Micmac terrace (Goldthwait, 1911). Date is maximum for water retreat.

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