The radiocarbon dating programmes of The National Museums of Scotland

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Since 1991, the Archaeology Department of the National Museums of Scotland (NMS) has been undertaking programmes of AMS radiocarbon dating of organic items in its collections, particularly wetland finds. This work was initially stimulated by the success of Caroline Earwood's research on dating bog butter containers and other wooden vessels from the National collections (Earwood 1990; 1993a; 1993b; 1997), which demonstrated among other things that the practice of bog butter deposition in Scotland extended at least as far back as the early centuries AD.

Preparations for the Museum of Scotland (which opened in 1998) involved the commissioning of numerous dates for our display items; and since then, the project has continued and diversified, latterly with the assistance of sponsorship from the Natural Environment Research Council (NERC) and the Society of Antiquaries of Scotland (SAS). The latest development has been the initiation of a nationwide programme of dating cremated human bone, taking advantage of the recently developed technique at the University of Groningen (Aerts *et al.* 2001; Lanting & Brindley 1998; Lanting *et al.* in press). For this programme, part-funding by SAS has allowed us to date bones from non-NMS collections as well as NMS specimens. In addition to these NMS-initiated programmes, there have been other dating projects featuring NMS material, such as Tolan-Smith and Bonsall's NERC-sponsored *Bone Artefact Dating Programme*, targeting Mesolithic artefacts from the collections (Bonsall *et al.* 1995).

To date, over 100 items have been dated, and the NMS programmes are planned to continue, funding permitting. Most of the artefactual dates have been obtained from the Oxford Radiocarbon Accelerator Unit and the University of Groningen, with others arranged through the Scottish Universities Research & Reactor Centre, the Queen's University of Belfast and Beta-Analytic.

As shown in TABLE 1, the artefactual material ranges from a fragment of birch-bark coffin cover from an Early Bronze Age log-coffin, found near Oban, to a Late Iron Age woven woollen child's hood from Orkney; and from an Early Historic horizontal mill-wheel paddle from Bankhead Farm to a Neolithic pit-fall trap from Mye Plantation. Among the themed suites of dates have been prehistoric handles, hafts and shafts (e.g. a Bronze Age side-looped spearhead shaft from Arnicle Farm; *cf.* Needham *et al.* 1997 on a similar programme), and containers and other hollowed wooden objects — including several unfinished carved bowls, which had probably been deposited in wetlands to keep the wood soft for carving (e.g. a bowl from Airds).

The programme has produced interesting results, not least a series of dates for the earli-

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ANTIQUITY 76 (2002): 794–6

est bow, wheel and ox yoke in Britain and Ireland (from Rotten Bottom, Blair Drummond and Loch Nell respectively). It has also been possible, not only through the artefactual dating programme but also through the *Dating Cremated Bones* programme, to shed important new light on Early and Middle Bronze Age developments. For example, a date from a wooden core of a tubular bronze bead from the hoard at Migdale helps us to date the 'Migdale' metalworking phase; while various dates inform our understanding of so-called 'Wessex I' and 'Wessex II' artefacts — especially important given the paucity of relevant dates from the south of England. These include a date, just received, relating to the 'Wessex I'-style gold discs from Barnhill. Similarly, several dates obtained from faïence-associated cremations — in connection with another current NMS project on faïence in northwest Europe — allow us to place the period of its use within the range *c.* 1875–*c.* 1500/1450 BC. (These complement dates obtained for Irish faïence-related bones by Lanting and Brindley.) If any proof were needed of the fallacy of traditional ideas about the importation of faïence from Egypt around 1400–1300 BC, it is offered by these determinations.

As regards the *Dating Cremated Bones* programme, this has been targeting particular types of Bronze Age urn and specific artefactual associations, and the scheme will continue and diversify to include late Bronze Age and Neolithic cremations. Among the dates so far obtained, the results for a dagger-associated

lab. code	object, material dated (in brackets)	findspot	reported conventional ^{14}C age years BP	calibrated ages 2σ cal BC/AD with relative probability
OxA-6813	log coffin cover (birch bark)	nr Oban, Argyll & Bute	3555±60	2040–1730 BC (94·4%) 1710–1690 BC (23·3%)
OxA-3535	woven hood, tassel (wool)	St Andrews Parish, Orkney	1595±80	AD 250–310 (4·4%) AD 320–640 (91·0%)
AA-29705	horizontal mill-wheel paddle (oak, not heartwood)	Bankhead Farm, Dumfries & Galloway	1310±55	AD 640–880 (95·4%)
UB-3882	pit–fall trap (alder)	Mye Plantation, Dumfries & Galloway	3913±39	2500–2280 BC (94·2%) 2250–2230 BC (1·2%)
OxA-6041	shaft of side-looped spearhead (wood)	Arnicle, Argyll & Bute	3115±60	1520–1250 BC (92·8%) 1240–1210 BC (2·6%)
OxA-7552	unfinished bowl (larch/spruce driftwood)	Airds, Isle of Lewis	2320±35	490–350 BC (75·9%) 320–200 BC (19·5%)
OxA-3540	flatbow (yew)	Rotten Bottom, Dumfries & Galloway	5040±100	4040–4020 BC (1·5%) 4000–3640 BC (93·9%)
OxA-3538	disc wheel (ash)	Blair Drummond, Perth & Kinross	2810±85	1220–800 BC (95·4%)
OxA-3541	ox yoke (wood)	Loch Nell, Argyll & Bute	3430±85	1940–1520 BC (95·4%)
OxA-4659	bead core (willow)	Migdale, Highland	3655±75	2300–1750 BC (95·4%)
OxA-11025	human bone	Barnhill, Angus	3607±39	2130–2080 BC (5·5%) 2040–1870 BC (87·8%) 1840–1820 BC (2·1%)
GrA-19054	cremated human bone	Collessie, Fife	3695±45	2210–1940 BC (95·4%)
OxA-4510	dagger scabbard (ox-hide hairs)	Collessie, Fife	3690±80	2350–1750 BC (95·4%)

TABLE 1. *Selection of Atomic Mass Spectrometry (AMS) radiocarbon dates from the NMS dating programmes, calibrated using OxCal v.3.5.*

cremation from Collessie have been particularly interesting. The date for the bone is closely comparable to one already obtained for ox-hide hairs from the dagger scabbard, thus providing a useful cross-check on the reliability of the technique.

Some of the NMS dates — including the first 13 results from the *Dating Cremated Bones* programme — have already been published (e.g. Sheridan 2001; Sheridan & Saville 1993; Sheridan *et al.* 1995); and the 23 Oxford dates obtained between 1994 and 1998 are due to be published in *Archaeometry* during 2002. In addition, the dates obtained to May 1996 are available, along with other radiocarbon dates for Scottish material, on the Historic Scotland website, thanks to Patrick Ashmore: http://www.historic-scotland.gov.uk/

In addition, two compendium articles are planned for the *Proceedings of the Society of Antiquaries of Scotland*, in which the dates and their significance will be discussed in more detail. In the meantime, queries on the NMS dating programmes can be addressed to: a.sheridan@nms.ac.uk

Acknowledgements. Sponsorship of dates by the Society of Antiquaries of Scotland, the Natural Environment Research Council, the University of Groningen and the Oxford Radiocarbon Accelerator Unit is gratefully acknowledged, as is the assistance and advice provided by the staff at the laboratories in Groningen, Oxford, Glasgow and Belfast. The kind co-operation of Neil Curtis, Mark Hall and Adrian Zealand in providing cremated bone samples, and of Patrick Ashmore in incorporating the pre-1996 NMS dates into Historic Scotland's database, is appreciated. Jan Lanting and Anna Brindley are particularly thanked for their advice and support.

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