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The organization of settlement in highland Yemen during the Bronze and Iron Ages

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Until the early 1980s when Alessandro de Maigret recognised and defined for the first time the Bronze Age of south-west Arabia (de Maigret 1990), archaeologists were faced with an embarrassing gap in the cultural sequence of Yemen. This gap, between the Neolithic and the late second millennium BC was, moreover, balanced by an equivalent gap in our geographical knowledge of the archaeology of early communities in the Yemeni highlands. Although a number of reconnaissances had been made of the highlands south of San'ā', the lack of a ceramic sequence inhibited the recognition of early settlement. Not only is it now possible to start to fill in this chronological gap with a range of Bronze Age and Iron Age cultures, we can also discern some patterns in the distribution of settlement. Here various factors that influenced the development of landscape and settlement structure in the Dhamār region are described from the late fourth millennium BC up to the recent past.

Since 1994, six seasons of archaeological surveys have been conducted in the Dhamār region by a team from the Oriental Institute, Chicago. These studies have demonstrated that from at least the early third millennium BC, the highlands of Yemen were occupied by numerous villages and towns. This paper will examine the macroscopic structure of the landscape, and will describe how settlements related to large intermontane basins, route systems, and other landscape features. The cultural landscape will also be examined within the context of environmental change as deduced from sedimentary sequences recorded through ancient lakes and marshes. This approach enables us to see how cultural development has occurred in the context of a changing physical environment.

The Environmental Sequence

It is now well attested that the Indian Ocean monsoon strengthened considerably following the last glacial maximum (around 18,000 BP), with the result that the period between around 9000 and 3000 BC was significantly moister than today. This is well illustrated by so-called proxy climate records derived from sediments accumulated in the adjacent ocean basins. For example the ratio of key elements such as zinc to aluminium varies according to the upwelling of Indian Ocean waters, which itself is mainly determined by the strength of the Indian Ocean monsoon (Sirocko 1996) (Fig. 1). Consequently as the proportion of zinc to aluminium increases it can be inferred that the monsoon strengthened and more rainfall fell over south-west Arabia. Fig. 1 also indicates the approximate duration of lakes in interior Arabia and highland Yemen, together with the chronological range of the humic palaeosols recorded in the Dhamār area, and sediments interpreted as being the result of soil erosion (Wilkinson 1999). Finally, the number of archaeological sites recovered by the Dhamār survey is shown to provide an indication of cultural activity.

It is evident from Fig. 1 that the duration of Arabian lakes and the humic palaeosol (Jahrān soil, see Wilkinson 1997) coincides closely, but not exactly, with the peak in Zn:Al ratio and therefore monsoon rainfall. On the other hand, sediments resulting from soil erosion largely accumulated after this peak and occupy the period of drier atmospheric conditions. Finally there appears to be a significant increase in the number of sites in the Bronze Age, namely those of third and second millennium BC date; again this is when climatic conditions were somewhat drier than before.

Unfortunately, although a large number of radiocarbon determinations exist for lakes in the interior of Arabia (Roberts 1982; Lézine *et al.* 1998), at present there are only two dates on lake development in the highlands of Yemen. Nevertheless, as in the interior of Arabia, these dates suggest that lakes or marshes were in existence from at least 9600 to 6050 BC (Fig. 2). Moist conditions are also implied, although with less certainty, from the presence of the distinctive mid-Holocene palaeosol (the Jahrān soil) which has yielded a large number of dates between 9000 and 3000 BC (Fig. 2). Over-

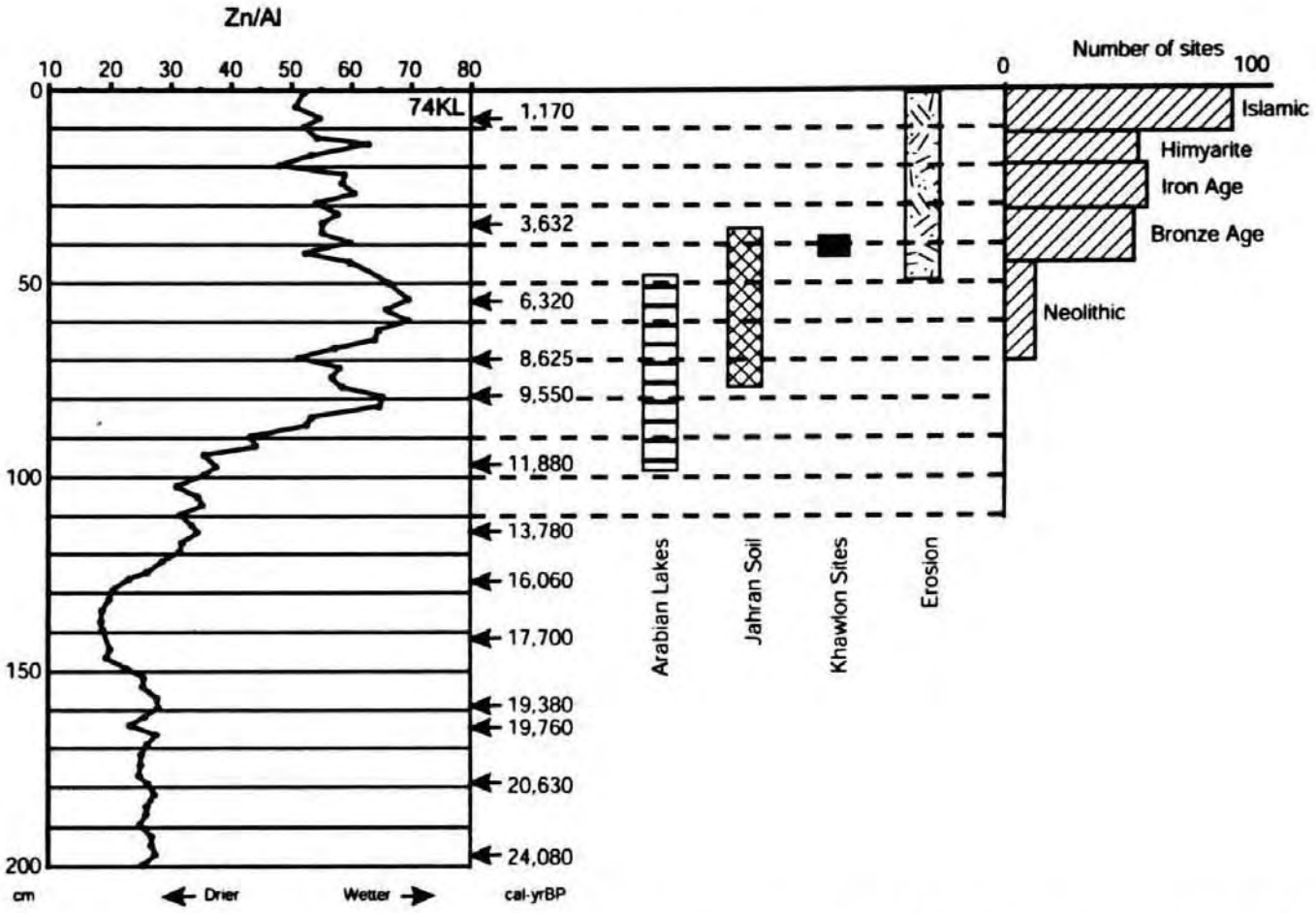

FIGURE 1. *From left to right:* **a).** *Climate proxy curve from core in the Arabian Sea. (Sirocko 1996).* **b).** *The duration of lakes in interior Arabia and the high plains of Yemen.* **c).** *The Jahrān palaeosol from the Yemen highlands.* **d).** *The date of Bronze Age sites in the Khawlān. (After de Maigret 1990).* **e).** *The chronological range of valley fills resulting from soil erosion.* **f).** *The number of archaeological sites of various periods recorded by the Dhamār survey up until 2001.*

all, the alternations of wet and dry conditions in the Yemen highlands are best illustrated from a deep section exposed in the side of a well just below the village of al-Adhla [Aḍlaᶜ] to the west of Dhamār.

The al-Adhla Section

This sequence consists of some 5 m of sedimentary layers deposited in a small basin that is now entirely cultivated. The lowest levels consist of a yellowish red soil containing calcium carbonate concretions that clearly developed under a dry or semi-arid soil climate during the late Pleistocene (Fig. 4). After this, environmental conditions appear to have become slightly moister until around 10,000 BC, when a lake or marsh containing freshwater molluscs developed. This wet episode appears to coincide with the beginning of the rapid increase in global temperature and strengthened monsoon conditions that occurred at the very beginning of the post glacial period (i.e. around the 11,880 BP date on Fig. 1). The pool or lake then shallowed so that a peaty marsh (black humic clay) formed, which was then followed during the mid-Holocene by the development of a deep sequence of humic soils. Although the sequence at al-Adhla is not sufficiently well dated to be interpreted in detail, we can infer from other sections in the area that this dark brown mid-Holocene soil continued to develop until around 3000 BC, after which loam, sand and clay eroded from the surrounding hills accumulated in the valley floor. These mineral sediments show no sign of having accumulated in a moist or humic environment and for this period of some 3000-5000 years one can infer that either environmental conditions had become somewhat drier or there was more soil erosion as a result of increased human activity, or a combination of both. On Fig. 4, this phase of increased accu-

Survey Sample No.	Context	Lab. No.	Conventional C-14 Age B.P.	Calibrated 2 sigma range B.C.
DS 228.1.2.130	Arch. charcoal	Beta 117426	3890 ± 80	B.C. 2575-2130
DS 66 Op 2/4	Arch. charcoal	Beta 101067	4070 ± 80	B.C. 2880-2440
DS 226.C.30.81	Arch. charcoal	Beta 117420	4270 ±70	B.C. 3030-2630
Moshak layer b	Charcoal in palaeosol	Beta 78544	4350 ± 60	B.C. 3095-2880
DS 228.1.5.153	Arch. charcoal	Beta 117427	4470 ± 50	B.C. 3345-2925
DS 226C.33.105	Charcoal in palaeosol	Beta 117422	4520 ± 50	B.C. 3360-3035
Pit 57 nr. Dhamar	Organic horizon at 105-150cm	-------	4630 ± 80	*B.C. 3370*
DS 226.C.18.103	Charcoal in palaeosol	Beta 117421	4810 ± 70	B.C. 3715-3375
DS 297.1.c	Charcoal in palaeosol	Beta 117428	5690 ± 70	B.C. 4715-4365
DS 297.1.d	Charcoal in palaeosol	Beta 117429	5920 ± 70	B.C. 4940-4620
Pit 24 Risabar	Organic horizon at 75-95cm	-------	6010± 90	*B.C. 4900*
DS 226.C.17.118	Charcoal in palaeosol	Beta 117423	6290 ± 70	B.C. 5335-5060
Sedd Adh-Dhra' II, #2	Charcoal in palaeosol	Beta 90836	6290 ± 70	B.C. 5335-5060
Sedd Adh-Dhra' II,# 1	Charcoal in palaeosol	Beta 90837	7080 ± 140	B.C. 6175-5635
Pit 22 Qa Jahran	Shell	-------	7210± 90	*B.C. 6050*
Sedd adhDhra'a	Peat		9260 ±60	*B.C. 9000*
al-Adhla (WP 333)	Shell	Beta 155780	10060 ± 60	B.C.10150-9330

FIGURE 2. *Radiocarbon determinations from soils and lake deposits in the Dhamār area. Calibrations in italics are approximate only.*

Survey Sample No.	Lab. No.	Conventional C-14 Age B.P.	Calibrated 2 sigma range B.C.
DS 101: Op 4/5	Beta 101071	2590 ± 60	B.C. 830-530
DS 228.1.4.116	Beta 117424	3000 ± 90	B.C. 1430-940
DS 228.1.14.126	Beta 117425	3050 ± 80	B.C. 1450-1030
DS 66: Sd.1.Un.1	Beta 90835	3100 ± 120	B.C. 1620-1005
DS 101: Op 3/6	Beta 101070	3260 ± 60	B.C. 1670-1410
DS 101: Op 3/2	Beta 101069	3510 ± 60	B.C. 1960-1670
DS 66: Sd.1.Un.2	Beta 90834	3600± 80	B.C. 2145-1735
DS 101: Op 4/8	Beta 101072	3730 ± 70	B.C. 2320-1920
DS 66 Op 4/1	Beta 101068	3860 ±60	B.C. 2470-2130
DS 228.1.2.130	Beta 117426	3890 ± 80	B.C. 2575-2130
DS269-3-6	Beta 167968	3940 ± 70	B.C. 2590-2210
DS324HSS1801 #11	Beta 156625	4070 ± 40	B.C. 2870-2570
DS 66 Op 2/4	Beta 101067	4070 ± 80	B.C. 2880-2440
DS324HSS1501 #6	Beta 156626	4100 ± 40	B.C. 2870-2570
DS 269.1.18	Beta 167967	4120 ± 40	B.C. 2870-2570
DS 269.3.34	Beta 167970	4440 ± 40	B.C. 3350-3010
DS 228.1.5.153	Beta 117427	4470 ± 50	B.C. 3345-2925
DS 269.3.24	Beta 167969	4480 ± 50	B.C. 3360-3010

FIGURE 3. *Radiocarbon determinations from four Bronze Age sites in the Dhamār area.*

mulation of mineral soils and sediments is represented by the transitional soil and the anthrosol above, the latter having accumulated at least partly as a result of the construction of valley floor terraced fields.

Chronology of Bronze Age sites

So far, five Bronze Age sites from the Dhamār area have supplied radiocarbon dates that contribute to an overall chronological framework for the Yemen highlands (Wilkinson, Edens & Gibson 1997; Edens & Wilkinson 1998; Edens 1999). The sites of Jubābat al-Jurūf (DS 169), Hayt al-Suad [Ḥayṭ Sawād] (DS 324), and Ḥammat al-Qāʿ (DS 101) were excavated under the direction of Chris Edens, whereas Sibal (DS 66) was excavated by McGuire Gibson and Chris Edens, and Kharraib (DS 228) by McGuire Gibson and Krista Lewis. Radiocarbon determinations demonstrate that the earliest ceramic-using horizons recognised in the highlands around Dhamār occur in the lower levels of Jubābat al-Jurūf (DS 269; cf. Fig. 3). These date from the late fourth millennium BC. Other early occupations have been dated to the first half of the third millennium BC at Jubābat al-Jurūf as well as at Hayt al-Suad (DS 324). Radiocarbon determinations from Sibal (DS 66) suggest a long span of occupation ranging from the early or mid-third millennium BC until around 1300 BC, but determinations from cultural layers associated with architecture and middens fall in a narrower third and early second millennium BC range. On the other hand, Ḥammat al-Qāʿ appears to have been occupied mainly during the final part of the third millennium and

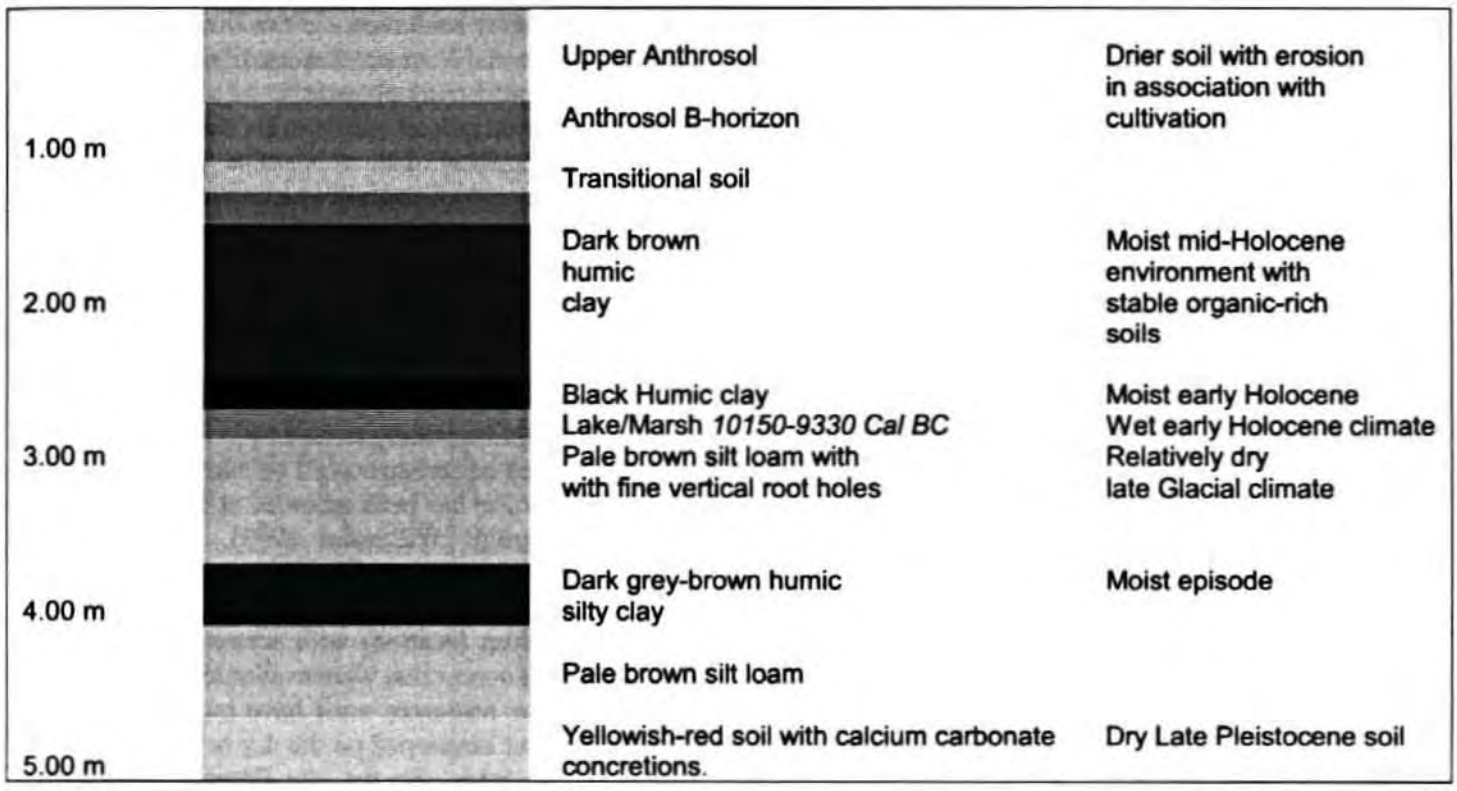

FIGURE 4. *A sketch section through the sedimentary sequence at al-Adhla [Aḍlaʿ], west of Dhamār, and inferred environmental conditions.*

the first half of the second millennium BC. The latest Bronze Age occupation falls in the range 1200-1300 BC at Kharraib. In some cases the span of radiocarbon dates appears to be longer than would be expected from the depth of stratigraphy, and it is therefore possible that certain early dates (such as the earliest from Kharraib: DS 228) may relate to stray pieces of charred material resulting from pre-occupation clearance activities. This does not appear to be the case for the dates from Jubābat al-Jurūf and Hayt al-Suad where the radiocarbon determinations are from charcoal contained within a stratigraphic sequence of cultural deposits. Jubābat al-Jurūf and Hayt al-Suad were excavated in the 2001 season and their cultural sequence and palaeobotanical remains will be reported by Chris Edens and Heidi Ekstrom in a future volume of *Arabian Archaeology and Epigraphy*.

Settlement and climate change

The latest evidence from Jubābat al-Jurūf indicates that ceramic-using societies were already in place during the moist interval of the mid-Holocene. In other words, some sites that have been identified as Bronze Age on the basis of meagre and less diagnostic assemblages may in fact be as early as the late fourth millennium BC. Overall, it is apparent from both the Indian Ocean cores and the numerous relict lakes in the Arabian peninsula that environmental conditions did dry significantly during or immediately after the third millennium. Moreover, there was also a clear increase in the number of sites in the late third and second millennium BC (Fig. 1). Since some of these sites were as large as 5 ha, it appears that there was a significant increase in human activity in the Bronze Age, an increase which occurred in the face of a drying climate (Fig. 1). The combination of increased human activity and a drier late Holocene climate would have placed significant stress on ecosystems: climatic drying would place a stress on the plant communities, whereas increased human populations and their domestic livestock would have both removed vegetation and disturbed ground conditions (Wilkinson 1999).

Bronze Age sites in their landscape context

Typically in the Dhamār region a large number of archaeological sites occupy hill- or plateau-top locations. This is particularly the case for those of Bronze Age

date. For example Hayt al-Suad, discovered in 2001, consisted of numerous rectilinear buildings scattered across a dipping plateau of brown vesicular volcanic rock overlooking a valley eroded in softer volcanic ash, tuffs and gabbro. Although many building plans were incomplete, one large structure was measured in the lower (western) part of the site. To the east, where quarrying had removed much of the archaeological midden, two large buildings with up to 1.60 m depth of occupation deposits were partly excavated under the direction of Christopher Edens. Throughout this *c.* 3 ha site, building stones were large (> 1 m in length and 1 m high) rough blocks hewn from the vesicular volcanic hilltop. In the main part of the site, blocks were set upright to form rectangular chambers, the largest of which measured 14.00 x 3.50 m together with additional rooms (Fig. 5), although in the section excavated by Edens large blocks were laid flat on top of one another. Whether these two contrasting building styles represent a chronological difference in architecture remains to be seen.

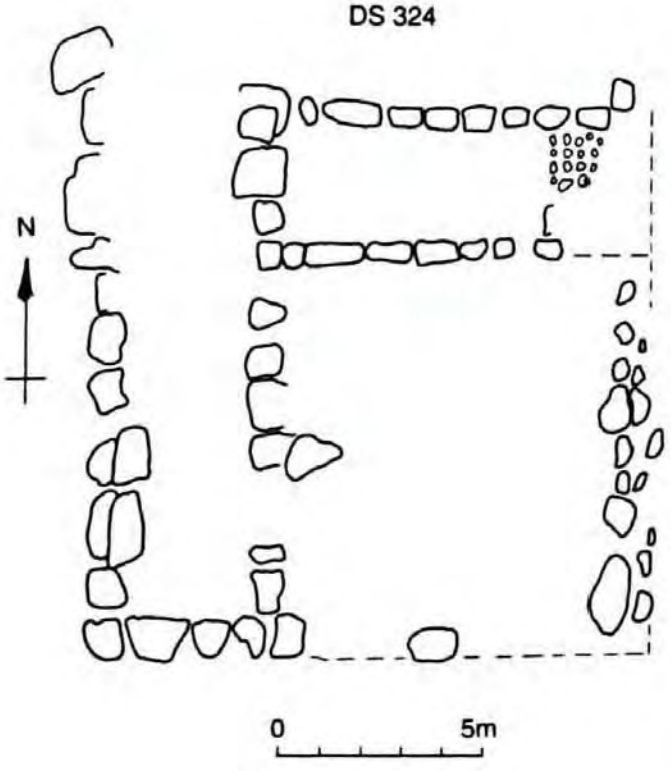

FIGURE 5. *A plan of the building at the west end of Hayt al-Suad [Ḥayṭ Sawād].*

Although many settlements in the Dhamār region are on high points, they are not necessarily on the highest remote hills, but occupy plateaux or hills that were convenient for lower ground (presumably for access to cultivation and pasture), but which also provided some measure of security. Certainly Ḥammat al-Qāᶜ (Wilkinson, Edens & Barratt 2001) was an eminently defensible site, whereas others such as Kharraib (DS 268: Edens 1999) and Jubābat al-Jurūf (DS 269) were situated on plateaux which overlooked lower ground on one side, but with a plateau on the other. It has also been observed that many Bronze Age sites are located close to wadis that could be readily terraced (C. Edens, personal communication) or perhaps could be converted to check dam cultivation, as has been recorded at Sedd adh-Dhraʾ [Sadd al-Dhārrah] (Wilkinson 1999). Overall, many Bronze Age settlements can be seen to occupy situations that combine a measure of security (and perhaps the status of a hilltop location) with access to agricultural and pastoral resources that were available on the plain.

Valley floor resources must have included marshes or meadows that developed on the dry or drying early to mid Holocene lakes. So far, the Dhamār project has located three main areas of relict lakes: (a) in the Qāᶜ Jahrān, which is by far the largest, (b) in the area between Mahnashah and site DS 281 (see below: Fig. 8), and (c) near al-Adhlah, to the south-east of Maṣnaᶜat Maryah (west of Dhamār). In the case of the Qāᶜ Jahrān, the presence of a lake was first recorded by Acres (1982), and sections recorded by members of the Dhamār project show that lake deposits and overlying humic soils extended to within 1 km of the Bronze Age site of Hawagir (DS 293). In addition, numerous minor basins appear to have contained verdant valley floor meadows, which remain in the form of the humic horizons of buried soils.

Such valley floor meadows and marshes would have provided excellent grazing for flocks of sheep and cattle, which would, in turn have contributed to the wealth of the local communities. Such a relationship is most evident at the site of Hawagir (DS 293) which sprawls over some 15-20 ha on what is now the edge of the cultivated Qāᶜ Jahrān plain near to the relict lake. This site was investigated by three soundings in 1999, and according to the pottery recovered, occupation dates to some time in the second millennium, probably during the second half. Although this site is difficult to evaluate because of its disturbance by post Bronze Age fields, it is by far the largest known Bronze Age site in the region. Following the abandonment of Hawagir sometime towards the end of the Bronze Age it was replaced by an Iron Age site (DS 291) positioned on the summit of the

distinctive peak immediately to the south.

Equally important in the case of Hawagir is the location of this site on what appears to be a major ancient north-south route through the highlands. This route remains in use today as a series of north-south sectors of local routes that skirt the eastern side of the lake basin (Fig. 6). Not only are several large sites located along this route, but also there are wayside cisterns (© on Fig. 6), as well as at least two groups of inscriptions. A short distance to the north-east of Hawagir, Qatabanian inscriptions refer to a nearby temple which might have formed a wayside shrine located at a convenient and well shaded stopping point along the route. A second group of inscriptions along this route occurs below Haid Bayan, where a series of inscribed graffiti occur near the base of the hill. Finally, a pair of distinctive and important sites (DS 326 and 342) face each other across the route immediately to the south of Riṣābah.

Rather than positing that any single factor contributed to the location of Bronze Age settlement, it seems

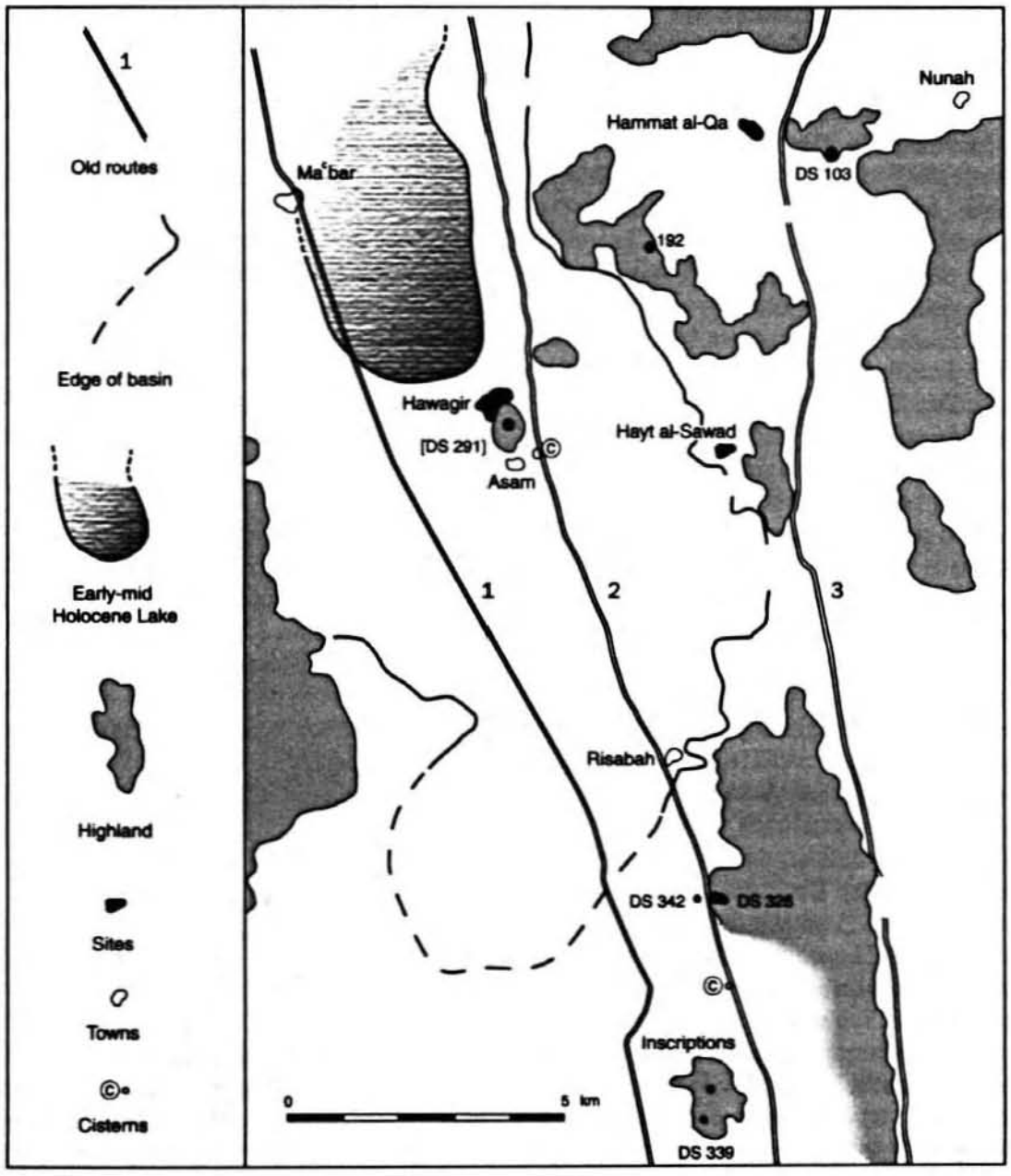

FIGURE 6. *The area of the Qāʿ Jahrān to the north of Dhamār showing the approximate limits of the early/mid Holocene lake, three north-south routes (1-3), and some major sites mentioned in the text. North is to the top. The highland area is above roughly 2400 m above sea level.*

more likely that there was a tension between different structural elements of the landscape. At least four contributory factors can be suggested:

1 The presence of grazing within the centres of many basins provided an excellent resource which, by being capable of sustaining large flocks or herds, may have generated some degree of wealth for local communities.
2 A location close to some form of terraceable or cultivable land either on slopes (as at Ḥammat al-Qāᶜ) or on minor wadis would have provided essential food supplies.
3 Hill- or plateau-top locations provided some measure of defence or security for communities, and in some cases, such as at Ḥammat al Qāᶜ, this may have been formalized by the construction of a circuit defensive wall (Wilkinson, Edens & Gibson 2001).
4 The presence of north-south route systems would have increased the opportunities for the exchange of goods, and, because people (and perhaps animals) moved along them, this could have increased the demand for food and other supplies at roadside settlements.

Specifically, the site of Hawagir appears to have occupied an optimum location for access to pastures in the basin centre, as well as a key position adjacent to a major north-south route. On the other hand, the site has minimal defensive capabilities, except that it is adjacent to a prominent hill immediately to the south, which after Hawagir's abandonment was occupied by the Iron Age settlement DS 291 (Jabal Asam). Other Bronze Age settlements such as Ḥammat al-Qāᶜ have excellent defensive capabilities, but valley floor grazing, although present, was probably less extensive than around Hawagir. This site too may have been positioned on a north-south route (Route 3, below).

Also apparently oriented on the ancient north-south Route 2, is a pair of sites Kharabat Jubhān (DS 326) and al-ᶜĀqir (or Khāniq: DS 342) positioned on opposite sides of the north-south valley known as the Wādī Jubhān (Fig. 6). These sites comprise a large Iron Age and Bronze Age complex (DS 326) extending over some 3-4 ha of plateau on the east side of the wadi and the ancient route, and a small *c.* 1 ha building complex (DS 342) on the west side of the Wādī Jubhān. DS 342 includes the remains of a building the plan of which suggests that it may have been a major Bronze Age building of specialized function (Fig. 7). This large building contrasts markedly with the typical Bronze Age buildings of other settlements investigated, which mainly consisted of elongated structures of apparently exclusively domestic function. In contrast to the standard Bronze Age house of the Yemen highlands, the al-ᶜĀqir building consisted of a durable double wall 16 m north-south x 19 m east-west, which enclosed an area comprising a forecourt to the east and a group of rooms to the west (Fig. 7). Centrally located within the rear range of rooms was a 6 x 6 m room with smaller abutting chambers to the east as well as a range of other rooms built against the back wall.

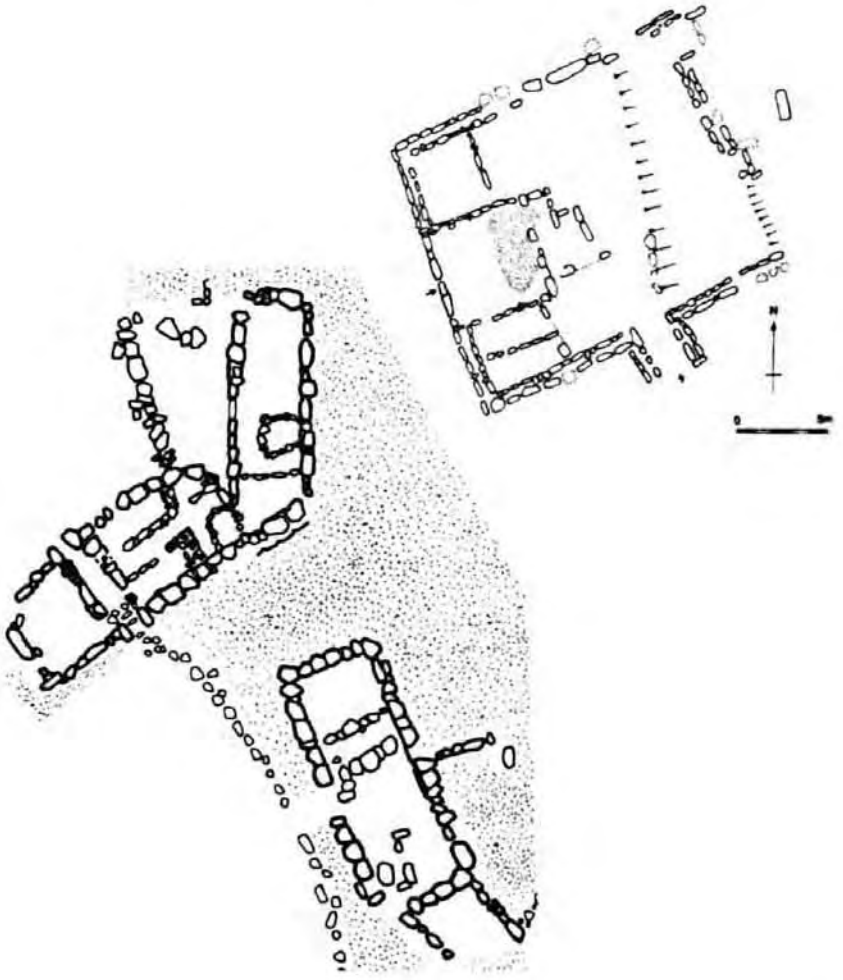

FIGURE 7. *The building at al-ᶜĀqir (DS 342) (top right), at the same scale as a group of Bronze Age buildings at Kharraib (DS 228). (Drawn by E. Barbanes and G. Barratt).*

The enclosure was entered from the south via a monumental entrance, or alternatively the rooms could be accessed by a second smaller entrance from the west. Surface pottery suggests a Bronze Age date for this building as well as for neighbouring structures. Although the function of the main building can only be guessed at, it is possible that it was used to control or watch over the movement of people and goods travelling along the main north-south route that went past the site. In addition, the site of al-ʿĀqir also included the remains of several other well-constructed buildings of unknown function.

On the other hand, little can be said about Kharābat Jubhān because the presence of intensive Iron Age occupation as well as post-Iron Age fields has disturbed the earlier Bronze Age occupation, which is now only hazily evident in the form of scatters of potsherds of apparently Bronze Age date.

The presence of a major north-south route can be inferred with greater confidence further to the south. Here a series of major sites or possible sites of Iron Age/Himyarite date form a discernible alignment roughly along the line of the present Ibb-Dhamār road. These sites (Fig. 8) are, from north to south, al-Ḥerrān (DS 180, immediately to the north of Dhamār), Dhamār (which itself is a mounded settlement and has yielded inscriptions), Dhamār Qarn (DS 240), Khirbet al-Ḥusayn (DS 212; Barbanes 2000: 212-213), Ribāṭ ʿAmrān (DS 226), and Ẓafār (DS 9). In the case of Ẓafār, this major settlement, the capital of the kingdom of Ḥimyar, is tucked away on a side valley overlooking the north-south road from Ibb to Dhamār. That this road was not the only route linking Ẓafār with the north is demonstrated by the presence of a well-constructed paved road from Ẓafār that crosses the head reaches of the Wādī Shalālah area (Lewis 2002).

Conclusions

Overall, no single over-riding factor should be seen as having determined settlement locations in the Yemeni highlands. When a site occupies a hilltop, it benefits from a secure location, whereas it sacrifices its access to fields, pastures, or in some cases any nearby route systems. On the other hand settlements like Hawagir could take advantage of (and perhaps grow rich from) their access to both verdant valley floor pastures and a major north-south route, but this was at the expense of security. Every location therefore represented a trade-off between economic, political and social advantages.

The possible existence of inter-regional routes through the area, however, adds an interesting dimension to site locations, and so far three routes have been recognised (Routes 1-3 on Fig. 6). Although the routes north of Dhamār lack the classic diagnostic features of ancient Yemeni roads such as stone paving, Routes 2 and 3 do exhibit occasional stretches bounded by parallel walls of stones. These form a common feature of traditional and ancient relict tracks in Yemen as well as elsewhere in the Near East. Significantly, there is not just one but at least three alternative routes to the north of Dhamār. The westernmost (Fig. 6: 1) is the modern metalled road through Maʿbār and thence to the Yaslaḥ pass and Sanʿāʾ. The central route (Route 2, described above) runs by Hawagir, below DS 342, and to the east of the Qāʿ Jahrān. Finally a third route (Fig. 6: 3) is aligned further to the east below Manqaḍah and the Qāʿ as-Sawād, through the town of Zarājah (which also includes a Himyarite site, DS 323) and then north through the village of Dhiraʿ.

Of these routes, the modern metalled road was certainly in use in the late nineteenth century when Harris passed through Maʿbār and the Qāʿ Jahrān en route for Sanʿāʾ (Harris 1893: 264, 283-85). Moreover if it is true that one of the cisterns along this route bore a Himyaritic inscription inscribed into the plaster, as Harris reports (1893: 283), then this route must extend back some 2000 years.

Regarding Route 3, according to Clive Smith (personal communication) Dhiraʿ al-Kalb is on the route from Dhamār to Sanʿāʾ, taken by Sinan Pasha during his campaign in Yemen in 1569-1571. This route, which was to the east of the present Dhamār-Sanʿāʾ road, normally was made in about six stages. Dhiraʿ al-Kalb was half way between Dhamār and Sanʿāʾ and may have corresponded to the modern village of Dhiraʿ to the north of Zarājah. This Zarājah route was used by Jourdain in 1609 (Clive Smith, personal communication) and later by Niebuhr in 1763 (Niebuhr 1792). By 1917 it existed as an alternative and shorter track over very mountainous country; impossible for wheeled traffic but practicable for pack animals.[1] Interestingly it was Route 3, which was indicated to the field team by a Yemeni colleague in 2001 as being the earlier *ḥajj* route to Sanʿāʾ and onwards to Mecca. As with other long-distance routes in Yemen this was defined by occasional stretches of parallel walls on either side, and also featured one or two plastered cisterns of uncertain antiquity.

The presence of three possible alternative long- distance routes to the north of Dhamār should not occasion

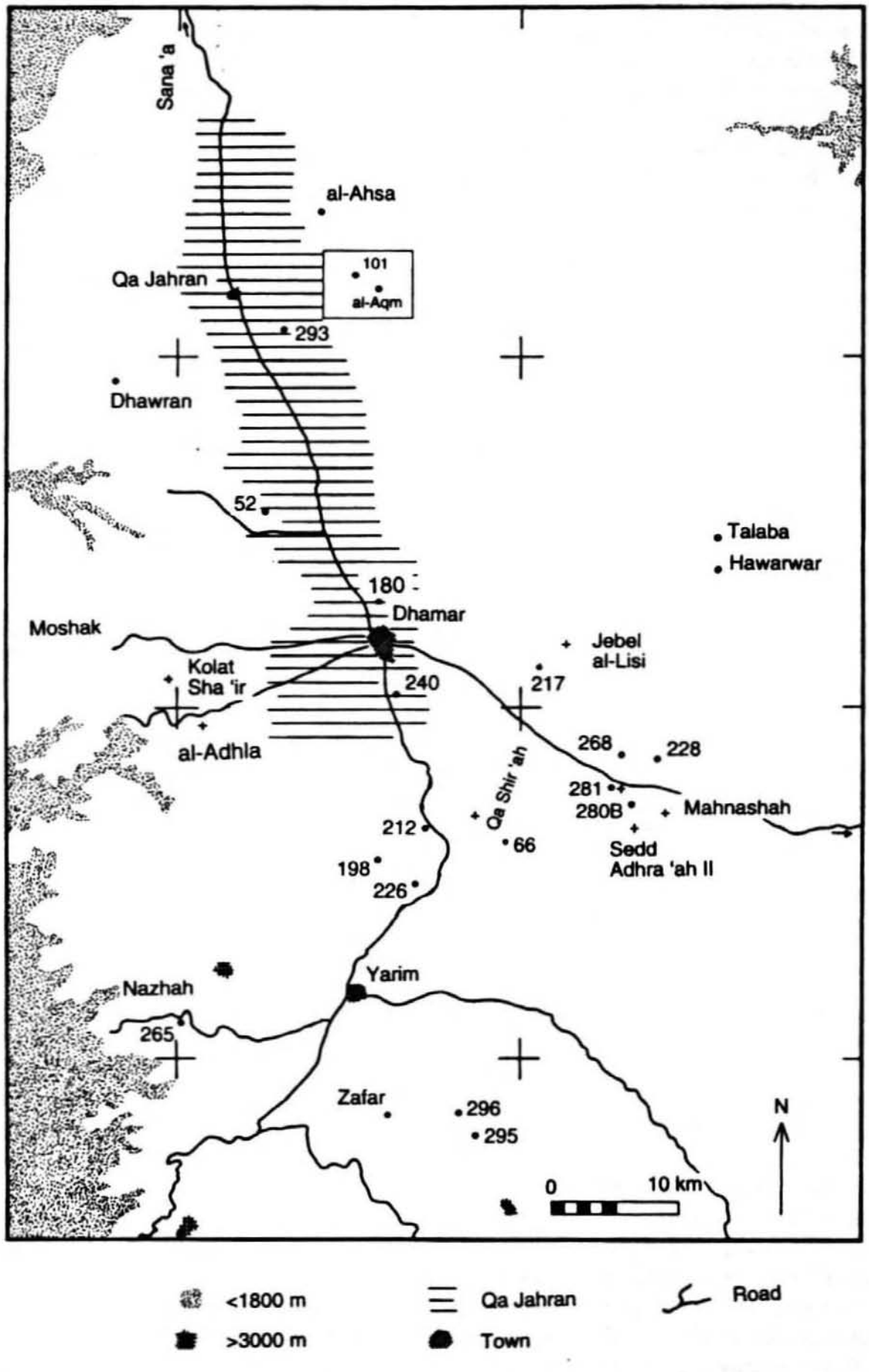

FIGURE 8. *Map of the Dhamār area showing the locations discussed in the text together with the alignment of Iron Age and Himyarite sites al- Ḥerrān (DS 180), Dhamār,Qarn Dhamār (DS 240), Khirbat al-Ḥusayn (DS 212), Ribāṭ ʿAmrān (DS 226), and Ẓafār.*

surprise. It seems perfectly natural to expect that, depending upon local political conditions, it might be difficult to rely on any single road, therefore an alternative road or two would always have been welcome.

Overall, several Bronze Age sites appear along Route 2. Although the evidence for a route at this early date is hardly strong, the alignment does become clearer, especially to the south during the Iron Age and Himyarite periods. The above-mentioned Iron Age/ Himyarite sites may therefore have developed along what may have been a long route system running north-south through the highlands, and may even have emanated from as far away as the vicinity of *Eudaimon Arabia* (Aden) and ultimately may have extended to San'ā' and northwards.

At the beginning of this paper it was observed that the archaeology of the Yemen highlands was little understood or appreciated until the 1980s. The now clear evidence that exists for a relatively dense pattern of settlements from as early as the third millennium BC (and indeed beginning in the fourth millennium) suggests that the highlands may have formed a core area around which the later incense trading kingdoms developed. Whatever the merits of this case, it is interesting that major settlements such as Hawagir as well as the pair Kharābat Jabhān and al-'Āqir (DS 342 and 326) appear to have developed along a possible major north-south route. This could have represented an inter-regional linkage that was in use as early as the second millennium BC. The presence of an Iron Age route through the highlands may therefore relate to the further strengthening of trade links that developed throughout south-west Arabia when the region became much more closely tied via trade to the Hijaz and the Levant. Nevertheless, to return to an earlier theme, it was probably the tension between a number of environmental, economic and political variables that was more significant to site locations than any one factor alone.

It can be argued that despite the highlands being well-watered relative to the surrounding lowlands, climate change made this area less verdant during its main period of growth during the third and second millennia BC. Nevertheless, the highlands continued to be more attractive for long term settlement than the interior deserts, and perhaps this contrast was more marked during the last few thousand years when the interior deserts became uninhabitable for all but the most well adapted mobile pastoralists. That there was direct movement of population from the desert to the highlands remains to be demonstrated, however. It seems reasonable to suggest that long-distance routes may also have started to contribute to the structure of the settlement pattern as early as the Bronze Age, and although these routes may have been a factor in the growth of some settlements, the availability of large areas of potential pasture on the highland basins must also have been a major contributory factor to the wealth of the local chiefdoms. Equally during all but the most peaceful of circumstances, these local leaders and their communities would have benefited from being positioned in higher, defensible locations. Presumably each factor must have contributed, in different degrees, to the location, prosperity, and sustainability of these Bronze Age communities, with the result that the factors underlying settlement choice probably varied considerably from place to place.

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Note

[1] I am very grateful to Clive Smith who provided me with valuable supplementary information on the eastern route. A good sketch map of Route 1 in the 19th century is provided in Harris 1893: 264 and of Route 3 in the 18th century by Niebuhr (1792).

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