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Inventory of radiocarbon dates from southern Patagonia and Tierra del Fuego

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Résumé

160 datations Cl 4 effectuées à partir d'échantillons provenant de la Patagonie australe et de la Terre de Feu sont inventoriées et brièvement commentées. Les résultats ont été classés de la manière suivante : 1) Datations archéologiques : Patagonie (Argentine) 15 datations; Patagonie (Chili) 53 datations; Terre de Feu (Argentine) 17 datations; Terre de Feu (Chili) 7 datations. 2) Datations glaciologiques et de sciences apparentées : Patagonie (Argentine) 18 datations; Patagonie (Chili) 27 datations. 3) Datations en relation avec le volcanisme : Terre de Feu (Argentine) 6 datations ; Terre de Feu (Chili) 5 datations. 4) Datations en relation avec les changements du niveau de la mer : Côte atlantique, 8 datations; plate-forme continentale atlantique, 4 datations. Une carte et 2 tableaux font la synthèse graphique des principaux aspects de l'inventaire.

Abstract

160 radiocarbon dates taken from samples collected in the southern Patagonia and Tierra del Fuego are inventoried and briefly commented upon. The results were classified in the following way : 1) Archeologie dates : Patagonia (Argentine) 15 dates ; Patagonia (Chile) 53 dates; Tierra del Fuego (Argentine) 17 dates; Tierra del Fuego (Chile) 7 dates. 2) Glaciologie dates and from connected sciences : Patagonia (Argentine) 18 dates ; Patagonia (Chile) 27 dates. 3) Dates in relation with volcanism : Tierra del Fuego (Argentine) 6 dates ; Tierra del Fuego (Chile) 5 dates. 4) Dates in relation with changes of the sea level : Atlantic coast, 8 dates; continental Atlantic platform, 4 dates. One map and two charts synthetize graphically the main aspects of the inventory.

Resumen

En este articulo se inventarian y comentan brevemente 1 60 fechados radiocarbónicos efectuados a partir de muestras procedentes de Patagonia austral y Tierra del Fuego. Los resultados han sido clasificados de la siguiente manera : 1) Dataciones arqueológicas : Patagonia (Argentina) 15 dataciones ; Patagonia (Chile) 53 dataciones ; Tierra del Fuego (Argentina) 1 7 dataciones ; Tierre del Fuego (Chile) 7 dataciones. 2) Dataciones glaciológicas y de ciencias afines : Patagonia (Argentina) 18 dataciones ; Patagonia (Chile) 27 dataciones. 3) Dataciones relacionadas con el volcanismo : Tierra del Fuego (Argentina) 6 dataciones; Tierra del Fuego (Chile) 5 dataciones. 4) Dataciones relacionadas con los cambios del nivel del mar : Costa atlántica, 8 dataciones ; plataforma continental atlántica, 4 dataciones. Un mapa y dos cuadros sintetizan gráficamente los principales aspectos del inventario.

INVENTORY OF RADIOCARBON DATES FROM SOUTHERN PATAGONIA AND TIERRA DEL FUEGO

by Omar R. ORTIZ-TRONCOSO

En fait, toute l'archéologie sud-américaine en est à ce point de la recherche où les faits connus, déjà nombreux, sont localisés géographiquement et chronologiquement avec plus ou moins de précision et où l'on tente de les organiser systématiquement dans des directions diverses avec plus ou moins de succès.

A. LAMING-EMPERAIRE (Approche méthodique des cultures préhistoriques amérindiennes, 1973).

In the 1950's, when Libby started with the application of his dating method, Junius B. Bird of the American Museum of Natural History, New York, handed him over various samples, which he had collected in South Chile during excavations carried out between 1932 and 1937. In this way, since 1951 radiocarbon dates for two of the most important Patagonian sites – Mylodon and Palli Aike caves – have been known. The very great age of these sites had previously been recognized through the presence, in the oldest layers, of Pleistocene faunal remains (Johnson, 1951, Arnold & Libby, 1951 : 120, Libby, 1952 : 94); and in addition, it was pointed out that Palli Aike Cave was « the most ancient of human samples from South America. Contemporaneous with Gypsum Cave... » (Arnold & Libby, *op. cit.* : 120). Subsequently, Fell's Cave was dated using samples collected by the late John Fell, amateur archaeologist and owner of the ranch where that site is located (Rubin & Berthold, 1961 : 96).

The existence in the southernmost part of South America of sites undoubtedly assigned to the Late Pleistocene and Early Holocene was important not only for the regional archaeology, but also for the general prehistory of the continent. If the initial population of the Americas came from the North, it was obvious to expect older finds in the northern half of South America. Nevertheless it was necessary to wait ten years for the confirmation

of this idea, finally corroborated by the discovery of the Venezuelan stratified Paleo-Indian kill sites. During the last twenty years, Bird and other scholars from Argentina, Chile, England, and especially from France have made available new radiocarbon results, which generally agree with the early dates mentioned above, and put recently discovered sites into the chronological sequence of the area.

This paper gives a detailed inventory of 160 radiocarbon measurements on samples from Southern Patagonia and Tierra del Fuego. The samples not only come from archaeological sites, but also from localities of interest for the study of paleo-ecology. The data have been separated as follows :

1. Archaeological samples (from the Paleo-Indian stage to the early Historic Period).
   1.1. Patagonia, Argentina (15 dates).
   1.2. Patagonia, Chile (53 dates).
   1.3. Tierra del Fuego, Argentina (17 dates).
   1.4. Tierra del Fuego, Chile (7 dates).
2. Glaciological and related samples.
   2.1. Patagonia, Argentina (18 dates).
   2.2. Patagonia, Chile (27 dates).
3. Samples related to volcanism.
   3.1. Tierra del Fuego, Argentina (6 dates).
   3.2. Tierra del Fuego, Chile (5 dates).
4. Samples related to changes in sea-level.
   4.1. Atlantic coast (8 dates).
   4.2. Atlantic continental shelf (4 dates).

Gordon (1967) was the first one who published an inventory of archaeological C-14 dates from Chile, but his work must necessarily be made up to date as a great number of measurements from that country were obtained after 1967. Recently Rivera (1977/78) published a new list with a similar aim, but he comments only on the results from the northern provinces, the geographical area of his speciality. Laming-Emperaire (1968) gave a list of radiocarbon dates carried out between 1957 and 1968 by the laboratory of Gif-sur-Yvette (and its predecessor Saclay) on samples collected from sites excavated by the French missions in Patagonia and Tierra del Fuego. For our part, we have made an inventory of 46 dates from the same general area which remained unpublished as yet (Ortiz-Troncoso, 1974, appendix 1 & 2) ; a number of new results was published recently (Ortiz-Troncoso, 1977/78).

Many Argentinean scholars — specially A.R. González — have published lists with radiocarbon results ; the most recent one (González & Lagiglia, 1973) includes five dates from Southern Patagonia, but new reports about excavations carried out during the past few years in that region and also in the southernmost area of Tierra del Fuego have increased this number considerably (Aguerre, 1977, Gradin & Tamers, 1975, Gradin *et al.*, 1976, Orquera *et al.*, 1977, etc.).

In the main, samples related to glaciology were collected during expeditions of the American Geographical Society and the Institute of Polar Studies of the Ohio State University, conducted by C.J. Heusser and J.H. Mercer respectively. Samples related to the chronology of the volcanic activity were collected by V. Auer of the Geological Institute, Helsinki University.

We consider our list of archaeological dates to be complete, at least until the submission date of the manuscript (June 1979). Lists 2 to 4 are selective; perhaps, there may be omissions resulting from the dispersion of C-14 results in the geological literature. However, they include series published in *Radiocarbon* as well as all the important reports about various non-archaeological aspects of the prehistory of Patagonia and Tierra del Fuego. In any case, this inventory contains by far most of the useful dates for archaeologists. Our most important objective is providing a tool for future research rather than giving a finished chronological table.

Sites are described from North to South, and radiocarbon results in years B.P. from the oldest dates to the most recent ones. It should be noted, that dates obtained before 1962 were calculated with the year of measurement as reference year; in 1962, A.D. 1950 was accepted as the standard reference year. Dates are based on the Libby value (5568 ± 30 yr.) for the half life.

The most important problem for the compilation of an inventory like this one is the scanty information provided by archaeologists about their radiocarbon dates. In many publications elementary data are lacking, for instance laboratory n°, nature of sample, year of measurement, etc., whereas the dates included in *Radiocarbon* represent only a small part of the now available ones. We are working, in collaboration with A. Boomert, at an inventory of archaeological C-14 dates from South America and the West Indies, of which the first part will be published next year. For this reason, any published or unpublished information about this subject is welcome.

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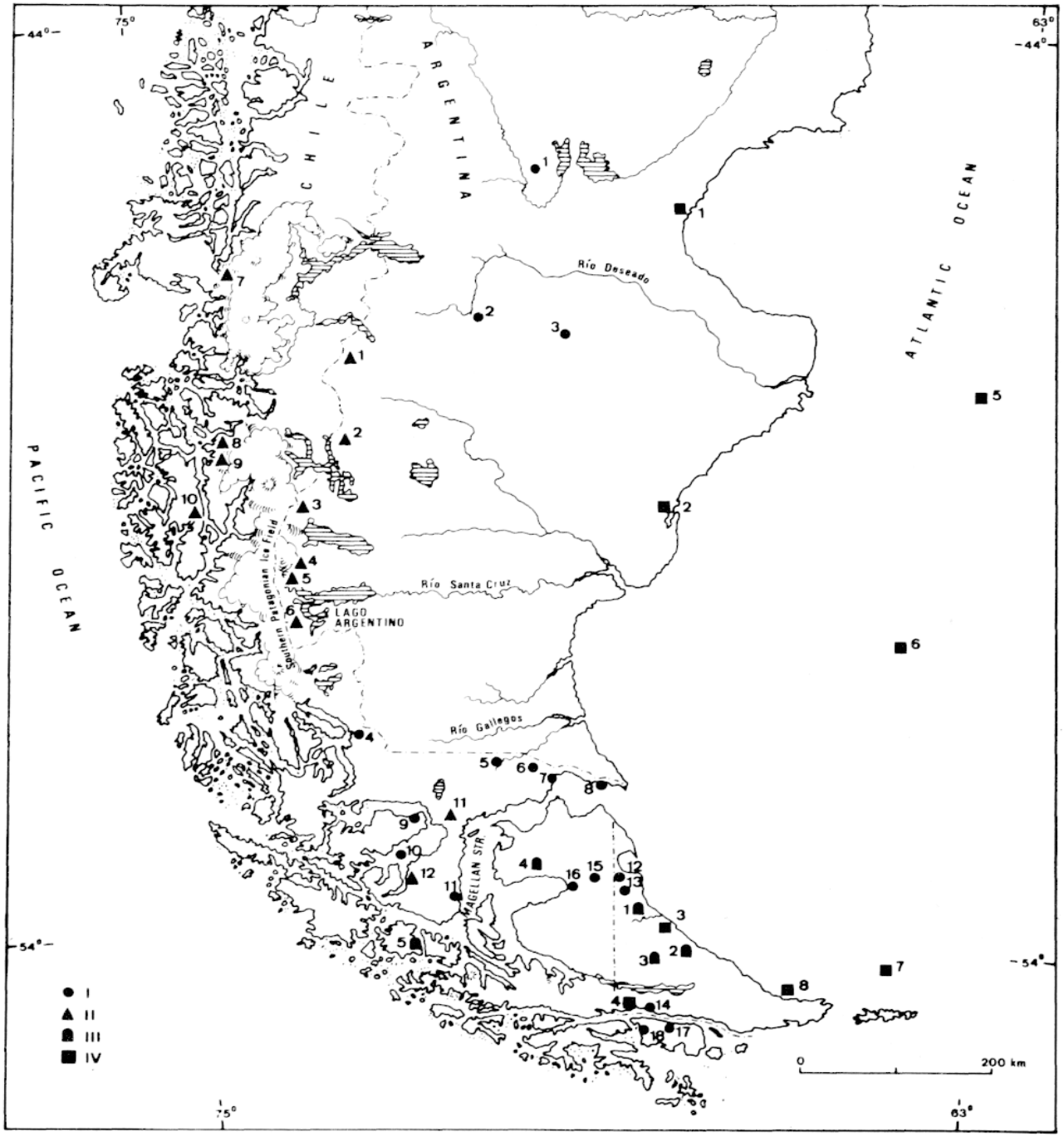

Fig. 1. — Geographical distribution of radiocarbon samples from Southern Patagonia and Tierra del Fuego.

I. *Archaeological samples*
1. Manos Pintadas Rock Shelter
2. Las Manos Cave (Alto Rio Pinturas)
3. Los Toldos, Cave n°3
4. Mylodon or Eberhard Cave
5. Fell's Cave & Río Chico-1
6. Palli Aike Cave
7. Bahía Munición-3
8. Cañadon Cóndor
9. Ponsonby (Riesco I.)
10. Englefield Island
11. Bahía Buena & Punta Santa Ana
12. Cabeza de León
13. Castillo
14. Lancha Packewaia & Túnel
15. Tres Arroyos
16. Marazzi Rock Shelter
17. Lauta (Navarino I.)
18. Rock Shelter on the West coast of the Navarino I.

II. *Glaciological and related samples*
1. San Lorenzo Este G1
2. Narváez G1
3. Adela G1
4. Dos Lagos G1 & Cerro Norte G1
5. Upsala G1
6. Moreno G1
7. Laguna de San Rafael G1
8. Ofhidro (N and S) G1 & Bernardo G1
9. Témpano G1 & Hammick G1
10. Puerto Edén
11. Otway Sound, Rio Verde moraine
12. Silva Palma Fjord

III. *Samples related to volcanism*
1. La Misión, Rio Grande
2. Estancia Pirenaica
3. Río Ewan
4. Altos Boquerón
5. Clarence Island

IV. *Samples related to changes in sea level*
1. Comodoro Rivadavia
2. San Julián Bay
3. Estancia Viamonte
4. Ushuaia, Puerto Golondrina & Punta Pingüinos
5. Core 16-149
6. Core 16-143
7. Core 15-104
8. Sample V-14-T-14

1. – ARCHAEOLOGICAL SAMPLES

1.1. – *Patagonia, Argentina.*

Site	*Lab. n°* *	*Material dated*	*Years B.P.*	*Reference*	*Comment*
Manos Pintadas Rock Shelter 45°28' S, 69°42' W)	IVIC-860	Charcoal.	3330 ± 70	Tamers 1973 : 314	Sample from trench II, layer 9 (183 cm below surface) in a rock shelter with pictographs in Cañadón de las Manos Pintadas ; coll. (1970) by C.J. Gradin (Museo Etnográfico, Buenos Aires) and subm. by J.M. Cruxent (IVIC). Report of the excavation by Aschero (1975). According to Gradin (1973, 1974) this is «nivel antropógeno IV».
Manos Pintadas Rock Shelter	CSIC-128	Guanaco dung.	2440 ± 50	Gradin *et al.* 1976 : 246	Sample from unit A-B, layer 6.
Manos Pintadas Rock Shelter	IVIC-859	Charcoal.	1910 ± 60	Tamers 1973 : 314	Sample from trench I, layer 4 (60 cm below surface) ; coll. and subm. as IVIC-860. According to Gradin (1973, 1974) this is «nivel antropógeno VI».
Manos Pintadas Rock Shelter	CSIC-127	Charcoal.	1700 ± 50	Gradin *et al.* 1976 : 249.	Date related to Nova-115, from Las Manos Cave (Río Pinturas) ; see below, Unit B, layer 4.
Las Manos Cave (Alto Río Pinturas) (47°09' S, 70°45' W)	CSIC-138	Charcoal.	9320 ± 90	Gradin *et al.* 1976 : 221.	Sample from layer 6, middle part (125 cm depth) in a rock shelter with pictographs. Excavations in 1973-74 ; report by Gradin *et al.* (1976).
Las Manos Cave (Alto Río Pinturas)	CSIC-385	Charcoal.	9300 ± 90	Aguerre 1977 : 131.	Sample from layer 6, lower part (126 cm depth). Result in agreement with sample CSIC-138.
Las Manos Cave (Alto Río Pinturas)	Nova-117	Charcoal.	7280 ± 60	Gradin & Tamers 1975 : 215-6.	Sample from layer 7 ; According to Gradin *et al.* (1976 : 221) this is layer 6, upper part.
Las Manos Cave (Alto Río Pinturas)	Nova-116	Charcoal.	3380 ± 90	*Ibid.*	Layer 5 (70 cm depth).
Las Manos Cave (Alto Río Pinturas)	Nova-115	Charcoal.	1610 ± 60	*Ibid.*	Layer 4-c (60 cm depth). Date related to layer 4 of the Manos Pintadas Rock Shelter (see samples IVIC-859 and CSIC-127).

Las Manos Cave (Alto Río Pinturas)	CSIC-137	Charcoal.	430 ± 50	Gradin *et al.* 1976 : 222.	Layer 3-b (30 cm depth). The date is not reliable because of the high nitrogen presence in the sample.
Los Toldos, Cave n° 3 (47°22' S, 68°58' W)	BVA-	Charcoal.	12,600 ± 600	Cardich *et al.* 1973 : 97.	Sample from layer 11 (lower part), 135 cm depth, in a cave with pictographs. This site, with 11 cultural layers, is one of the numerous caves and rock shelters in the Cañadon de las Cuevas area. Excavation (1971) conducted by A. Cardich (Univ. Nacional de La Plata). Samples subm. by L.A. Cardich. Lab. n° not given.
Los Toldos, Cave n° 3	BVA-	Charcoal.	8750 ± 480	*Ibid.*	Layer 9 (upper part), 87 cm depth. Late Toldense culture.
Los Toldos, Cave n° 3	BVA-	Charcoal.	7260 ± 350	*Ibid.*	Layer 7 (lower part), 76 cm depth. Casapedrense culture.

1.2. – *Patagonia, Chile.*

Mylodon or Eberhard Cave (51°35' S, 72°36' W)	A-1390	Giant sloth dung.	13,560 ± 190	Long & Martin 1974 : 639.	Unstratified sample.
Mylodon or Eberhard Cave	NZ-1680	Giant sloth skin fragment and hair.	13,500 ± 470	Ortiz-Troncoso 1977/78 : 245.	Sample stored in Museo de la Patagonia (Punta Arenas, Chile) ; subm. (1972) by H.W. Wellman (Victoria University, New Zealand). Related article by Wellman (1972) about geological formation of this cave.
Mylodon or Eberhard Cave	Lu-794	Collagen from part of giant sloth vertebra.	13,260 ± 115	Hakansson 1976 : 304.	Sample coll. by E. Nordenskjöld in 1899 ; subm. by G. Andersson (Malmö Museum).
Mylodon or Eberhard Cave	BM-728	Collagen from femur of giant sloth.	12,984 ± 76	Burleigh *et al.* 1977 : 143-4.	Sample coll. *ca.* 1900 from cave floor deposits beneath fallen roof debris ; stored in The British Museum (Nat. History) ; purchased from G.A. Milward 1904 ; subm. by A.J. Sutcliffe (The British Museum).

(*) See laboratories list at the end.

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
Mylodon or Eberhard Cave	BM-1375	Giant sloth dung.	12,552 ± 128	Saxon 1978 : 4 ; Burleigh *et al. Radiocarbon* forthcoming.	Trench 5, layer 10 (260 cm depth) with giant sloth remains ; sediment consisted of brown sloth dung mixed with rock meal. Excavation by E.C. Saxon (Univ. of Durham) in 1976.
Mylodon or Eberhard Cave	C-484	Giant sloth dung.	10,800 ± 570 10,864 ± 720 Average : 10,832 ± 400	Arnold & Libby 1951 : 120.	Sample coll. by J.B. Bird in 1937 ; first radiocarbon date for this site and for South Patagonia.
Mylodon or Eberhard Cave	A-1391	Giant sloth hide.	10,400 ± 330	Long & Martin 1974 : 639.	Unstratified sample.
Mylodon or Eberhard Cave	Sa-49	Giant sloth dung.	10,200 ± 400	Delibrias *et al.* 1964 : 244.	Excavation by the French Mission in 1953 ; report in Emperaire & Laming (1954).
Mylodon or Eberhard Cave	BM-1207-A	Burnt guanaco bones.	7785 ± 747	Saxon 1978 : 4 ; Burleigh *et al. Radiocarbon* forthcoming.	Trench 2/7, layer 8 (130 cm depth) with guanaco bones and lithic artifacts ; sediment consisted of rock meal. Saxon's excavation. The error term is great because of the small sample size.
Mylodon or Eberhard Cave	BM-1204-A	Charcoal.	5684 ± 52	Saxon 1978 : 4 ; Burleigh *et al. Radiocarbon* forthcoming.	Trench 2, layer 7 (120 cm depth) with guanaco bones and lithic artifacts ; sediment consisted of rock meal. Saxon's excavation.
Mylodon or Eberhard Cave	BM-1204-B	Charcoal.	5643 ± 60	Borrero 1977 : 84 ; Burleigh *et al. Radiocarbon* forthcoming.	Remeasurement of BM-1204-A.
Mylodon or Eberhard Cave	BM-1201-B	Charcoal.	5395 ± 58	*Ibid.*	Remeasurement of BM-1201-A.
Mylodon or Eberhard Cave	BM-1201-A	Charcoal.	5366 ± 55	Saxon 1976 : 66 & 71.	See comment about BM-1204-A.
Mylodon or Eberhard Cave	BM-1202	Charcoal.	2556 ± 45	Burleigh *et al. Radiocarbon* forthcoming.	Sample from layer A in shell refuse in the cave's entrance (called Nordenskjöld Midden) ; Saxon's excavation. This refuse indicates the presence of fishers and gatherers in the Almirante Montt Gulf, near Mylodon Cave.
Fell's Cave (52°04' S, 70°00' W)	I-3988	Charcoal.	11,000 ± 170	Bird 1969 : 52.	Oldest occupation layer with *Onohippidium, Gripotherium, Canis* sp., *Lama guanicoe, Dusicyon* and *Ctenomys magellanicus*. Sample coll. during excavation by J.B. Bird in 1969.

Fell's Cave	W-915	Charcoal.	10,720 ± 300	Rubin & Berthold 1961 : 96.	Oldest occupation layer. Sample coll. by J. Fell (*ca.* 1959) on behalf of J.B. Bird.
Fell's Cave	I-5146	Charcoal.	10,080 ± 160	J.B. Bird, pers. commun.	Possibly, transition between periods I & II in the cultural sequence published by Bird (1946 : 19-20). This sample (and the next ones) from Bird's excavation in 1969.
Fell's Cave	I-5144	Charcoal.	9100 ± 150	*Ibid.*	Period II.
Fell's Cave	I-5145	Charcoal.	9030 ± 230	*Ibid.*	Period II.
Fell's Cave	I-5143	Charcoal.	8480 ± 135	*Ibid.*	Transition between periods II & III.
Fell's Cave	I-5142	Charcoal.	8180 ± 135	*Ibid.*	Early period III.
Fell's Cave	I-5138	Charcoal.	6740 ± 130	*Ibid.*	Period III.
Fell's Cave	I-5141	Charcoal.	6560 ± 115	*Ibid.*	Period III.
Fell's Cave	I-5140	Charcoal.	6485 ± 115	*Ibid.*	Period III.
Fell's Cave	I-5139	Charcoal.	685 ± 90	*Ibid.*	Period V.
Río Chico-1 (52°04' S, 70°00' W)	UW-	Charcoal.	2070 ± 80	Bate 1971 : 35.	Sample coll. by L.F. Bate (1970) from a test pit. The site – near Fell's Cave – is a rock shelter with pictographs. Lab. n° not given.
Palli Aike Cave (52°10' S, 69°35' W)	C-485	Burned bones of sloth, horse and guanaco.	8639 ± 450	Arnold & Libby 1951 : 120.	Sample associated with human bones and artifacts ; excavation (1937) by J.B. Bird.
Bahía Munición-3 (52°15' S, 69°30' W)	Gif-1043	Charcoal.	3200 ± 450	Laming-Emperaire 1968 : 84-6 ; Delibrias *et al.* 1972 : 299-300.	Bottom of level 11 ; excavations by the French Mission in 1959 and 1964 (samples coll. in 1964). This site is a 7 m consolidated sand hill with 11 archaeological levels composed of sand, shells and lithic artifacts ; it is not a typical shell midden.
Bahía Munición-3	Gif-1042	Charcoal.	1990 ± 110	*Ibid.*	Level 9.
Bahía Munición-3	Gif-1039	Charcoal.	1680 ± 140	*Ibid.*	Level 6.
Bahía Munición-3	Gif-1038	Charcoal.	800 ± 100	*Ibid.*	Level 5.
Bahía Munición-3	Gif-1037	Charcoal.	740 ± 110	*Ibid.*	Level 4.
Bahía Munición-3	Gif-1041	Charcoal.	550 ± 100	*Ibid.*	Level 8. According to Laming-Emperaire (1968 : 86), the position of levels 7 and 8 in the stratigraphy is not very clear ; therefore, dates proposed

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
					for these levels are suspect and not in agreement with the rest of the series. Probably 7 and 8 correspond to recent settlements at foot of sand hill.
Bahía Munición-3	Gif-1040	Charcoal.	530 ± 100	*Ibid.*	Level 7 ; see comment above.
Bahía Munición-3	Gif-1035	Charcoal.	290 ± 90	*Ibid.*	Level 2 ; very little chronological distance with level 3. According to Laming-Emperaire (1968 : 85), level 2 can be dated in A.D. 1750 and 3 in A.D. 1610.
Bahía Munición-3	Gif-1036	Charcoal.	250 ± 90	*Ibid.*	Level 3.
Cañadon Condor (52°18' S, 68°40' W)	I-5147	Charcoal.	3725 ± 100 3475 ± 100	J.B. Bird, pers. commun.	According to Bird, these dates are related to period IV of the Fell's Cave sequence. Sample from a layer of material accumulated in the bottom of a tidal lagoon (13 m above high water mark) ; «the layer contains marine diatomes, shellfish, fish bones and at the same time enough other organic material to burn like peat. It could not be treated for removal of humic acids». See comment about this site in Bird (1938 : 275).
Ponsonby (Riesco I.) (52°40' S, 71°30' W)	Gif-1051	Vegetal debris from peat bog.	7610 ± 170	Laming-Emperaire 1968 : 81-3 ; Delibrias *et al.* 1972 : 298.	Excavations by the French Mission in 1951-53 and 1958 ; sample coll. in 1952-53, just below Gif-1048.
Ponsonby (Riesco I.)	Sa-47	Wood and roots.	6500 ± 400	Delibrias *et al.* 1964 : 243 ; Laming-Emperaire 1968 : 81-3.	Contemporaneous with Gif-1048.
Ponsonby (Riesco I.)	Gif-1048	Charcoal.	6370 ± 160	Laming-Emperaire 1968 : 81-3 ; Delibrias *et al.* 1972 : 298.	First traces of human occupation by hunters.
Ponsonby (Riesco I.)	Gif-1052	Wood.	5520 ± 140	*Ibid.*	See comment above.
Ponsonby (Riesco I.)	Gif-1049	Charcoal.	3720 ± 130	*Ibid.*	Industry similar to that of inland pampas ; may come from upper terrace which is very eroded.

Ponsonby (Riesco I.)	Gif-1050	Shells.	3700 ± 130	*Ibid.*	Shell deposit with industry of fishermen.
Englefield Island (53°10' S, 71°50' W)	Sa-20-c	Charcoal.	9248 ± 1500	Emperaire & Laming 1961 : 16-17.	Shell midden ; excavation by J. Emperaire and B. Passini in 1952 ; sample subm. in 1958. Date with very great error term and not in agreement with dates for Bahía Buena and Punta Santa Ana sites (see below) with similar lithic and bone industries.
Englefield Island	Sa-20-c	Charcoal.	8456 ± 1500	*Ibid.*	See comment above.
Englefield Island	GrN-8573	Charred bones.	3915 ± 75	Pers. commun. to the author by Dr. W.G. Mook (Radiocarbon Lab., Univ. of Groningen), 1.08.1978.	Sample coll. by J. Emperaire in 1952 and subm. by O.R. Ortiz-Troncoso in 1978.
Bahía Buena (53°36' S, 70°59' W)	GrN-7614	Charcoal.	5895 ± 65	Ortiz-Troncoso 1977/78 : 246.	Oldest occupation layer ; excavation by O.R. Ortiz-Troncoso in 1973.
Bahía Buena	GrN-7613	Charcoal.	5770 ± 110	*Ibid.*	See comment above.
Bahía Buena	Gif-2927	Charcoal.	5210 ± 110	Ortiz-Troncoso 1975 : 104.	See comment above.
Punta Santa Ana (53°37' S, 70°58' W)	GrN-7612	Shells.	6410 ± 70	Ortiz-Troncoso 1977/78 : 246.	Oldest occupation layer ; excavation by O.R. Ortiz-Troncoso in 1972.
Punta Santa Ana	Gif-2928	Shells.	5620 ± 120	Ortiz-Troncoso 1975 : 104.	See comment above.

1.3. – *Tierra del Fuego, Argentina.*

Cabeza de León (53°19' S, 68°35' W)	MC-1069	Charcoal.	1100 ± 95	Rapaire & Hugues 1977 : 52.	Sample from depth of 30 cm, associated with lithic artifacts, in a rock shelter ; coll. (1975) and subm. by E.C. Saxon.
Castillo (53°40' S, 68°28' W)	MC-1071	Charcoal.	Modern.	Rapaire & Hugues 1977 : 53.	Sample from wind-eroded scarp under collapsed rock shelter ; coll. and subm. as MC-1069.
Lancha Packewaia (54°49' S, 68°10' W)	CSIC-305	Charcoal.	5920 ± 90	Orquera *et al.* 1977 : 235.	Layer X, unit I. This date does not agree with CSIC-306 (see below). Samples from this shell midden were collected during excavations by an Argentine team in 1975. Report by Orquera *et al.* (1977).

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
Lancha Packewaia	CSIC-307	Collagen from bones of sea lion and guanaco.	4980 ± 70	*Ibid.*	Layer E, unit I.
Lancha Packewaia	MC-1068	Charcoal.	4215 ± 305	Rapaire & Hugues 1977 : 52.	«Sample from surface of fossil beach, underlying 3rd lowest shell midden. Too old, age may be considered maximum. Sample diluted with old CO_2». Samples subm. to MC Laboratory by E.C. Saxon.
Lancha Packewaia	CSIC-306	Charcoal.	4020 ± 70	Orquera *et al.* 1977 : 235.	Layer X, unit I.
Lancha Packewaia	CSIC-312	Charcoal.	1590 ± 50	*Ibid.*	Layer D, unit II.
Lancha Packewaia	CSIC-311	Charcoal.	1120 ± 50	*Ibid.*	Layer D, unit I.
Lancha Packewaia	MC-1065	Charcoal.	1080 ± 100	Rapaire & Hugues 1977 : 52.	Middle midden layer ; this date is exactly contemporaneous with R-4542/1 (NZ) : Lauta, Navarino Island ; Tierra del Fuego, Chile ; site 1-a.
Lancha Packewaia	CSIC-314	Charcoal.	470 ± 50	Orquera *et al.* 1977 : 235.	Layer D, unit III.
Lancha Packewaia	MC-1063	Charcoal.	455 ± 85	Rapaire & Hugues 1977 : 51.	Sample from humus layers underlying uppermost midden levels. According to Stuiver & Suess (1966, quoted by Rapaire & Hugues 1977 : 51) «tree-ring calibration places upper midden in 16th century and underlying soil in 15th century».
Lancha Packewaia	MC-1066	Charcoal.	410 ± 75	*Ibid.*	Same layer as MC-1063.
Lancha Packewaia	MC-1062	Charcoal.	280 ± 85	*Ibid.*	Sample from uppermost midden levels of 2 trenches 30 m apart.
Lancha Packewaia	MC-1064	Charcoal.	280 ± 85	*Ibid.*	See comment about MC-1062.
Túnel (54°49' S, 68°10' W)	CSIC-310	Charcoal.	6070 ± 70	Orquera *et al.* 1977 : 238.	Layer E (in unit II) of a shell midden near Lancha Packewaia.
Túnel	CSIC-309	Charcoal.	5960 ± 70	*Ibid.*	Layer D, unit. II.
Túnel	CSIC-308	Charcoal.	5850 ± 70	*Ibid.*	Layer D, unit I.

1.4. – *Tierra del Fuego, Chile.*

Tres Arroyos (53°22' S, 68°50' W)	MC-1070	Charcoal.	135 ± 85	Rapaire & Hugues 1977 : 52.	Sample consists of charcoal from depth 50 cm, at rear of N facing rock shelter, coll. (1975) and subm. by E.C. Saxon.
Marazzi Rock Shelter (53°30' S, 69°20' W)	Gif-1034	Charcoal.	9590 ± 210	Laming-Emperaire 1968 : 87 ; Laming-Emperaire *et al.* 1972 : 232-3 ; Delibrias *et al.* 1972 : 299.	Oldest occupation layer; excavations by the French Mission in 1965 and 1967-68 ; sample coll. in 1965.
Marazzi Rock Shelter	Gif-1033	Charcoal.	5570 ± 400	*Ibid.*	Middle levels ; sample coll. in 1965.
Lauta (Navarino I.) (54°55' S, 67°40' W)	Gif-2729	Shells.	2780 ± 110	Ortiz-Troncoso 1977/78 : 245.	Oldest occupation layer of a shell midden (site 3) ; sample coll. from a test pit in 1971 by O.R. Ortiz-Troncoso. Lauta dates are quoted by Rapaire & Hugues (1977 : 51-2) in connection with Lancha Packewaia series (Argentina).
Lauta (Navarino I.)	R-4542/1 (NZ)	Shells.	1080 ± 60	*Ibid.*	Oldest occupation layer of a shell midden (site 1-a, near the above cited) ; sample coll. from a test pit in 1971 by O.R. Ortiz-Troncoso.
Lauta (Navarino I.)	Gif-2728	Shells.	280 ± 90	*Ibid.*	Lower layer in site 1, near the above cited ; sample coll. under similar conditions.
Rock shelter on the West coast of the Navarino Island. (aprox. 55°00' S, 68°10' W)	I-3989	Wood.	970 ± 90	Orquera *et al.* 1977 : 95.	Sample coll. by J.B. Bird. See CSIC-311 & MC-1065 from Lancha Packewaia series (Tierra del Fuego, Argentina).

2. – GLACIOLOGICAL AND RELATED SAMPLES.

2.1. – *Patagonia, Argentina.*

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
San Lorenzo Este Glacier (47°40' S, 72°14' W)	I-2208	Wood.	4590 ± 115	Mercer 1968 : 94.	Sample (a stump) from « 1 m below water level of lagoon dammed by the outermost end moraine » ; agrees with sample I-2204 (Narváez Glacier). Coll. (1966) and subm. by J.H. Mercer (Inst. of Polar Studies, Ohio State Univ.)
Narvaéz Glacier (48°30' S, 72°15' W)	I-2204	Peat.	4320 ± 110	*Ibid.*	Sample gives min. age for the formation of the outermost end moraine ; agrees with sample I-2208 (San Lorenzo Este Glacier). Coll. (1966) and subm. by J.H. Mercer.
Adela Glacier (Río Fitz Roy Valley) (49°20' S, 73°00' W)	I-984	Peat.	800 ± 85	Mercer 1965 : 397.	Minimum age for the Fitz Roy III moraine. Sample coll. (1963) by the Ohio State Univ. expedition.
Dos Lagos Glacier (49°47' S, 73°12' W)	I-989	Wood.	390 ± 85	Mercer 1965 : 409.	Sample (a stump) exposed in moraine by recent stream erosion. According to Mercer, « the glacier therefore probably ceased to contribute to the moraine sometime during the sixteenth century ». Coll. (1963) by the Ohio State Univ. expedition.
Cerro Norte Glacier (49°50' S, 73°12' W)	I-987	Wood.	1595 ± 100	Mercer 1965 : 408.	Sample is a *Nothofagus* stump. According to Mercer, « the glacier must have been near its maximum when the tree was drowned near the middle of the fourth century ». Coll. (1963) by the Ohio State Univ. expedition.
Upsala Glacier, Cerro Pearson (Lago Argentino) (49°56' S, 73°14' W)	I-1033	Peat.	3585 ± 200	Mercer 1965 : 400.	Basal peat from the outermost moraine. According to Mercer *(op. cit.)* the age difference between this sample and the thin peat (I-985, see below) « intimately associated with glacial deposits on the other side of the moraine suggests that although the peat bog in its present form is the result of the moraine dam, the basal peat antedates its ». Samples from Upsala Glacier coll. (1963) by the Ohio State Univ. expedition.

Upsala Glacier, Cerro Pearson	I-985	Peat.	1995 ± 100	*Ibid.*	Sample from peat layer interbedded with glacial clay.
Upsala Glacier (Lago Argentino, Bahía Upsala) (50°02' S, 73°17' W)	I-988	Wood.	2310 ± 120	Mercer 1965 : 404.	Sample (a log) found 4 km from the present ice front. According to Mercer «it is well preserved, with bark attached, and thus was probably buried near where it grew by ice advancing past this point about 350 B.C.».
Moreno Glacier (Lago Argentino, between Brazo Rico and Cerro Frías) (50°30' S, 72°58' W)	I-2209	Peat.	10,000 ± 140	Mercer 1968 : 95.	According to Mercer *(op. cit.)* sample is «basal peat on clay covering cobbles in drainage channel through Late-Glacial moraines. Gives min. age for abandonment of drainage channel...». Samples from Moreno Glacier coll. (1966) and subm. by J.H. Mercer.
Moreno Glacier	RL-119	Peat (mainly *Juncus*)	9510 ± 210	Tucek 1977 : 260.	Basal peat from bog; sample coll. (1971) by Mercer. Comment by Mercer : «sample invalidates conclusions drawn from data of I-2201 : 3830 ± 115 (Mercer 1968), which was misidentified as basal peat for this same section of bog» ; agrees with age of basal peat in ancient outlet of Brazo Rico (see I-2209).
Moreno Glacier (Lago Argentino, Brazo Sur).	I-2203	Peat.	7840 ± 360	Mercer 1968 : 94-95.	Sample coll. 8 km from the glacier. Min. age for recession of ice past this point.
Moreno Glacier (Lago Argentino, Punta Bandera)	I-2200	Peat.	6740 ± 130	*Ibid.*	Min. age of end moraine.
Moreno Glacier (Lago Argentino, Brazo Sur)	I-2207	Wood.	3860 ± 115	*Ibid.*	Sample from upper buried layer in front of the glacier.
Moreno Glacier (Lago Argentino, between Canal de los Témpanos and Brazo Sur)	I-2201	Peat.	3830 ± 115	*Ibid.*	See comment about RL-119.
Moreno Glacier (Lago Argentino, Brazo Sur)	I-2206	Wood.	2170 ± 105	*Ibid.*	Date «suggests advance of Moreno Glacier to about its present position».

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
Moreno Glacier (Lago Argentino, Brazo Sur)	I-2205	Peat.	1980 ± 100	*Ibid.*	Mercer *(op. cit.)* : « peat, thought to have begun to form after the Moreno Glacier ceased to form an ice dam ; that is, it gives a min. age for a recession after an earlier advance ».
Moreno Glacier	I-2273	Peat.	370 ± 90	*Ibid.*	Check on sample I-2202.
Moreno Glacier	I-2202	Peat.	210 ± 90	*Ibid.*	Sample coll. 5 km from the glacier ; « covering material may be till reworked by mudflow or sheet wash following a forest fire ».

2.2. – *Patagonia, Chile.*

Laguna de San Rafael, San Rafael Glacier 1 (46°42' S, 73°55' W)	Y-733	*Nothofagus* wood.	180 ± 80	Stuiver *et al.* 1960 : 52.	*Nothofagus* log inbedded in till ; « the till was probably deposited before A.D. 1890, during the most recent advance of the glacier » ; coll. by D.B. Lawrence. « The San Rafael district is the northernmost region where the Andean glaciers reach sealevel ». Research (1959) by the American Geographical Soc. expedition for study of glaciation and recent deglaciation ; samples subm. by C.J. Heusser. See general comment by C.J. Heusser in Stuiver *et al.* (1960 : 53).
Laguna de San Rafael, San Rafael Glacier 2 (46°42' S, 73°55' W)	Y-734	Root.	290 ± 80	*Ibid.*	Sample found *in situ*, overlain by forest debris and till. The till was probably deposited before A.D. 1890, as sample Y-733. Coll. by D.B. Lawrence.
Laguna de San Rafael, San Rafael Glacier 3 (46°39' S, 73°54' W)	Y-735	Trunk (probably *Nothofagus* sp.)	405 ± 100	*Ibid.*	Probably the tree was not *in situ* ; « it was probably deposited in the till but eroded out by a stream crossing the till body ». Coll. by D.B. Lawrence.
Laguna de San Rafael, Istmo de Ofqui 4 (46°41' S, 74°03' W)	Y-736	Twigs.	730 ± 120	*Ibid.*	Sample from peaty layer ; it provides a minimum age for the till, deposited during the younger of two advances of the glacier. Coll. by E.H. Muller & C.J. Heusser.
Laguna de San Rafael, San Rafael Glacier 5 (46°40' S, 73°53' W)	Y-737	*Nothofagus* wood.	6850 ± 200	*Ibid.*	Date points out a period with a less extensive glacier (nonglacial interval). Coll. by E.H. Muller.

Laguna de San Rafael, Istmo de Ofqui 2-23 (46°40' S, 74°04' W)	Y-738-2	Peat.	3740 ± 400	Stuiver *et al.* 1960 : 53.	Sample from near bottom of postglacial section (220 cm depth, «taken by boring in bottom of a lake»). «The sampled section overlies laminated sediments, presumably deposited when the margin of San Rafael Glacier was nearby, and not long after its retreat from the moraine on which the lake is situated and which nearly surrounds Laguna de San Rafael». Coll. by C.J. Heusser & Sh. Horie.
Laguna de San Rafael, Río Témpanos 7-A (46°36' S, 73°58' W)	Y-739	Peat.	3720 ± 170	*Ibid.*	Sample (91.5 cm depth) from section 185.5 cm deep, exposed on E bank of Río Témpanos (tidal connection of Laguna de San Rafael). «The peat section overlies finely laminated silt, apparently lacustrine; its base postdates the draining of a lake that was formed after retreat of Guala Glacier from the outermost position of its piedmont stage». Coll. by E.H. Muller & C.J. Heusser.
Laguna de San Rafael, Río Témpanos 7-B	Y-740	Peat.	3180 ± 200	*Ibid.*	Sample (137 cm depth) from section above described.
Laguna de San Rafael, Río Témpanos 7-C	Y-741	Peat.	3600 ± 140	*Ibid.*	Sample (185.5 cm depth) «from basal contact of section described under Y-739, where roots penetrate underlying silt».
Ofhidro North Glacier (48°25' S, 73°50' W)	I-3827	Wood.	800 ± 95	Mercer 1970 : 5.	Sample (a stump) «exhumed from outwash about 700 m beyond 19th century moraines»; «tree lived for about 100 yrs. Indicates that tree was killed, probably by outwash during ice advance, about A.D. 1300 ± 95». Ofhidro Glacier samples coll. (1967/68) and subm. by J.H. Mercer.
Ofhidro South Glacier (48°26' S, 73°53' W)	I-3510	Peat.	4060 ± 110	Mercer 1970 : 4.	Minimal age for second end moraine.
Ofhidro South Glacier	I-3511	Peat.	3740 ± 110	*Ibid.*	Minimal age for sixth end moraine.
Bernardo Glacier (48°35' S, 73°55' W)	I-3823	Peat.	10,000 ± 160	Mercer 1970 : 4-5.	Minimal age («perhaps not a close minimal age») for two moraines. Samples coll. (1967/68) and subm. by J.H. Mercer.

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
Bernardo Glacier	I-3509	Peat.	7730 ± 130	*Ibid.*	After Mercer (1970 : 4) « peat covered by lake clay and modern peat, near shore of lake formely dammed by Glaciar Bernardo. Expected to give date of impounding, but I-3823 shows that age is misleadingly young, probably because of rootlet contamination ».
Bernardo Glacier	I-3824	Wood.	270 ± 90	*Ibid.*	Sample (a stump) found 100 m from present front of glacier. « Indicates that tree was killed between A.D. 1430 and 1740 ».
Témpano Glacier (48°45' S, 74°02' W)	I-3825	Peat.	11,100 ± 170	Mercer 1970 : 4-5.	« Gives latest date for shrinkage of glacier to almost its present size » ; (agrees with next sample). Samples coll. (1967/68) and subm. by J.H. Mercer.
Témpano Glacier	I-3507	Peat.	11,070 ± 160	*Ibid.*	« Gives latest date for recession of Glacial Témpano to within its present margins ».
Témpano Glacier	I-3826	Peat.	6010 ± 120	*Ibid.*	Sample is « basal peat from 80 cm depth on a subdued moraine ridge at 360 m elevation ». « Glacier margin is at 310 m, and a moraine ridge more than 4120 C-14 yrs. old is at 345 m (see sample I-3508). Gives a min. age for the moraine ridge, but probably not a close min. age ».
Témpano Glacier	I-3508	Peat.	4120 ± 105	*Ibid.*	« Basal peat from 1.1 m depth covering sediments of former ice-marginal lake, upper margin of Glaciar Tempano. Lake drained after ice receded from a well-marked lateral moraine ».
Hammick Glacier (48°50' S, 74°15' W)	I-3502	Peat.	3110 ± 130	Mercer 1970 : 4.	Sample from lower part of front of first (outermost) end moraine (minimal age for moraine, « but apparently not a close min. age ; see sample I-3506 »). Samples coll. (1967/68) and subm. by J.H. Mercer.
Hammick Glacier	I-3503	Peat.	2300 ± 110	*Ibid.*	Min. age for second end moraine.
Hammick Glacier	I-3504	Peat.	2070 ± 95	*Ibid.*	Min. age for third end moraine.
Hammick Glacier	I-3505	Moss.	1545 ± 100	*Ibid.*	After Mercer (1970 : 4) : « Dates stabilization of outwash at this site. Expected to give close minimal date for recession of ice from outermost moraine, but young age indicates outwash was active until after recession from third moraine ».

Hammick Glacier	I-3506	Wood.	2800 ± 100	*Ibid.*	Sample from a tree that grew for ± 300 yrs. «Indicates that site was ice-free 3200 ± 100 B.P. and advance was in progress 2800 ± 100 B.P.
Puerto Edén (Wellington I.) (49°08' S, 74°27' W)	I-3513	Peat.	9670 ± 160	Mercer 1970 : 4.	Sample from end moraine of former valley glacier. «Gives minimal age for the moraine and probably latest date for stranding of tributary glacier as mainland ice receded from coast of I. Wellington. Must be misleadingly young». Coll. (1967/68) and subm. by J.H. Mercer.
Otway Sound, Río Verde moraine (52°47' S, 71°00' W)	I-3512	Peat.	12,460 ± 190	*Ibid.*	Basal peat from ca. 40 cm depth ; postdates the deglaciation of the Canal Jerónimo, between Otway Sound and Magallanes Strait.
Silva Palma Fjord (53°20' S, 71°45' W)	R-4542/2 (NZ)	Wood chips.	4490 ± 80	Pers. commun. to the author by Dr. T.A. Rafter & Dr. R.C. McGill (Inst. of Nuclear Sci., New Zealand), 4.06.1974.	Sample coll. (1973) by E. Pisano Valdés & O.R. Ortiz-Troncoso from a natural stratigraphy near the fjord entrance; Altithermal deposit. Subm. by O.R. Ortiz-Troncoso.

3. – SAMPLES RELATED TO VOLCANISM.

3.1. – *Tierra del Fuego, Argentina.*

La Misión, Río Grande (53°43' S, 67°49' W)	Y-181	Peaty gyttja.	7850 ± 110	Deevey *et al.* 1959 : 153-155.	Date related to rise of sealevel and volcanic activity ; coll. (1952) and subm. by V. Auer. Full related bibliography by V. Auer and J. Frenguelli ; see also Markgraf (1976). Deevey *et al. (op. cit.)* point out that «peat buried below sealevel in coastal swamps is always suspect». See also comment by Auer (1974 : 18-19).
Estancia Pirenaica (54°17' S, 66°47' W)	Y-183-I	Peat.	11,680 ± 150	*Ibid.*	Sample from a bog, near volcanic ash layer I. According to Deevey *et al. (op. cit.)* this sample is believed to be less reliable than Y-188 (Altos Boqueron) as a date for ash layer I. Samples from Estancia Pirenaica coll. (1952) and subm. by V. Auer.

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
Estancia Pirenaica	Y-183-II	Peat.	6600 ± 90	*Ibid.*	Sample coll. from 0-3 cm below volcanic ash layer II. See sample Hel-316 from Clarence Island.
Estancia Pirenaica	Y-183-III	Peat.	4480 ± 50	*Ibid.*	Sample coll. from 0-3 cm above volcanic ash layer II. See sample Hel-316 from Clarence Island.
Estancia Pirenaica	Y-183-IV	Peat.	2240 ± 60	*Ibid.*	Sample coll. from volcanic ash layer III. See sample Hel-322 from Clarence Island.
Río Ewan (54°19' S, 67°22' W)	Y-182	Peat *(Carex).*	6690 ± 100	*Ibid.*	Sample coll. from o-5 cm below volcanic ash layer II. Coll. (1952) and subm. by V. Auer. This date agrees with Y-183-II (Estancia Pirenaica); see also Hel-316 (Clarence I).

3.2. – *Tierra del Fuego, Chile.*

Altos Boquerón (53°17' S, 69°57' W)	Y-189	Peat *(Marsippo-spermum).*	9380 ± 90	Deevey *et al.* 1959 : 153-155.	According to Auer (1958 : 229), sample coll. from 5 cm underlying eruption I; he gives 9300 ± 200 B.P. Coll. (1952) and subm. by V. Auer. See also sample Hel-290 from Clarence Island.
Altos Boquerón	Y-188	Peat *(Drepanocladus)*	8905 ± 110	*Ibid.*	According to Auer (1958 : 229) sample coll. from 5 cm overlying eruption I; he gives 8700 ± 100 B.P. Coll. (1952) and subm. by V. Auer.
Clarence Island (54°15' S, 71°50' W)	Hel-290	Peat.	8820 ± 290	Auer 1974 : 9.	Date of Thepra I; see also samples Y-188 & Y-189 from Altos Boquerón. Samples from Clarence Island coll. and subm. by V. Auer.
Clarence Island	Hel-316	Peat.	4840 ± 300	*Ibid.*	Date of Thepra II; see also samples from Tierra del Fuego : Y-182 (Río Ewan), Y-183-II & Y-183-III (Estancia Pirenaica).
Clarence Island	Hel-322	Peat.	2980 ± 250	*Ibid.*	Date of Thepra III; see also sample Y-183-IV from Estancia Pirenaica.

4. – SAMPLES RELATED TO CHANGES IN SEA-LEVEL.

4.1. – *Atlantic Coast.*

Comodoro Rivadavia (45°50' S, 67°30' W)	L-740-A	Shells (*Chione antiqua* King)	5350 ± 200	Richards & Broecker 1963 : 1045.	Sample from a locality 5 km north of Comodoro Rivadavia, at an elevation of 9 m (transgression) ; coll. 1963.
San Julián Bay (49°23' S, 67°49' W)	Y-180	Shells.	8110 ± 100	Stuiver 1969 : 585.	Sample from 20 cm depth at 9-10 m high bank (transgression) ; coll. (1952) and subm. by V. Auer.
Estancia Viamonte (54°03' S, 67°20' W)	Y-194	Peat.	> 41,000	Deevey *et al.* 1959 : 153.	Sample from a layer between the second-oldest and third-oldest of 3 layers of till (exposed in a seacliff) ; interglacial deposit. Coll. (1952) by R.T. Reynolds ; subm. by V. Auer.
Estancia Viamonte	Y-195	Peat.	> 41,000	*Ibid.*	See comment above.
Ushuaia (54°51' S, 68°20' W)	–	Shells.	5430 ± 270	Urien 1968 : 35-41.	Sample from 8.5 m high ; old marine level (see Orquera *et al.* 1977 : 19).
Puerto Golondrina (2.5 km south from Ushuaia)	–	Shells.	1400 ± 300	*Ibid.*	Sample from 2.5 m high ; old marine level.
Punta Pingüinos (4 km south from Ushuaia)	Y-190	Peat.	7660 ± 100	Stuiver 1969 : 585.	Sample from layer in shore outcrop stratified between gravel deposit and drift deposit (bottom). Profile discovered by F. Vervoorst ; coll. by Catani and subm. by V. Auer. See also Auer (1974 : appendix). « Underlying thin sand stratum inbedded within peat horizon ».
Punta Pingüinos	Y-191	Peat.	7450 ± 100	*Ibid.*	« Overlying sand stratum » ; corresponds to a regressive ocean stage. « Peat is overlain by marine clay and sand, which shows ocean transgression to 6 m level corresponding to Littorina transgression in Baltic Sea ».

4.2. – *Atlantic continental shelf.*

Site	*Lab. n°*	*Material dated*	*Years B.P.*	*Reference*	*Comment*
48°09' S, 61°19' W	L-628	Shells.	⟩ 35,000	Fray & Ewing 1963 : 125 ; Richards & Craig 1963 : 145.	Core 16-149 from 150 m depth off Puerto Deseado ; according to Richards & Broecker (1963 : 1045) « this may represent a lowering of sea level in Illinoian time ».
50°53' S, 62°42' W	L-685	Shells.	18,700 ± 500	*Ibid.*	Core 16-143 from 157 m depth coll. between Santa Cruz province and Falkland Islands.
54°08' S, 63°54' W	L-665-J	Shells.	12,000 ± 300	Fray & Ewing 1963 : 125 ; Richards & Craig 1963 : 145.	Core 15-104 from 119 m depth off San Pablo.
54°25' S, 65°35' W	L-531	Shells.	⟨ 500 (recent)	Richards & Craig 1963 : 145.	Sample V-14-T-14.

LABORATORIES

A : Lab. of Isotope Geochemistry, Univ. of Arizona, Tucson.
BM : Research Lab., The British Museum, London.
BVA : Arsenal, Wien.
C : Chicago ; Dept. of Chemistry, Univ. of California, Los Angeles.
CSIC : Inst. Rocasolano, Consejo Sup. de Investigaciones Científicas, Madrid.
Gif : Centre des Faibles Radioactivités, Gif-sur-Yvette.
GrN : Natuurkundig Lab. der Rijksuniversiteit, Groningen.
Hel : Helsinki Univ. Radiocarbon Dating Lab.
I : Teledyne Isotopes, Westwood, New Jersey.
IVIC : Inst. Venezolano de Investigaciones Científicas, Caracas.
L : Lamont-Doherty Geological Observatory, Columbia University, Palisades, New York.
Lu : Radiocarbon Dating Lab., Univ. of Lund.
MC : Lab. de Radioactivité Appliquée, Centre Scientifique de Monaco.
Nova : Life Sciences Center, Nova Univ., Florida.
NZ : Inst. of Nuclear Sciences, Lower Hutt, New Zealand.
RL : Radiocarbon, Ltd., Lampasas, Texas.
Sa : Saclay ; see Gif.
UW : Dept. of Chemistry, Univ. of Washington, Seattle.
W : US Geological Survey, Reston, Virginia.
Y : Radiocarbon Lab., Yale Univ., New Haven, Connecticut.

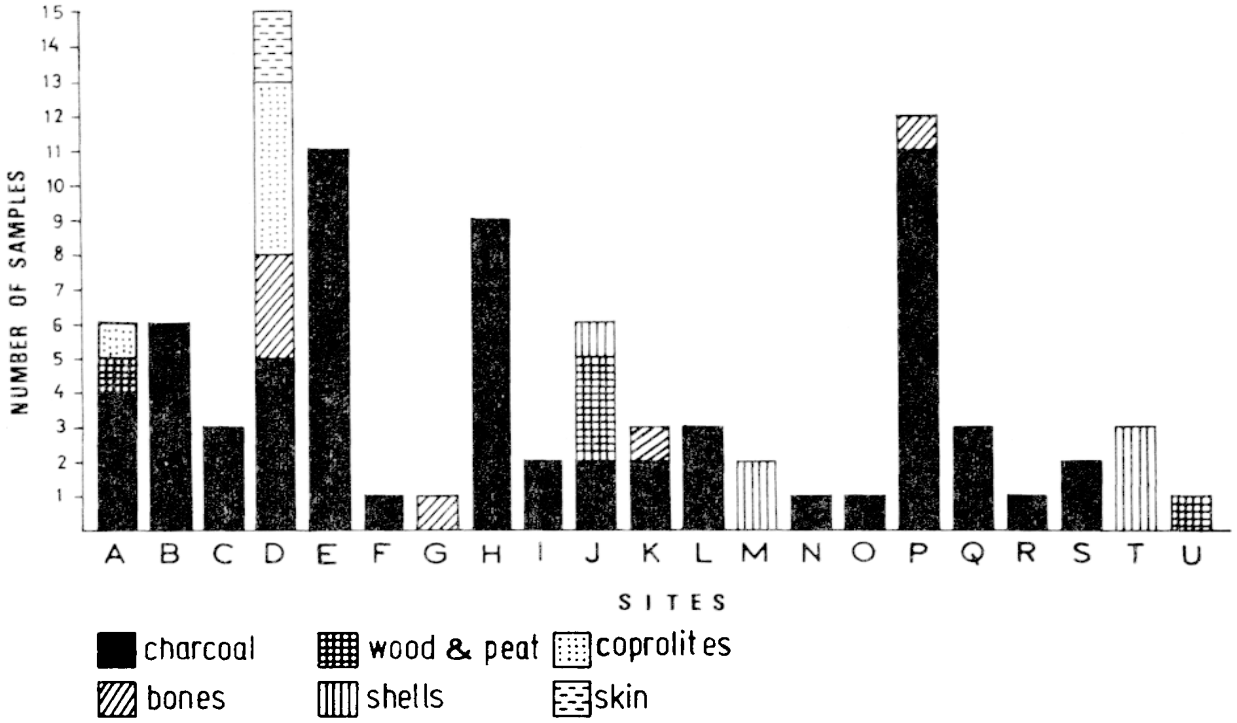

Fig. 2. – Nature of archaeological samples. Sites are : A. Manos Pintadas Rock Shelter – B. Las Manos Cave – C. Los Toldos, cave n° 3 – D. Mylodon Cave – E. Fell's Cave – F. Río Chico-1 – G. Palli Aike Cave – H. Bahía Munición-3 – I. Cañadón Cóndor – J. Ponsonby – K. Englefield Island – L. Bahía Buena – M. Punta Santa Ana – N. Cabeza de Leon – O. Castillo – P. Lancha Packewaia – Q. Túnel – R. Tres Arroyos – S. Marazzi Rock Shelter – T. Lauta – U. Rock Shelter, west coast, Navarino Island.

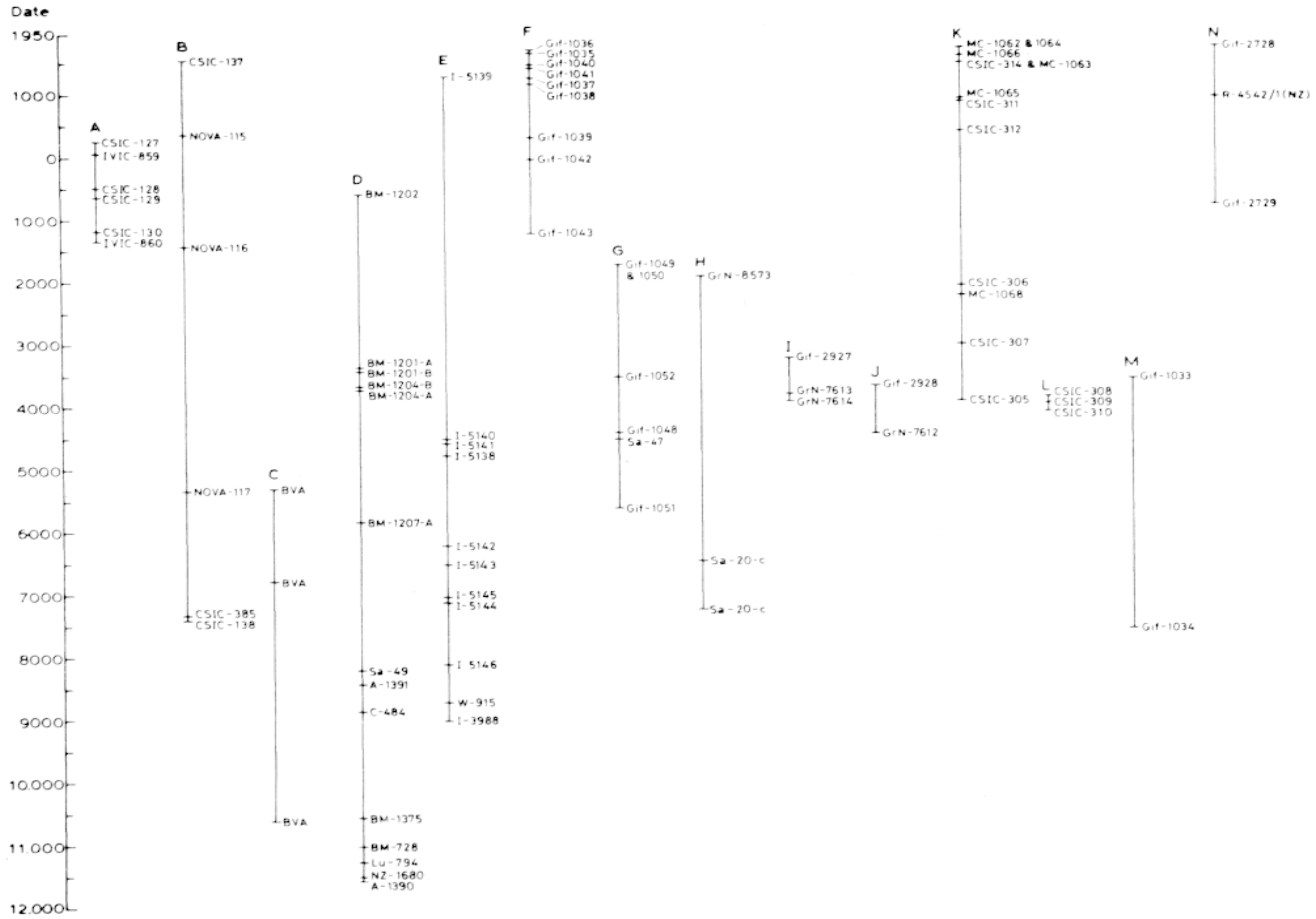

Fig. 3. — Principal archaeological series in calendar years. Their position is only tentative, as the radiocarbon results were not calibrated according to the De Vries-effect. The series come from : A. Manos Pintadas Rock Shelter — B. Las Manos Cave — C. Los Toldos, cave n° 3 — D. Mylodon Cave — E. Fell's Cave — F. Bahía Munición-3 — G. Ponsonby — H. Englefield Island — I. Bahía Buena — J. Punta Santa Ana — K. Lancha Packewaia — L. Túnel — M. Marazzi Rock Shelter — N. Lauta. (Drawing I.P.P.)

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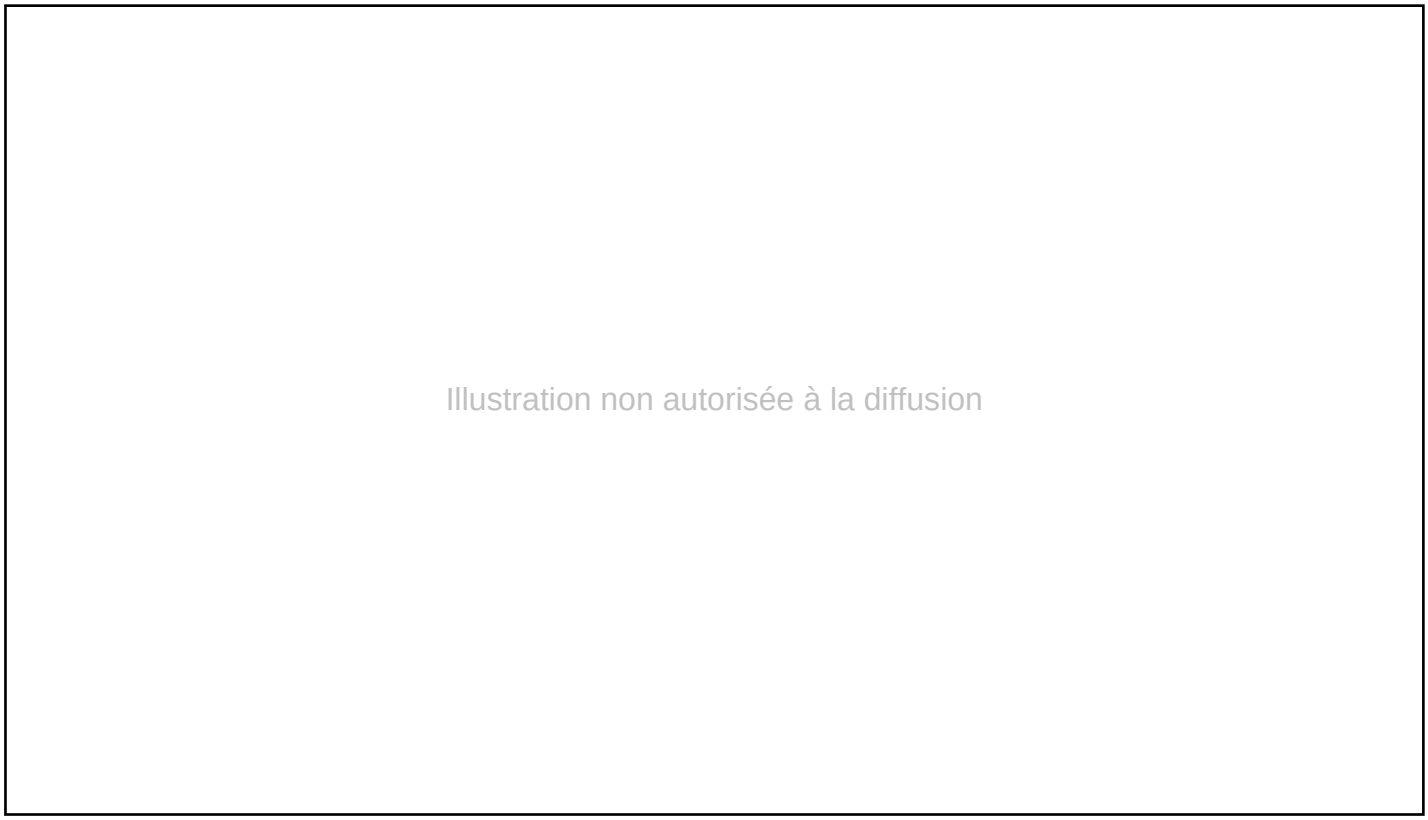

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