Chapter 8

Frontierland: towards an environmental history of Bute in the later Middle Ages

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THE medieval history of Bute and the other Clyde islands has been presented traditionally as a series of isolated vignettes constructed from scattered, incidental references in narrative accounts which are not concerned primarily with Bute itself. Consisting mainly of references to military clashes in the long struggle for control of the wider Firth of Clyde between the Scottish crown and its agents on the one hand, and the rulers of Argyll and the Isles and their associates on the other, the story has been presented mainly as a succession of invasions, battles and raids. Other types of documentary source, principally charter materials which detail awards of land and office in the island, or financial accounts which record income drawn and expenditure incurred by Bute's Stewart lords, allow that traditional picture of conflict to be tempered by glimpses of the quieter routines of administration, peaceful inheritance of property, and the rhythms of agricultural life. Taken together, these two main groups of documentary evidence can be used to construct an image of island life which flowed along almost unchanging, disrupted only occasionally by brief episodes of violence which had few long-term consequences for the islanders. It is an appealing but hardly convincing image. Other forms of evidence which historians have not used traditionally, when combined with traditional parchment records, are revealing an altogether different experience. Palaeoclimate data (principally the record of past climate change represented by the isotopes trapped in the deep layers of the polar ice-caps, or revealed in tree-ring records), paleoenvironmental evidence (mainly analysis of pollen preserved in archaeological contexts, other plant remains, and the micro-faunal remnants of environmentally sensitive species), and geoarchaeological techniques (chiefly methods which explore the natural and anthropogenic processes of soil formation), have been combined with historical records to construct interdisciplinary environmental histories. While these can still only provide us with the broad themes in any historical narrative, together they provide context for the keynote events recorded in the documentary records. They can allow us to understand why events fell out as they did, or particular strategies were pursued, moving beyond the bare-bones catalogues of what happened and when.

This essay cannot provide a full environmental history of Bute, even just for the Middle Ages, but it can attempt to set out the broad context for events and consider some of the

evidence which permits us to see the opportunities and problems which the ordinary islanders faced in their daily lives. It will begin with an overview of the current understanding of the broad environmental trends which were experienced in the North Atlantic region in the medieval period, and a general consideration of the impacts of natural agency, climatic, resource-based and pathogenic, on the human condition. This will be followed by a review of the evidence for weather and its impact on the western maritime zone of Scotland. These two sections set out some context for the final segment, which considers the significance of Bute within the Stewarts' domain and some of the evidence for environment-related stresses affecting the daily lives of its people.

Environmental change, famine and disease: the context

Growing contemporary awareness of environmental impacts on human culture and society, most commonly seen through the lens of the climate change debate, has helped to trigger an expansion of research into past climate trends. Within that new research, the study of the environmental history of the Middle Ages is helping us to gain greater awareness of how our ancestors coped with or collapsed in the face of climate change and long episodes of extreme weather. Their experience is helping us to model how resilient modern subsistence economies in environmentally marginal regions might be during a time of rapidly changing climate. For the historian, however, awareness of the nature and scale of the stresses which environmental change placed on the land- and sea-use regimes which supported the whole edifice of medieval society is helping to reconfigure our understanding of the underlying pressures which helped to drive political events. The fragmentary and largely qualitative nature of medieval record sources for climate, or more particularly weather events, for long rendered it impossible to talk in anything more than the broadest of generalisations about climatic trends. More recently, however, the greater availability of proxy data obtained from a range of scientific measures, such as analysis of the isotope record from cores taken from the Greenland ice-cap, has allowed climate variation across the Historic era to be expressed graphically in forms accessible to non-specialists. The result is that we can now reconstruct with some confidence a general picture of climatic variability in medieval Scotland from which we can identify both the likely long-term impacts on the human population of the country and the shorter-term effects of extreme weather events, especially those triggered by episodes of climatic instability. There is a danger of perhaps seeing environmental change as the primary agency for all changes in human society, political, societal, cultural and economic (neo-environmental determinism as that route is called), but recognition of the centrality of non-anthropogenic agency in defining the human experience encourages the re-evaluation of evidence for long-term change in how our ancestors exploited Scotland's natural resources. Environmental impacts on the medieval subsistence economy, it has been argued, forced major changes in the political and socio-economic structures of the kingdom (Oram & Adderley 2008; 2010a; 2010b).

The current scientific emphasis on the role of climate-related impacts in stimulating human societal change should not obscure the part played by other environmental factors. Epidemic disease, for example, is now widely recognised as having agency in the reconfiguration of economies, cultures and societies (Campbell 2009; Jillings 2003), with effects extending far beyond the obvious immediate impact of high human mortality. Indeed,

the indirect consequences of epidemics may have had equally profound or even greater long-term impacts as high mortality rates did in the short-term. Research has suggested how high mortality rates might trigger fundamental shifts in devotional practice, human interpersonal relationships and wider social attitudes (Oram 2008). Epizootic diseases (widespread disease in particular animal species), such as the catastrophic pan-European cattle plague of the 1310s, also have been identified as significant factors in past human economic crises (Spinage 2003; Campbell & Newfield 2009). The consequences of such diseases for peasant economies that depended on meat and dairy products, wool, woolfells and hides, and on oxen for traction, cannot be overstated.

Famine and episodes of crop failure were also recurrent features of the environmental history of the pre-modern age. The most serious episode was the Great European Famine of 1315–22 (Kershaw 1973; Jordan 1996), but failure of the grain harvest dogged Scottish peasant society at regular intervals from at least the twelfth through to late seventeenth centuries and is widely recognised as contributing to high European mortality levels in urban and rural contexts throughout the late Medieval and Early Modern eras (Smout 1985; Gemmill & Mayhew 1995: 63–5; Appleby 1980; Sella 1991). Famines might have as many human as natural environmental factors contributing to them; if we recognise that fact we must also acknowledge that what are thought of conventionally as primarily human social actions can also have profound ramifications for the wider environment. The most obvious such action is warfare, specifically long-term disturbances like those experienced in Scotland during the Wars of Independence (Barrow 1976; 1978; Lomas 1996). Long-term political disturbance and the emergence of a raiding culture in the West Highlands and Hebrides in the later medieval period, however, produced as profound socio-economic upheaval as major episodes of international conflict (Oram & Adderley 2008; 2010a; 2010b). It is not just the immediate physical destruction of property and slaughter of human and livestock populations that resulted directly from human conflict that must be considered but, perhaps more importantly, also the long-term legacies of military campaigning. Depopulation and depressed agricultural economies were often consequences of epidemic disease which followed in the wake of armies (McKerral 1948; Stell 1991; Oram 2008). Long after the fighting was over, the destructive legacy of war and its associated diseases, social and economic dislocation, contrived to weaken the human population and the fabric of their society.

Confrontation with this catalogue of potential negative impacts of environmental and human-induced change on past societies certainly seems to confirm Thomas Hobbes' view of life for the bulk of the population as 'nasty, brutish and short'. But it must be remembered that there were also many positive outcomes from such changes. It was generally more benign climatic conditions spanning the period from the early tenth to later thirteenth centuries which stimulated a boom in the European economy and enabled the first major expansion of population in the medieval West since the collapse of the Roman Empire. Warmer and drier weather conditions in the developing kingdom of Scotland allowed arable agriculture to expand into more upland districts, helping to provide the economic platform upon which the apparatus of the state could be built. Longer growing seasons and the growth of abundant grass provided the fodder to maintain larger flocks and herds, from which the wool, dairy produce, meat and leather provided peasant communities with bulk produce to trade. Calmer seas and less frequent storms permitted the development of deep-water marine exploitation and the expansion of catches to a level where a commercial fish trade

was possible for the communities down the Atlantic sea-board. It is in the balances and imbalances of these positives and negatives that the human settlement history of Bute and the wider Clyde estuary region was shaped.

Climate and weather in the Atlantic West

The contemporary climate change debate has stimulated new interrogation methods for palaeoclimate records, using data which could provide context for shifts in settlement patterns or modes of exploitation visible in the archaeological and historical record. Alongside material from historical documentary sources, proxy environmental measures which use ice-core, ocean sediment and tree-ring data can offer a long-term perspective on past climatic movement. Many of these data are region-specific but through synthesis of different types we can model likely climatic changes both over wider areas and longer periods. Climate change recorded in documentary sources has previously been discussed for various upland areas of Britain (Parry 1985), but Bute and the western margins of the British Isles generally experience a more temperate maritime climatic regime, and it is likely that long-term climatic shifts were mitigated considerably by the North Atlantic Ocean.

In respect of the climate for the period c1100 – c1600, various proxies have been resolved to annual or seasonal resolution (fig 8.1). These proxies, drawn from Ural and Siberian tree-ring data and the Greenland ice cap, are remote from the western Scottish context and should not be used as absolute indicators of climatic variability there. The method employed is to contrast Northern Hemisphere/North Atlantic summer temperatures from dendrochronological analyses, stable isotope records providing an index of relative winter 'severity' from ice core data, and for an annualised long-multi-proxy mean (for discussion and application of this method, see Oram & Adderley 2008). The annualised multi-proxy data indicates that a long period of higher annual mean temperatures commenced in the tenth century and extended through to the later thirteenth century, but within this timeframe both the proxy data and existing historical accounts reveal cold episodes and extreme weather events (Crowley & Lowery 2000). In addition to these longer term trends, year-on-year seasonal differences (ie between summer and winter) have also been identified as having significant consequences for landscape management in other North Atlantic territories including Iceland, Faroe, and southern Greenland (Simpson et al 2002; Edwards et al 2005; Adderley & Simpson 2005; 2006; Adderley et al 2008).

Synthesis of the various data exposes the general trend in weather events which were driven by these climatic shifts. The era commenced with a pronounced episode of cooling in the ninth and tenth centuries, attested for in record sources and in the evidence for a catastrophic volcanic eruption in southern Iceland which threw around 220 million tonnes of sulphate aerosols into the atmosphere which, combined with atmospheric water vapour, produced around 450 million tonnes of dilute sulphuric acid circulating the globe in the troposphere (Dawson 2009: 94-5). While we can only infer from more recent measured eruptions what the likely impact of such an event was on the global climate, the cooling effect produced by the 1991 eruption of Mt Pinatubo in the Philippines (less than one tenth of the scale of the tenth-century Icelandic eruption) suggests that there were perhaps decades of instability marked by colder winters and, probably, by wet summers memorable for acidic rainfall which stunted growing crops. As this episode faded, temperatures again climbed

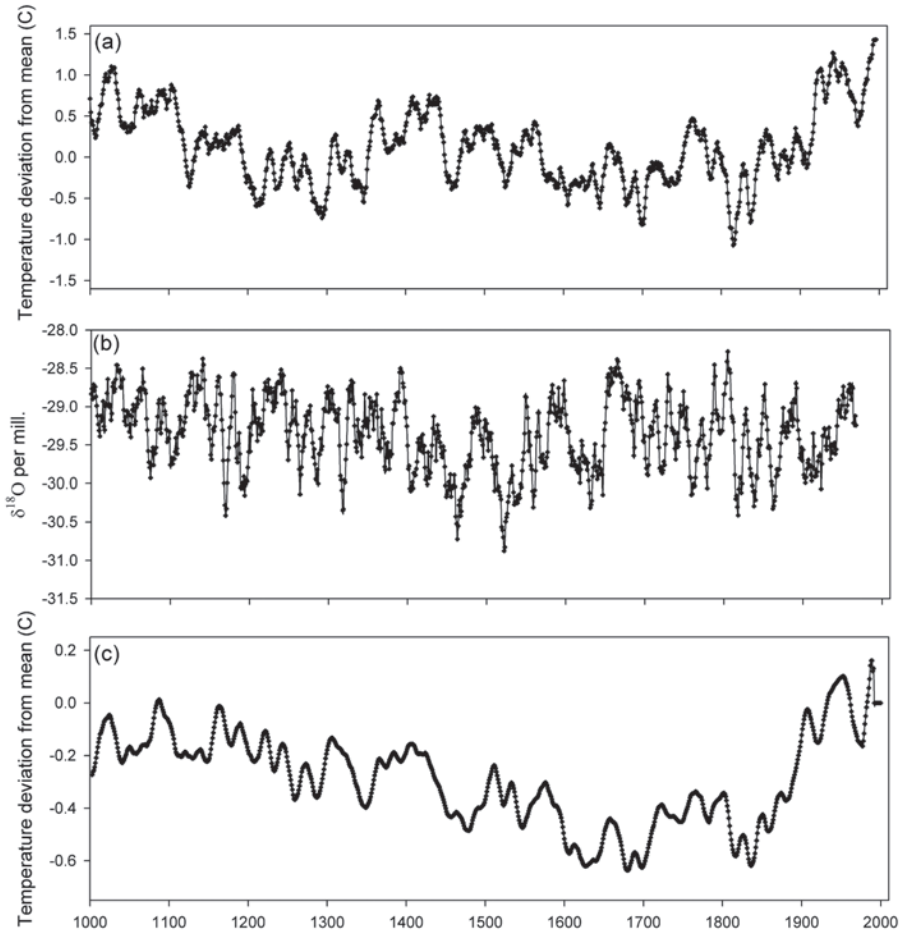

Fig 8.1 Long-term climate proxies AD 1000–AD 2000 for the exotropical Northern Hemisphere and North Atlantic: (a) normalised simple mean of four dendroclimate sequences showing deviation of summer temperature from mean (1601–1974) summer temperature (resampled data after Briffa et al 2000); (b) winter –18O data from DYE-3 ice core of Greenland Ice Cap Summit (Adderley & Simpson 2006; Vinther pers comm; Vinther et al 2003) and (c) unweighted aggregate of fifteen Northern Hemisphere proxies: annual deviations from long-term mean (Crowley & Lowery 2000). All data plotted as 10-Year Moving Averages.

to produce an era of milder conditions which spanned the eleventh and twelfth centuries, conditions which encouraged settlement spread and agricultural development in previously more marginal districts.

Twelfth- and thirteenth-century records reveal episodes of extreme environmental distress punctuating the generally more benign 1100s in Scotland. For example, the winters of 1124–5 and 1125–6 were especially cold. Prolonged winter rain, frost and snow, and cold and wet summer conditions resulted in harvest failure and famine, with many deaths

reported from hunger and cold in winter 1125–6 (*Chron Bower* vol 4: 161). Some Irish annals suggest that the western British Isles experienced optimal growing conditions in 1199–1200, with 'a vast crop of mast and apples in abundance' noted in both years,[1] but others record 1200 as 'a cold, foodless year, the equal of which no man witnessed in that age'.[2] In Scotland, 1200 saw heavy summer rainfall, widespread flooding, destruction of property and deaths (*Chron Bower* vol 4: 423). Accounts of storm-damage and another dearth in 1205 indicate a harvest failure in 1204 and, perhaps, in 1205, and livestock was also badly hit by snow and frosts in winter 1204–1205 (*Chron Bower* vol 4: 437). Early sixteenth-century narratives drawing on thirteenth-century sources suggest that winter was one of the worst of the so-called 'medieval warm period' and Icelandic and Norwegian saga accounts of extensive sea ice off Greenland in 1203 provide a context for this cold episode (Stewart 1858: 61; Dawson 2009: 98). This same extension of the southward range of sea ice probably produced the anti-cyclonic conditions which brought the warm, dry summer followed by heavy rainfall in autumn which caused catastrophic flooding of the Tay in 1209 (*Chron Bower* vol 4: 457). Two mild, productive decades were followed after 1233 by another of severe winters. Conditions in this period are consistent with high surface air pressure, characterised by cold, icy and stormy winters moving in from the Atlantic, and punctuated by sharp droughts (*Chron Bower* vol 5: 149, 169). Drought conditions recurred for much of the British Isles through the 1250s, but a dramatic change occurred in 1258. High levels of volcanic sulphates in ice cores indicate another major volcanic eruption which triggered a second episode of climatic cooling which lasted for many years, if not decades. It is likely to have been this event, misdated to 1256, which the Lanercost chronicler described as 'great corruption of the air and inundation of rain' which destroyed cereal- and hay-crops that year (*Chron Lanercost*, 64; Dawson 2009: 99–100). A rapid southward extension of sea ice off Greenland again heralded severe winters for Britain in the 1260s, 1270s and 1280s, but bad though these episodes were far worse followed after 1300.

A combination of atmospheric and oceanic circulation systems drive climatic shifts like those experienced between 1000 and 1300. Changes in ocean surface temperatures affected the pattern of weather systems arriving in the British Isles from the Atlantic. In particular, ocean-surface warming increased atmospheric moisture and brought increased storminess with some extreme summer wind and rain events, and periods of extreme heat or coldness often seen in records of hot, wet summers and prolonged snow and ice in late winter. Conversely, extension of the southward range of sea ice increases the incidence of winter storms as cold surface temperatures bring the high surface air pressures associated with anti-cyclonic circulation. This draws cold air further south to collide with warmer moist air moving east across the Atlantic. The result is winter storm systems moving across the North Atlantic followed by late springs, adverse summer growing conditions, and wet and delayed harvests (Dawson 2009: 73). In contrast to the detailed records of the impact of this prolonged period of poor weather in the first quarter of the fourteenth century on England and Ireland (Jordan 1996: 7–39), little evidence survives of its direct impact on Scotland. This anomaly is attributable to the political upheavals which Scotland was experiencing at this time, with the existing records concentrating on the military and political struggle for survival. Dire accounts of conditions in Ireland and northern England, however, leave little room for doubt that Scotland experienced the same cycle of weather events, crop failures and famines that afflicted neighbouring regions, and administrative accounts relating to the

English garrisons in Scotland point to great difficulties locally in obtaining supplies of food and fodder (Dawson 2009: 101–2).

After 1300 there was marked shift towards colder annual temperatures in the northern hemisphere. Anti-cyclonic circulation established a seasonal pattern of bitterly cold winters, delayed and cool springs, hot and dry summers and warm, wet autumns from around 1308. Then in 1315 a further dramatic change occurred with the summers turning cold and delivering almost continual frontal systems which deposited seemingly endless rains. The result for much of England and Ireland was delayed harvests and shortages of both grain for human consumption and fodder for livestock, but the only contemporary account of similar conditions in Scotland is given by the Lanercost chronicler, who noted that in 1316 there was 'mortality of men through hunger and pestilence, unheard of in our times' (*Chron Lanercost*, 233). The later fourteenth-century *Gesta Annalia* also refers to a severe winter in 1321–2 'which was a sore trial to men and killed off nearly all their animals' (Fordun, ii: 341). Greenland ice core data point to this episode as stemming from a rapid summer-time rise in ocean surface temperatures in the North Atlantic, an overheating which continued through winter to maintain an upward spiral in temperatures and a consequent dramatic increase in atmospheric moisture (Dawson 2009: 102). These sea-ice conditions peaked around 1318–9 but it was only in 1325 that a further change occurred with a brief return of summer droughts, and by the early 1330s wet summer conditions had returned. This short episode was followed by a plunge to the lowest temperatures experienced in the North Atlantic region since well before 1000, with contemporary English and Irish sources chronicling a return of the conditions which had produced famine two decades earlier (Dawson 2009: 103) (no Scottish source mentions this event). While this plunge in temperatures has been described as 'a period of polar cooling that is minor by glacial standards', it was probably the final catalyst for a dramatic reconfiguration of social organisation and economic structures in Ireland, Scotland and Iceland, and the collapse of Norse colonies in Greenland (Mayeski et al 2004: 252; Oram & Adderley 2008: 80–82). The cumulative effect of these extended episodes over many years had been more pronounced than the traumas created by shorter periods of year-to-year variation.

While there is huge debate over the exact chronological range to which the term should be applied, the climatic cooling of the fourteenth century has been seen as the first stage of the so-called 'little ice age' which lasted through to the middle of the nineteenth century (Mann 2002; Fagan 2000). Like the 'medieval warm period', the 'little ice age' was not an era of consistent climatic conditions and it did not mean relentless cold weather. The 1350s did see unprecedented low temperatures but it was a severe episode soon after 1400 which perhaps saw the cold become more deeply entrenched. Winter storms in the North Atlantic were more regular, more violent and more prolonged, and the south-west to north-east circulation of warmer water which helped to give the British Isles their generally milder climate moved south as colder, polar circulation systems extended. One result was that the North Atlantic winter storm track which passed over Iceland and the Faeroe Islands became fixed instead over Britain. Storm systems fed in from the west off the Atlantic to collide with cold air drawn by anti-cyclonic circulation from Russia, and the result was often snow (Dawson 2009: 104–5). The sea ice retreated northward slightly mid-century but it is wrong to call this a period of warmer mean temperatures, rather it was less cold than what had preceded it.

Most evidence suggests that severe weather affected the Atlantic seaboard throughout the fifteenth century. An especially cold winter in 1431–2 was marked by ice and gales, and brought widespread deaths amongst livestock, but a second extreme winter in 1434–5 saw three-and-a-half months of unrelenting low temperatures which caused widespread shortages of food as mills were reportedly unable to grind grain due to the icing-up of water-courses (Chron Bower vol 8: 267, 293). The delayed spring in 1435 apparently was followed by a poor harvest and resulting food-shortages. Famine struck again in 1439 following a poor grain harvest; contemporary west of Scotland accounts suggest that the associated deaths were amongst the worst ever experienced (Auchinleck, 160). A re-advance of sea ice after about1460 brought repeated cold winters, and from the 1490s these were accompanied by the hot dry summers and wet autumns which are characteristic of high pressure systems across northern Europe.

There is a dearth of detailed narrative accounts from Scotland for the central decades of the fifteenth century. This absence is only partly compensated for by parliamentary records which hint at poor harvests and resultant high food prices through the 1450s. Parliamentary legislation in January 1450 over supplies of food, hoarding and price inflation points to underlying problems with the harvest (RPS 1450/1/23; 1450/1/24). This was followed in August 1452 by similar legislation intended to force the release of hoarded grain into the market (RPS 1452/3). Favourable treatment of merchants who brought food to Scotland was ordained in the July 1454 parliament, again perhaps indicating that the harvest had been deficient (RPS 1454/3). Efforts to increase production levels, both to secure domestic supplies and reduce the drain on money through the importing of basic foodstuffs, can be seen in legislation of the March 1458 parliament, which instructed the sowing of minimum amounts of wheat and beans on any property where an eight-oxen plough was used (RPS 1458/3/29). A supply crisis was again the subject of legislation in June 1478 probably arising from a series of harsh winters and wet autumns in the mid-1470s, and 1482 legislation again giving favourable treatment to merchants importing foodstuffs suggests an extended period of shortages (RPS 1478/6/83; 1482/3/8; 1482/12/84).

From then down to about 1520 there was some recovery in annual temperatures, but there are indications of poor harvests along the Highland fringe in 1524–5 (*Chron Perth*, 21), and a return to colder and wetter circumstances in the middle of the sixteenth century. Winter 1554–5 was especially severe throughout the southern Highlands. Severe frosts began in November, but the main episode started with frosts between 13 December and 25 December, then snow began to fall lasting through to 17 January, 'it was the grettast snaw and storm that was sein in memorie of man lewand that tyme'. After a brief thaw, snowfall resumed and the coldest weather was experienced between 22 and 26 February (Taymouth, 21). Extreme weather accompanied these fluctuations in the annual mean temperatures; the 1540s saw severe winter storms, while the 1560s to mid 1570s experienced extremely cold winters and wet and windy summers, and from 1575 to 1582 eastern Scotland experienced near drought conditions summer and winter, while the west and central Highlands had unusually high levels of rainfall (Taymouth, 129, 135, 136, 137–8, 141–2). There was a short-term recovery again in the late sixteenth and early seventeenth century, but at its peak the annual mean temperature had barely returned to the levels experienced in the cold years of the mid fifteenth century. These, then, are the broad trends in northern hemisphere temperatures across the medieval period in the North Atlantic region. Long-term movement

in the fortunes of the people of Bute and in the basis of their economic systems should be assessed in this context.

The catalogue of misery presented in the above account can only partly be offset by the reminder that in the years where no extreme or unusual events were recorded the people of Scotland were able to make a living at above subsistence level. Furthermore, despite the regular rehearsal of incidences of crisis triggered by severe weather events, principally expressed in terms of hunger-related deaths arising from harvest failures and consequent shortages and inflation in food prices, it is important to reflect on the fact that while society in Scotland clearly changed in the face of such challenges it did not collapse. What that suggests is that far from being static and inflexible (peasant conservatism is a term that is often expressed by modern scholars), the agricultural regimes upon which Scottish society was founded were responsive and resilient, and shifts in forms of social organisation and modes of exploitation should perhaps be thought of as positive reactions to climate change rather than always negative, rearguard defences of a failing system.

The Stewarts' bread basket?

Detailed historical records for most of the Clyde estuary are lacking before the mid twelfth century, from when it is possible to begin to reconstruct the course of events which saw the power of the Scottish crown intruded aggressively into the region by kings from David I (1124–53) to Alexander III (1249–86). For one hundred and fifty years, the narrative that can be recovered is one of prolonged political disturbance and a painfully slow progression towards stability. That century and a half of conflict to secure control of Bute and the other Clyde islands can be read as a straightforward political struggle driven by a simple desire for territorial aggrandisement. For the Scottish crown and the Stewarts, there was unquestionably a strategic case for westwards expansion, while for the members of the Argyll dynasty who opposed them there was an identical case for eastwards expansion to block Scottish encroachment. But territorial aggrandisement is only part of the issue, and the eagerness of all parties involved to secure control of Bute suggests additional motives. Of those motives, the most obvious is control of resources and expansion of their economic potential. The agricultural wealth of Bute would have expanded significantly the sources of income and ability to dispense patronage of whoever secured possession of the island.

Although there are no surviving records of the income obtained from Bute by its rulers before the fifteenth century, those later accounts of productivity from a time of extreme environmental stress point towards the likely agricultural potential of the island during the more benign twelfth and thirteenth centuries. In contrast to much of the land to its north and west, the geology of Bute produced a very sharp diversity in land form that encouraged a split in emphasis in agricultural practice north and south of the low-lying 'waist' of the island between Ettrick Bay on the west and Kames Bay on the east. While the Highland Boundary Fault which marks the division in the underlying solid geology which determines much of the landscape character lies to the south of the 'waist', the overlying drift geology makes the low ground of the east-west trench more suitable for agriculture (fig 8.2). North of the fault line, the solid geology is primarily metamorphic rock with igneous intrusions, producing a landscape of glacial rounded hills, craggy escarpments and trench-like valleys, supporting thin acid soils and areas of blanket peat. The highest point, Windy Hill, reaches

Fig 8.2 Aerial view of Bute looking towards Ettrick and St Ninian's Bay from Tormore Hill (DP 066199, © Crown Copyright: RCAHMS. Licensor www.rcahms.gov.uk).

a mere 278m above sea level, with most of the remaining hill country rarely exceeding 160m. Although there are pockets of land suitable for arable cultivation in this northern zone, especially in the Kames-Ettrick 'waist', much of this largely upland area was probably always exploited as rough pasture. Most of Bute's solid geology south of the line filled by Loch Fad and Loch Quien comprises sedimentary rocks overlain by deep, fertile soil, with the southernmost point of the island being primarily igneous in origin (fig 8.3). This tripartite split in underlying geology has determined the land-use strategies employed in the different zones throughout the human occupation of the island, but prevailing climatic conditions would have introduced further opportunities or constraints on the exploitation regimes in different periods. In contrast to the metamorphic rock and acid soil landscapes of Cowal to the north and northern Arran to the south, the southern districts of Bute would have been an island of fertility in a sea of impoverished grasslands. In short, Bute was a highly desirable piece of property.

Prehistoric settlement sites and early historic place-names in 'kerry-' (Gaelic *ceathramh* = a quarter(land)) on the fertile sedimentary zone indicate that this was already the location of important centres of agricultural production and tribute collection by the late tenth or early eleventh centuries (Oram forthcoming). In the more benign conditions of the 'medieval warm period', the settled and cultivated areas associated with such centres expanded and took in

Fig 8.3 Aerial view of Bute looking towards Glen Callum, taken from the south-east (DP 066098, © Crown Copyright: RCAHMS. Licensor www.rcahms.gov.uk).

more land that under colder and wetter conditions would have been incapable of sustaining agriculture or more intensive grazing. Even some areas of the less attractive metamorphic zone would have become more amenable to more rigorous exploitation. The brief episodes of extreme weather which punctuated the twelfth century aside, the climatic regime which encouraged this expansion of population and agriculture lasted through to the second half of the thirteenth century. Thus, when the Stewarts and the heirs of Somairle were competing for control of Bute in the 1200s, they were seeking to acquire one of the richest agricultural resource bases in the south-west Highland region. As their investment in building Rothesay Castle underscores, Bute became an important component of the Stewarts' lordship and was fully integrated into its economic structure.

How valuable Bute was to the Stewart descendents of Walter son of Alan we can only guess, for no detailed financial records survive from the Stewart lands earlier than the fifteenth century. No financial accounts, such as records of teind receipts from which a general view of the agricultural productivity of the island could be gained, survive from the diocese of the Isles under which the churches of Bute fell. It is only in the revaluation of land undertaken in 1366 for King David II as part of the process to better exploit the resources of the kingdom, where the Stewart lands in Bute, Cowal, Knapdale, Arran and the Cumbraes were valued collectively at £1000 'by the old assessment', that a relative impression of productivity can be achieved, but with no new value given it is not immediately obvious how Bute had been affected by the environmental crises of the fourteenth century (RPS 1366/7/18). For the rest of Scotland, outline analysis where both 'old assessment' and new valuation figures are provided reveals a fall of 44 percent north of the Tay and 52 percent south of it. The drops in both areas are sufficiently close, and the similarities in falls recorded in areas that had suffered heavily from military operations and areas remote from the main theatres of campaigning, to suggest that the sharp decline in land values was not solely a consequence of the impact of warfare (Grant 1984: 78). What the fall exposes clearest is a sharp decline in income received from rents, reversing what had been a generally upwards trend through the thirteenth century as rising population kept demand for tenancies high. A collapse in population during the famine and plague years reversed that demand and apparently sent rents into free-fall. It is perhaps as significant that the sharpest falls in values in the 1366 schedule are in central and western Highland or south-west mainland districts, where levels fell by between half and two thirds in most cases as against between one third and a half in the east. It is difficult to avoid the somewhat determinist conclusion that this marked divergence had additional factors behind it, the most obvious of which was the impact on agricultural productivity of poor weather associated with changes in the North Atlantic climatic patterns. Although no 'true value' figure was supplied for Bute, Arran and Cowal in 1366, the combined rentals from these districts which are obtainable for the 1440s suggest that there had been a drop of over three quarters from the suspiciously rounded £1000 of the thirteenth century to a mere £224 plus cattle and grain renders by 1445. The cumulative impact of late fourteenth-century price deflation, collapsing rents due to population decline, and a contraction in agricultural productivity through both falling population levels and environmental factors, resulted in a shift in Bute's position within the Stewarts' property portfolio from a central to more marginal role.

A closer look at the financial records permits identification of some general trends. The first surviving account was rendered at the Exchequer in June 1440 by the chamberlain

of Bute and Arran. It included accounts for the period back to the harvest of 1438, but nothing earlier, and it is impossible to know whether or not the yields indicated in them are at a depressed level after the poor years of the 1430s. There are suggestions, however, that a new set of the royal lands in Bute, Arran and Cowal was made around the start of James II's reign, and it is probably safe to assume that the rents agreed on that occasion made allowance for the downwards movement in conditions reflected in the poor harvests experienced in recent years. The chamberlain's accounts record an annual rent comprising £141 16s money, and renders in produce (referred to as *grassums*) comprising11 chalders, 12 bolls and two firlots of barley[3], and 40 marts (ER v: 81). These *grassums* were paid at Martinmas (after the harvest was securely in) and were levied at a rate of one boll of barley for every merk of rent, and one mart for every five merks of rent. This weighting towards arable-derived income, a reflection of the relative fertility of the sedimentary rock areas of the island even during an era of extreme climatic disturbance, stands in sharp contrast to the Stewarts' other north and west Firth of Clyde properties, principally in Cowal, where the thin, acidic soils over the metamorphic rocks of the district produced little by way of arable crops. There, income from Dunoon and Glendaruel was in money and marts (see, for example, ER v: 246). While much of the barley received in Bute was disposed of as fees paid to royal officers there, more than half of it was transported to the mainland, possibly for sale at market or for onward transmission for consumption by the household. In 1440, for example, five chalders was shipped to Dumbarton and two to Irvine (ER v: 87). Even at the probably much-reduced levels of the mid-fifteenth century, Bute's grain surpluses were an important component of royal income. Indeed, the very fact that Bute was still capable of producing surpluses underscores the significance of the island and probably explains the attractiveness of the Clyde islands to other regional lords who sought to gain control of it in the fifteenth century.

This level of grain income from Bute was maintained through the whole of James II's reign, but in the 1460s the records of rents received include notice of significant arrears. In March 1460, the rents for one term accounted for £70 19s 3d, 11 marts and two quarters, and 11 chalders 15 bolls of barley, but there was also arrears of rents at £11 12s, 10 marts and three chalders, nine bolls and two firlots (ER vii: 11–14). This substantial level of arrears in money, barley and marts suggests that something significant had occurred to disturb the production regime or the rent collection mechanism. The receipts for the three terms from March 1460 to July 1462 continue at the same level as set in the preceding reign, yielding around £71 in money rents per term (ER vii: 107), but by that date arrears in marts had reached 43 and in barley over 14 chalders (ER vii: 109). It was not until 1462–4 that the rents returned to the levels taken in the 1440s, reaching over £140 per annum with no mention of arrears (ER vii: 272). This sudden but short-term emergence of high levels of arrears may be associated with the political disturbances which followed the death of James II, during which time John MacDonald, earl of Ross and lord of the Isles, had attempted to take control of the Clyde islands, and coincided with the death of the old chamberlain and a possible hiatus in the administrative mechanisms, but the arrears in 1460 relates to conditions dating back at least to 1459. It seems that, while the accumulation of arrears may have been worsened by political circumstances, other factors were at work. The records of poor weather conditions and bad harvests through the 1450s are perhaps being reflected here in the reality of tenants' inability to meet their rent obligations.

Alongside the money and grain rents, renders of cattle or marts, usually referred to in the accounts as *malemartis* (cattle rendered as part of the rental agreement), constituted an important component of Stewart income from the island. It emerges in the mid fifteenth century that these cattle were being driven live to supply the needs of the king's household. In 1440, allowance of 40s was made in the chamberlain of Bute and Arran's accounts for the costs of driving two groups of marts from Ardneil (Portencross) in Ayrshire, to where probably they had been carried from Kilchattan Bay in southern Bute, to Stirling (ER v: 85).[4] Twenty-nine Bute marts were driven from Ardneil to Stirling in 1443, thirty-two in 1444 and thirty-three in 1445, the beasts in this last year being taken on to Edinburgh (ER v: 64, 210). Reference in 1445–6 to the marts being taken to the Torwood, part of the royal hunting forest east of Stirling, suggests that the cattle were being grazed there to fatten them up before slaughter after the likely weight-loss of the long drive from the Ayrshire coast (ER v: 251). The number of cattle received in this way as rent remains fairly stable from the 1440s onwards, although there is again a significant episode of arrears noted in the early 1460s. The arrears of 43 marts, more than a year's render, points to a major disruption of the process in 1460–1 and was perhaps associated with raids on the island by John MacDonald, but could equally reflect the consequences of a weather event which had adversely affected the herds. There is a tendency to regard the pastoral component of medieval agricultural regimes as less exposed to the vagaries of climate than the arable, but the reduction in biomass production (growth of grass and other fodder) and contraction in the extent and altitudinal range of good-quality pasture that occurred across the medieval period, saw a progressive decline in the carrying capacity of the land. It is probable that the numbers of beasts evident in the records by the mid fifteenth century reflects a significant contraction from the pre-1300 levels. Surviving medieval chronicle entries, such as the 1321 *Gesta Annalia* reference to widespread livestock deaths, also reveal more immediate weather-related impacts. Winter deaths, especially among the breeding herds, would have taken years to recover from. Poor summer conditions, however, could be equally devastating, for in cold and wet conditions cattle expend calories on simply maintaining body-heat, calories that would otherwise have gone into body-mass or milk-production. Weaker animals are more likely to have died, pregnancies may have been less likely to reach full term, and calves faced under-nutrition from cows which were not producing adequate milk. By the mid fifteenth century, such long-term trends may have forced peasants to reduce the numbers of animals in their herds, adjusting the soums (the assessments of carrying capacity and, therefore, herd sizes placed on specific land) to reflect the reduced potential of the land.

It is likely that the downward trends in temperatures, increases in rainfall, also saw a resultant contraction in both growing seasons and altitudes at which viable grain crops could be grown. This factor led in turn to a slow withdrawal from the extended limits of agriculture which had been reached by 1300. We can assume that the area under cultivation contracted significantly in the north of the island and that arable crops became concentrated most heavily on the zone of sedimentary geology. Grain, and in particular barley, nevertheless continued to feature as the principal agricultural commodity being extracted from most properties in the southern parts of the lordship of Bute by the Stewart kings into the sixteenth century. For example, the 1512 charter of Farquhar McNeill to his son Donald of the twenty shillingland of 'Lapencaill' set out the rent due from the land to the king as 18s 6d in money, six firlots of barley, six firlots of oats, and 4s 6d for part of a mart (RMS iii: no 1083). Likewise,

when in 1515 at Kingarth Gilchrist McCaw of Garrochty granted his cousin the twenty-five shillingland of South Garrochty, the rent due to the king from that property was given as 23s 2d in money, two bolls of barley, seven firlots of oats and 5s 7½d for part of a mart (RMS iii: no 819). Birgidale Knock, at the south end of Loch Fad, a twenty-five shillingland, yielded rent in 1517 of 25s, two bolls of barley, six firlots of oats, and the fourteenth and fifteenth parts of a mart (RMS iii: no 1376). The appearance of a component of oats in these later accounts is also perhaps significant, probably reflecting increasing investment in the cereal variety best-suited to the poor growing conditions of the era.

An indication of the overall scale and scope of arable productivity on the island at the end of the Middle Ages is obtained from the feu-charter of 1534, whereby King James V feued his property on the island to Colin Campbell of Ardkinglas. In addition to money rents of over £150, Campbell received 11 chalders and 15 bolls of barley, 10 chalders of oats, one chalder and eight bolls of 'flour', plus 41 and two quarter marts (RMS iii: no 1405). Rents, clearly, had been maintained at the low level reached a century earlier, suggesting that there had been neither a recovery in population levels to trigger inflationary movement in the economy nor an improvement in environmental conditions to boost yields and, hence, values. Livestock payments had disappeared, probably having been commuted for cash and incorporated in the money rent figure rather than signalling an abandonment of livestock rearing by the Stewarts' tenants. The more significant change, however, was the emergence of alternative crops in the cereal component of the rents. The presence of oats as a significant crop by the reign of James IV (1488–1513), which coincided with a return to the poorer growing conditions experienced in the early fifteenth century, possibly reflects a long-term shift by the tenants farmers into investment in crops better-suited to the climate regime which had become established across most of the maritime west. More work needs to be done on such financial data from the Exchequer Rolls across the fifteenth and sixteenth centuries, but from the sample evidence discussed here it seems that the climatic variability of the period down to the early 1460s had a significant impact on peasants' economies and their ability to pay rents to their lords, and that again by the 1490s it had encouraged them to shift into new exploitation strategies.

Conclusion

Political events, geography and geology combined to produce a unique set of circumstances which shaped the social and cultural development of Bute in the medieval period. Located in a political frontier zone between rival powers on opposite shores of the Clyde estuary, it was a strategic territory from which the peninsulas and sea-lochs of the south-western Highlands could be dominated or from where expansion into the mainland to the east could be launched. It occupied also something of a frontier position in terms of socio-economic structures, for its underlying geology allowed it to sustain an arable agricultural regime akin to that which prevailed across most of Lowland Scotland. Few parts of the mainland and islands to its north and west could support such intensive cultivation regimes at a similar level. Bute's agricultural potential was undoubtedly a key factor in its attractiveness to external powers over the centuries, for despite its relative smallness of scale it was capable of producing a disproportionately high level of agricultural yields. Its western maritime position did not shield Bute from the impact of climate change, although the shelter of Kintyre and

Knapdale to the west and the hills of Mid Argyll and Cowal to the north may have helped to ameliorate the worst effects of deteriorating weather conditions. Blessed with its Old Red Sandstone geology in the south part of the island, Bute was able to sustain an arable regime across an era where cultivation of cereals was in drastic decline in most of the western Highland and Hebridean zone. In common with the rest of Scotland, population levels may have collapsed as a consequence of famine and epidemic in the fourteenth century, but that fall enabled Bute's agricultural regime to remain viable and deliver surpluses for most of the time throughout an era of profound environmental change. To men like John MacDonald, whose Hebridean and West Highland domain had experienced the full force of climatic deterioration since the early 1300s, possession of Bute would have helped to offset the contraction of the resource base available to him from which he had to maintain the complex network of alliances, patronage and culture of conspicuous consumption upon which his Gaelic-style lordship was sustained. His attempts to take control of the island in the 1460s, used against him in the process of forfeiture brought before parliament in 1475, should be seen as the gamble of a man under pressure rather than a simple predatory act. The Stewarts' bread basket was too tempting a prize to ignore in such bleak times.

Notes

1 Annals of Innisfallen at http://www.ucc.ie/celt/published/T100004/index.html, Annals AI1199.6 and AI1200.5 (accessed 23/6/11).
2 Annals of Loch Cé at http://www.ucc.ie/celt/published/T100010A/index.html, Annal LC1200.5 (accessed 23/6/11).
3 One chalder = 16 bolls; 1 boll is equivalent to approximately 145 litres dry volume.
4 Ardneil was an important ferry-port on the route which linked the Stewarts' lands in Kyle, centred on Dundonald Castle, with their Bute properties. King Robert II, the first Stewart king, issued at least eight charters there between 1374 and 1390, presumably while waiting for suitable conditions for the voyage to the island: *RMS*, i: nos 466, 520, 692, 722, 777, 780, 799, 800. Robert III, who spent much of his reign (1390–1406) resident at Dundonald and Rothesay, also used the crossing from Ardneil: see, for example, National Archives of Scotland, GD1/19/1.

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