7. DISCUSSION

Though limited in both scope and scale, the excavations undertaken at Cramond have produced a closely grouped series of radiocarbon dates, suggesting a focus of Mesolithic occupation activity occurring during the mid-9th millennium bc.

Conneller (2022: 172) has recently termed the period 8200–7000 bc the Middle Mesolithic, a period of change, with an increasing variation of both human life-ways and inhabited environments. More specifically, this is illustrated by an increase in cut features and post-built structures associated with the emergence of hazel within the pioneer biota of the emerging post-glacial woodland.

The occupation of Cramond with its relatively large hazelnut assemblage and well-stratified cut features would appear to be an early illustration of this change, emerging within the Mesolithic of Eastern Scotland albeit at a slightly earlier date. The evidence revealed at Cramond and the inland site of Manor Bridge, Peebles (Warren 2001), where hazelnut-rich pits provided evidence of occupation dating between 8400 and 8200 bc, suggests that hazel and its associated human usage was well established in this area at least as early as the mid-9th millennium. This open mosaic woodland landscape may have had a fairly limited range within Eastern Scotland during this period, possibly restricted to the coastal fringe and major river valleys such as the Forth and Tweed.

Cramond is the earliest of the southern Forth Littoral sites that also include East Barns (Gooder 2007; Engl & Gooder 2021), Echline (Robertson et al 2013) and Howick (Waddington 2007). These last three sites consist of robust house structures constructed at the turn of the 8th millennium bc. These sites including Cramond all appear to occupy similar environmentally productive locations along the southern coast of the Firth of Forth. The house sites of the Forth Littoral have been identified as the archaeologically visible signs of possible Mesolithic population movement related to the rapid inundation of the North Sea during the period 8000–7500 bc (Waddington 2007).

In his initial publication of the Cramond site, Saville (2008) noted the association of narrow-blade technology with radiocarbon dates centring around 8400 cal bc (actual range *c* 8600–8200 cal bc). These are not only the earliest dates produced so far for the Mesolithic in Scotland but remain the earliest dates from Britain with this microlith component (Saville 2004: 207). It was determined that the dates and their material associations formed a coherent, internally consistent series which could be accepted as a reliable indicator of their true age, approximately at the time of deposition. In fact, alongside sealed deposits found at the recently excavated house sites of East Barns (Engl & Gooder 2021), Echline Fields (Robertson et al 2013), Howick (Waddington 2007) and Low Hauxley (Waddington & Bonsall 2016), which have all produced sizeable narrow-blade microlithic assemblages, Cramond provides a strong example of direct association within the archaeological record for the Mesolithic period in Britain.

The question of such an early date for the narrow-blade assemblage identified at Cramond has created some discussion. It has been asserted (Conneller et al 2016; Conneller 2022: 179) that the Cramond assemblage demonstrates a transition from Early to Late Mesolithic lithic types and is in fact an example of a 'basally modified assemblage' based on the presence within the assemblage of a point with inverse basal retouch (Illus 8: 3675). This artefact provides a potential link to the 'Honey Hill' type assemblages – in which this microlith form is the 'type fossil' – currently thought to relate to the end of the Early Mesolithic/beginning of the Later Mesolithic and dated very approximately to the period 9000–8500 bp/8500–7300 cal bc (Reynier 1997; Barton & Roberts 2004: 344).

This viewpoint has been rebutted by Waddington et al (2017) on the basis that apart from the single basally modified point, the Cramond assemblage is, alongside the other Forth Littoral sites, indisputably narrow-blade in form, with directly comparable core technology, microlith types and other tool forms.

The occurrence of an inverse basally retouched microlith within the Cramond assemblage should therefore perhaps be regarded as anomalous – after all it is odd that no one argues for the Kinloch site being of Neolithic date, despite the presence of two well-stratified leaf-shaped arrowheads in one of the earlier pits (Wickham-Jones pers com). It should therefore be accepted that the Cramond assemblage is essentially, as it appears at face value, a very early example of a Later Mesolithic-type

scalene-triangle-dominated industry. In England and Wales the earliest dates for such industries are in the 8600–7500 bp/8000–6200 cal bc bracket (Barton & Roberts 2004: 346; David & Walker 2004: 317).

The lithic assemblage produced at Cramond, though relatively small, is sufficient to characterise the lithic assemblage as being of a 'narrow-blade' type. The assemblage contains a microlith spectrum dominated by 'geometric' types, especially scalene triangles although these have a generally more 'crescent-like' appearance than those recovered at both East Barns and Echline Fields. Microliths are the chief designated tool-type within the assemblage, with scrapers the only other category with a significant presence. This pattern is a familiar one in Scottish Mesolithic sites, whether small or large assemblages are involved (McCullagh 1989; Wickham-Jones 1990; Wickham-Jones & Dalland 1998; Mithen 2000; Engl 2021), and in itself is entirely unexceptional.

In fact, there are some specific points of comparison with other Scottish Mesolithic assemblages when the overall small size and likely limited range of the Cramond assemblage is allowed for. In terms of technology the Cramond industry might be somewhat unusual in containing only platform cores without any substantial evidence of bipolar anvil knapping. This technique appeared to be a significant component of the *chaîne opératoire* at East Barns (Engl 2021), where the technique was used extensively in order both to work intractable quartz pebbles and to extend the working life of both flint and chert platform cores.

The mean size of the microliths at Cramond (14.7mm in length) matches very similar figures produced from sites both on the west coast of Scotland such as Colonsay, Islay and Rùm (Saville 2004: 188) and from the fellow sites of the southern Forth Littoral such as East Barns (Engl & Gooder 2021) and Echline Fields (Robertson et al 2013). The Cramond microburins are perhaps on the small side when mean sizes are compared with those from Colonsay and Islay (Mithen 2000, vol 2: 580) and they also appear far more numerous at Cramond when contrasted with the relatively low microburin to microlith ratios in other assemblages (Wickham-Jones 1990; Mithen 2000). If the unstratified worn-edge piece (Illus 11: 5017) is correctly to be seen as part of the Mesolithic assemblage, on the basis of its frequent Mesolithic occurrences elsewhere (Saville 1977), then it not only adds a new implement type to the Scottish Mesolithic repertoire, but also provides an indirect confirmation of the use of fire on site, if the interpretation of this tool-type as a fire-making implement is accepted (Stapert & Johansen 1999).

Saville's tentative view was that this technological change to narrow-blade assemblages within the British Mesolithic was happening first within northern Britain. Waddington (2007) has built on this initial hypothesis, stating that on current evidence the appearance of narrow-blade technology closely associated with substantial house structures and a coastal way of life appears to have emerged around the North Sea Basin during the 9th millennium bc. This hypothesis has been supported in both the publications of the Echline (Robertson et al 2013) and East Barns (Engl & Gooder 2021) sites.

The drivers of Mesolithic technological change and population movement are likely to be complex, with a variety of regional and ecological factors in play. Conneller (2022: 178) states that rather than tracking an east–west population movement, the radiometric dates produced by the sites of the Forth Littoral may in fact be a reflection of the rise of hazel within the early post-glacial environment of north-eastern Britain during the 9th millennium.

Hazel is found in abundance within all of the sites of the Forth Littoral, with all except Cramond providing evidence of a mixed economy. This included the exploitation of terrestrial woodland mammals such as pig, deer and auroch, together with marine resources such as seal (East Barns, Howick), fish (Echline) and shellfish (Howick). It is perhaps worth noting that the inland site of Manor Bridge (Warren 2001) also produced hazel-rich pits dated to between 8400 and 8200 bc. This site is close to the River Tweed and would, like the coastal, hazel-rich sites of Cramond and Fife Ness (Wickham-Jones & Dalland 1998), be located in an optimum location for the exploitation of hazelnuts.

Given the limitations of the excavation undertaken at Cramond, the site cannot be adequately described as another example of a 9th-millennium bc Mesolithic house site, such as those excavated at Echline Fields (Robertson et al 2013),

Howick (Waddington 2007) and East Barns (Engl & Gooder 2021), as this will only be determined by a much fuller investigation of the site. In its existing excavated form Cramond appears to be a small site, which, given the quantity of Mesolithic material within the immediate locale, is likely to be a small part of a much wider occupation focus. Cramond is likely to represent a repeatedly visited camp site that was associated with the processing of significant quantities of hazelnuts such as proposed for the later site at Fife Ness (Wickham-Jones & Dalland 1998).

Nevertheless, despite its archaeological restrictions Cramond remains a well-contexted site that appears to push back the boundaries of narrow-blade technology within Britain to the mid-9th millennium. The Cramond site was occupied during a period of rapid environmental change in which a significantly warming climate led to the rapid recolonisation of northern Britain by a variety of biota including hazel. This warming also led to the inundation of the North Sea Basin. These environmental changes do appear in tandem with the emergence of narrow-blade technology and can be seen as part of the adaption of Mesolithic populations to the emergence and exploitation of a broader range of physical environments.

Whether this occupation came about as the result of large-scale population movements associated with the inundation of the North Sea, as proposed by Waddington & Bonsall (2016), or simply as a result of a gradually expanding population related to milder environmental conditions, the adoption of the technology is likely to have produced many regional and chronological differences. These hypotheses will undoubtedly be developed as new sites and assemblages come to light.