

New dating and environmental evidence from Burghead Fort, Moray

Kevin J Edwards* and Ian Ralston†

Amongst the promontory forts of Scotland, perhaps none has received such continuous attention since mid-Victorian times as that at Burghead, Moray (Macdonald 1860; Young 1891, 1893; Small 1969). The site is well known for the discovery therein of a series of Pictish symbol stones depicting bulls, for its elaborate rock-hewn well and for its complex timber-laced wall, long regarded as an outlier of the continental *murus gallicus* tradition (Cotton in Wheeler & Richardson 1957; Collis & Ralston 1976) but now more readily accommodated in the continuing custom of timber-laced construction within Dark Age Scotland (Ralston forthcoming). Whilst its topographic location is by no means unique on the south coast of the Moray Firth, the area enclosed by the defences of the Burghead headland differentiates this site from the series of smaller promontory forts to the east: indeed the site is the only coastal promontory to have merited inclusion in Feachem's map (1966, fig 13) of minor *oppida* in North Britain.

This paper presents new radiocarbon dates from Burghead together with pollen-analytical data. It also re-examines some of Small's inferences (1969) concerning various aspects of the site and makes chronological comparisons with the two other promontory forts on the Moray Firth coast for which isotopic dates have been obtained: these are the Banffshire sites of Cullykhan or Castle Point, Troup (Greig 1970, 1971, 1972) and Green Castle at Portknockie.

Burghead fort occupies a sandstone headland (NGR NJ 108692) and lies at an altitude of between 8 and 18 m OD. Considerably ravaged by the depredations attendant on the construction of the westerly extension of Burghead village in the early 19th century, the remaining portion has attracted the attention of three separate excavators. The well-known plan by Roy (1793), frequently reproduced (eg Macdonald 1860; Small 1969), has not been without its detractors with regard to its accuracy (compare Young 1891, 446 with Young 1893, 86) but remains our best source on the defensive system as a whole. In our present state of knowledge, assessment as to whether the entirety of the defences represents a single phase of construction or not must remain on the speculative level, but pre-Dark Age utilisation of the promontory seems not unlikely (Ralston forthcoming).

The most recent excavations, by Small in 1966, were concentrated on the seaward western defences of the upper fort, this area appearing both better preserved as well as being under threat from active marine erosion. The positions of Small's backfilled trenches remain unpublished, but, by the time the present authors visited the site in 1976, marine erosion appears to have continued to proceed actively, and there were indications in the form of loose blocks above the present cliff,

* Department of Geography, Queen's University, Belfast

† Department of Geography, University of Aberdeen

that the defences of this part of the site were already beginning to slip seaward. Examination of the eroding sections above the cliff revealed the presence of (i) two organic layers separated by a thin layer of sterile sand underlying debris from the wall, a trait recorded by Small on his published section (1969) and (ii) large amounts of charcoal amongst fire-reddened wall rubble, which appeared to be *in situ*, though no excavation was undertaken to confirm this hypothesis. The discussion which follows concerns itself with the results of the scientific analysis of these deposits and the archaeological implications.

THE ORGANIC LAYERS

Profile

On the seaward side of the upper fort wall (fig 1) and approximately 5 m below the then existing rampart crest, the profile described in Table 1 was observed beneath wall rubble. This

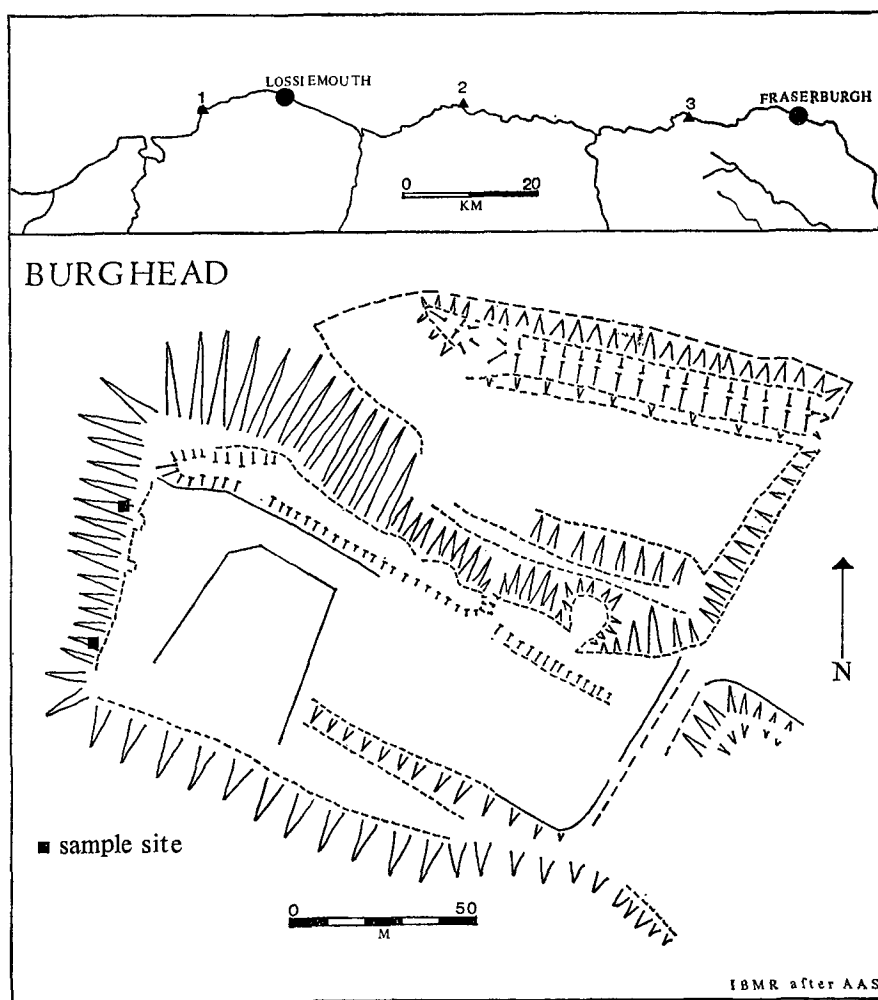


FIG 1 Site locations : (1) Burghead, (2) Green Castle, (3) Cullykhan

TABLE 1

Depth (cm)	Material
0-6	Black organic material containing small pieces of charcoal and some sand
6-10	Yellow sand
10-12	Black organic material containing small pieces of charcoal and some sand
12-16	Grey sand
16-16.25	Thin iron pan
below 16.25	Yellow sand

profile was intermittently traceable across the western face of the cliff, though it was obscured at many points by wall and cliff fall materials.

Macdonald (1860, 343) and Young (1893, 87) record a black basal deposit on the promontory and Small (1969, 63) reports that 'the wall of the fort is significantly sited on the upper of the two black layers.' There is little doubt that the double organic layer detailed in Table 1 reflects these earlier records.

The profile section below 12 cm features both grey sand and a thin iron pan. These are two attributes of a leached podsol soil profile which was possibly related to a former soil surface denoted by the lower organic horizon. Small (1969, 63) remarked that analysis of the material from these carbonaceous organic bands shows that they contain 'largely twigs, probably of oak, birch, and willow, particularly very young shoots only one or two years old, and much of the rotted organic matter is probably leaves'. The small size of the charcoal pieces in the examined cliff section discussed in this paper only permitted the identification of some pieces as *Quercus* (oak). The upper organic band which underlay fallen rampart wall rubble was of special interest since it clearly pre-dates or may have been contemporaneous with the construction of the upper fort rampart. Pollen analysis of this material was carried out in the hope that it might provide an indication of the vegetational environment of the site and also indicate whether the timber used in the fort was of local origin. A radiocarbon determination from the upper organic band was also obtained in an effort to discover the earliest date for the construction of this section of the fort.

Pollen Analysis

Samples centred upon 1 cm in the upper and 11 cm in the lower organic bands were subjected to standard chemical digestion by acetolysis and hydrofluoric acid. The residue was mounted in silicone oil and microscope counts of pollen and spores were made to achieve a land pollen sum of 400 grains. Pollen preservation was poor and much particulate charcoal was encountered.

The results are presented in Table 2.

The obvious point of note is the high proportion of herbaceous pollen in both organic bands. Frequencies of 96.5 and 83.5% for the upper and lower horizons almost certainly denote an open and largely tree less landscape. This is emphasised by the fact that the arboreal taxa present are considered to be prolific pollen producers and are usually over-represented in the fossil record (Faegri & Iversen 1975). The organic material is much more akin to a peaty turf layer than a mineral soil and it is therefore thought unlikely that the high herbaceous component results from the selective destruction of tree and shrub pollen (Havinga 1974).

The two pollen spectra display important differences in detail. The lower band has a predominance of grass (*Gramineae*) and heather (*Calluna vulgaris*) pollen. The latter takes in conjunction with the grey sand and iron pan layer underlying the organic band, may confirm the horizon as an acid peaty soil which originally carried a dry-heath flora overlying the podsol profile. The 10.5% of *Corylus/Myrica* pollen may indicate the presence of some hazel, though the potential of

TABLE 2

Pollen counts from Burghead expressed as percentages of the land pollen sum

Pollen type	Upper Organic	Lower Organic
TREES	2.5	6.0
Betula	0.5	2.5
Pinus	1.0	1.5
Alnus	1.0	2.0
SHRUBS	1.0	10.5
Corylus/Myrica	1.0	10.5
HERBS	96.5	83.5
Gramineae	38.8	39.5
Cyperaceae	1.5	1.0
Calluna Vulgaris	16.9	32.5
Bellis	0.5	—
Liguliflorae	32.8	7.0
Chenopodiaceae	0.5	—
Plantago lanceolata	—	0.5
Plantago maritima	0.5	—
Ranunculaceae	—	0.5
Rosaceae	4.5	2.0
Succisa	0.5	0.5
AQUATICS	—	0.5
Littorella	—	0.5
SPORES	0.5	1.0
Sphagnum	0.5	1.0

hazel pollen and that of the tree taxa to travel long distances by wind transport, precludes any statement as to the proximity of woodland. The pollen record from the lower band does not exhibit any obvious signs of active agriculture, though it may reflect vegetation communities resulting from soil impoverishment consequent upon agriculture (cf Case *et al* 1969; Moore 1975).

The pollen spectrum from the upper organic layer features a decline in *Calluna* representation to just over 50% of previous levels, a rise in *Liguliflorae* frequencies of over four times and *Gramineae* values similar to those from the lower band. This may well indicate the existence of a dominant grassland community with a major dandelion-type (*Liguliflorae*) element in the vegetation. This would suggest a move away from acidic soil conditions at the site, an environmental change made possible by wind-blown sand covering the lower organic band. This would provide a fresh surface for humus consolidation as indicated by the upper organic layer. Present-day and past analogues for this condition are currently under examination by the first author in the Dundrum sand dune system in County Down, Northern Ireland. The older dune sands at Dundrum have been severely leached and have a *Calluna*-dominated vegetation cover. The fresher seaward dunes are less acid in reaction and have a ground flora in which grasses and the *Liguliflorae* are especially common in areas where heavy grazing by rabbits has occurred. Pollen spectra from one palaeosol group within the dunes seem to demonstrate similar conditions pertaining in the past. A Neolithic fossil soil produced a *Calluna-Rosaceae-Artemisia* pollen assemblage. An overlying Bronze Age humic horizon separated from the Neolithic layer by sand dune material

contained a *Gramineae-Liguliflorae-Tubiflorae-Cruciferae* microfossil assemblage. It is not possible to be sure whether the upper pollen spectrum at Burghead reflects pastoral activity, especially in the virtual absence of plantain pollen and bracken spores. The pollen certainly indicates an open grassy area which was perhaps utilised for domestic as well as grazing purposes. The marked drop in tree and shrub pollen frequencies in the upper assemblage (down from 16.5 to 3.5%) may signify a decrease in the general woodland pollen rain as a result of clearance. In view of the low frequencies involved, however, any clearance may have taken place some distance from the site.

Radiocarbon Dating

Material from the top 2 cm of the upper organic band was submitted to the Palaeoecology Laboratory of the Queen's University of Belfast for radiocarbon dating. The resulting determination, uncalibrated and based on the Libby half-life of 5568 ± 30 years, is shown in Table 3. The

TABLE 3

Sample	Laboratory reference	Age bp	Age ad	$\delta^{13}\text{C}$
upper organic	UB-2208	1690 ± 40	260 ± 40	-26.0 ± 0.2
rampart charcoal	UB-2083	1085 ± 40	865 ± 40	-24.8 ± 0.2

date of 260 ± 40 ad is not significantly different statistically from the date of 390 ± 110 ad reported by Small for charred timber associated with the construction of the defensive wall. The dating relationship will be examined in detail in the discussion section.

RUBBLE CHARCOAL

At about 38 m to the south of the profile described above, and 4 m below the rampart crest, substantial amounts of charcoal were found in a cavity located within rampart rubble. The sandstone rubble was reddened by burning and the situation is reminiscent of Macdonald's statement (1860, 348) that the 'action of fire was, however, very evident on the stones here, and large pieces of charcoal were abundant'. The charcoal was broken into fragments generally less than 4 cm in length, but the well-defined ring-porous structure was identifiable as oak (*Quercus* spp). The charcoal was radiocarbon-dated and the results are shown in Table 3. The determination of 865 ± 40 ad is the latest date yet obtained from Burghead.

DISCUSSION

On the basis of the pollen and cliff profile evidence, it is suggested that the period of construction of the upper fort at Burghead was preceded by two phases of soil forming activity. The first is indicated by the lower organic band overlying the leached podsolised profile. The charcoal content of this organic horizon may derive from anthropogenic activity on the site, though the pollen spectrum does not provide unassailable evidence of agriculture. Less probably, macroscopic charcoal could result from natural fires, while microscopic charcoal could originate from the wind-blown debris of domestic fires a great distance away. This layer remains undated, though the radiocarbon date for the subsequent organic horizon provides a *terminus ante quem* for its accumulation. Pollen spectra dominated by *Calluna* are a feature of the Bronze Age and later sections of many pollen diagrams from northern Scotland (Birks 1975; O'Sullivan 1976; Edwards 1978).

At some time subsequent to the formation of the lower organic layer, wind-blown sand accumulated over the promontory and formed a surface for colonisation by a grass-dominant flora. The authors would not necessarily or wholly subscribe to the hypothesis of Small (1969, 66) that the 'presence and nature of the black layers in the section below the foundations of the rampart suggests that brushwood had been scattered over the sandy site to facilitate the movement of building materials during construction'. The organic band is as likely to be a combination of plant litter and the charcoal remains of occupation debris, perhaps not even related to fort construction. Interestingly, however, the pollen from this layer contained no *Quercus* grains whatsoever, yet oak is the taxon most commonly reported in the literature concerning the site. Similarly, birch and willow, the other two woodland types mentioned by Small (1969, 63) are only represented in the pollen record by a meagre 0.5% of birch (*Betula*) pollen. The lack of any meaningful palynological indication of the arboreal taxa present in the excavations at Burghead may mean that the organic layer formed in an open landscape prior to fort construction. The macroscopic charcoal would thus derive from wood materials brought to the site from elsewhere. This would have implications for the 14C date of 260 ± 40 ad obtained for the deposit, since it could be an average determination from older peaty soil humus and younger charcoal. An attempt was made to separate the sample into bulk organic and charcoal fraction for separate dating, but the resulting sample sizes were too small for precision dating. Allowing for these problems, the radiocarbon determination would still indicate the latest date for the formation of the organic matrix and the earliest date for the construction of the upper fort wall.

The 3rd-century ad radiocarbon date for the earliest start of construction (a central date of around AD 290 after dendrochronological correction to calendar years following Clark 1975) can be compared with Small's 14C dates for charred oak timbers from the wall. The radiometric details given by Small (1969, 64) are somewhat confusing and the data in Table 4 is based on the

TABLE 4

Laboratory reference	Small's reference	Age bp	Age ad
N-327	RS1	1560 ± 110	390 ± 110
N-328	RS2	1340 ± 105	610 ± 105
N-329	RS3	1560 ± 115	390 ± 115

original date list of the Riken laboratory (Yamasuki *et al*, 1968), and determinations are given using the conventional half-life of 5568 ± 30 years. The Burghead 14C dates are displayed in fig 2, with both one standard deviation (68% probability) and two standard deviation (95% probability) error terms indicated. Additional support for choosing the two standard deviation term may be construed from the recent work of Campbell *et al* 1978. The visual agreement between UB-2208 and the charred oak dates N-327 and N-329 are confirmed statistically at the 95% level by the arithmetic difference-root mean squares test proposed by Lavell (1971, 1.5). A positive result is also obtained if the two Riken dates are combined to produce a re-calculated mean standard deviation of ± 89 years (formula in MacKie 1977, 237 but see also Ward & Wilson 1978). These statistical comparisons assume that the dates are strictly comparable, which assumes that the quoted 14C error terms account for all dating errors (compare Campbell *et al* 1978). It is necessary to bear in mind inter-laboratory differences, the higher precision Belfast dates (counted at 5 atmospheres pressure rather than the 2 atmospheres of Riken) and the important consideration of the interpretation placed on the organic band material.

In his report, Small (1969, 67) notes that there was no evidence for any gradual decay of the

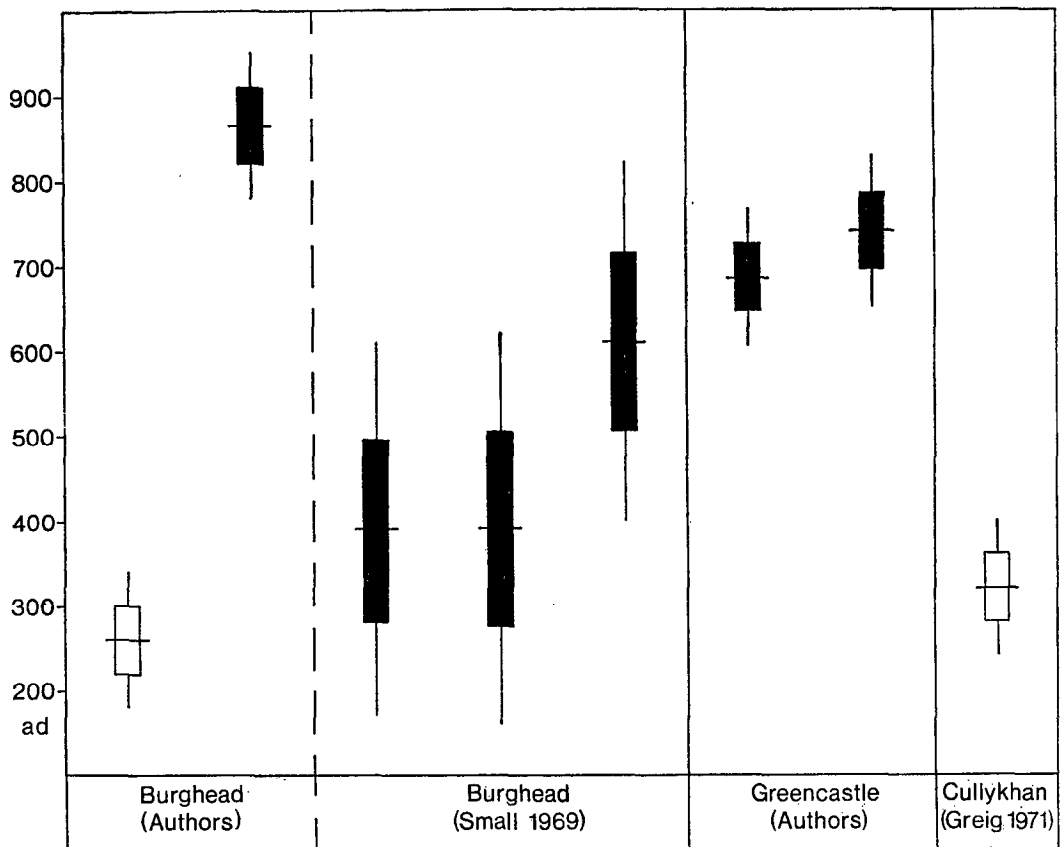


FIG 2 Radiocarbon dates from promontory forts in north-east Scotland. Thick and thin vertical bars represent one and two standard deviation error terms respectively. Solid dates are from construction timbers, open ones are from other materials

rampart wall and he makes the reasonable suggestion that the rampart and its timber works were well maintained until its destruction by fire. Such maintenance would explain the date of 610 ± 105 ad (N-328) obtained for charred oak, though this date is not statistically different from the earlier Riken dates even allowing for a contracted error term of ± 89 years. The new date obtained from charcoal associated with wall rubble (UB-2083) of 865 ± 40 ad (about 900 AD after correction to calendar years) is statistically different from N-328 and might provide the latest date so far for the destruction of the fort. Present information remains insufficient to associate the destruction of the site with Viking activity.

All the available radiocarbon dates for Burghead place the construction and utilisation of the upper fort within the proto-Pictish and Pictish periods. Comparisons with the other two dated Moray Firth promontory forts (figs 1 & 2) suggests that Dark Age activity on these sites is neither exceptional nor likely to represent the initial use of these headlands. Both Cullykhan (Campbell *et al* 1978) and the Green Castle, Portknockie, where the main fortification is preceded by a palisade (*Discovery and Excavation in Scotland*, 1978, 12) have earlier defences. At the Green Castle, pollen analysis of material from ardmarks from a ploughing phase stratigraphically earlier than the principal defence though later than the early Iron Age use of the promontory suggests at least limited on-site agricultural activity, in contrast to the Burghead evidence. The main defence,

elaborately timber-laced, has provided two ^{14}C dates for carbonised oak beams of 655 ± 40 ad (UB-2149) and 740 ± 45 ad (UB-2150). These dates clearly fit within the time spread of the Burghead determinations. Only the most recent of the radiocarbon dates from Cullykhan of 317 ± 40 ad (BM-445), for a wooden object associated with a wooden structure, seems applicable to our period and this seems to post-date all the early defensive phases of the site that have been identified.

Burghead remains anomalous amongst the excavated or putative Dark Ages fortified sites in NE Scotland, at least in terms of its size. Further investigation of the smaller sites, as Small predicted (1969, 67), may however fill out the picture tentatively sketched above.

ACKNOWLEDGMENTS

We would like to thank Mr Gordon Pearson of the Queen's University Palaeoecology Laboratory for providing radiocarbon dates and discussing problems of interpretation. Mr Robert Larmour carried out preliminary pollen counts and Miss Maura Pringle of the Queen's University Geography Department drew the diagrams.

REFERENCES

- Birks, H H 1975 'Studies in the vegetational history of Scotland. IV. Pine stumps in Scottish blanket peats', *Phil Trans Roy Soc, B*, 270 (1975), 181-226.
- Campbell, J A, Baxter, M S & Harkness, D D 1978 'Radiocarbon measurements on a floating tree-ring chronology from North-East Scotland', *Archaeometry*, 20 (1978), 33-8.
- Case, H J, Dimpleby, G W, Mitchell, G F, Morrison, M E S & Proudfoot, V B 1969 'Land Use in Goodland Townland, Co. Antrim, from Neolithic Times until today', *J Roy Soc Antiq Ir*, 99 (1969), 39-53.
- Clark, R M 1975 'A calibration curve for radiocarbon dates', *Antiquity*, 49 (1975), 151-66.
- Collis, J R & Ralston, I B M 1976 'Late la Tène defences', *Germania*, 54 (1976), 135-46.
- Edwards, K J 1978 *Palaeoenvironmental and Archaeological Investigations in the Howe of Cromar, Grampian Region, Scotland*. Unpub PhD thesis, Univ of Aberdeen.
- Faegri, K & Iversen, J 1975 *Textbook of Pollen Analysis*. Oxford.
- Feachem, R W 1966 'The hill-forts of Northern Britain', in Rivet, 1966, 59-88.
- Greig, J C 1970 'Excavations at Castle Point, Troup, Banffshire', *Aberdeen Univ Rev*, 43 (1969-70), 274-83.
- Greig, J C 1971 'Excavations at Cullykhan, Castle Point, Troup, Banffshire', *Scot Archaeol Forum*, 3 (1971), 15-21.
- Greig, J C 1972 'Cullykhan', *Curr Archaeol*, 3 (1971-2), 227-31.
- Havinga, A J 1974 'Problems in the interpretation of pollen diagrams of mineral soils', *Geologie en Mijnbouw*, 53 (1974), 449-53.
- Lavell, C 1971 *Archaeological site index to radiocarbon dates for Great Britain and Ireland*. CBA, London.
- Macdonald, J 1860 'Historical notices of "The Broch" or Burghead, in Moray, with an account of its antiquities', *Proc Soc Antiq Scot*, 4 (1860-2), 321-68.
- Mackie, E W 1977 *Science and Society in Prehistoric Britain*. London.
- Moore, P D 1975 'Origin of blanket mires', *Nature (London)*, 256 (1975), 267-9.
- O'Sullivan, P E 1976 'Pollen analysis and radiocarbon dating of a core from Loch Pityoulish, Eastern Highlands of Scotland', *J Biogeogr*, 3 (1976), 293-302.
- Ralston, I B M forthcoming 'The Green Castle, Portknockie and the promontory forts of North-East Scotland', *Scot Archaeol Forum*.
- Rivet, A L F (ed) 1966 *The Iron Age in Northern Britain*. Edinburgh.
- Small, A 1969 'Burghead', *Scot Archaeol Forum*, 1 (1969), 61-8.

- Ward, G K & Wilson, S R 1978 'Procedures for comparing and combining radiocarbon age determinations: a critique', *Archaeometry*, 20 (1978), 19-31.
- Wheeler, R E M & Richardson, K M 1957 Hill-forts of Northern France. *Res Rep Soc Antiq London*, 19 (1957).
- Yamasuki, F, Hamadaa, T & Fujiyama, C 1968 'Riken natural radiocarbon measurements IV', *Radiocarbon*, 10 (1968), 333-45.
- Young, H W 1891 'Notes on the ramparts of Burghead, as revealed by recent excavations', *Proc Soc Antiq Scot*, 25 (1890-1), 435-47.
- Young, H W 1893 'Notes on further excavations at Burghead', *Proc Soc Antiq Scot*, 27 (1892-3), 86-91.