

CORNISH ARCHAEOLOGY

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HENDHYSCANS KERNOW

2007

Gwithian: a celebration for archaeology and a celebration of a career
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2007



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Front cover: Detail from a watercolour by Marjorie Somerscales, one of two artists in residence on the Gwithian project, of the view across the excavated walls of Crane Godrevy manor house looking towards Godrevy Light, Gwithian, 1958. (© M Somerscales, Gwithian Archive). (See Nowakowski *et al*, Return to Gwithian: shifting the sands of time, this volume; the full watercolour appears as colour plate 15.)

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EDITORS

GRAEME KIRKHAM AND PETER HERRING



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Gwithian: a celebration for archaeology and a celebration of a career

It might be said by many, in their advancing years and as they review their lives, ‘I was there’, when referring to some significant event in their chosen career. Fewer are able to say ‘I was involved’, but only the special few are able to say ‘I led’. In archaeology in Cornwall, and nationally, Gwithian was the significant event and Charles Thomas was the Leader.

To be a leader one must have interest, enthusiasm, vision, direction and a clear recognition of ultimate achievement, qualities which have driven Charles throughout his illustrious career.

For Charles Thomas the interest seems to have been inborn and his career path became clearly established when he came under the tuition of Sir Mortimer Wheeler. Fieldwork and research were promoted as disciplines of huge importance and with that, a recognition that archaeology would benefit and prosper from greater public knowledge and involvement.

Charles’s entire career has been established around these principles: fieldwork, research and outreach. His outreach saw him as a major player in establishing the Cornwall Archaeological Society, from its roots as the West Cornwall Field Club, to which he gave so much time and energy. Director of excavations, editor, teacher, lecturer and writer were interlinked roles he willingly undertook and, for a wider audience, he found time to teach archaeology for the Workers’ Educational Association.

To say that he was, and is, the father of the Cornwall Archaeological Society would, for him, be overstating the case, but this is how many mature and younger members of the Society regard him.

And into this new recognition of the outcomes for archaeology came Gwithian – the Charles Thomas baby. Perhaps Gwithian was meant to be for a man with so much desire and so much energy. Indeed, there had to be a Gwithian.

Gwithian was not just a ‘dig’, it was an excavation experience. It was a desire to proceed in such a way that every crumb of information was gained from every scrape of a trowel, every square inch of a surface, every new find. The Gwithian experience developed field practice in archaeology as it emerged as a new discipline breaking away from the antiquarian process; it helped establish a path for the future of archaeology and was to influence all who were involved and, indeed, the archaeological world. The excavation was inclusive, from the raw amateur interest to the trained and training professional, and the enthusiasm was so powerful that it became a challenging and changing experience for all.

Charles Thomas’s name is indelibly linked to Gwithian. Whatever else he has done in a glittering archaeological career which has taken him to the heights of academia, a conversation with anyone about him eventually comes around to Gwithian.

This volume celebrates both the contribution of Charles Thomas as he approaches his eightieth

GWITHIAN: A CELEBRATION

birthday and the influential role that the Gwithian project has played in modern archaeology and the history of archaeological enquiry in Cornwall. It also celebrates a man whose intellect still towers over amateur and professional archaeologists in Cornwall and whose passion for greater knowledge by excavation, research and outreach has never dimmed. The archaeological discoveries at Gwithian continue to have great relevance both nationally and internationally and the project still attracts a lot of attention and respect.

Gwithian divides the Cornish archaeological world in two: one set who can say 'I was there' and

the others remorseful that they were not! I wasn't there and the production of this journal has highlighted that to my envy and regret.

With a great pride in being able to say in Cornwall 'he is ours', the Cornwall Archaeological Society dedicates this volume to the work, and continuing work, of Charles Thomas.

*Tony Blackman
President
Cornwall Archaeological Society
April 2008*

Reflect, respect, rejoice

NICHOLAS THOMAS

This New Year's Day, 2008, I was informed by my old friend Geoffrey Wainwright, freshly elected President of the Society of Antiquaries of London, that my fiftieth annual fee for Fellowship, just paid, entitled me to the honour of Life Membership as a Fellow: FSA. By coincidence Paul Ashbee, another former president of the Cornwall Archaeological Society and most distinguished contributor to our knowledge of Cornwall's past, had on this day received similar notification. Charles Thomas, I can divulge, will be honoured likewise in 2010. Thus my extreme age, not just as an FSA, and my treasured association with Cornwall Archaeological Society, explain why I received, with intense pleasure and trepidation, an invitation to offer what can only be a personal and heartfelt overview of this epoch-making Gwithian enterprise.

One year ahead of Charles Thomas at Oxford, we never met there. As far as I know he was not even a member of the University Archaeological Society, to which I dedicated much of my spare time. I guess I first saw him when he strode into the Library of the University of London Institute of Archaeology on one of his earliest days as a postgraduate diploma student like me, but a year later, wearing no doubt that familiar green corduroy jacket. Whether he was also smoking his unbelievably weathered and disgusting pipe I do not remember: probably not, but for reasons of Library etiquette (Joan du Plat Taylor, Librarian, could be quite fierce), not health. We may both have been there, heads down in our books, when Joan came slowly into the Library one day to announce to all that King George VI had died.

In my Oxford days our digging was confined to the Neolithic and Bronze Age sites outside

Dorchester-on-Thames, Oxfordshire, which were being destroyed by gravel working (Whittle *et al* 1992). My interest in site XIII there, the Big Rings, and my responsibility for its examination as site supervisor in 1951 and 1952, under the inspiring leadership of R J C Atkinson, led me northwards in



Fig 1 Charles Thomas at Crane Godrevy, 1958. (© JGN, Gwithian Archive).

1952 to the Thornborough Circles near Ripon, Yorkshire (Thomas 1955) the only structural parallels to the Big Rings. Charles Thomas was in the party along with several other students from the Institute of Archaeology and our friendship sprang from there. In 1953, 1955 and 1957 he was my essential colleague and camp commandant at Snail Down, Wiltshire (Thomas 2005a). Here, among other activities, we honed to perfection the organisation required to run a camp for 30–40 volunteers whom we charged, feeding them with the help of paid student cooks invariably so good that they could even offer a fish course on Fridays (there on Salisbury Plain and on Calor Gas rings!). Somehow we kept the threat of overflowing Elsans at bay throughout each season; and, through Charles Thomas, our accounts were sufficiently convincing to satisfy John Hirst at the Ministry of Public Building and Works, since this was a funded rescue excavation.

I visited Gwithian at least twice during the 1950s. One occasion included the twenty-first birthday party of Charles Thomas's sister Elizabeth, where I remember one digger, Jacquetta Hawkes' son Nicholas, proved to have a very active presence on the dance floor. (He appears – not dancing – in Atkinson (1956, pl XXA, foreground, right), helping three other Bryanston schoolboys to pole a cement re-creation of a Stonehenge bluestone up the Salisbury Avon on a punt for some television programme or other.)

In much later years, when I brought my young family to Gwithian for beach-style holidays, it was at Charles Thomas's house, Pencobben, that we stayed. Walks to get fish and chips drew our grumbling children across those Bronze Age houses and fields known from Charles Thomas's dig; and in his Pencobben outhouses resided much of the precious material archive that these excavations had harvested. I recall showing my (bored) children the famous bone comb used for decorating Beakers (Clarke 1970, vol 1, fig 1). It lay loose in a drawer in that entrancing holiday house. Gwithian and Pencobben have ensured that we shall be in love with Cornwall for our remaining days.

Looking back over half a century, I mind us as being almost disgracefully young and, in a sense, irresponsible. This is not to decry our passion to learn what lay beneath our feet. Having come through a World War which had so restricted the activities of the giants of 1930s archaeology when they were in their prime, I think we felt that we had

to get on with it. Digging was the thing to do. Sometimes, of course, there was a risk to a site which therefore called for excavation, and the Ministry of Works was there to fund that. Often, the mere mention of a site had us reaching for our regulation 5-inch Brades (it *had* to be Brades) pointing trowels. Richard Atkinson had fitted a specially comfortable garden trowel handle to his; Sir Mortimer Wheeler, interestingly, favoured a long knife.

Finance was lacking for any but Ministry of Works digs. But to make ends meet, even then, for a great venture like Gwithian, or Mawgan Porth, or Snail Down, you relied upon volunteers. They could be summoned, for example, through the *Archaeological News Letter* of Dorothy Heighes Woodforde, descendant of that Samuel Woodforde who painted the fine portrait of William Cunningham, Colt Hoare's field collaborator, which hangs in Devizes Museum. Parson Woodforde was also an ancestor. Or you could appeal to the local archaeological society. And you expected those answering the call to pay for their board and lodging, usually tented and basic. This was in contrast with the excavations of leaders like Wheeler, whose backbone of workers comprised professional labourers under a foreman, with a smattering of experienced volunteers to do the more delicate work. Others were recruited to wash sherds, thereby no doubt, removing those precious residues which we so prize today for what they can tell. And I remember, when visiting Colonel Drew's excavation of Roman buildings in Colliton Park, Dorchester, Dorset, as a child in the 1930s, you could buy a handful of sherds for one penny.

But what happened when our digs were finished? Nowadays the country's rescue units have professional staff, permanent premises and funds provided for the most part by developers. The assumption is that publication is the relatively rapidly produced end product, the objective of any piece of fieldwork. Fifty years ago this assumption was the same. Our teachers drummed it into our heads. But resources were usually not there. The product of your dig tended to have to follow you wherever you went. Usually you had no choice. My Snail Down archive of 1953–1957 only came to rest in its proper home, Devizes Museum, in 2000. Dorchester, site XIII, dare I confess, still lies in boxes under my bed. Ironically, this problem is now affecting even the units, as readers of *Museums Journal* (for example, January 2008, 20–5) and *Rescue News* will know.

For the same reason, in those days the writing up almost never got done quickly and so often not at all, or not until today's resources could be brought to bear upon this ever-increasing backlog. Charles Thomas details the problem posed by his Gwithian work (see main report, this volume). Paul Ashbee has explained recently why Mawgan Porth had to wait so long before its comprehensive report eventually appeared in 1997 (Ashbee 1998–9, 227). Interim reports, relatively easily written and – an important factor for societies – quite cheap to publish, made available the results of many digs of that era, but thinly. Those produced for Gwithian came out in unusual quantity and commendably quickly, as Charles Thomas's notable contribution to this bibliography makes clear. Without a shadow of a doubt, one of the most significant contributions English Heritage has made to the furtherance of archaeological studies has been its provision of funds for the publication of so much of this accumulation.

Our teachers at the Institute of Archaeology were, of course, crucial to our archaeological development. At their head towered V Gordon Childe, its director and one of Great Britain's most significant prehistorians. Around him he had gathered a team of acclaimed academics. For environment and the pleistocene period there were Professor F E Zeuner and I W Cornwall. For Near Eastern studies and to broaden our minds we could sit at the feet of Professor Sir Max Mallowan or Kathleen Kenyon, her work at Jericho just beginning. To hear her lectures I used to project her slides. One of my impressions of those days, doubtless inaccurate, was that the Institute was almost awash with ivories from Nimrud, Mallowan's great research site. Professor K de B Codrington transported us to India. And there were others. Over all these towered Professor Sir Mortimer Wheeler, incomparable action-archaeologist, but one who never seemed quite to dwarf Gordon Childe.

Apart from theoretical prehistory, the Institute of Archaeology focused keenly on material culture and encouraged our interest in how objects were designed and made in early times. I remember my delight when introduced to the concept of a skeuomorph. At a neighbouring desk in the library, fellow student Arthur ApSimon, subsequently a significant influence upon Cornish prehistory, was already being encouraged, between essay writing and pot repairing, to develop his hugely important ideas on Early Bronze Age daggers, to be published soon after he left the Institute of Archaeology (1954).

Never primarily an excavator, despite his seminal

work at Skara Brae and Rinyo, Orkney (Childe 1931; see Renfrew 1985 for fuller bibliography), 'Uncle Gordon', as we called him, provided courses abounding in practical teaching. I can see him now, potato and knife (*sic*) in hand, explaining the mysteries of striking platforms and how flint flaking was done. Once, during a memorable seminar delivered by his old friend L S B Leakey, we watched, transfixed, as the latter skewered a (dead) rabbit from across the lecture space using a bow and flint-tipped arrow. Our understanding of ceramics was given substance by visits from a distinguished studio potter, Ian Rawson, who patiently encouraged our clumsy efforts at coil building and even more disastrous attempts to produce pots on the Institute of Archaeology kick-wheel.

From M B Cookson – 'Cookie' – and his fortunately imperturbable assistant Mrs V M Conlon came our appreciation of what constituted a good excavation photograph. In those days the images were in black and white and taken preferably with a plate camera. Cookie was painstaking in explaining how to position a scale, usually your six-foot red, white and black ranging rod (I gave Sarah and Bernard Wailes one for a wedding present) so that it was truly informative without being intrusive. If placed on the ground it had to be absolutely horizontal and at right angles to the line of view, never pointing away lest perspective diminished its usefulness. If vertical, it had to *be* vertical. To such always minimal usage, the inclusion of a human figure was permitted, especially at a distance and usually occupied using spade or broom. An incomparable series of images showing how it should be done the Institute of Archaeology way can be found, for example, in Wheeler's *Stanwick fortifications* (1954). In my Snail Down excavation report (2005a) Duncan Christie, the husband of our former President, Patricia (Paddy) Christie, wields a broom in plates 13 and 24, Paddy herself doing the honours in plate 35 wearing her usual *a-la-mode* headgear. I detail this aspect of our practical training at the Institute of Archaeology because excavation photographs in the Gwithian report in this volume show to perfection what Cookie taught. Although taken by Vincent Megaw, Charles Thomas must have supervised such detail in these superb images. Colour plate 10 includes a copy of the scale for objects which Cookie had designed and encouraged us to copy and use ourselves.

Other practical aspects of what Gordon Childe offered to us included the principles and – if you

were keen, like me – the practice of archaeological conservation. To know why bronze (today, ‘copper alloy’) rots or iron rusts was new to most of us. Repairing or restoring pottery, constrained by many dos and don’ts, was a profitable as well as an informative therapy. In these laboratories we admired our teacher, Ione Gedye; one of us, Henry Hodges, eventually made a professional career in a closely related field (1964).

I wonder whether it was the constant presence of Marjorie Maitland-Howard in the conservation department that influenced Charles Thomas’s (and my) encouragement of artists to come on our digs to draw and paint, artists in archaeological residence? Marjorie was a fine painter and sculptor who spent much of her time making scale models of pleistocene animals under Zeuner’s supervision. When perfected they were cast and painted. Many a museum still enlivens some of its displays with these lovely models. The real art came in Marjorie’s environmentally-correct painted backgrounds to her dioramas. We were all very aware of this work and it may have become part of our archaeological subconscious. Marjorie’s quality as a sculptor can be judged today by her bronze bust of Childe which graces the reading room of the library at the Institute of Archaeology. It was commissioned by Sir Max Mallowan’s wife, Agatha Christie. At Gwithian, colour plate 15 shows the quality and value of

Marjorie Somerscale’s paintings, done alongside the very different recordings (not shown here) of Rhoda Dawson (Bickerdike). The latter, with other artists, caught the essence of our digging at Snail Down (Thomas 2005a, front cover by I P (Molly) Bewsher). Rhoda also came with us to Thornborough where, in the absence of colour photography, she made a useful record of the section shown in plate IIIA (Thomas 1955). I understand from Paul Ashbee that Bruce-Mitford made a point of inviting his friend, the artist Alan Sorrell, to attend at Mawgan Porth (Ashbee 1998–9, fig 1). Some of his renowned reconstruction images appear in the final report (Bruce-Mitford 1997; Sorrell 1981). Mortimer Wheeler, it should be remembered, was inclined to enliven and humanise some of his published sections with his own charming little drawings of perspiring diggers (Wheeler 1954, plate VII). These also many of us noticed. In his youth he had yearned to become an artist and for a while he haunted the Slade (Hawkes 1982, 43–44, 46).

The actual reconstruction of excavated archaeological features practised particularly by Wheeler (1953, plate IIIB, Raymond Allchin the human scale; 1954, several plates. For the whole matter see Townsend 2007, esp 97–9) may also have influenced our inclusion of artists in our digging teams. At Gwithian, Figure 2 shows the team reconstructing the early Bronze Age building on site



Fig 2 Reconstructing the Early Bronze Age building [1642] on site GMXV (© Malcolm Murray, Gwithian Archive).

GMXV and colour plate 12 records the careful reconstruction of the footings of post-Roman buildings [2241] and [2242]. Figure 13, in the main report in this volume, shows how accurate copies of ancient pottery, for example, can add real interest to what usually appears as sherds. In 1969 Peter Reynolds worked out a 'construct', as he urged us to call it, of our house 1 at Conderton and had it built full-size both at the Avoncroft Museum of Buildings, Bromsgrove, Worcestershire, and at St Fagans, National Museum of Wales (Reynolds 2005, 85–93, pl 43–6).

And at the Institute of Archaeology there was excavation. Perhaps through the enthusiasm of Wheeler, Kenyon, and friends of theirs like Dr Molly Cotton and Kitty Richardson, it was laughingly said that you were not a proper archaeologist until you had 'passed R-B'. In other words, you must have dug on several Roman sites before you became acceptable. I had. No question: King's Head Yard, Southwark, 1945 (Kenyon 1959), Sabratha, Tripolitania, now Libya, 1948 (Kenrick 1986), Callow Hill, Oxon, 1950 (Thomas 1957), and Verulamium, St Albans, 1949, an official Institute of Archaeology training dig. I have a local newspaper cutting of the time showing me and other students hard at work, under the headline 'Youth in love with antiquity'. This must have been enough. But had Charles Thomas? I suspect not. His subsequent career, however, does not seem to have suffered. The fact was that in our time at the Institute of Archaeology all the Diploma students were such inveterate diggers that there was no need for Gordon Childe to do anything more about it.

I do not recall specific teaching about landscape archaeology. This seems a curious omission considering the close links between the Institute of Archaeology and, for example, the Royal Commission on Historical Monuments (England), a number of whose inspectors, such as Collin Bowen, attended courses there. But perhaps the concept had not yet become established. This is what makes Charles Thomas's campaign at Gwithian so exceptional. It lasted 19 years, itself a commitment to a field research programme perhaps without precedent, although Wharram Percy may have run it close (Beresford and Hurst 1990). And it was comprehensive. As figure 2 in the main report shows, the Gwithian project covered a wide, coherent landscape in which excavation, fieldwork and documentation, including place-name study, were expertly coordinated. Little at the Institute of

Archaeology would have set Charles Thomas along this kind of holistic approach. Moreover, he had started before he joined the Institute of Archaeology.

In the way that we both included talks and excursions to neighbouring sites during our digs, even coach trips, we may have been inspired by training at the Institute of Archaeology. There we were encouraged to run adult education classes while still students if we could, making free use of their superb slide collection. When Leslie Grinsell left his position in Barclays Bank to prepare a gazetteer of barrows in Wiltshire for the Victoria County History in 1949 (Grinsell 1957; 1989, 22–5), I was glad of the opportunity to take over his class at the City Literary Institute in 1951 as my first experience of teaching.

By and large we emerged from the Institute of Archaeology capable of careers in universities, museums or in Government-sponsored archaeology. Almost every student during my and Charles Thomas's time entered one of these fields. Charles Thomas, of course, began his career in the Wayside Museum at Zennor, and although he made an early move into academia, his interest and influence in museums, notably Truro, has never diminished. He has his own museum collection, with complex dioramas, at home after all. I followed the museum path. But when I once applied for a lectureship at Leicester University, it was said that the short list comprised three Thomases – Stanley Thomas (who got the job), Charles Thomas and Nicholas Thomas.

I think we were self-confident. And we seemed to have the ability to organize. Paul Ashbee told me recently how a fellow Institute of Archaeology student, Richmal Disher, subsequently his wife, had organization thrust upon her when taking part in Wheeler's dig at Bindon Hill, Dorset (Wheeler 1953), a training project that attracted a number of Institute of Archaeology students. One morning at breakfast, when Wheeler's organizer Theo Newbold suddenly announced that she was off to London to have an operation, Wheeler dumped her management files in Richmal's lap and told her to get on with it. Subsequently she proved to be a remarkable manager at Mawgan Porth. In the present report Charles Thomas makes the interesting point that in our time many of the volunteers had active wartime backgrounds, or, like Charles Thomas himself, had done their National Service. But alas not me! Perhaps because HM Government felt a degree of guilt over its treatment of the Channel Islands in

1940, their young men were exempted from what must have been a character-building experience. This instilled an element of discipline and experience of tough living which made the often harsh working conditions on a dig acceptable. Shortcomings in required fields of expertise such as surveying could often be met by canvassing for students with appropriate abilities and a wish to gain experience. Notable help came to us from members of the Architectural Association, whose ringleader, Martin Weaver (subsequently architect and professor in Canada), brought teams of friends to Gwithian, Snail Down, Conderton and the Roveries, Shropshire (Thomas forthcoming). John Stengelhofen, today a respected architect in Cornwall, was among Weaver's Architectural Association recruits to the cause of archaeological surveying.

Bearing in mind that our financial resources were so limited, it was crucial that as much assistance as possible could be obtained without charge. The ethos in those days was that volunteers were only too glad to come and work for nothing except the experience so gained and an occasional bus or train fare. Hence our wish to provide an informative and enjoyable experience in return. And experts were generous with their help too. Ian Cornwall, Zeuner's assistant at the Institute of Archaeology, came to Snail Down and to Thornborough in his own time in response to appeals for scientific guidance. Cookie gave us a weekend at Snail Down, producing some memorable images with his full-plate camera (Thomas 2005a, *passim*).

And the proof of the pudding? Our excavation records, though not of today in style or standard, are capable of providing sufficient data for modern interpretation and publication. The original documentation for this report and what we hope will be its eventual definitive version has such a sound basis, even if half a century old, that during the course of its preparation Jacky Nowakowski and her team – including Charles Thomas himself – have been able to re-work certain aspects of the excavators' original conclusions to reveal important new aspects of the Gwithian story.

Ever since those extraordinary photographs of criss-crossed Bronze Age ards marks ('grooves' as Fowler would prefer) and Cornish-style spades entered the archaeological conscience nearly half a century ago (for example, Fox 1964, plates 43, 44; Fowler 1981a; 1981b, including end-papers), we have awaited the full story with notable tolerance. Now, at last, we have a great deal of it. Colour plates

6 and 7 in this volume simply are beyond words. Here is Bronze Age man endeavouring to clear and to cultivate repeatedly an unforgiving piece of land. To have found and then put into context these amazing traces is a triumph of enormous consequence. To be able, now, to study a relatively ancient landscape, changed by man and by nature and changed again virtually continuously for a millennium, and to be able to carry the research further in future years is a major contribution to prehistory. Such is the significance of Charles Thomas's work at Gwithian.

This was no ordinary landscape. It took in a sizeable stretch of the sea shore of St Ives Bay, a crucially important resource for early farmers living there. Two small local rivers added a valued freshwater element. Moreover the land under review, much of it on Godrevy Headland, belongs in large part to the National Trust and some still to the Thomas family. Protection and privacy are thus assured for continued research.

Charles Thomas has been able to show that significant numbers of late Mesolithic hunter-gatherers were the first to exploit what the area offered. Site GB revealed an intact working floor, a feature rare enough anywhere in Britain. And the potential for throwing light on the Mesolithic-Neolithic interface is one of the unexpected and welcome bonuses from the Gwithian project.

Surely the most substantial, almost startling revelation from Charles Thomas's 19 seasons is the uncovering, in close proximity, of a succession of often well-preserved houses set among fields and spanning a thousand years. And there seems to be every likelihood that this unprecedented succession suffered little interruption. The agricultural boundaries that were a feature of the main Bronze Age site appear to have been respected for that length of time. There had been building activity from Charles Thomas's Bronze Age Phase 1 (c 1800 cal BC) until Phase 5 (c 1300–900 cal BC), which included a virtual hamlet of houses and workshops. Still to come was the native Roman building overlooking the sea at Porth Godrevy, whose excavation by the Fowlers I enjoyed watching one day (Fowler 1962). But perhaps most unusual of all, there were the post-Roman buildings of the fifth to eighth centuries AD. And finally there emerged the still upstanding remains of a small medieval manorial house, Crane Godrevy, up on the headland with an outlook across land long inhabited and worked over. For good measure, it now appears that



Fig 3 Members of the '58 excavation team met again at Gwithian in June 2005. Back row, left to right: Pru Fox, Jean Southon, Jessica Thomas (née Mann), Professor Charles Thomas, Elizabeth Fowler (née Burley), Sarah Wailes. Front row, left to right: David Landridge, John Stengelhofen, Professor Bernard Wailes, Viv Southon (© J Nowakowski, HES Gwithian Archive 05018)

this building lies within a Cornish round. Our county has not yet yielded another area of anciently inhabited land even remotely like this; indeed a parallel would be hard to find anywhere in Britain or Ireland.

Agricultural remains – the ecofacts – that are now available for study from Gwithian are, in their diversity and state of preservation, still without close compare. Charles Thomas and his teams of helpers over so many years (and the work goes on) have given us a Bronze Age landscape filled with detailed evidence for mixed farming: enrichment of the generally rather poor soil by manuring, scrub often cleared out using spades (of wood?), boundaries

maintained over centuries. Is this an even more significant aspect of Gwithian than the houses its people lived in? I cannot decide.

To a curator and collector at heart like Charles Thomas – and to a genuine one like me – the treasure trove of portable antiquities which came from Gwithian's multitude of sites is a revelation. House remains, agriculture: amazing. But might not the evidence for a thousand years of domestic pottery and its making prove to be just as important? The study of such a range of well-known ceramic classes and styles has already immeasurably enhanced knowledge of early pot making in Cornwall and far beyond. Here we have evidence for new categories –

Mediterranean imports, bar-lug cooking wares, grass-marked pottery – and detail has been added to well-known Bronze Age wares such as Trevisker. Moreover it can be shown that gabbroic clay was brought to Gwithian by choosy local early Christian potters, their skills perhaps reflecting, distantly, the traditions of their Neolithic ancestors, although fresh Neolithic pottery has yet to be found at Gwithian.

Charles Thomas found much else for us to envy and study: how about the Group XII ard point still in a plough furrow, every description of copper/bronze, iron and bone tool and ornament, and no less than *three* wooden bowls? Lucky Truro! Really, though, Gwithian deserves a site museum of its own. Surely the sections of this report which mention such finds make an indisputable case for full, detailed publication?

A similar case is made with the section on scientific dating. Essentially a pilot study, this has established that current techniques applied to a more fundamental selection of material could enhance considerably the broad chronological framework which we have in this report. Like the usability of excavation records of 50 years ago, artefacts and natural remains can still provide scientifically acceptable data for chronology. Presumably lack of funds as well as the rarity of dating laboratories made it impossible to obtain this kind of information during the early years of the Gwithian project. Now we have the technology and well-documented specimens for evaluation: funds *have* to be found to extend the pilot study. It would be much more than the icing on the cake, Charles Thomas's unique, priceless confection, it is the framework upon which his remarkable project is being built.

How extraordinary that at roughly the same time two excavations of such immense significance should have taken place relatively closely in Cornwall: Gwithian and Mawgan Porth! That in this report so few references are made to the latter – only one reference to Rupert Bruce-Mitford in the bibliography – in no way belies the similarities between the two projects, nor the good relations enjoyed between Charles Thomas and Bruce-Mitford. Both were sand sites, each certain to overlie hectares of well-preserved ancient land surface. Volunteers provided the manpower, with a strong Services element. From the University of London Archaeological Society came most of those at Mawgan Porth. At Gwithian the West Cornwall Field Club, absorbed into the new Cornwall Archaeological Society in 1961, (Thomas 1986), was the recruiting

ground. Paid cooks and dedicated organizers kept each show running smoothly. An element of some difficulty – near disaster once at Mawgan Porth – was the continuation of wartime food rationing (not to mention sanitation) for the early seasons at each site. Artists were present at both to enhance the record. Funds were short, perhaps more crucially at Gwithian, since Mawgan Porth had Ministry of Works backing as an emergency operation; and for comparable reasons final publication has been long delayed (Ashbee 1998–9, *passim*).

There was a difference in the overall strategies for excavation. Paul Ashbee relates (*ibid*, 225) how he had struggled with Bruce-Mitford to do the digging at Mawgan Porth using the sort of grid system that Wheeler had developed for area clearance at Maiden Castle, Dorset, and in India. For the reasons he has related, compromises had to be made but that was how he wanted to dig it. At Gwithian, perhaps because of the need to establish the extent of the main site, Charles Thomas had to use a sort of keyhole approach in the layout of his trenches. Wider clearance was introduced when the character of the revealed features called for it (colour plate 1). The same figure shows the location and shape of some of Charles Thomas's spoil heaps. At Mawgan Porth the character of the site made it necessary to introduce heavy plant, light railway lines and trucks and tip turntables at the end of each branch. Perhaps the presence of ex-Service personnel made such an arrangement manageable, despite one nearly disastrous run-away with an unsecured loaded truck. For Charles Thomas, presumably, it was planks and barrows.

Paul Ashbee recalls that Charles Thomas made several visits to Mawgan Porth during their seasons of work. Paul Ashbee himself – a sad reflection on the resources of those times – had no car, nor public transport and was able to make only one visit to Gwithian, when a more prosperous visiting museum curator from far up the line offered him a lift in his car.

In this report Charles Thomas has implied that evening work and lack of spare cash confined most of his volunteers to camp; the *Pendarves Arms* at Gwithian was also too far. But there must have been home entertainment of some sort. At Snail Down I remember more than one occasion, of an evening, when Charles Thomas did his famous imitation of a member of the species *homo Neanderthalis* encountering a box of matches for the first time



Fig 4 Gwithian Team, June 2005. Site GMXVII. Back row, left to right: Neil Craze (HES), Professor Charles Thomas, Carl Thorpe (HES), Helen Roberts (University of Wales, Aberystwyth), Vanessa Straker (English Heritage), David Earle Robinson (English Heritage). Front row, left to right: Imogen Wood (HES), Joanna Sturgess (HES), Anna Lawson-Jones (HES), Henrietta Quinnell, Erika Guttman (University of Cardiff), Jacky Nowakowski (HES), Janice Light (© HES Gwithian Archive 2005 CNV00027)

Paul Ashbee has painted a charming picture of sing-along evening entertainment at Mawgan Porth, especially when Bruce-Mitford's boss at the British Museum, A B Tonnochy, Keeper of British and Medieval Antiquities, visited them. He turned out to be a more than competent pianist, addicted to the melodies of Gilbert and Sullivan. (Although my personal contribution is of absolutely no relevance here, does Paul Ashbee know that Bruce-Mitford was a boxing blue at Oxford, hence the slightly unlikely shape of his nose?)

About half a century ago, Charles Thomas's ad grooves and spade impressions left by Bronze Age farmers established that the archaeological remains in the Gwithian area were of exceptional interest, and that the name, Gwithian, would become famous in British archaeology. But despite the excellent interim reports and published comments which he and senior

members of his original team – Peter Fowler, Vincent Megaw, Bernard Wailes – have published over the years, the context for this agricultural activity and the full range of what else lay beneath the sand thereabouts remains tantalizingly incomplete.

Jacky Nowakowski and her team (Fig 4), so many of them drawn from Cornwall County Council's remarkable Environment and Heritage Section, have at last given us an exciting indication, in some depth, of what we could expect from full-scale publication of these excavations which Charles Thomas conducted before most of them – but not me – were born. The challenge, now, is for the present generation to make this come about.

Carissimo vecchio mio – cento di questi giorni!

References

- ApSimon, A M, 1954. Dagger graves in the 'Wessex' Bronze Age, *Univ London Inst Archaeol Annual Rept*, **10**, 37–62
- Ashbee, P, 1998–9. Mawgan Porth remembered, *Cornish Archaeol*, **37–8**, 224–31
- Atkinson, R J C, 1956. *Stonehenge*, London
- Beresford, M W, and Hurst, J G, 1990. *Wharram Percy deserted medieval village*, London
- Bruce-Mitford, B, 1997. *Mawgan Porth. A settlement of the late Saxon period on the north Cornish coast. Excavations 1949–52, 1954 and 1974*, English Heritage Archaeological Rept **13**, London
- Childe, V G, 1931. *Skara Brae. A Pictish village in Orkney*, London
- Clarke, D L, 1970. *Beaker pottery of Great Britain and Ireland*, Cambridge (2 vols)
- Fowler, P J, 1962. A native homestead of the Roman period at Porth Godrevy, Gwithian, *Cornish Archaeol*, **1**, 17–60
- Fowler, P J, 1981a. Later prehistory, in Piggott, ed, 63–298
- Fowler, P J, 1981b. Wildscape to landscape, in Mercer, ed, 9–54 and end papers
- Fox, A, 1964. *South-west England: 3500BC – AD600*, London
- Grinsell, L V, 1957. Archaeological gazetteer, in R B Pugh and E Crittall, eds, *A history of Wiltshire, vol 1, pt 1*, 21–279, London (Victoria County Histories)
- Grinsell, L V, 1989. *An archaeological autobiography*, Gloucester
- Hawkes, J, 1982. *Mortimer Wheeler: adventurer in archaeology*, London
- Hodges, H W M, 1964. *Artifacts: an introduction to early materials and technology*, London
- Kenrick, P M, 1986. *Excavations at Sabratha, 1948–1951*, Jnl Roman Studies monograph **2**, London
- Kenyon, K M, 1959. *Excavations in Southwark, 1945–1947*, Res Papers Surrey Archaeological Society, **5**, Guildford and London
- Mercer, R, ed, 1981. *Farming practice in British prehistory*, Edinburgh
- Piggott, S, ed, 1981. *The agrarian history of England and Wales, vol 1, 1: prehistory*, Cambridge
- Renfrew, C, ed, 1985. *The prehistory of Orkney*, Edinburgh
- Reynolds, P J, 2005. The Conderton construct, in N Thomas, 2005b, 85–93
- Sorrell, A, 1981. *Reconstructing the past*, London
- Thomas, A C, 1986. The next quarter-century, *Cornish Archaeol*, **25**, 233–6
- Thomas, N, 1955. The Thornborough Circles, near Ripon, North Riding, *Yorkshire Archaeol Jnl*, **38**, 425–45
- Thomas, N, 1957. Excavations at Callow Hill, Glympton and Stonesfield, Oxon, *Oxoniensia*, **22**, 11–53
- Thomas, N, 2005a. *Snail Down, Wiltshire, the Bronze Age barrow cemetery and related earthworks in the parishes of Collingbourne Ducis and Collingbourne Kingston. Excavations 1953, 1955 and 1957*, Wilts Arch and Nat Hist Soc monograph **3**, Devizes
- Thomas, N, 2005b. *Conderton Camp, Worcestershire: a small middle Iron Age hillfort on Bredon Hill*, CBA Res Rept **143**, York
- Thomas, N, forthcoming. The Roveries, Bishops Castle, Shropshire: an Iron Age hillfort in the Welsh Marches
- Townsend, S, 2007. What have reconstructed roundhouses ever done for us . . . ?, *Proc Prehist Soc*, **73**, 97–112
- Wheeler, R E M, 1953. An Early Iron Age 'beach-head' at Lulworth, Dorset, *Antiq Jnl*, **33**, 1–13
- Wheeler, R E M, 1954. *The Stanwick fortifications, North Riding of Yorkshire*, Repts Research Committee Soc Antiqs London, **17**, Oxford
- Whittle, A, Atkinson, R J C, Chambers, R, and Thomas, N, 1992. Excavations in the Neolithic and Bronze Age complex at Dorchester-on-Thames, Oxfordshire, 1947–1952 and 1981, *Proc Prehist Soc*, **58**, 43–202

Return to Gwithian: shifting the sands of time

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‘Gwythian . . . a parish standing nere St Iles baye, much annoyde with the sea sande, which flyeth at a lowe water with the winde out of the choked haven into the Lande, swallowing up much of the lande of the inhabitants, to their great impoverishment.’

John Norden, c 1584 (Norden 1728, 27)

The project history and background

Introduction

Jacqueline Nowakowski

Cornwall’s coastal landscapes conceal rich archaeological resources which present unique and challenging opportunities for research. For over 20 years, from the late 1940s into the 1960s, the sand dunes at Gwithian in west Cornwall were the scene of a major landscape study (Fig 3). During that time over 70 sites, dating from the Mesolithic to the post-medieval periods, were discovered and investigated to varying degrees, through large and small-scale excavations, field survey and field walking. The extent of the study area was approximately 15 sq km (Fig 3). A remarkable field school emerged where, over the years, the techniques of field archaeology were taught and learnt (colour plate 1). This project was directed by Charles Thomas (Thomas 1958a) and throughout its course discoveries entirely new to Cornish and British archaeology were made.

Gwithian has remained one of the few underdeveloped sandy landscapes along the north Cornish coast. Here the special alkaline qualities of the Gwithian sands (shell-sand made up of millions

of crushed dead marine animals such as mussels, limpets and cockles) has favoured the excellent preservation of some archaeological organic materials (with the general exception of pollen). From at least the early medieval period the area became dominated by massive sand dunes, and their protective shield has ensured outstanding preservation of archaeological sequences which date from the Mesolithic through to the post-medieval periods. These buried layers represent intact earlier land surfaces sealed by major and minor sand blows. Episodes of settlement and snapshots of early land use were effectively buried and fossilised in time.

As the field study grew, the Gwithian archaeological project increasingly became a key event in the calendars of a growing number of amateur field workers in the county. Many members of the West Cornwall Field Club took part in the Gwithian campaign alongside young archaeology students. By providing technical training, Gwithian became one of the major archaeological field fixtures of the post-war era and ran at a time when field archaeology as a profession was developing (see, for example, Longworth and Cherry 1986). At the same time, the Gwithian project was one of only a few archaeological studies of sandy coastal sites nationwide (for example,

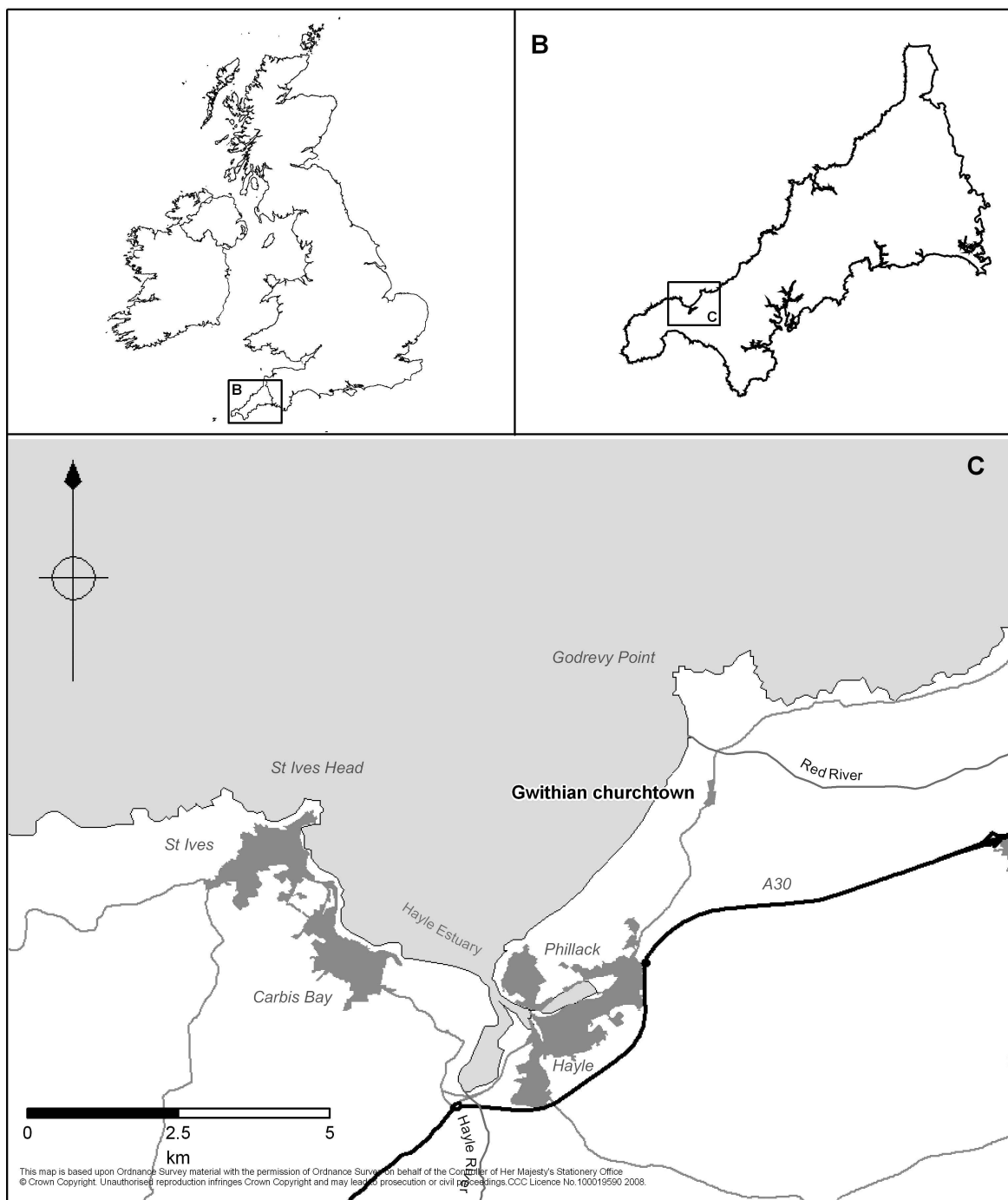


Fig 1 Location of the Gwithian Project area (B Tapper, Historic Environment Service, Cornwall County Council).



Fig 2 General view of the Gwithian area in 1987, showing Gwithian sand dunes, Godrevy headland and Hanson sand quarry (© Historic Environment Service, Cornwall County Council. F12/149, S Hartgroves).

Northton on the Isle of Harris: Simpson 1976; Simpson, Murphy and Gregory 2006). Many of the remarkable discoveries, particularly those relating to ancient agricultural practices, promoted the richness of Cornish archaeology onto a wider national scene.

A brief history of the sand extraction industry at Gwithian

During the earlier twentieth century, the dunes at Gwithian were worked as a major economic resource. From the 1930s, sand was extracted, initially on a relatively small scale and principally for agricultural use. Later it was used by the construction industry when the salt was flushed out

rendering it suitable for cement. Shortly after the Second World War, permission for larger-scale quarrying was granted and huge tonnages were extracted to help rebuild war-bombed Plymouth and for county road-building programmes. Extensive mineral licenses were granted and successive firms – Amey's Aggregates, ARC and later, Hanson, quarried over 60 hectares of sand dunes. These works have had a dramatic impact on the local topography, especially where the Red River fed into the sea, and the wider buried archaeological resource at the time of operations. There was also one unsuccessful attempt to resume tin extraction when a very large bund was constructed across the beach, which resulted in further alteration to the landscape.

Commercial sand extraction at Gwithian largely centred on the beach and at the mouth of the Red River, particularly on its southern side. Less extensive sand extraction took place north of the river at site GU. The Red River valley was the bed of a former estuarine tidal creek yet almost along its entire length (13 km) the river has been the scene of mineral extraction, water management (canalisation by the Tehidy estate *c* 1850s) and mineral processing in the historical past (Fig 2). Over the centuries these changes have altered the course and shape of the river at the Gwithian end. Estuarine deposits in the old quarrying zone have been recorded under sand-blown deposits at depths of 4m, although these depths are likely to vary (Wessex Archaeology 2002). The old course of the river at Gwithian has not been comprehensively mapped although historically it may have curved across the beach, perhaps permitting navigable conditions at high water by the early medieval period at least. Figure 15 illustrates the suggested high-water mark of the estuary *c* AD 1000 as suggested by place-name evidence.

The current project

While interim and summary papers on some of the results from Gwithian appeared with exemplary frequency (see, for example, Thomas 1958a; 1970; Fowler and Thomas 1962; Megaw, Thomas and Wailes 1961), the opportunity to publish the results fully did not materialise. A successful application in 2003 by the Historic Environment Service (HES), Cornwall County Council, for funds from the Aggregates Levy Sustainability Fund (administered by English Heritage) led to a full appraisal of the entire Gwithian archive (Nowakowski 2004). This was followed in 2005 by a project which focused on the results of the key Bronze Age and post-Roman excavations (Nowakowski 2007).

During this major programme of work the entire physical archive has been audited, indexed, ordered and stored to archive standards. The site documentation of the Bronze Age and post-Roman excavations has been updated. This has involved a comprehensive revisit of all original records created during fieldwork: field notes, plans, sections, finds and photographs. Detailed context-based narratives have been produced, defining the spatial extents of the main phases of human settlement and activity for the two key periods. There now exist detailed descriptive summaries of the Bronze Age and post-

Roman excavations (Sturges and Lawson-Jones 2006a; 2006b; 2006c). In addition datasets with high potential for further detailed analysis and scientific dating have also been identified and assessments of all key finds groups have also been carried out (Nowakowski 2007). A new survey now exists which accurately records the locations of sites onto Ordnance Survey Landline mapping. All this groundwork has permitted preliminary working interpretations presented in the following overview.

In June 2005 a small-scale field exercise (site GMXVII, see location on Fig 5) took place to obtain new samples for analysis. This became part of a memorable long weekend when some members of the original team returned to Gwithian to view the work and meet the current team (colour plate 2; N Thomas, this volume, figs 3 and 4; Nowakowski 2006; Nowakowski, Sturges and Lawson-Jones 2006). Over three days, samples for palaeo-environmental analysis (soils, land and marine snails, pollen, macroplant fossil remains, charcoal and animal bones), alongside small quantities of pottery and stone, were recovered from a re-exposed trench section where the multi-layered Bronze Age sequence was intact (see below). A series of AMS (accelerator mass spectrometry) radiocarbon dates together with OSL dates (Optically Stimulated Luminescence) were obtained (Appendix 1; Tables 1 and 2). These results have enhanced the record and are presented in the following summaries.

The Bronze Age and post-Roman excavations archives are large and the extensive post-excavation work which has now taken place has ensured that these are accessible for future research (Sturges and Lawson-Jones 2006a; 2006b; 2006c; Nowakowski, Sturges and Lawson-Jones 2006). The entire archive has been catalogued and placed in the Royal Cornwall Museum, Truro. Copies of the digital data produced during this project have been deposited with the Archaeology Data Service at the University of York. A future programme of analysis leading to full publication is desirable. To date, funds have been available for work on the results of these two major excavations, although it must be stated that within the overall archive there are other important datasets which would also benefit from analysis and could be developed as major future research projects (see below).

Fig 3 Gwiltian Project site locations (© Gwiltian archive, J Sturgess and B Tapper)

Past stories and present versions – the landscape story unfolds

The following account is principally intended to present the emergent key results of recent work on the two major excavations, to offer current working interpretations and to highlight particular themes and their future research potential. The Gwithian project did however develop as a landscape study and, in keeping with its original spirit, the Bronze Age and post-Roman narratives are presented here as part of a wider landscape story. By doing so it is intended as an updated summary of earlier statements, for it is now just 50 years since a summary account of archaeological work undertaken at Gwithian was published. This account, *Gwithian. Ten years' work (1949–1958)*, has, to date, remained an invaluable

guide to the archaeology of the area (Thomas 1958a). However, it was an interim commentary, written at a time when fieldwork was in progress and when fresh discoveries were to emerge to replace past ideas. No revised account appeared on the completion of all the fieldwork in 1969. Now a major revisit of the archive has taken place it is timely to present an updated version of this story.

The setting

Charles Thomas

The setting for the excavations and associated fieldwork described in this summary, long known as the 'Gwithian area', is in administrative terms the



Fig 4 Aerial view of the main excavation sites, 1987. A: Bronze Age sites; B: post-Roman sites; C: Crane Godrevy. (© Historic Environment Service, Cornwall County Council. F12/150, S Hartgroves).

northern portion of the eastern half (i.e., east of the Hayle – Marazion isthmus) of the ancient Hundred of Penwith, the westernmost pre-Norman division of Cornwall, culminating in the actual Land's End. Gwithian, as ecclesiastical parish and churchtown village, merely happens to be central (Figs 1 and 3). Physically we are concerned with a tract of land about 3 miles east to west and about the same north to south. Its southern part is an irregular plateau up to 80m OD dropping north to 60m OD. The north-west side of the study area forms the shore of St Ives Bay and the whole is relatively exposed.

Most of the land lies on Devonian slate. It lies well north-west of the granite massif known as the Wendron Moors, or Carnmenellis block, with its spectacular Carn Brea protrusion, but there is an underlying east-west sill of greenstone, archaeologically important and apparently the source of the petrological Group XVI, limited exposures of which have been located.

Apart from numerous short linear hollows and side-valleys (Cornish *nant*, *nans* in place-names), all with small streams, the area is intersected by the winding major valleys of two little rivers, each six or seven miles (11km) long and each originating in the granite uplands to the south east. Neither has a surviving river-name. The Brea stream, east from Bolenowe Moors, crosses the principal deep-mining area at Tuckingmill, and then, discoloured for centuries by mine waste and the discharge of shallow adits, becomes 'the Red River'. The so-called Roseworthy stream, west, at a half-way point intersects the Group XVI greenstone with a spectacular gorge below Penpons railway viaduct and then meanders north, passing four or five little side-valleys, such as Nantrissick and Nanterrow, to a point about a mile inland from the sea where it joins the Red River. From here the combined waters run through marshes and reed-beds to their marine outflow at Gwithian beach. This final stretch, confined when the first proper Gwithian Bridge was built in about the thirteenth century, represents a tidal estuary, in Cornish *heyl*, a good idea of whose extent can be appreciated after heavy winter floodings.

The northern, marine, edge of the study area is mostly precipitous cliffs, the North Cliffs (80–85m OD) from Godrevy to Portreath. The former inlet of the Red River, its older name *Dour Conar* ('Conar Water'), repeats on this east side of St Ives Bay what happens on its western part. There, on the larger estuary of the River Hayle, is the town of Hayle (with a tidal side-inlet to Phillack, older Egloshayle).

The alternative for boats, a landing-place on sandy beaches (Cornish *porth*), occurs at St Ives itself with Porth-ia (the harbour) and Porthminster, flanking St Ives church. At Gwithian, Porth Godrevy – with site GT, yielding salt-making briquetage in Roman times (see below) – and near Gwithian Bridge a lost *Haleporth* place-name recorded in 1650 (Fig 15). The various place-names emphasise both the importance of a safe marine ingress since at least the Bronze Age, and (since the Mesolithic) also a source of food – molluscs, fish, birds – and materials like willow, reeds, clay and possibly peat beds.

The whole Gwithian area has become progressively less wooded since prehistory, although woodland is slowly becoming re-established in the river valleys. Apart from sporadic copper and tin mining from the sixteenth century to around 1900, and large-scale tin-streaming along the Red River (Sharpe 1990b), the principal industry has for centuries been mixed farming. Its twentieth-century decline, leaving many medieval-origin farmhouses abandoned and converted, goes with a rise in seasonal tourism. Invention of the wet-suit has led to surfing all the year around, and heavy pressure in the immediate area of Gwithian. There is now much less arable than formerly and consequently exploratory field-walking (in ploughed land) is rarely possible.

The small village of Gwithian stems from a parish church, sited inland from accumulations of blown sand in the early thirteenth century. It replaced a pre-Norman centre, the Domesday *Conarditone* (to the inhabitants, probably *Conar*) that, as the focus of native territory, ranked later as the paramount manor in the hundred of Penwith. Archaeologically this is our Sandy Lane, site SL (Figs 3, 14 and 15). In the southern part of the study area is the next such centre, Domesday *Ritwore*, today Roseworthy Barton. Over the years, a combination of systematic fieldwork, analysis of large-scale estate and other maps (dating from the 1780s), collection of the all important place-names, and early photography has given us an enviable picture of this small region.

A brief history of the Gwithian Project

At Gwithian, fieldwork, excavations major and minor, one-off or multi-season, took place between 1950 and 1969. A full account of all the excavations, even as a chronological catalogue, has yet to be written. Projects were generally confined to university and school vacations with a preference for spring-time; in any given season they could involve

simultaneous work at widely-separated sites like Porth Godrevy (GT) and GMX, or GMI and Crane Godrevy (see below). Additionally, a trained detachment, the Mobile Team, might be formed to carry out brief relevant or rescue investigations a few miles away. In a seven-day week the working days were long, whatever the weather; there was planned local publicity and arrangements for the public to visit sites, be guided around, and shown a hut fitted out as a museum. Cohesion, for the bulk of the diggers not living locally and coming daily, was supplied by a tented camp including the odd caravan and hut, and central catering with a marquee and professional cooks. Gwithian has no shops. The arrangements involved daily trips to Hayle to get supplies and all water had to be ferried to sites in churns.

The main difference between these Gwithian excavations, which were very much the norm for post-War Britain until the early 1960s, and what takes place today is that most of the diggers – from complete beginners or older school-children up to trainee supervisors – were not paid. Instead they were charged to attend, not very much but enough to cover subsistence. Only the directors, qualified supervisors and technical staff received anything, mainly in the form of travel expenses (Gwinear Road station on the main London to Penzance line, two miles away, closed in 1964). On a fine, productive, day the work on a given site might continue until 1800 hours, after which some people would be expected to spend more time on recording and conservation. A solitary Gwithian churchtown pub, *Pendarves Arms*, was there for those who could face the walk, were over 18 and had any money left.

Funds were always limited. After 1954, when sponsorship and backing both widened, small (if for the time generous) grants came from the West Cornwall Field Club and Royal Institution of Cornwall, and then the Prehistoric Society and other national bodies. After 1958, rather more could be found from whichever universities could adopt a season at Gwithian as the required, often compulsory, attendance for archaeological students. There were also useful contributions from the visiting public – donations, sales of postcards and field guides – and loans of tents and huts from various organisations. A major bonus was that most of the work took place on private uncultivated grassland, officially Godrevy and Hellowe Towans, owned by the family of the principal director. Nothing was then Scheduled. Anything could be dug, and nothing had to be back-filled. Nobody else could lay claim to the finds.

The first-ever excavation in August 1950 was, by modern standards, quite improper. This was a cutting through a ruined barrow, site GB (*cf* Thomas 1950; Fig 3), with a brief follow-up in 1952 (Thomas 1958a). This did at least introduce the existence of the Mesolithic in the immediate area (Thomas 1953) and fortunately the adoption of fairly exhaustive recording. Meanwhile, guided by what Mr Rogers had found on the surface of the future site GMI a half-century earlier (Rogers 1910), a real desideratum, considered then a homestead of what was *then* known as ‘the Dark Ages’, lay ripe for investigation. At the same time a combination of fieldwork and documentary research pinpointed, high uphill from GMI, the likely site of the medieval Crane Godrevy manor; all that was then visible was a surface jumble of eighteenth-century rickyards. Assuming (quite correctly, as it was to transpire) that the 1603 place-name *Godrevye Caran* and conceivably even 1335 *Carran*, Feet of Fines, stood for *caer hen*, ‘the old, abandoned, round’, the possibility was raised of something even more interesting. Was there in fact a round, a Roman-period bank and ditch enclosure, concealed below the grass? How could one find it?

In 1953 there was a first short season at GMI undertaken by family and friends from West Cornwall Field Club, which then took on the work during 1954. The only guide to technique was R J C Atkinson’s *Field archaeology* (1946). Immediate discovery of walling, enigmatic bar-lug pottery, then grass-marked wares (thought at the time to be Viking: Harding 1950) and the even more enigmatic wheel-made imported wares followed. Two small cuttings were made at CG, Crane Godrevy. The 1954 and 1955 seasons had interim reports (Thomas 1954; 1955; 1956). By 1957 we could identify and classify the imported wares from the Mediterranean, greatly expanding (and correcting) C A Raleigh Radford’s earlier Tintagel-based ideas; the Gaulish Class E-ware was first properly identified, and so named, at GMI (Thomas 1957a). Its supposed Rhenish origin was later rectified (Peacock and Thomas 1967). During the 1956 season, the main Crane Godrevy homestead was exposed (Thomas 1957c), while on lower ground the focus of work shifted from GMI to what would become even more important, the complex of Bronze Age sites, GMIX, X, XI, XV, (Thomas 1956; 1957b; later Megaw, Thomas and Wailes 1961). Down at Godrevy (as opposed to Crane Godrevy), below the farm, investigation along the low cliff suggested that the place-name (1298 onwards, *Godrevy*, plural of *godref*, ‘little hut, small

homestead') implied some kind of pre-medieval settlement. This was found by the Mobile Team in 1956 and then fully excavated in 1957–58 (Fowler 1962). The season of work during 1958, involving as it did a sparkling conference visit by the Prehistoric Society to inspect Bronze Age agriculture laid bare, also produced a wider statement of *Ten years' work (1949–1958)* (Thomas 1958a).

And so it went on, though with excavations becoming less frequent as the directors and key staff got full-time jobs, or university posts, or had to go overseas, or were side-tracked into other campaigns. The main Bronze Age work culminated in the exposure of GMXV, an Early Bronze Age homestead, with barely time to plan and sample the apparent 'Deverel-Rimbury' enclosure further up the hillside (site GMXVI). There was a final season in 1969 at Crane Godrevy, concentrating on the ditch of the round (Thomas 1969). Other minor sites and features were sampled, or planned, or even rescued. The great expanse of Gwithian beach south of the Red River outflow, today virtually destroyed by decades of industrial sand extraction, had to be monitored. In August 1963 a frantic one-day foray salvaged Sandy Lane (site SL), closing a destructive footpath. The work identified middens probably belonging to the pre-Norman *Conar* or *Conerton*; and added the late pre-Norman 'Sandy Lane, styles 1 and 2' ceramics to the Cornish repertoire (Figs 3 and 14). Other south-of-the-river sites (HP, OLS, WE) – with surface finds including Bronze Age, Early Iron Age and early medieval material – were only sampled when time and opportunity allowed.

The minus side of the entire campaign was that, as new scientific aids to analysis and absolute dates arose, there was no money to pay for them. Post-excavation work was carried out by a few people in their spare time (although *cf* Megaw 1976 and for the few scientific dates Aitken and Weaver 1962; Callow, Baker and Pritchard 1963). The plus side is that these were pioneering excavations. There was then no real insurance against accident-claims arising in the field, but many of those in charge were ex-Service and things were run smoothly, with discipline and precision. In camp there was always a duty supervisor. Part I Orders (a detailed plan of each day's work) and Part II (personnel; arrivals, departures, promotions) were posted daily. Accounts were kept, recording always completed by nightfall. Very detailed training schemes, involving background lectures, technical and practical instruction, even field trips, took place most seasons. Promising

enthusiasts could earn advancement to assistant supervisors, even supervisor status, charged with the field-books and recording. About a dozen subsequent professors (mostly archaeological) cut their teeth at Gwithian. At a more human level, encounters led to engagements and marriages. Unusual, too, was the engagement from 1954 onward of two successive professional artists – Rhoda Dawson (Bickerdike) and Marjorie Somerscales – who worked full-time on site, making detailed drawings and watercolours of excavation in progress (colour plate 15), key sections, features, larger finds and even reconstructions of places such as the medieval house at Crane Godrevy. Their valuable record supplemented the photography and is still most useful.

The insistence on the vital importance of fieldwork led to some specialised reports (for example, Megaw, Thomas and Wailes 1961; Fowler and Thomas 1962). Of course, there were insufficient general statements of what exactly went on at Gwithian, and why (though *cf* Thomas 1956, 22–8, on techniques, training and finance). The enormous changes in our national attitudes to British archaeology since the 1970s – the advent of RESCUE, English Heritage, the National Monuments Record and all the county Sites and Monuments Records, new legislation, the sidelining of the amateur world and introduction of a galaxy of new and often non-destructive techniques – mean that old-style work on those 1950–60s lines would today be unthinkable. It is the *results* that count; the extraordinary finds, the very full records, the obvious and implicit importance of so much of the material. This summary account is here simply to offer a backdrop.

A detailed chronology of Gwithian

A Mesolithic and Neolithic overview

Charles Thomas

The coastline from Godrevy Head to Portreath, the North Cliffs, is precipitous, lofty (up to 80m OD), in parts inaccessible and lacking shingle beaches. In Mesolithic times, it was probably much the same, some distance further out. The east side of St Ives Bay offers a very different picture. Low cliffs from Godrevy Head, south west to the mouth of the Red River and then, beyond Gwithian beach, west towards Hayle, have long aroused interest because they present classic geological sections. Recent turf overlies head, or blown sand, or indurated sandrock,

in turn resting on a raised beach with a base of iron-manganese concretions (perhaps exploited during the post-Roman period, see below) formed on wave-cut platforms of the Devonian slate (Boase 1832; Whitley 1870; Whitley 1906). In 1958 a full section, 9m high, was cut down the Godrevy beach cliff by the excavations team and duly published (Thomas 1958b, 5–9, fig 1).

The archaeological interest is that this raised beach, or rather its long-vanished, more seaward, predecessor was a prime resource for many of the Late Mesolithic sites in and around Gwithian. Either *in situ* with other material, or as wave-eroded shingle, flint pebbles occur, their ultimate source being perhaps the Antrim coast. Most are small, a few potato-sized, a very few larger, the size of a grapefruit; but all are sea-worn and cortical, the flint itself being mostly grey to black but occasionally amber. The Godrevy beaches also contain elongated pebbles of slate and of a harder coarse-grained sandstone, with some local granite and other occasional igneous rocks.

In 1950 various cores, struck flakes and debitage were noticed in a high pre-turf level along a stretch of the low cliff at Porth Godrevy (site GT, Fig 3) and also in disturbed banks just inland, around a late dug pond. In 1952 a second season of excavations at Godrevy Head barrow (GB, Fig 3) revealed that this ruined, ditchless mound had been built directly over a Mesolithic working-floor that could be plotted in great detail. This inspired a gradual search in the immediate area for further surface sites, a dozen or so being discovered (*cf* Thomas 1958b, 8–9, listing the first five). At that time many arable fields were under wider cultivation, a few annually, most on a five- or seven-year rotation. Today, in contrast, most farmland in and around Gwithian is permanent pasture for contract grazing or set-aside; limited cultivation is for cauliflowers. Since the 1980s there has been a renewed interest here in the Mesolithic, with systematic transect-based surface collection on three major sites (Lawson-Jones 2003). A fourth site is now inaccessible under the present National Trust car park and a fifth has been destroyed by beach-sand removal.

The Mesolithic *facies* is fairly uniform over the 20 recorded sites and has been described in outline with selected illustrated material (Palmer 1977; Jacobi 1979; Berridge and Roberts 1986; Roberts 1987). It is clearly Late Mesolithic in date. With flint so readily available, about 90% is debitage, and the rest untouched beach pebbles, cores (mainly prismatic), scrapers, blade flakes, some microburins and

numerous non-geometric backed microliths. What gives the industry special interest is the hundreds of elongated pebbles (some of slate, but mostly the harder sandstone) with chipped or bevelled ends – the so-called ‘limpet scoops’ – including some like incipient adze-shaped hoes (*cf* Woodman *et al* 1999) and other specialised forms. Recent experimental work (Fletcher 2005) suggests that the bevelled pebbles were in effect ‘scrapers’ for preparing animal skins – for example, sealskins, perhaps for onshore *curraghs* or coracles. Selective use of the hard gritty sandstone goes with an important demonstration that this rock, also occurring along the North Cliffs, is the stone axe Group XIX (Mitchell 1988; see also Davis *et al* 1988 for a summary of Group XIX and the early, *extra*-Cornwall, distribution of Mesolithic and Neolithic implements).

The most important Gwithian site for this period, HU/NE, lies in Hudder Field, first broken in around 1700 AD, and now a 15-acre coastal close by the North Cliffs (Fig 3). Here, over two decades, detailed transect collections have defined a central focus some 30m by 40m, with a concentration of lithics, a wealth of calcined flint, occasional larger rocks ploughed up, and apparently a Mesolithic site not more than 0.5m beneath the present surface; in fact, a prime site for a detailed excavation. HU/NE has a nearby satellite site (HU, also transect-collected) and four or five outlying working-floors (Fig 3). A short distance away another major site, CM, a field still under cultivation, exhibits a concentration implying more than just occasional use, and yields items pointing towards a Mesolithic-Neolithic overlap. So does a percentage of material from HU/NE, HU, GU and other sites, with worked flints (mostly scrapers, core or flake) showing secondary retouch cutting through the near-universal blue-white patination of older flakes and cores. There are, as yet, no organic finds. The overall total of all the Gwithian Mesolithic items (uncounted, of course!) must be well into five figures, with intriguing pointers to maritime exploitation. This oldest known cultural horizon has so far been defined only at a basic level. Given the present strong revival of interest in the Northern European Mesolithic (for example, Saville, ed, 2004), it has enormous and obvious potential.

If the ready availability of suitable lithics is the *leitmotiv* of Gwithian in the Mesolithic period, that of a slightly larger area – with Gwithian as the north-west quadrant – in the fourth-third millennia Neolithic must be the dominating hilltop settlement of Carn Brea; dominating in an immediate sense

because this sinister granite boss (230m OD) is visible from miles away in most directions. The recent English Heritage dating programme places Neolithic activity at Carn Brea firmly in the fourth millennium cal BC (Whittle *et al* in prep). The excavations at Carn Brea (Mercer 1981; Mercer 1986) showed among other things the exploitation of a local greenstone, from rough-outs to finished axes, which cannot be obtained on this granite outcrop. The commonest source for this was petrologically identified as an extensive east-west belt of greenstone in the Camborne area, lying a few miles west from Carn Brea (Evens *et al* 1962, 220–3), although with the comment that ‘a possible factory-site’ for this, the petrological Group XVI, had not been found. The extent of the greenstone, on the south side of the Gwithian area and a few miles inland from the North Cliffs, is well shown on Geological Survey 1:50,000 sheets 351/358 Penzance, 352 Falmouth.

Although since 1950 no ‘Neolithic-only’ site has been discovered in the Gwithian area, the cultural hiatus between the very end of the Mesolithic and an Early Bronze Age represented by up to 28 barrows – most in groups of two and six and almost all now destroyed – was partly explained by a fresh examination of material (and more fieldwork) in 2004–5. Some six potential sites are involved, three coastal, three further inland. These last are on an exposure of the greenstone (VF, Viaduct Farm Penponds, spectacularly set in a greenstone gorge). These yield surface-collected flint, the odd implement and saddle-quern mullers or rubbers, but nothing obviously Mesolithic. While some of the flint is Godrevy beach-pebbles, the sites also contain non-local black nodular flint from Devon or further afield, often worked as large ‘horseshoe’ scrapers (*cf* the now-lost Mount Pleasant Road, Camborne, assemblage published by Marsden (1922) as ‘Mousterian’). The likelihood is that, as with Group I greenstone from the Land’s End area (*cf* Berridge 1994), there never were any ‘axe factories’ of the Group VI, Langdale Pikes, character (so, persuasively, Coope 1979). Instead there may have been defined sources, whence blanks or greenstone chunks could reach Carn Brea, there to be turned into rough-outs and finished items, in exchange for non-local nodular flint. Some flint pieces, as from Rosewarne field 2, are up to 150 mm long, impossible from beach-pebble flint.

The most interesting Gwithian-area site flanks the North Cliffs, some way east from Godrevy, but near

the Reskajeage Downs cluster of six barrows (all ploughed out), site RD. Here, at site NC1-NC, finds over a restricted area include greenstone pounders, rough-outs and crude axes, a quantity of nodular flint and a high proportion of worked items including leaf-shaped and barbed-and-tanged arrowheads (a surface collection made by H J Berryman in 1990: Nowakowski 2004, section 6.1). Was this originally a near-coastal site? Are there echoes of coastal material in the typologically late material from Hudder Field (HU) and site CM? At present there is insufficient evidence to expand these ideas, and there is an apparent gap between the end of the many Gwithian Mesolithic sites and the Early-Middle Bronze Age settlement (see below). Other, truly Neolithic sites may well await discovery.

Neolithic activities on the excavated sites

Henrietta Quinnell

The assessment in 2003 identified five small abraded Early Neolithic sherds, including a rim, from phase 1 contexts in GMIX, GMX and GMXV (see below). Petrological examination by Roger Taylor (Quinnell 2004b) indicated that these were gabbroic but of an unusual fabric including crushed gabbroic rock. A few lithic pieces from phase 1 (*ibid.*) may also be of this date. There are two fragments of greenstone axes, one from Phase 1 GMXV structure [1642] (Clough and Cummins 1988, no 1195, identified as Group 1a) and a second from phase 5 (273) (bag 643) from GMX (Quinnell 2004d). These scattered finds from the excavations support the suggestion of Early Neolithic activity in the Gwithian area; the lithics indicate that this activity continued through the Late Neolithic period (see Lawson-Jones 2004).

Bronze Age Gwithian

Joanna Sturgess

Background, location and setting

Evidence for Bronze Age settlement was discovered in 1954 during the second year of work on the main post-Roman sites (Fig 5). The sites were targeted for excavation because they looked like a group of Bronze Age barrows. After the excavation of one

(site GMV) in 1955, and during the early stages of excavation of another (site GMX) in 1956, it became clear that these were not barrows but rather mounds of sand which sealed domestic middens. These middens had been dumped over the site of an abandoned settlement of Middle to Late Bronze Age date. Continued excavation of these mounds and the surrounding area until 1961 revealed a prolonged sequence of Bronze Age settlement with fields (Figs 5 and 6). This covered a large area extending beyond the excavated trenches. Recent radiocarbon dates indicate that Bronze Age occupation spanned a period of roughly 900 years, from approximately 1800 cal BC to 900 cal BC (Appendix 1, Table 1). It seems likely that occupation was more or less continuous during this period. Three major phases of settlement and farming dating to the second millennium BC were found. These were phase 1 (Early Bronze Age), continuing during phases 3 and 4 (Middle Bronze Age), with a final episode during phase 5 (Middle to Late Bronze Age).

The sites were scattered over an area of approximately 1 ha (centred at NGR SW 59031 42290) within sand dunes located 1 km north of Gwithian village (Figs 3 and 4). This area lies at a height of approximately 15–30m OD at the base of a steep south-facing slope which protected it from the prevailing wind (Fig 4). Bronze Age fields and structures lay on artificial terraces cut into the foot of this slope which formed the northern edge of a wide flood plain and estuary of the Red River. The modern canalised course of the Red River lies 100m to the south of the Bronze Age sites and the present beach lies 700m to the west (Fig 4).

Introduction to the stratigraphy of the main Bronze Age sites

The excavation of the Bronze Age sites revealed a long well-preserved stratigraphic sequence. The sequence comprised nine banded horizons which were recorded as major 'layers'. At that time, each was dated by particular types of pottery. The banded 'layer sequence' was established during the early stages of excavation and was based on the survival of the full sequence exposed in a cutting on GMX (colour plate 3) and used as a model that was subsequently applied to the recording of all trenches across the entire area investigated. It is now clear that not all the major horizons were consistent across the large area investigated but also that few trenches were excavated down to bedrock. Work on updating

the archive has produced a sequential narrative identifying all the major and minor events for each phase. They are presented in summary as follows:

- Phase 1** **A homestead and farming:**
A single post-built structure within a fenced enclosure associated with terraces and ploughed fields (Figs 5 and 6, and colour plate 4).
- Phase 2** **Possible minor neglect:** A wind-blown sand horizon.
- Phase 3** **Settlement and farming:** A probable stone and post-built structure associated with terraces and field boundaries and several phases of ploughed fields (Figs 5 and 6 and colour plates 5 and 6)
- Phase 4** **Farming and minor neglect of an isolated area:** A wind-blown sand horizon which contained some midden material, suggesting soil improvement.
- Phase 5** **Major settlement, farming, fishing and craft industries** (Figs 5 and 6)
- Sub-phase 5a:** A series of roughly dug hollows (possibly the result of vegetation clearance).
- Sub-phase 5b:** A group of post-built structures set within fields, with associated boundaries and terraces, and phases of ploughing (Figs 5 and 6 and colour plate 8)
- Sub-phase 5c:** A group of stone-built enclosures and structures associated with field boundaries and ploughing.
- Sub-phase 5d:** Phased dumps of midden material overlying and in the vicinity of the post-built and stone-built structures.
- Phase 6** **Sand dune formation** A multi-phase wind-blown sand horizon containing sparse evidence for later activity.
- Phase 7** Modern turf and topsoil.

The earliest Bronze Age settlement at Gwithian appears to have been established before the beginning of sand dune formation, but later settlement during this period continued despite episodes of blown sand accumulation which eventually sealed and finally buried the sites. The

wind-blown sands provided good conditions for the excellent preservation of many classes of artefact and ensured the preservation of the remains of buildings and fields, sealing and protecting fragile features such as ard (plough) and spade marks. With the exception of rabbit burrowing, there was no major disturbance to the sites.

General comment

Several boundaries were located during the excavations. A parallel pair, both aligned north-south, and described at the time as ‘field walls’, ran up and down the slope to the east and west of the main Bronze Age sites GMX and GMIX (Fig 6 and colour plate 5). That to the east showed evidence of having been in use for a long period of time and this main boundary may have been established early in the overall sequence (during phase 1). It continued as an earth boundary during phase 3, and was later maintained as a stone wall during phase 5. In its earlier phase a lynchet formed along this boundary with a drop of approximately 0.5m to the east and, at a later date, a stone wall was built upon it (colour plate 5). This main field wall situated along the eastern edges of sites GMX and GMIX was maintained and became a formal boundary which marked out different areas. This is clear in the stratigraphy which was dramatically different on either side. Evidence at present suggests that during phase 5 the settlement located on the western side of the boundary was cultivating the fields to the east of it.

At the main Bronze Age sites, excavation was carried out by opening small trenches one at a time and these were frequently expanded to larger open areas. Bulk soil samples were rarely taken. Most finds were recorded in detail, although sea shells and pebbles were considered either too abundant or not significant enough to be collected routinely, and were therefore retained only selectively. New environmental data collected from the 2005 fieldwork (site GMXVII, see above) has enhanced the original record and has helped to create a more informed picture of the local environment.

The Bronze Age sequence

Phase 1 Early Bronze Age (c 1800 cal BC)

The earliest archaeological evidence comprised two horizons (‘Layers’ 8 and 7) which represent the land surfaces of the earliest settlement during phase 1.

These horizons were rarely wholly excavated and were principally examined in the northern GMXV cuttings with only keyhole examinations at the other sites. The lower horizon was described as ‘a thin dark occupation which has traces of bone, teeth, shells, charcoal and pot’, overlying the natural bedrock. It was identifiable as a compact clay soil rather than the sand-based soils typical of all other horizons. This was the original formation of soil over bedrock before any dune formation and was present at the very start of the second millennium BC. It contained cord-impressed (Trevisker) pottery and a small collection of abraded Neolithic and Beaker sherds (see above). Overlying this horizon in the southern cuttings was a fairly substantial sand-based ploughsoil which also contained cord-impressed Trevisker sherds and very occasional abraded Beaker sherds (see above).

Phase 1 A single homestead – structure [1642] and enclosure

The earliest building found at Gwithian was structure [1642] (colour plate 4), which was built on a narrow terrace in the northern part of site GMXV and was cut into the top of the lower clay soil horizon. It was a sub-circular post-built structure 7.5m in diameter with a central hearth and an entrance with a ‘porch’ on the south-eastern side. Three curvilinear ‘gullies’ or construction slots contained posts which formed the main house walls. A series of stakeholes with associated earth banks (or collapsed wall material) surrounded the outside of the gullies and presumably formed an external wall. Together these may have created a double-skinned wall perhaps offering better insulation. No daub was found in association with this structure. The porch comprised four posts forming a square; from the two external posts the banks and outer stakeholes arched back to meet the two construction slots on either side of the entrance. The structure lay within what appeared to be a square or rectangular enclosure defined by wooden stakes set along earth and stone banks (Figs 5 and 6). The full extent of this early enclosure was not excavated.

Within the building there was minimal evidence for major structural alteration and a review of J V S Megaw’s initial interpretation for this being a two-phase structure is timely (Megaw 1976). Reassessment has shown that [1642] is more likely to have been a single-phase building which underwent occasional repair. Several features inside the building indicated how space was organised. To the

west of the entrance lay a hollowed-out area inside the south-west gully. To the east of the central hearth was a wide shallow pit with a channel aligned to the north west, while to the north lay a cluster of stakeholes and postholes. On the western side of the structure was a group of four postholes, originally interpreted as an earlier entrance (Megaw 1976). The two main entrance postholes were packed with quartz pebbles. The construction slot on the western side of the entrance was partially lined with broken quern stones and slate, and contained some unusual finds including a pottery ring, a copper-alloy awl and a perforated whelk (Fig 8). A dense scatter of a variety of stone tools was found in the north-west floor area.

Phase 1 Evidence for early agriculture

Although the two horizons of phase 1 were rarely wholly excavated (see above), there is evidence for agricultural activity during this phase. One photograph of structure [1642] shows parallel ard marks immediately outside the house enclosure which appear to cut the top of the lower clay horizon, although these were not recorded during the excavation. These represent the earliest episodes of cultivation identified at Gwithian. Similar parallel ard marks (aligned east-west) were found in 2005, again scoring the top of the lower clay horizon, at site GMXVII further down slope. Plant macrofossil samples collected during the 2005 fieldwork show that barley and naked barley (*Hordeum* sp.) were grown during this phase (Straker 2006). Preliminary analysis of land snails recovered from these horizons suggests that the local landscape during this period was open country (Davies 2006). Pollen survival was poor, but the presence of open-habitat species (grass, dock and plantain) adds general support to the land snail data (Robinson 2006). During the original excavations, sampling carried out by Geoffrey Lewis identified bracken spores within this horizon at site GMXV (Sturgess and Lawson-Jones 2006b).

Phase 1 General character and date

The area on which structure [1642] was built had been terraced into the hillside. To the south of the building was a lynchet which marked the edge of the terrace and separated the house from fields below. Although only one structure was identified during the limited excavation, it is possible that there were more homesteads (perhaps constructed along the same terrace) set within this farmed landscape.

Currently there are two scientific (AMS) dates from finds associated with structure [1642]. Both are from carbonised residues on fragments of two different vessels and these sherds were found on the house (floor) level in GMXV (Appendix 1). There are, however, some problems with these dates. One, (OxA-14568), gave a determination of 3430 ± 50 BP with a calibrated date range of 1890–1610 cal BC and the other, (OxA-14490), 2961 ± 36 BP, calibrates to 1310–1040 cal BC (see Table 1). While OxA-14568 (25A) would seem to confirm an Early Bronze Age date for the structure the other OxA-14490 (25B) is much later. Clearly further scientific dates are required.

Phase 2 Wind-blown sand horizon

This phase is represented by a single banded horizon (in the original record as 'Layer 6'). Its early description as a layer of clean wind-blown sand (of varying depths) still stands, although further geoarchaeological analysis of samples taken in 2005 is needed to verify this. Ard (cultivation) marks were found scored into the top of this horizon, but none were recorded at the base, and in many trenches excavation stopped once the ard marks had been exposed. A charcoal stem found in samples from this horizon at site GMXVII in 2005 has been identified as bramble or briar (Gale 2006). The land snail assessment carried out in 2005 shows that there was a low density of open country species with *Pupilla muscorum* noted at its base and at the interface with the upper phase 1 horizon (Davies 2006). A sample for an OSL date (Aber-101/GWT-6) was taken from here and an age of 3360 ± 160 years ago was obtained (Roberts 2006, and see Appendix 1, Table 2).

Phase 3 Middle Bronze Age (c 1500–1200 cal BC)

This horizon ('Layer 5') is described in the original record as a 'Bronze Age occupation layer' (for example, Thomas 1958a; Megaw, Thomas and Wailes 1961). At the time of excavation it was described as a single 'layer' to simplify a series of deposits considered to contain a particular style of Trevisker pottery with cord-impressed decoration. This horizon, phase 3, was far more complex than realised initially and comprised many layers and features.

Two general areas where this horizon was shown to be different can be defined. The first was

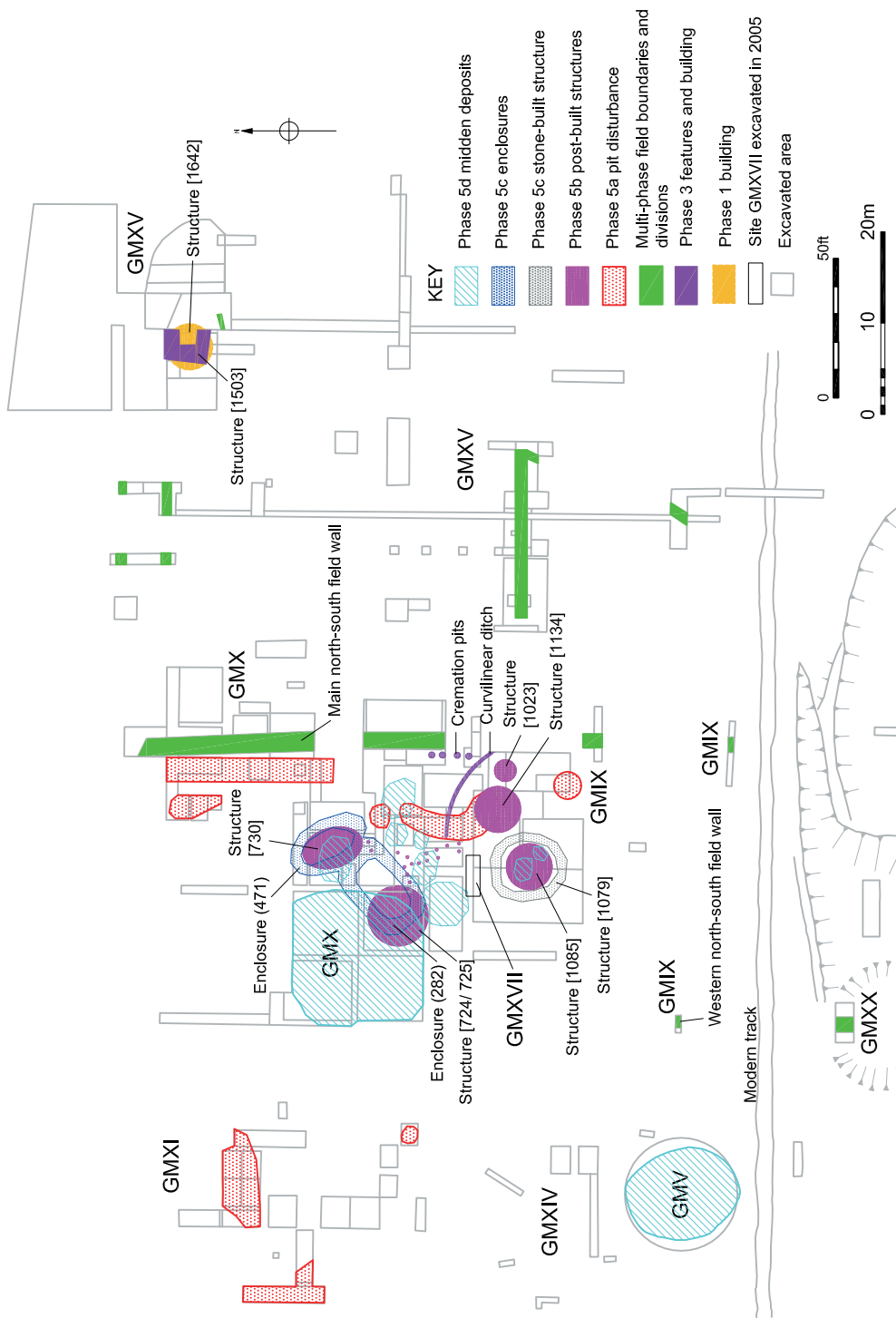


Fig 5 Schematic plan of multi-phase Bronze Age settlement activity at the main sites (© Gwithian archive, J Sturgess)



Fig 6 Schematic plan of multi-phase Bronze Age fields and boundaries at the main sites (© Gwithian archive, J Sturges)

downslope (to the south) in GMIX, GMX, GMXI and GMXIV, where it appeared as a ginger ploughsoil horizon and had extensive evidence for cultivation within fields on terraces. A large area of ard marks was revealed at the base of this horizon. Evidence for animal husbandry was represented by the recovery of animal bones from this ploughsoil. The recent soil assessment has played an important part in helping us understand the farming practices belonging to this phase within this area (see below). The second area, where the stratigraphy was very different, was upslope (to the north) in GMXV, on an upper terrace where this horizon comprised many layers and features associated with building stones and large quantities of domestic waste, as well as episodes of ploughing. Here, two recent radiocarbon (AMS) samples from the rubble layers have given dates. One measurement, 3180 ± 35 BP, calibrates to a date range of 1520–1400 cal BC (SUERC-6167), and the other, 3039 ± 37 BP, calibrates to 1410–1130 cal BC (OxA-14489) (see Table 1).

Phase 3 Downslope (to the south): GMX, GMIX (Figs 5 and 6)

At the base of the slope (to the south) during phase 3 were Bronze Age fields. This horizon is characterised by evidence for ploughing in the form of criss-cross cultivation marks at the top and especially at the base of the horizon (colour plate 6). Evidence for individual fields existed in the form of field banks and terraces. The origin of these field boundaries remains debatable although it is possible that some had been laid out during the earliest episodes of cultivation here during phase 1 (see above). Charred macroplant seeds of emmer wheat (*Triticum cf dicoccum*) and field madder (*Sherardia arvensis*, an arable crop-loving plant) were identified in the bulk samples taken from this horizon at GMXVII in 2005 (Straker 2006).

Two parallel stone-built field walls aligned north-south were built upon existing lynchets either during this phase or at an early stage of phase 5 (see below). Against the western face of the main north-south field wall (which ran up and down slope to the east of sites GMIX and GMX), there were four cremation pits and hints of other cremation deposits. Each of the cremation pits contained the partial remains of a single cremated human adult with pyre goods (animal bone and marine shell) (McKinley 2004).

A curvilinear ditch to the west of the main north-south field wall did not appear to be directly

associated with the field systems (Fig 5). Its function remains unclear.

Phase 3 Upslope in GMXV

Upslope (to the north) in site GMXV, which lay on a terrace, the stratigraphy was again different from that excavated downslope. Here the phase 3 horizon comprised at least seven layers and was clearly not just a uniform band of ploughsoil.

At least four phases of ploughing associated with phase 3 have been identified on this terrace, alongside the collapsed remains of a probable stone and post-built structure [1503]. This resembled the western half of a rectangular building or enclosure, aligned south east – north west. Associated with this structure was much domestic waste including shell middens. A hearth was also uncovered which seems likely to have been associated with the building. Structure [1503] had been erected on the same spot where the earlier sub-circular timber building (structure [1642]) of phase 1 had stood, but the two were separated by a layer of wind-blown sand.

Phase 4 Middle Bronze Age

In the original record this horizon was termed ‘Layer 4’, when it was described as ‘wind-blown sand’ (see Thomas 1958a), and was then interpreted as a major phase of abandonment of the area (see Megaw, Thomas and Wailes 1961). It was only clearly definable to the west of the main north-south field wall (see above). However, although it may have arrived on site as a wind-blown deposit, recent assessment has shown that it had clearly been worked, and probably enriched, as a ploughsoil. Assessments of samples taken in 2005 at GMXVII in the middle of the Bronze Age sites revealed that this horizon contained many small marine shell fragments, a few charcoal fragments, what is probably an emmer wheat grain and some fragments of animal bone, including sheep/goat (Light 2006; Gale 2006; Straker 2006; Hammon 2006 respectively). Ard marks were recorded at the top and at the base of this horizon in the area to the west of the north-south field wall.

While the phase 4 horizon here was clearly cultivated, land snail species sampled during the fieldwork in 2005 suggest that only the fields to the west of the main north-south wall underwent a period of neglect, when shade-loving species were abundant and open country species were generally

rare or absent (Davies 2006). Similar evidence was also noted elsewhere to the west of the main north-south field wall by Geoffrey Lewis during the original excavation. The new land snail evidence suggests that, during phase 4, the field to the west of the main north-south wall had become overgrown either with scrub or woodland (Davies 2006). However, similar evidence of neglect does not appear within the archaeological data for the fields to the east. Here, current evidence suggests more intensive ploughing throughout phases 3, 4 and 5. This was represented by a single thick ploughsoil, which amalgamated all three horizons. A future targeted exercise in this part of the site similar to that carried out in 2005 is highly desirable in order to test current working interpretations of the ways different zones of the landscape were farmed.

A sample for an OSL date (Aber-101/GWT-4) was taken from this horizon during the fieldwork in 2005 and an age of 3650 ± 160 years ago was obtained (Roberts 2006; 2007 and see Appendix 1, Table 2).

Phase 5 Middle to Late Bronze Age (c 1300–900 cal BC)

A final major phase of settlement took place towards the end of the second millennium BC at Gwithian. This appeared within phase 5, represented by the original 'Layer 3' horizon and described at the time as a 'Bronze Age occupation layer'. This horizon contained a particular style of Trevisker pottery dominated by incised-line decoration (see below). The complexity of phase 5 is represented by many sub-phases containing evidence for settlement, farming, human burials, clearance and middens, and it was this horizon that produced the greatest variety and range of artefacts. The whole of phase 5 may span approximately 400 years, from c 1300–900 BC (based on the recent AMS dates, see below and Appendix 1).

The earliest identifiable activity in phase 5 was an episode of probable vegetation clearance to the west of the main north-south field wall, represented by irregular pits in association with spade marks (Fig 6 and colour plate 7). Following this apparent clearance episode, a small nucleated village was established made up of sub-circular post-built buildings. At least three of these were almost certainly dwelling houses, standing alongside buildings of other functions. At a later date the overall character of this settlement may have

changed when the post-built structures were replaced with a single stone-built roofed structure alongside two stone and earth banked enclosures (possible stock enclosures). None of these buildings were set in hollows. On the demise of these stone and earth enclosures the settlement, now largely abandoned, became the focus for the dumping of domestic waste – midden material – possibly as an act of systematic or 'ritual' closure (cf Nowakowski 2001). To the east of the main north-south field wall, the land appears to have been under arable cultivation during the whole of phase 5. In addition, there is evidence for both animal and arable farming continuing from earlier phases and that the major field boundaries established in earlier phases went on being used and maintained.

A number of successive changes took place during this major phase.

Sub-phase 5a: Ground clearance

Phase 5a was the earliest identifiable event and this was represented by an episode of extensive digging with spades, noted across the area to the west of the main north-south field wall (Fig 6) and associated with shallow irregular pits and hollows. This activity might be explained by scrub clearance of the field to the west of the main north-south field wall which had perhaps become overgrown during phase 4 (see above), in preparation for establishing the settlement during phase 5b.

Sub-phase 5b: A new farmstead

Phase 5b is the horizon in which the remains of an entire 'hamlet' were uncovered. The buildings lay between the two north-south field walls and extended over an area of approximately 900 square metres (Fig 5). Three of the buildings may have been houses, timber post-built structures with central pebble-lined hearths (some with phases, see colour plate 8). Two buildings – structure [724/725] and structure [1134] – were circular in plan, each approximately 6m in diameter; the third, structure [730], was oval and measured approximately 7.5m north-south by 4.5m east-west, but was not fully excavated. The entrances of the three buildings were not identified but it seems highly likely that all faced south east. Two other roofed structures were identified: [1085] and [1023]. In its earliest phase, structure [1085] was a sub-circular post-built building later built over by stone and timber structure

[1079], during phase 5c (see below). It is possible that the underlying post-built structure [1085] was another house, although no clear hearth was found. The other probable roofed structure [1023] was also post-built and was sub-circular and approximately 2.5m in diameter. It was described during excavation as a 'granary' and it is likely that it had a raised wooden floor.

Within structures [724/725], [730] and [1134], there were features and finds (including many stone and bone tools) that indicate activities related to their uses. A full study of the finds in relation to the features and areas within the buildings will give a more detailed insight to the activities that took place within them. It should also be noted that daub and fired clay were present, suggesting that daub may have coated the walling of the post-built structures. This is different to the evidence of the earlier building found at site GMXV (see phase 1, above).

Below-floor deposits were present in both structures [724/725] and [1134]. Beneath the later floor surface of [724] an earlier post-built structure [725] was uncovered together with internal features, finds and human burials. All appear to have been sealed deliberately beneath the later floor of structure [724]. A group of features and finds along the north-eastern side of the building included a probable wooden bowl (colour plate 11) filled with unfired clay and sealed with granite 'chips'. A saddle quern and a pit full of stone tools all sealed by a layer of unfired clay lay alongside. Associated with this group were two long bones of a human infant. Next to this sealed group of features was another wooden bowl alongside a group of stone tools, again both sealed by clay and again in association with human baby long bones. On the south-east side of the building were two clay-lined pits and in the north-west quadrant of the structure a complete neo-natal human skeleton was found sealed by the later floor.

Some features similar to those found in structure [724/725] were also present in structure [1134]. In structure [1134] a wooden bowl was uncovered in the north-east quadrant, and in the south east, a clay-lined pit filled with pink quartz. Similar features were not found in structure [730], although it was not fully excavated. However, structures [730] and [724] appear to have been abandoned at the same time. This was demonstrated by the deposition of stone fragments of axe matrices which lay adjacent to the latest pebble-lined hearths in both houses (see below). On abandonment, structures [724] and [1134] were burnt down but this does not appear to

have been the case for [730].

After the abandonment of the post-built structures 'crushed whole pots' and concentrations of sherds were deposited in layers overlying the buildings.

Another feature probably associated with phase 5b, or with phase 5c, was a narrow double posthole alignment leading down from structures [724/725] and [730] in the north, to structures [1085] and [1134] in the south. It is possible that this was part of an arrangement for controlling livestock.

Sub-phase 5c: Stone-buildings and fields

Structure [1079] (colour plate 9) was built on the same spot as structure [1085] (see above) but was very different in character to the timber post-built structures of the preceding phase. It was defined by a sub-circular stone wall with a few internal postholes and measured approximately 9m in diameter. The stone (killas) walls were approximately 0.9m wide with an earth and rubble core which was stone-faced internally and externally. Associated with this structure was a partially surviving clay floor and a small, semi-circular clay-built oven or hearth which abutted the inner face of the northern wall (colour plate 9). Only the northern and eastern walls survived, to a height of four or five courses of stonework, but it was clear during excavation that the walls of the structure had once extended further south and west. Stone-built divisions were found inside. It is likely that the entrance was positioned on the south east as, just to the south west, an unusual cup-marked stone had been set vertically into the wall.

Also associated with phase 5c were two earth- and stone-built banked enclosures, [282] and [471]. Enclosure [282] was sub-rectangular (measuring approximately 10m long by 6m wide) and aligned north east – south west. At its south-western end it overlay the post-built structure [724]. At its north-eastern end it adjoined a sub-ovoid enclosure [471], which was aligned north west – south east and which measured approximately 9m long by 5m wide. Enclosure [471] overlay post-built structure [730]. No entrances into these two enclosures were identified during excavation.

Sub-phase 5d: Settlement demise

Phase 5d represented the final episodes of Bronze Age activity across the sites. This was marked by the presence of middens which had been dumped over

areas of the settlement and may indicate ritual abandonment or deliberate closure (*cf* Nowakowski 2001). Where these artefact-rich middens originated is unknown, although they may suggest that there was a related settlement close by. There is a range of different types of midden deposits (see below) and further analysis is needed to determine whether they are of different phases. The largest midden sealed the banked enclosure [282] which overlay post-built structure [724]. It consisted of a series of dumped layers containing domestic waste separated by intermittent sand lenses that probably accumulated over a number of years. Other midden deposits, including that overlying enclosure [471] and the midden to the south of structure [724], were more homogenous spreads of dark soil containing domestic waste. Within the midden to the south of structure [724] the bones of a human infant were found. There were also some very small deposits containing only marine shells.

Some of the middens were originally recorded as ‘cremation mounds’, and these were different in character again. These were interpreted as such because they were thought to contain burnt bone. Recent assessment has however shown that these mounds did not contain burnt bone (McKinley 2004) and were in fact spreads of mixed domestic waste including bone, pottery, stone and shell. These had been sealed by a layer of tightly packed small stones and some mounds were retained by stone kerbs.

Phase 5 Agriculture

It is clear that the major field boundaries which appeared in the landscape during phase 3 (possibly as early as phase 1, see above) were still in use and still maintained during this latest phase of settlement.

To the west of the main north-south wall in some areas ard marks were found overlying and below the later (phase 5d) middens, and ard marks were also found cut into the surface of the phase 4 horizon. On the eastern side of the north-south field wall in sites GMX, GMIX and the lower cuttings of GMXV, the stratigraphy differed from that found on the west of this field wall. It was suggested in the original excavation records that phase 5 was not present here, but it now seems likely that more intensive uninterrupted ploughing to the east of the main north-south field wall throughout phases 3, 4 and 5 had caused the mixing of these horizons, creating a stratigraphic sequence that could not be compared with that to the west where arable cultivation

appeared less intensive during phases 4 and 5 (see above).

Bronze Age life and ritual – an overview

Artefactual, environmental and structural evidence has shown that throughout the second millennium BC at Gwithian, farming, fishing, hunting and craft activities were major features of Bronze Age life. At least three different phases of settlement have been identified within the excavation area, although it should be noted that this particular focus is unlikely to be the sole settlement dating to this period in the wider area (see below). The successive settlements were placed in an ideal location next to a river and the sea and in a comparatively sheltered spot at the base of a slope. The nearby rocky beaches provided a rich source of shell fish.

Farming at Gwithian during this period was mixed, appearing to focus equally and simultaneously on both arable cultivation and animal husbandry. A wide variety of animal bone has been identified in the Bronze Age archive, including cattle, sheep/goat, pig, roe and red deer, dog, some fish and a single whale bone. Field systems were in use throughout, and these fields, boundaries and terraces continued in use for substantial periods of time. It is likely that the terraced fields and enclosures marked by banks and fence lines were established during the Early Bronze Age, which suggests possible continuous use from approximately 1800 BC to 900 BC. Though detailed geoarchaeological analysis of soils sampled from site GMXVII in 2005 (Guttmann 2006) has not yet taken place, preliminary assessment suggests that the soils were improved with the addition of organic material through composting and manuring.

Access to rougher and wooded ground is implied by the wide variety of wood species found during the excavations (Gale 2004 and 2006), together with the evidence for the exploitation of red deer (see below and Riddler 2007a).

There is evidence for a wide variety of industry and craft during the Bronze Age. Alongside fishing, cereal cultivation and animal husbandry, many subsidiary and related activities took place. In the later phases of occupation (phase 5) there is evidence for pottery production on site (see below). Although bonfires associated with firing sites have not been identified within the excavation area, the later ceramics show clear signs of spalling and re-firing, probable wasters are evident and samples of unfired

(gabbro) clay were recovered. Some notched bone and stone objects may also prove to be associated with pottery production (see below).

Tools for a range of tasks were made in a variety of materials, including stone, animal bone and metal. There is ample evidence for cereal processing in the form of saddle querns and countless mullers (although it is possible that a few of these were used for other purposes such as pounding broken pottery to make grog for pottery production). Stone ards were used to plough the fields. Some stone, bone and antler tools, including flint scrapers and polishers, pins, needles, scoops and awls indicate that leather and cloth working were part of routine life, alongside small-scale metalworking represented by clay and stone moulds, hammerstones and anvils (Riddler 2007a; Needham 2007). Flint tools including arrowheads show that hunting was also part of daily life. As well as tools, there are also decorative personal ornaments including ‘amulets’ (pendants) (Fig 7), bracelets, rings and beads.



Fig 7 GM/ME stone amulet from GMX cutting 23 (464) (© Historic Environment Service, Cornwall County Council, C Thorpe).

The outstanding preservation of the Bronze Age evidence owes much to the way the settlements were used and then finally abandoned during antiquity. Many deposits and activities could be interpreted as ‘ritual’. The majority of this type of behaviour was evident in the post-built structures during the later phase 5 settlement and the early phase 1 structure (see below), where selected objects and items appeared to have been curated and buried. The presence of the remains of the human dead so closely placed within domestic contexts is also of interest. Both whole and partial human skeletal remains were found. These included four cremation pits (created during either phases 3 or 5) aligned against the main north-south field wall and infant remains found in one of the phase 5 buildings.

Bronze Age material culture

Henrietta Quinnell and Carl Thorpe

A selection of the ceramic assemblage of some 3000 sherds (Quinnell 2004b) and pieces of baked clay (Quinnell 2004c) has been microscopically examined by Roger Taylor, allowing comment on sourcing to be made with reasonable confidence. Some problems remain to be resolved by the study of thin-sections. A few stonework items from the 500-plus assemblage have also been examined, with the need for thin-section work identified, but most await petrological study (Quinnell 2004d): their character indicates that most were sourced from local beaches.

The earliest material is a group of 17 small, generally abraded, Beaker sherds scattered across phase 1 contexts: one was found in the 2005 excavations (Quinnell and Thorpe 2006). These are of gabbroic fabrics. Decoration includes cord impression, comb-stamping, incision and rustication. A date towards the end of the third millennium BC is probable. Some lithics may be contemporary (Lawson-Jones 2004). The sherds may indicate the spread of manure across phase 1 fields from a settlement focus yet to be identified (see above).

Also scattered across phase 1 levels were Trevisker sherds, often abraded. An assemblage of 220 sherds, generally fresh and often large, was associated with the circular wooden house, structure [1642] in GMXV, and its infill. Phase 1 Trevisker sherds occur in a wide range of gabbroic admixture fabrics. These are gabbroic clays from the Lizard to

which other materials have been added, which are generally used in west Cornwall for this style (Parker Pearson 1990). They are mainly decorated with cord impressions, with a little comb-stamping and occasional finger-nail and incised pieces. A notched slate, a probable pot stamp, suggests on-site ceramic manufacture, better evidenced in phase 5 (Riddler 2007a). The initial identification of structure [1642] as of Beaker date (Megaw 1976) occurred as the details of the Trevisker ceramic sequence were being elucidated: the full range of Trevisker decorative traits including comb-stamping was not clearly understood until the publication of the large assemblage from Trethellan Farm (Woodward and Cane 1991). If the radiocarbon measurement 3430 ± 50 BP (OxA-14568) which produced a calibrated date range of 1890–1610 cal BC, and the archaeo-magnetic date centring on 1700 bc taken on the upper surface of the central hearth by Aitken in 1960 (Sturges and Lawson-Jones 2006b) are supported by subsequent determinations, structure [1642] will be the first Early Bronze Age house located in Cornwall and the associated Trevisker assemblage the earliest known from domestic contexts.

The stonework assemblage from the phase 1 structure includes saddle quern fragments and mullers, indicative of cereal preparation. The whole range, slickstones, rubbing stones, whetstones, even possible line winders suggestive of fishing, is similar to those found in subsequent phases except that there is more shaping and careful preparation than found later. A small group of lithics appeared typical for the period and included *débitage* indicative of *in situ* manufacture: the quality of flint was generally better than that in later phases. A copper-alloy awl and a pottery ring were also found in the house (see above). There are five bone artefacts, all of types more fully represented in subsequent phases, and a small assemblage of domestic animal bone with high potential for detailed study (Riddler 2007a). Surviving marine shells are generally not of edible species and many have modifications, most notably a common whelk with its apex removed and eight perforations (Light 2004; Fig 8). Site notebooks record limpets and mussels which were not retained (see above).

The broad characteristics of the phase 1 assemblage are continued through phase 3. Trevisker sherds again have a wide variety of gabbroic admixture fabrics and are dominated by cord-impressed forms but with some incised and comb-stamped pieces. In general, sherds are abraded,

reflecting their provenance in agricultural layers where they have been deposited with manure. There is a small quantity of bone/antler, lithics and stonework. The former includes a bone comb interpreted as a pot stamp from site GMX (Megaw 1976, fig 4.6 (12); Clarke 1970, fig 1:6; Riddler 2007a). The latter includes two ard points, one found *in situ* in a furrow and of Group XII picrite from Shropshire (Clough and Cummins 1988, no 1196), and the second from a broadly similar context but currently unsourced (*ibid*, no 1197).

All the artefacts come from settlement(s) whose structures, apart from [1503], have not been identified and so are broad scatters rather than close concentrations. Radiocarbon determinations of 1410–1130 cal BC (OxA-14489) and 1520–1400 cal BC (SUERC-6167) (on residues on ceramics)



Fig 8 Perforated dog whelk (bag 86) from the south-west gully (construction cut) of Early Bronze Age building [1642] (phase 1) at site GMXV. (© Historic Environment Service, Cornwall County Council, C Thorpe).

indicate a date range within the Middle Bronze Age (Appendix 1, Table 1).

South of the Red River and the excavated sites, some 250 Trevisker gabbroic admixture sherds generally similar to those of phase 3 have been collected from the surface from five broad areas stretching from Hockins Pit (HP) and Sandy Lane (SL) to a kilometre down the coast at Gwithian Towans (SW 576 408; Fig 3). These spreads are important as they indicate the extent of settlement and land use in the Gwithian landscape during the Middle Bronze Age.

The greater part of the prehistoric assemblage comes from phase 5 settlement in sites GMX and GMIX. The ceramics present in the complex contextual sequence within this phase appear to belong to one distinctive version of the Trevisker style: the larger part of the assemblage derives from middens over the latest structures, indicating a subsequent or broadly contemporary but unlocated settlement in this area still using these distinctive ceramics. About 95% of the fabric used is gabbroic admixture but with a more limited range of inclusions than in earlier phases: about 5% utilised granitic derived clays probably from a fairly local source, a feature not detected earlier. The forms are simple and generally straight-sided, and decoration is confined to untidy incised designs, often incorporating lugs, on the upper parts of vessels (colour plate 10). Sherds are generally large and fresh with some nearly complete broken vessels. Firing is irregular with spalling and re-firing frequent, features often indicative of local manufacture and breakage. Some of these sherds may be 'wasters', some 'spoiling' features occurring on vessels which have been used and suggesting use of sub-standard pots from local manufacture.

These suggestions of on-site manufacture alongside the use of low grade vessels were confirmed by the petrological identification of a sample of unfired gabbroic clay. Eight fragments of locally sourced baked clay may come from the cylindrical objects usually termed 'loomweights' which current research indicates may in fact be oven bricks or supports for the firing of ceramics (Poole 2000; A Woodward pers comm). There has been extensive discussion in the past as to whether gabbroic clays were potted in the Lizard and exchanged as pots or whether the clay itself was exchanged (Parker Pearson 1990). The identification of unfired gabbroic clay provided the first definitive data for the acquisition of clay as opposed to pots and

strongly supports on-site potting. Indeed, the presence of probable pottery stamps in phase 1 and 3, of stone and of bone respectively, suggests that on-site manufacture may have occurred at earlier phases. However, a bone comb pot stamp from phase 5 (Riddler 2007a) must be redeposited as none of the phase 5 ceramics are comb-stamped. Petrological evidence has subsequently shown the potting of gabbroic clays away from source at Tremough in the Penryn area (R Taylor in Gossip and Jones 2007) and around Stannon on Bodmin Moor (R Taylor in Jones 2004–5).

Nine radiocarbon AMS determinations indicate a date range of 1380 to 900 cal BC for these ceramics, the later part of the Middle Bronze Age and the beginning of the Late Bronze Age (Appendix 1, Table 1). There is no clear-cut evidence for the end of the Trevisker Style but now that Late Bronze Age Plain Ware vessels likely to date to the late eleventh or tenth centuries BC have been found in Cornwall – for example, at Richard Lander School, Truro (Gossip 2005) – the last century or so of the Gwithian date range appears too late and will need subsequent corroboration. No other site with a sizeable Trevisker assemblage has produced only incised Trevisker vessels. There has been inconclusive debate, ever since the identification of the Trevisker style (ApSimon and Greenfield 1972), as to whether decorative traits were chronologically significant and now the Gwithian phase 5 ceramics demonstrate the late use of incision as opposed to cord-impression. One fascinating possibility (to be supported by further study) is if Trevisker ceramics were manufactured at a range of sites, and at Gwithian in a very distinctive style, there could be complex local exchange patterns. The Gwithian phase 5 assemblage, on current understanding, however, appears to be cohesive without items brought in from other sites.

Conjoining fragments of two stone axe mould matrices from the same block have been published from phase 5 contexts and assigned to the Penard metalworking phase (Burgess 1976), currently dated to the century or so before 1150 cal BC (Needham 1996). They have also been considered by Needham (1981) and assigned to early stages of the Stogursey tradition within the Late Bronze Age. The fragments can now be related to the latest phases of structure [724] and its neighbour structure [730] (see above); the rock is provisionally identified as chlorite schist from south Devon. Analysis of the metal used in the mould should assist more detailed dating as the

presence of lead in the alloy would indicate a Late Bronze Age date (S Needham pers comm). Two unusual decorated copper-alloy pins have also been published from structure [724], and a further pin lacking its head (Rowlands 1976, 67–8, fig 4.8 a and b), with a general date range similar to that of the axe moulds, a range consistent with the current radiocarbon determinations from phase 5. There are a few other copper-alloy fragments: one from a rapier was found in 1988 in a small trench dug by John Evans some distance away from GMX/IX (J Nowakowski and A Sharpe pers comm). There are also four clay mould fragments, two definitely from phase 5 with the potential for determining the type of artefacts being made. It is odd that no other detritus from metalworking is recorded: the entire metalwork and metalworking assemblage merits modern study to determine details of chronology, sourcing and function.

Five pieces of probable Kimmeridge (Dorset) shale and two of a local slate represent parts of armlets and rings, most of which appear to have been manufactured on site. The extensive exchange of shale in the Middle Bronze Age is unusual, with the only known parallel coming from Brean Down in Somerset, which, like Gwithian, has extensive coastal connections (Foster 1990, 159–60).

Most of the prehistoric bone/antler assemblage comes from phase 5 contexts with concentrations in structure [730] and in an area to the north of structure [1134]. Fragments of waste indicate on-site preparation and artefacts include awls and gouges, a comb fragment, needles, pin-beaters, worked rib pieces and a biconical bead. This collection, due to good preservation conditions, is unique for prehistoric Cornwall. Further work needs to be carried out on artefact function but current interpretations relate to weaving, fishing and potting. Preservation conditions also favoured the survival of a moderate assemblage of animal bone with high potential for further analysis. Surviving marine shells, as in earlier phases, are mostly not of edible species and some have been perforated or modified in various ways, possibly as ornaments: a group of dog whelks may have had their apexes removed to facilitate use of the organisms for dyeing (J Light pers comm).

Assessment of the lithics of this phase indicate a small, typically Middle Bronze Age group, not made on site, with a range of forms which may complement those of bone and antler (Lawson-Jones 2004). Another class of objects, assumed to have been common in prehistory but rarely found, is represented

by three wooden bowls of which records survive in the archive (see above and colour plate 11).

Over 300 items of stonework, of a total prehistoric assemblage of about 500, come from phase 5 levels, almost all (from initial examination) deriving from local beaches. There is a strong cereal-preparation component in the form of mullers and saddle querns, a large group of whetstones and many items probably connected with the preparation of leather – flensing stones, lapstones, slickstones and rubbing stones. Line winders and net-sinkers indicate fishing. This assemblage has less modification than that associated



Fig 9 Incised and polished stone found at site GMX (bag 756) from cutting 26, phase 5 (548) (© Historic Environment Service, Cornwall County Council, C Thorpe).

with phase 1 structure [1642] but artefacts have been extensively used, often for more than one purpose. Unusual items include two amulets, one with a pattern of radial lines surrounding the perforation (Cubbon 1998, fig 2; Fig 7) and three slate pieces incised with rectangular lines in patterns reminiscent of those on the locally made pottery (Fig 9).

Overall, the material culture demonstrates continuity over time, with on-site manufacture of gabbroic ceramics possible in phases 1 and 3 and likely in phase 5. The use of local stone continues, with the range of functions increasing through time. The bone/antler assemblage is exceptional because of good preservation. Many of these items indicate manufacture of artefacts beyond those connected with farming and food subsistence, with the phase 5 settlement as much a series of workshops as of dwelling places. The ecofactual record, with good surviving animal bone, is so far unique for Bronze Age Cornwall and Devon. There is considerable potential in the archive for relating artefacts to structures and so refining understanding of the uses of different buildings at this time (see below). The location was suitable for short distance coastal exchange of substantial quantities of clay used for potting while items like shale, the axe moulds and pins indicate contact with places far beyond Cornwall.

The Iron Age and Roman period

Henrietta Quinnell

To date, evidence for activity through the first millennium BC is almost entirely lacking at Gwithian. A small group of gabbroic sherds from a surface collection at Gwithian Old Land Surface (OLS), south of the Red River, includes parts of four carinated open bowls likely to be of Late Bronze Age or very Early Iron Age date (*cf* Dudley 1956, fig 9, nos 1, 13).

Two small surface collections, from OLS and Hockins Pit (HP), also south of the Red River, each include probable decorated sherds of Middle Iron Age South Western Decorated Ware (Quinnell 2007). A possible rim sherd of this type occurs at Godrevy Hillside (GH) (Fig 3) in a small group which probably extends to the second century AD. In the Gwithian area the general scarcity of South Western Decorated sherds, so common in general in Cornwall, is striking. The principal Roman-period sites, Crane Godrevy and Porth Godrevy (see

below), have produced a single sherd and a small group respectively in well-made gabbroic fabric (Quinnell 2004b, 110) and in forms which are likely to date either to the Late Iron Age or to the Roman period up to the mid-second century AD. In both cases the material appears to be background scatter with a gap before the establishment of the sites.

The coastal structure at Porth Godrevy was published by Fowler in 1962. It was sub-rectangular in shape, its wall a stone-revetted bank, and appeared to be set within an enclosure. The structure underwent some alterations and rebuilding and had drains, pits, postholes and hearths in its interior. Re-assessment of the ceramics (Quinnell 2004b) indicated that everything associated with activity within the structure could belong in the third century AD, based on the Type series devised for the large Roman-period assemblage from Trethurgy (Quinnell 2004a, Chapter 5). Two sherds of Dressel 20 Spanish oil jar amphora were identified and marks of reworking noted among the small collection of second-century samian (Simpson in Fowler 1962). The setting of two jars (Fowler 1962, fig 9, nos 7 and 13) upright in the floor can now be recognised as very unusual for Cornwall and may perhaps be related to salt production; some 170 briquetage sherds, in both local and gabbroic fabrics, were identified during re-assessment. These indicate forms illustrated from salt production sites at Carnoon Bank (Morris 1980, fig 19) and at Trebarveth (Peacock 1969, fig 19). Re-assessment of the stonework (Quinnell 2004d) identified 25% as whetstones and emphasised the absence of spindle whorls. Porth Godrevy was published as a coastal farming homestead. The briquetage, numerous whetstones and lack of spindle whorls strongly suggest more of a workshop function. The rotary querns found (Fowler 1962, fig 14, no 22) were unused and may have been brought in, together with samian, amphora and a dozen late third century barbarous radiate coins, from a settlement nearby, possibly Crane Godrevy, to which the Porth Godrevy workshop may have acted as an outpost. A further notable feature is the virtual absence of shells from edible shellfish, unlike all other suggested settlement sites of different dates in the Gwithian area.

Finds from the round at Crane Godrevy (Thomas 1969) were assessed in 2003 but recent work on the stratigraphy was confined to the enclosure ditch (colour plate 14 and Sturgess and Lawson-Jones 2006a). This, on the west side, was substantial, up to 2.1m deep and 3.6m wide, and appears to have been

deliberately infilled; no conclusive remains of a bank were identified. The ditch was continuous under the suggested later entrance (Thomas 1969, fig 32, E) with structural features of the latter better interpreted as an early medieval sunken structure. The shape of the round, in interim results interpreted as triangular (*ibid*, fig 32), remains uncertain. Of approximately 60 sherds, most came from apparent midden dumps in ditch infill. The local gabbroic forms all belong to types which are third or fourth century AD, together with a South Devon piece of similar date; a single Cordoned Ware sherd of the first century BC until mid-second century AD, may have been curated. The midden dumps also contained a copper-alloy buckle with belt plate of fourth, or possibly fifth, century AD type (J Hines pers comm). A second buckle of broadly similar type but different pattern was found unstratified in the round interior. A small number of gabbroic sherds of similar date to those in the ditch were found unstratified or redeposited in medieval contexts inside the round. There were also three sherds of post-Roman Bv amphora and one of North African Red Slip ware. The pottery previously published from the round as Iron Age (Thomas 1964a, fig 21) can now, with better understanding of Roman gabbroic wares (Quinnell 2004a, Chapter 5), be confidently identified as third to fourth, or even fifth, century AD. The small range of datable artefacts is not adequate to date the construction of the site but a large section of ditch was entirely infilled in the late Roman period (colour plate 14) and some activity is likely to have continued into the fifth or sixth century AD.

South of the Red River, 31 Roman-period gabbroic sherds form a sparse scatter across the four principal sites, Wheal Emily (WE), Gwithian Old Land Surface (OLS), Sandy Lane (SL) and Hockins Pit (HP). The types represented can all be accommodated within the second to third centuries AD (Quinnell 2007). The sparse scatter of sherds points to general background activity in the Red River area, such as the spreading of waste on agricultural land, rather than to the location of dwellings. A coin of Tetricus (AD 270–273) was found on the beach in the broad area of Gwithian OLS in 1968 (Thomas 1968b, 107; Sturgess 2001, 10). Trevarnon Round, 2 km south of the Red River (Thomas 1964a, fig 10; Fig 3), has produced coins, including one of Theodosius (AD 388–408), in agricultural works and two early Roman period brooches (Thomas 2004) from recent metal detecting.

Post-Roman Gwithian

Joanna Sturgess

Background, location and setting

Post-Roman activity at Gwithian was first identified in January 1953 when sea shells, bones and a few sherds of pottery were collected from soil thrown out of rabbit burrows at site GMI. This site was the starting point for the large-scale post-Roman excavations that took place throughout the 1950s. During this period many sites, typically comprising a series of small trenches, were excavated (Figs 10 and 11).

Five excavation areas covering the post-Roman sites have been the main focus for recent work on the archive. These sites – GMI, GMA, GMB, GME and GMIV – centre on NGR SW 5895 4214 and lie within a wide landscape of deep deposits of wind-blown sand on the northern side of the Red River estuary. Four of these sites (GMI, GMA, GMB and GME) were positioned along the top of a linear sand dune measuring at its base approximately 150m by 50m and reaching a height of at least 4m (Fig 10). The remaining site (GMIV) lay at the north-east foot of the dune. This prominent landscape feature is aligned north east – south west following the course of the Red River (which is now canalised but lies 65m to the south) (Fig 4). The modern beach is 680m to the west. The level area on top of the dune where GMI, GMA, GMB and GME were located reaches a height of approximately 8m OD and measures 20m wide before dropping steeply to the north and south (Fig 10). Immediately to the north of the linear dune there is a large sub-rectangular seasonal pond measuring approximately 50m north east – south west by 20m north west – south east (Fig 4), probably created from a natural slack (wind erosion between dunes) during the time of the post-Roman occupation here. It would certainly appear that both the dune and the pond were established landscape features during the post-Roman period and that the landscape in this particular area has undergone very little topographical change since then.

During the 1950s, the excavations of GMI and its closely associated sites were accompanied by investigations of other related post-Roman sites nearby (Fig 10). Results of these related works have previously been published (Fowler and Thomas 1962) and are summarised below. They included site GMXX, a series of five small trenches 125m to the

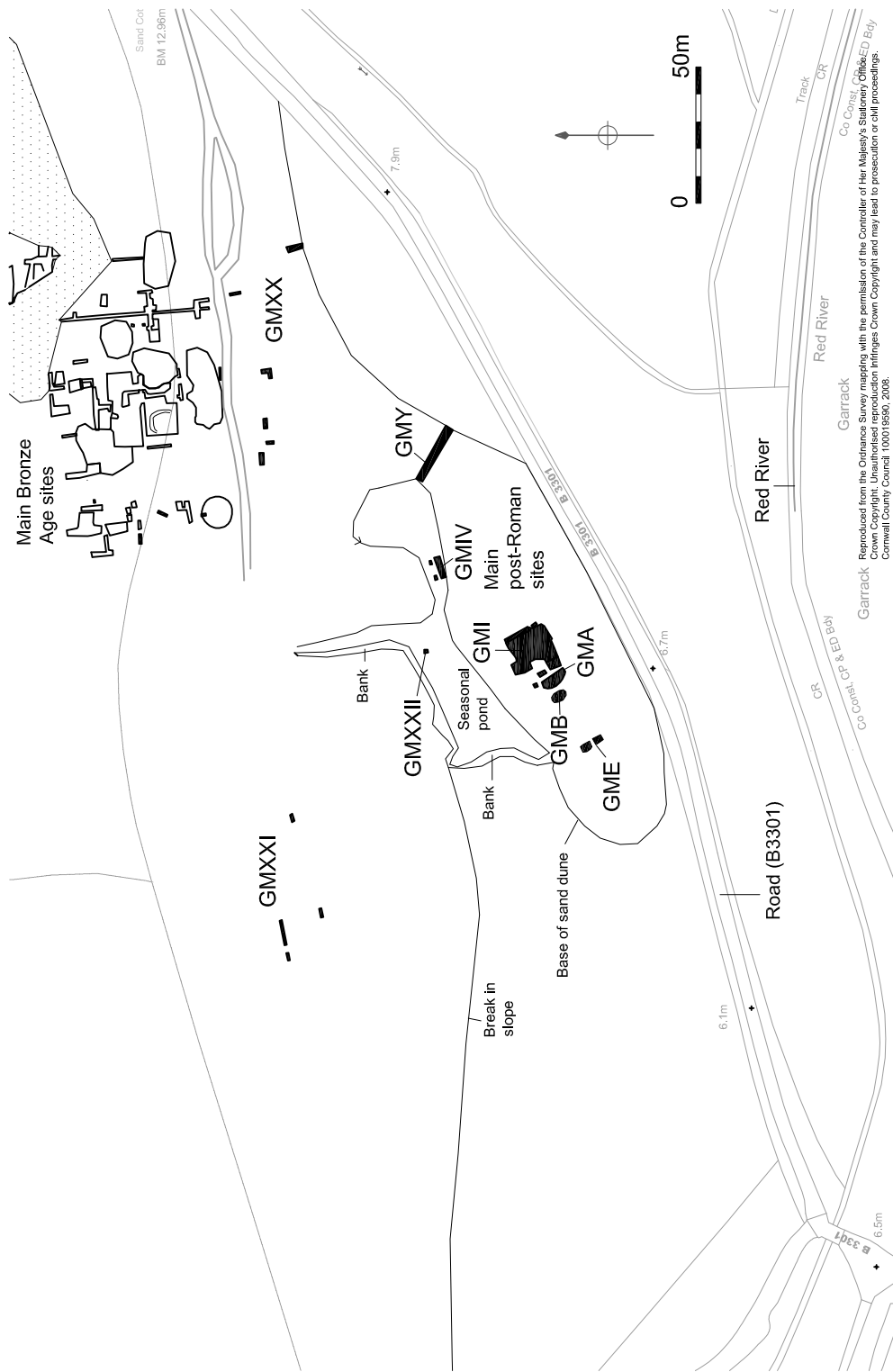


Fig 10 Location plan of the post-Roman sites, based on a 2005 Total Station survey (© Gwithian archive, J Sturgess).

north east of GMI, which uncovered post-Roman deposits and finds which may be indicative of settlement or agricultural activity. Another site, GMXXI, comprised four small trenches 105m to the north west of GMI and revealed evidence for post-Roman ploughing. Site GMXXII was a small test pit dug into the pond, revealing shell-rich post-Roman deposits below wind-blown sand. Another site GMY (a single trench cut through the dune 70m to the east of GMI) exposed mixed post-Roman layers (Fowler and Thomas 1962). All these post-Roman sites lie at the foot of a steep south-facing slope which protects the area from the prevailing wind. The slope (which rises to a height of 70m OD) forms the northern edge of what was once a wide flood-plain of the Red River. During this period the site was likely to have been positioned on the edge of a tidal inlet (Fig 15). Situated on the plateau at the top of this slope was the site of Crane Godrevy (CG), which also produced evidence for post-Roman activity (Fig 4). Here grass-marked pottery was found in association with sunken buildings (see below).

It should be noted that the state of preservation of all the post-Roman sites excavated at Gwithian was outstanding (Sturges and Lawson-Jones 2006c). The industrial complex was constructed on top of blown sand accumulation and, after abandonment, was sealed by a succession of further blown sand layers which acted as a protective cover against later erosion. There is very little in the way of later activity in this area besides the occasional post-medieval or modern pit at site GMB and a few rabbit burrows. The later sand accumulations also provided alkaline conditions allowing excellent preservation of many classes of artefact. Unusually for Cornwall, large quantities of animal bone survived.

Stratigraphic summary of the main post-Roman sites

The post-Roman deposits found at sites GMI, GMA and GMB were broadly three layered bands, each containing many contexts and each identified by specific types of pottery. During recording, three major successive chronological horizons were proposed but recent work on the archive has shown that these were not extensively excavated across all the sites. Most of the remains uncovered are likely to be part of one major extended phase incorporating a series of linked episodes and events.

In general terms, the stratigraphy of the main sites on top of the dune comprised turf (phase 8) which

overlay deep deposits of mixed blown sand and soil (phase 7), the majority of which was wind-blown sand and probably dated to the post-medieval period. Beneath this were two thin closely-set turf lines (phases 6a and 6b), dated by pottery to the medieval period, c thirteenth and fourteenth centuries, and represented periods of dune stabilisation. This in turn overlay another thin layer of wind-blown sand (phase 5) which sealed all post-Roman deposits. The upper post-Roman deposits (phase 4) represented a comprehensive episode of abandonment of the complex. Below the abandonment levels was a series of buildings (all more or less contemporary) associated with industrial features (pits and flues) (phase 3). Predating the buildings were more industrial features of similar character (phase 2). Below the earliest post-Roman deposits there are wind-blown sand deposits interrupted by very occasional turf lines. In places, these deposits (phase 1) were excavated to a depth of at least 2.1m but were only partly explored and were probably much deeper. The major episode of post-Roman activity was therefore associated with phases 2, 3 and 4.

Post-Roman Gwithian – the main phases (c fifth to eighth centuries AD; Fig 11)

Phase 2 Industrial features and pits

The earliest post-Roman activity was represented by two pits and two industrial features. One of the industrial features was a substantial stone-lined trench [2326] which had been subjected to burning at high temperatures and contained charcoal in layered episodes of burning. The other was a linear charcoal-filled trench [2300] where *in situ* burning had also occurred. Some slag and metalwork found associated with this early phase may suggest that these features were connected with metalworking but a clearer date and interpretation awaits future analysis. Three radiocarbon (AMS) dates for phase 2 are currently available and these suggest activities dating from the fifth to seventh centuries AD (see Appendix 1, Table 1).

Phase 3 Buildings and a workshop complex

Phase 3 is the busiest phase of activity across all the main post-Roman sites. It is characterised by a series of buildings and structures of a non-domestic nature which were uncovered at sites GMI and GMA (and

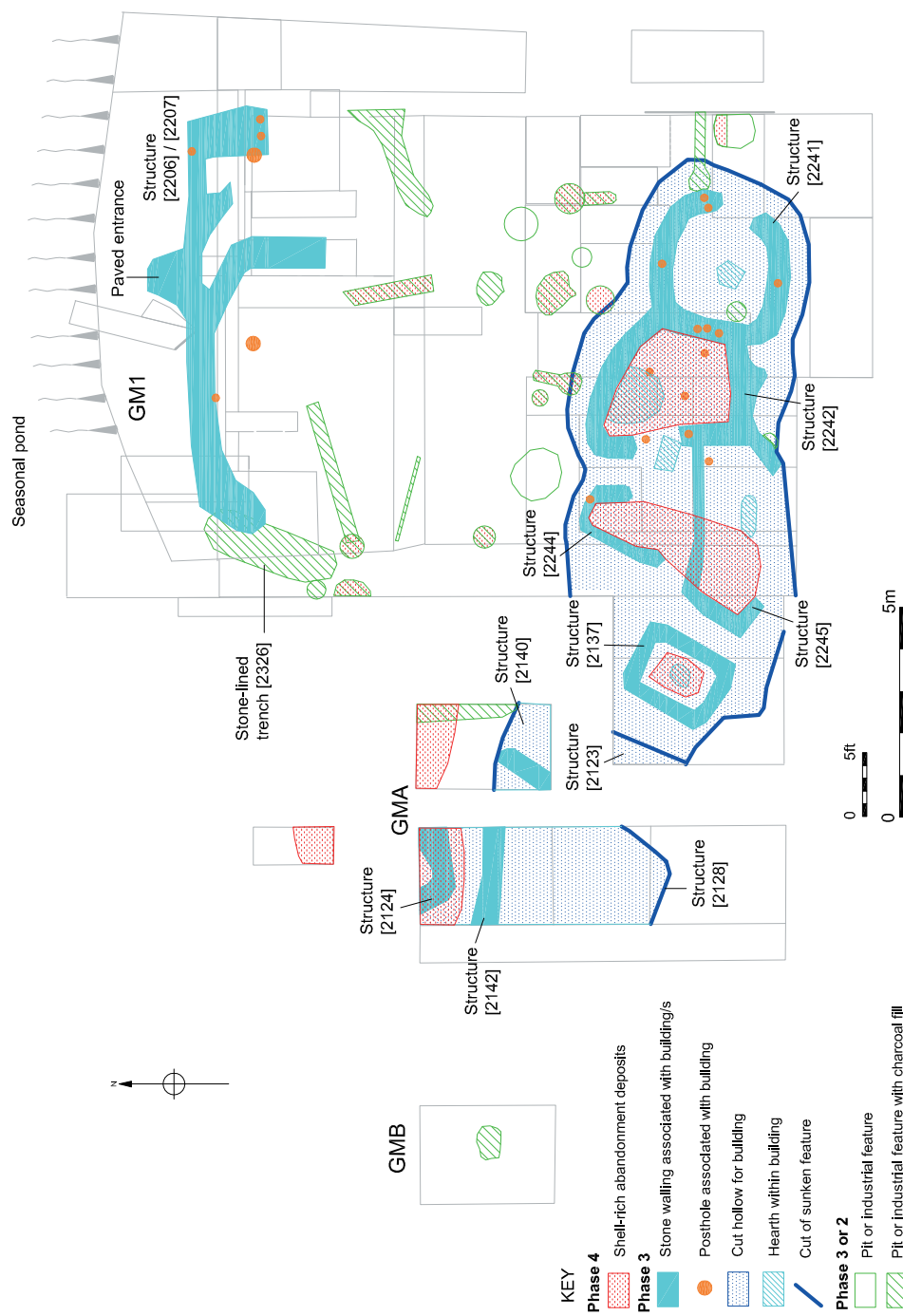


Fig 11 Schematic multi-phase plan of post-Roman structures, industrial features, pits and shell-rich abandonment deposits in GMI, GMA and GMB (© Gwithian archive, J Sturgess).

probably GMB) and associated with industrial features recorded at sites GMI, GMA and GMIV. The phasing of smaller events within this industrial settlement has proved difficult but it appears that the buildings were all part of one broad phase of occupation and they may all have been abandoned at the same time.

The remains of at least nine buildings were found in GMI and GMA, with a possible further three in GMA and GMB (Fig 11). With one exception, they were constructed in a row, aligned east-west, along the southern side of the top of the dune. They were built within purpose-cut hollows or 'sunken' features up to 0.9m deep, and were all more or less sub-square or sub-rectangular in form. Many were adjoining and shared party walls. Turf and soil was packed into the sides of the hollow, then revetted by stone and, in some cases, stone-capped. This formed a deeply embedded stone-faced revetment preventing collapse of the sand. Postholes were also found, set within the base of the revetted face, showing that the buildings were of stone, turf (or soil) and timber construction. It seems likely that the eaves of roofs rested upon the top of the revetment and may have reached ground level, with the result that the buildings were nested into the ground.

The exact function of each of these buildings is unclear, but their shape, size and the objects found within them, suggest that they were all workshops and probably not permanent dwellings. The wide range of artefacts found in and around them, including stone, iron and bone tools, alongside fish bones, sea shells, animal bones and pottery, suggests multiple functions. Large quantities of stone artefacts (many for sharpening metal tools) were associated with structure [2242] and whole (crushed) bar-lug pots were found in association with structures [2245] and [2137].

Structure [2241] was a small sub-ovoid structure built within a sand-dug hollow cut deep (0.6m) into clean wind-blown sand (Fig 11). The hollow was stone and turf-lined and the building had an entrance on its eastern side. Internally it measured up to 2.4m in diameter. It contained a central hearth lined with the broken fragments of a single rotary quern and a stone-lined and capped pit (with evidence for internal burning), which lay to the south west of the hearth. It also contained what appears to be an intact floor surface. It is likely to be contemporary with structure [2242] (below). On abandonment it was filled in with a layer of stone rubble representing either collapse or deliberate infill. Residue on a pot sherd from this

infill gave an AMS measurement of 1310 ± 35 BP (SUERC-6160) which calibrates to cal AD 650–780 (Appendix 1, Table 1). The structure was rebuilt following its excavation with the result that its inner faces appear more rounded than square.

Structure [2242] was a small sub-rectangular building similarly built within a sand-dug hollow 0.9m deep which was also revetted with stone and turf. This building adjoined and shared a party wall with its neighbour (structure [2241], Fig 11 and colour plate 12). After a slightly exaggerated reconstruction following excavation, its internal floor was up to 3.0m in diameter, but originally this would have been smaller as it measured 1.8m east-west by 2.4m north-south. It contained what appeared to be an intact upper floor surface with traces of an earlier floor surface beneath. There was evidence for at least two phases of rebuilding. Internally there were two hearths, an upper open hearth and an earlier stone-lined hearth. Five postholes were found. This building appeared to open into structure [2244] on its western side.

Photographs of these structures show them as reconstructed after excavation (colour plate 12).

Structure [2244] was a small cell-like structure also set within a stone and turf revetted hollow 0.3m deep, opening into the western side of structure [2242] (Fig 11). It was only partly excavated and its full extent or dimensions are uncertain.

Structure [2245] was another sub-rectangular building set in a stone- and turf-revetted hollow 0.6m deep. Its overall size is unknown but it seems likely that it adjoined the western side of structure [2242]. If this is the case, then an unlined hearth found to the west of [2242] would have been an internal feature. On abandonment, it too was filled with a layer of stone rubble representing either collapse or perhaps deliberate closure.

Structure [2137] was also sub-rectangular and built within a stone- and turf-revetted hollow. It was aligned north east – south west with an entrance probably in the south. It was never fully excavated but its probable internal measurements were 1.5m by 2.4m which made it a very small space of only 3.73 square metres. An internal central hearth and floor surface were recorded.

Only partial traces of other related structures were excavated along the southern side of the dune: [2123], [2124], [2128], [2140] and [2142]. All were built within hollows. Collectively these small buildings seemed to have been the hub of a busy complex.

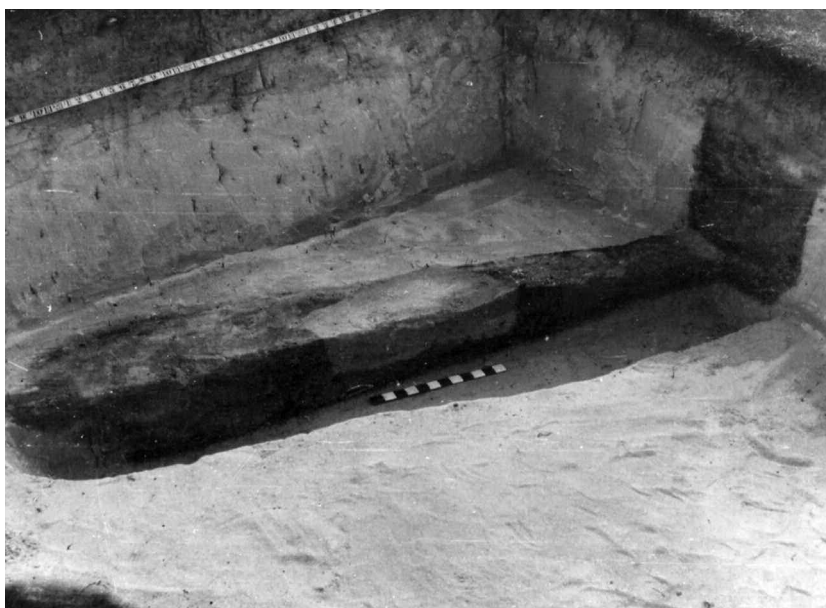


Fig 12 Charcoal-filled linear feature [2053] at site GMIV (© Gwithian archive).

Structural remains on the northern side of the dune were of a different form. Here lay structure [2206/2207] which appears to have been a sub-rectangular open-sided (roofed) building of stone and timber (Fig 11). It faced onto an ‘open’ area located in the centre upon the top of the dune and towards the other structures to the south. The building was aligned east west and was approximately 9m long by 4.5m wide, and was therefore much larger than all the other structures which lay to the south. The long northern wall incorporated a central doorway and at either end were short lengths of return walls. There was a roughly central north-south stone-built partition. The stone-built walls (killas and quartz) were freestanding and incorporated square-set post sockets and were therefore unlike the build of the smaller structures to the south, although it seems possible that this too had been erected within a hollow. It still remains unclear whether the investigated remains of this structure represented two buildings rather than one, and also whether it remained in use for a short length of time after the abandonment of the other buildings. Its unique form, apparently a well-constructed lean-to and the notable quantity of metalwork found in this part of the site, suggests that it had a specific function. A possible interpretation of the building may be as a blacksmith’s workshop.

Phase 3 Industrial features and pits

Many sub-circular pits were found in the central part of GMI, which may be ascribed to phase 3. The majority had vertical sides and flat bases. Some had flues, including [2274], [2226] and [2336], with evidence for *in situ* burning, while there were also linear trenches which contained burning *in situ* and charcoal-rich fills (in GMI, GMA and GMIV) (Fig 12). Some, but not all, contained slag and metalwork, and from the recorded quantities and types of slag and metalwork it is clear that both iron smelting and smithing were carried out (Hatton 2004).

Phase 4 Final abandonment

The upper post-Roman deposits at sites GMI, GMA, GMB and GME represent the abandonment of the entire complex. In the northern half of GMI, structure [2206/2207] was burnt down, but elsewhere the interiors of ruined buildings and other features such as the open pits were filled with deep deposits of midden material with a high sea-shell content (mainly mussels and limpets). These middens also contained some bone, pottery, metalwork and stone. These dumped deposits appear to have been laid down either in a single episode, or in quick succession, following the demise of many of the buildings, since there was very little evidence for

sand accumulation within or below them. The overall impression is of some desire to level the site after abandonment, creating a hazard-free surface.

Overall summary of the post-Roman sites

Recent work on the stratigraphy of sites GMI, GMA, GMB, GME and GMIV has revealed an uninterrupted phase of post-Roman occupation associated with industrial activity and a group of post-Roman buildings. The combined sites represent part of what appears to be an industrial complex presumably established to provide for a nearby contemporary domestic settlement which remains to be located. This may well lie within the (larger) unexcavated part of the linear dune. Radiocarbon (AMS) dates, taken from (internal) residues on pottery from these sites in 2005 indicate that the occupation and abandonment of this area spans a period of time between the fifth and the eighth centuries AD, although further dates are required. Previously the date range was thought to have been from the fifth century AD to the eleventh century AD (Thomas 1958a, 23). One of the most important results of the recent work is the identification of a form of sunken-feature building as yet unparalleled for this period in Cornwall. The exception may be a stone-revetted building found built within middens at Tean on the Isles of Scilly by Charles Thomas in 1956. This may prove to be of similar date, function and build, although the full results of the excavation of this site remain unpublished (Thomas 1985, 183–5, and below).

The evidence suggests that from an early phase, small-scale industrial activities may have been the main activity at Gwithian, before the construction of any buildings, although these activities clearly continued throughout the period when the buildings were in use. Rapid assessments of the artefacts recovered, alongside the study of the characters of the features, suggest metalworking (mainly, iron but, some bronze) (Hines 2007), bone working (Riddler 2007b), leather working and the recycling of imported ceramics. The finds assemblage can broadly be split into two groups. The first of these groups is contemporary with the active occupation of the buildings and represents activities taking place within them, while the second group (the middens) appears linked to their abandonment. Without further detailed analysis of the finds it remains unclear whether the latter group is derived from elsewhere (presumably close by) and therefore perhaps not

directly related to the industrial complex.

Post-Roman material culture

Carl Thorpe and Charles Thomas

The greater part of the post-Roman finds come from the buildings found at sites GMI, GMA, and probably GMB, but also from industrial features recorded at GMI, GMA and GMIV, all of which have been assigned to phases 2, 3 and 4. The ceramics (3000-plus sherds) present across these major phases of activity comprise both native and imported wares. Recent AMS radiocarbon dates (six samples) indicate that activity on the site was concentrated within the period from the late fifth to the eighth centuries AD (Appendix 1, Table 1).

The imported ceramics (some 211 sherds) can be divided into two groups. The first is imported wheel-made wares of Mediterranean origin comprising A and B wares. Class A wares are Late Roman fine table wares, of which two types are recognised at Gwithian. Class Ai is Phocaean Red Slipped Ware (PRSW) from the coastal region of western Turkey (four sherds), and Class Aii is African Red Slipped Ware (ARSW) from the Carthage region of Tunisia (two sherds). Both date from *c* AD 475–550. Class B wares are amphorae of which 82 sherds were found at Gwithian: Class Bi from Greece (32 sherds); Bii from Cilicia in south-east Turkey (49 sherds); and one sherd of Bv, unprovenanced but probably of eastern Mediterranean origin. These wares have a long range of use from the fifth to seventh centuries AD, but the peak period of importation and distribution within Britain appears between the late fifth to mid sixth centuries AD (Thomas 1981; Fulford and Peacock 1984; Peacock and Williams 1986; Tyers 1996; Dark 2001).

The second group (118 sherds) of imported wheel-made pottery, E-ware, originated in France (Gaul). This is a range of 'kitchen' wares, the most common forms being in a well-thrown, well-fired, almost stoneware fabric. These comprise jars (both large and small with fitted lids, the rims often having a concave internal rim bevel), bowls and mugs. The exact source for E-ware is not known but it is broadly agreed as the Saintonge region of France, exported from the Loire or Bordeaux area (Thomas 1990). Its date range is considered to be late sixth to early eighth centuries AD. A radiocarbon determination of cal AD 605–660 (GU-11396) was recently obtained

from internal residue on an E-ware sherd from the crannog at Loch Glashan in Argyll (Crone and Campbell 2005).

The native wares found at Gwithian exhibit great variety and were originally classified into three major groups: 'Gwithian Style', 'Grass-marked' and 'Bar-lug' (Thomas 1960a; 1968a; 2005). A selection of these ceramics was examined by Roger Taylor in 2004 (Thomas, Thorpe and Quinnell 2004) and their fabric confirmed as gabbroic.

Gwithian Style wares were formerly seen as a broad continuation of the Cornish Late Roman potting tradition. It is now recognised that jars and large bowls have a range of styles with curved and everted rims, often with concave internal rim bevels, subtly different from those that occur up to the fifth century; low-walled platters (sometimes without a wall) replace Cornish flanged bowls. These platters were a new introduction unrelated to the Romano-Cornish gabbroic repertoire, perhaps connected to some change in the preparation and serving of food. They are all in a fine, highly-fired gabbroic fabric, the bases often sanded or sat on sand prior to firing. The high firing and finish on all vessel types contrasts with those in the Late Roman tradition. A date range of the late fifth to sixth centuries was proposed as associations were with both imported Mediterranean ware (especially Bii amphora), and E-ware (Thomas 1960a; 1991; 2005).

Grass-marked ware indicates the introduction of a new ceramic production technique: the use of chopped grass to prevent adherence to surfaces before firing, leaving clear vegetation marks on the bases and sides of vessels. There were only two forms: cooking pots, squat flat-based vessels with vertical or slightly incurving sides, and platters, similar in form to those found in 'Gwithian Style' pottery but with grass-marking replacing sanding. This ware was produced in a gabbroic fabric showing variable, often poor firing. From associations with E-ware, the date range was considered to be from the late sixth century AD (Thomas 1968a; 1991; 2005).

Bar-lug ware was seen as a continuation of the 'Grass-marked' wares, with the same fabric and vessel forms (colour plate 13). It represents another technical innovation in the form of opposed internal suspension bars (or lugs) into the rims of the medium and large cooking vessels so that they may be hung over a fire to function as cauldrons (Fig 13). The date of introduction of the bar-lug is uncertain, but these pots have been considered to date from the ninth to

tenth centuries AD (Thomas 1968a; 1991; 2005).

The results of the 2005 dating programme provide a limited date range from the mid fifth to the eighth centuries AD. This means that the pottery sequence described above as spanning the fifth to eleventh centuries AD has had to be re-examined and the following alternative chronology proposed (although this is subject to revision, following the results of any future dating programme).

Gwithian Style ware is now placed within the late fifth to late seventh centuries AD. This is supported by the radiocarbon (AMS) determination 1460 ± 27 BP (OxA- 14528) obtained from internal residue on a sanded platter sherd from GMI context [2210] which provides a calibrated date range of cal AD 550–650, and a second date from residue within a platter at Boden (Gossip forthcoming) of cal AD 590–670 (OxA-14560). This date range makes Gwithian Style partly contemporary with E-ware; the latter may have influenced stylistic features such as concave internal rim bevels. Gwithian Style to date has only been found in the Lizard and on sites broadly west of Redruth.

The association of Gwithian Style ware with the imported Mediterranean wares at GMI will need to be examined further. Elsewhere it appears that both occur in the late fifth and sixth centuries (and a radiocarbon determination from context [2210] of cal AD 420–600 (OxA-14529) does indeed suggest the possibility of activity at GMI within the fifth century), although the date obtained from the Gwithian Style sherd (late sixth to seventh centuries, see above) is later than that generally accepted for imported Mediterranean wares (the late fifth to mid sixth centuries AD). It might, of course, be suggested that these Mediterranean vessels, arriving at Gwithian by sea, were first acquired by a still-to-be discovered settlement nearby (see above), and that fragments found at GMI were secondary, some amphora sherds being used to make things like spindle-whorls; both rough-outs and complete samples were found at GMI, as indeed they have been elsewhere. Another possibility is that the importation of Mediterranean wares continued over a period of time longer than has usually been considered.

Recent work at Tintagel, the primary site in Cornwall for the importation of post-Roman Mediterranean ceramics, has produced an estimated date range from a series of AMS samples calibrating to cal AD 560–670 (at 95% confidence) (OxA-6002, OxA-6003 and OxA-6004; Morris and Harry 1997;

Barrowman *et al* 2007). This was taken from a hearth on Site C associated with a phase W building, the largest and best surviving structure uncovered. Associated with this building was an assemblage of imported Mediterranean pottery (Bii amphora predominating), suggesting that this must have been traded at a date later than that usually accepted for these wares.

When ‘grass-marking’ was adopted as a manufacturing technique, together with the restriction of vessel forms to straight-sided cooking pots and platters, remains uncertain. Gwithian Style is found without grass-marked pottery at a number of sites like Boden (Gossip forthcoming) and Goldherring (Guthrie 1969). It may have overlapped with grass-marked pottery during the seventh century. Unpublished drawings from excavations of a midden on Tean, Isles of Scilly carried out in 1956 and 1960, show at least two Gwithian Style jars (although in a granitic fabric) with ‘grass-marking’ (archive, courtesy C Thomas). A radiocarbon date of cal AD 600–770 (OxA-4695) came from the upper part of the midden (Ratcliffe and Straker 1996, 98, and see below). This date, together with that suggested above

for the Gwithian Style and the possibility for the late importation of Mediterranean wares, could just allow a date somewhere in the seventh century for the introduction of grass-marked wares.

A grass-marked basal sherd obtained from context [2238], the internal rubble collapse of structure [2241] in GMI, yielded a radiocarbon determination of 1310 ± 35 BP (SUERC- 6160), providing a calibrated date range cal AD 650–780. This determination, the latest obtained, indicated that the structures had collapsed, and been abandoned by the late seventh or eighth centuries AD, marking the end of phase 4. This has significance for the appearance of the ‘Bar-lug’ (colour plate 13 and Fig 13). Bar-lug sherds were discovered within sealed contexts associated with both the use and abandonment of contemporary structures at GMI. This suggests that bar-lug handles may have been introduced prior to the end of the eighth century AD. In the light of this date, one avenue of investigation that must now be pursued is the possibility that grass-marked wares and bar-lug pottery were all part of the same group, a kitchen ware range consisting of cooking pots, serving platters and cauldrons. The



Fig 13 Reconstructed bar-lug pot made by Lake's Pottery in Truro in the 1950s, showing how the vessel would have been suspended over a fire (© J V S Megaw, Gwithian archive).

fabrics of the two wares appear identical and the basic cooking pots and cauldrons have the same profile.

It is proposed that the term 'Grass-marked ware' be adopted for this unified ceramic group. If this suggestion is correct grass-marked ware will have had a life of over 400 years, from the seventh to the eleventh centuries AD. Mawgan Porth saw this ware, including the distinctive bar-lug, in use into the early eleventh century (Bruce-Mitford 1997). It continued at Launceston Castle into the second half of the eleventh century (Hutchinson 1979; Brown, Thompson and Vince 2006). It is important to note that bar-lug pottery remains to be scientifically dated and this is a key priority for the appearance of such a distinctive ceramic style.

An unfired clay sample with apparent grass-marking from GMI was examined by Roger Taylor (Thomas, Thorpe and Quinnell 2004) and found to be of unbaked gabbroic clay. This suggests that pottery manufacture was taking place on site with gabbroic clay imported from the Lizard. One of the aims of future work should be an examination of the native ceramic collection for wasters or re-fired material.

Nearly 2.5 kg of industrial metalworking debris came from GMI, GMA, GMB, GME and GMIV. There is both tap and run slag potentially indicative of iron smelting, while the presence of hearth bottoms suggests smithing (Hatton 2004). Charcoal-filled pits with likely industrial purposes have been identified for phases 2 and 3. It is possible that local iron was exploited. Iron concretions have been documented along the cliff face at Gwithian (Thomas 1958b).

The products of this metalworking activity may be represented by some 91 recognisable iron items and smaller items of scrap (Hines 2007). There are a high proportion of tools, including knives, small adzes/gouges, drill bits, augers and the remnants of at least two small saws. The latter can be matched with a saw from the Irish ring fort at Garryduff from the seventh century AD (Edwards 1996). Agriculture is represented by two reaping hooks, while personal items include dress pins, tweezers and a possible dagger within a substantially-preserved wooden sheath. One possible status item is part of the cheek piece from a horse bridle, similar to examples found at Whithorn, Dumfries and Galloway, dating from the early seventh century (Hill 1998), and Lagore Crannog, Co. Meath, Ireland (Laing 1975), again broadly seventh century in date.

Copper-alloy was scarce (12 pieces) and mainly represents scrap. There are however two needles and the mount from the rim of a drinking horn or cup. One unique item, unfortunately now lost but recorded in drawings and photographs, is a harpoon or fish-spear point (Sturges and Lawson-Jones 2006c, fig 74). A possible sword pommel in either tin or pewter completes the metalwork assemblage but further work is needed to confirm whether this is a finished item or a model from which moulds for casting could be made. Most of the metalwork, both copper alloy and iron, is utilitarian in nature, implying a site utilised for craftwork. None of the items need be later than the seventh century (Hines 2007).

Nineteen objects of bone and antler and two fragments of antler waste have been identified (Riddler 2007b). Most are from GMI, but also smaller numbers from GMA, GMB, GMIV and GMXX. Dress accessories are represented by a bead and a pin fragment. Personal items include at least two composite combs, one of broadly Dinas Powys type (Alcock 1987) *c* sixth to seventh centuries AD, while the other is best paralleled in Anglo-Saxon England and probably also of seventh century date (Riddler 2007b). Household equipment includes a fragment of an antler mount possibly from a casket. Many of the bone artefacts are associated with textile production and include spindle whorls, needles and a pin beater (used in weaving). A bone lucet (a tool for cord-making) was also found. Fragments of antler waste strongly suggest on-site preparation and manufacture of artefacts. Some animal bone may have been providing bone handles for metal objects (J Hines, pers comm). In general the bone and antler objects appear to be of sixth to seventh century date. This well-preserved collection is unique for post-Roman Cornwall.

Over 150 items of stonework were recovered, most coming from GMI. Almost all are derived from local beaches. In many ways the stonework continues prehistoric traditions, and a few items may have been collected from the nearby Bronze Age site and reused. A large number of whetstones was found, as were many items connected to leather working including flensing stones, lapstones, slick and rubbing stones. Cereal processing (probably not on site) is represented by 14 fragments of granite rotary quern stones, four of which formed the kerb of a hearth within structure [2241] in GMI (colour plate 12). These fragments come from an unusual type of rotary quern: a small horizontal hand-mill turned by an eccentric shaft pivoting from a point in the ceiling and

a pivot stone on the floor (an example of which was also found). This type of hand-mill is possibly matched in Ireland (Thomas 1960b). A perforated greisen stone weight for use with a steel-yard (Quinnell 1993), found associated with structure [2206/2207], might point to commercial transactions. Finally an unusual pillar cresset stone or lamp (*cf* Adams 1967, 51 and fig 13.3) was also found.

Gwithian during the early medieval period

Evidence for activity in the Gwithian area continuing beyond the eighth century AD into the Norman period and later was recovered from several small sites south of the Red River: 'Old Land surface' (OLS), Hockins Pit (HP), Wheal Emily (WE) and Sandy Lane (SL). North of the river is the medieval manor of Crane Godrevy (CG) (Fig 3).

The southern sites comprise small exposures of old land surfaces, over which lay successive midden layers variously sealed by wind-blown sand, seen in the faces of sand quarry pits or revealed by footpath erosion. None now survive, having been totally removed by commercial quarrying over the last 50 years. The spatial extent of these surfaces remains unknown (see below). Apart from a day's recording by the Gwithian team in August 1963 at Sandy Lane (see below), much of the material has been collected subsequently as surface finds. Pottery from these sites was assessed in 2006 when the presence of Gwithian Style ware south of the river from Hockins Pit was identified for the first time (Quinnell 2007).

The small collection of ceramics from OLS includes grass-marked ware with examples of cooking vessels, platters and bar-lug pots. No imported ware has been recovered from this site.

Hockins Pit (HP) includes both Gwithian Style pottery and grass-marked ware. More than 50 sherds of Gwithian Style are present with examples of platters (with sanded bases) and jars/bowls. The grass-marked ware included cooking vessels and platters but no certain bar-lugs were identified. The combined presence of Gwithian Style pottery, and grass-marked wares suggests that here activity commenced in the sixth century. Again, no imported ware has been recovered from this site.

Finds from parts of a midden exposure at Sandy Lane (SL) were selectively sampled in 1963 when at least four major layers were found, each apparently

sandwiched between sand-blown layers (see above). No grass-marked pottery was identified in the material assemblage collected.

Two major ceramic fabric types have been identified: gabbroic and granitic. The gabbroic wares seem to continue the local potting tradition identified in the post-Roman and earlier medieval periods, while those in the granitic fabric were from elsewhere in Cornwall and belong to the end of the sequence. Although no full stratigraphic record was available, detailed notes and observation allowed the local gabbroic pottery (over 2500 sherds) to be classified into three major groups, classified as Sandy Lane styles 1, 2, and 3 (Thomas 1964a). A selection of these ceramics has been examined by Roger Taylor (Thomas, Thorpe and Quinnell 2004) and all were confirmed as gabbroic.

Sandy Lane Style 1 (SL1) is a continuation of grass-marked pottery with coil-built cooking pot forms, showing vertical or slightly inward curving sides and flat bottoms. Generally well-fired, these small pots exhibit distinctive grass-marking. There are some visible changes. The walls of the vessels are thin in relation to their size, with the interior showing vertical or near-vertical finger-dragging marks caused by the potter shaping the pot. Decoration is rare. This pottery is considered to postdate the end of the use of the bar-lug (Thomas 1991).

Sandy Lane Style 2 (SL2) forms are small- to medium-sized well-fired hand-made cooking pots. These vessels are shouldered jars with flared sides and most are flat bottomed, although some examples have sagging bases. On one near-complete vessel, the entire sagging base was (surprisingly) still grass-marked. The distinctive feature is an everted rim, sometimes notably exaggerated with the ends often slightly beaded. The potters' vertical dragging marks are often observed on the interior but their exteriors show evidence of finish on a slow wheel. SL2 is considered a transitional style, demonstrating the adoption into a native potting tradition of the medieval cooking pot with everted rim and sagging base and the use of a wheel. Similar wares found during excavations at the hermitage on St Helens, the Isles of Scilly, are considered of twelfth-century date (O'Neil 1964).

Sandy Lane Style 3 (SL3) is completely wheel-thrown. Forms are small- to medium- sized cooking pots. These vessels are shouldered jars with flared sides with distinctive sagging bases. Rims may be everted, often beaded, or upright, in which case most are ribbed. There is no grass marking. The largest

collection came from the surface of the midden at Sandy Lane, demonstrating its position as the latest of the native ware styles (Thomas 1964a; 1968a; 1991). This is confirmed by its association with sherds of pottery in a granitic fabric identified as Bunnings Park / Stuffle ware and other Cornish medieval coarsewares that originate from the Lostwithiel area, attributed to the late twelfth and thirteenth centuries AD (O'Mahoney 1989a; 1989b; 1994). One interesting piece of stonework found at Sandy Lane was a flat piece of gritstone bearing on its surface graffito of a 'Nine Mens Morris' or Merrels board (Thomas 1964a, pl 1).

This scattering of sites south of the Red River should include the focus of the Domesday paramount manor of *Conarton* from the ninth to the thirteenth centuries, before the settlement was overwhelmed by sand blows in the thirteenth century (Thomas 1958a, and see below).

Finds from the later medieval manor of Crane Godrevy (Thomas 1969) were rapidly assessed in 2003 (Freeman 2004) but recent work on the stratigraphy has focused on the ditch of the earlier round and associated features (the revisited section of the round ditch is shown in colour plate 14). A number of 'sunken features' with walling and possible floor structures were identified within the area of the enclosure and overlying the infilled enclosure ditch (cutting U). Associated with these structures was a small collection of grass-marked pottery and a possible sherd of African Red Slipped Ware. The apparent similarity of the structures here with those downslope at GMI may suggest that they were broadly contemporary.

The first medieval re-occupation of Crane Godrevy is represented by a small rectangular structure orientated roughly north-south (house X) that was truncated by the construction of house I. This structure is associated with Sandy Lane Style 2 pottery and is thus most likely to be of twelfth century date (Thomas 1969).

The manorial complex of Crane Godrevy comprised two stone-built houses around a farmyard. House I, the main building, consisted of a major two-roomed component aligned east-west (essentially a form of longhouse), to which two northerly wings were added. House II lay to the west of house I and was basically a two-roomed building also orientated east-west (Thomas 1969).

House I appears to have been constructed in the fourteenth century (as may house II) and underwent a number of alterations and minor rebuilds over a

period of 200 years until it was finally abandoned some time in the late seventeenth century (Thomas 1958a). Pottery from all these periods was recovered and included material of both Cornish and north Devon manufacture. A range of ironwork was present, including agricultural tools such as hooks, knife blades, scythes, and drill bits. Structural fixtures and fittings like window glass and leading were recovered. Other categories of finds included clay pipes, shell, brick and copper-alloy objects, including a coin of Charles II, c 1672–5 (Freeman 2004). On one piece of re-used building stone was a scratched depiction of two moored medieval (sailing) vessels (Fig 16). Perhaps this was a portrayal of a local scene on the Red River?

Gwithian – emerging themes and future potential

Jacqueline Nowakowski and Charles Thomas

A case study in landscape archaeology

By 1956, the potential of the Gwithian project to develop as a case study in landscape archaeology was becoming evident. Sequences linking the various sites were being explored and emergent results could be drawn together into an overall narrative. When *Ten years' work* was published in 1958 (Thomas 1958a), investigations were well under way into the well-preserved post-Roman sites and the full potential of the Bronze Age archaeology was just beginning to surface. Chronological gaps were evident, however, and much field effort from the mid 1950s onwards aimed to fill these by working towards a fuller landscape study. This was partly successful with the discovery and excavation of the Roman site at Porth Godrevy (site GT) between 1956 and 1958 (Fowler 1962), and the later investigations at the medieval manor of Crane Godrevy (site CG) from 1956, finishing in 1969 (Thomas 1969).

Some areas of knowledge are now clearer than others for which to date there is still only tantalising data; for example, the Neolithic and Beaker periods and the Iron Age. Gwithian today remains a rich resource for further detailed archaeological research but it is also a vulnerable landscape (see below). Since the final season of excavations at Crane Godrevy in 1969, archaeological enquiry has continued, principally in the form of surveys and

assessments which contribute towards landscape management and conservation programmes. Parts of the study area are now in the ownership of the National Trust and Cornwall County Council (Sharpe 1990a; 1990b; Jones 1998; Thomas 1995; Thorpe 1996; 2001; Sturgess 2001; Wessex Archaeology 2002; Craze 2003; Lawson-Jones 2003; 2004; Kirkham 2005). These studies have contributed additional insights into Gwithian's wider history and continue to inform as well as promote the protection of this precious resource.

As described in the preceding sections, many new archaeological discoveries were made; some continue to be unique, all are available for future study. The major areas of period research are the Mesolithic, the second millennium BC and first millennium AD. There are in addition opportunities for detailed artefact studies as, for example, the very substantial stonework archive, which spans a considerable time depth (from the Mesolithic to the medieval) and therefore offers the opportunity for a full, synthetic, diachronic study of a wide variety of types of stone objects derived from a distinctive place. The post-Roman ceramic assemblage has been firmly established as a key dataset for this period (see below).

There are also more general themes that the Gwithian material offers. They have the potential to raise the profile and underline the importance of our fragile coastline in a world where environmental change is a major concern (see below).

The following section discusses the research potential for specific periods and then reflects on some of the general research themes that have emerged from this study and the potential for further enquiry.

A rich Mesolithic landscape

While the Mesolithic material in the Gwithian archive has not been assessed in detail during this recent programme of work, its importance has long been recognised and its full study is highly desirable (Thomas 1958a; Wymer and Bonsall 1977; Jacobi 1979; Berridge and Roberts 1986). Further fieldwork on the Mesolithic at Gwithian would be a fruitful and rewarding venture. The 20-plus surface sites, a few major, mostly minor, are likely to be contemporary. Today, of course, some sites are cliff-edge. The substantial Mesolithic archives (more than 20,000 items) from at least 20 sites form a rich corpus of data which is available for future analysis

(Nowakowski 2004, section 6.1). The character and scales of these sites may vary but all have been identified through the discovery of dense distributions of flints and pebble tools. The largest single collection of Mesolithic date has been recorded from the Hudder Field (HU) sites, which currently amounts to at least 12,000 items: flints and pebble-tools. Apart from mollusc fragments collected at sites BZ and GU, the finds are all lithic, constituting a classic Late Mesolithic assemblage with one particular major site, CM (see above), perhaps overlapping with the beginning of the Neolithic. The most distinctive feature of this collection are the hundreds of non-flint items, dominated by the bevelled pebbles (formerly known as 'limpet scoops') predominantly of a gritstone or greywacke, petrologically Group XIX and now identified as coming from the adjoining North Cliffs (Mitchell 1988). As Rosemary Fletcher (2005, 1–12) has pointed out, it seems incredible that after nearly half a century no serious attention has been paid to their function; her conclusions, based on practical experiment, support Jacobi's comment (1980, 188–90) that the preparation of hides, notably seal-skins, for boats may have been the dominant use.

Some Mesolithic sites have been recorded as exposures and provisionally interpreted as relict former land surfaces. Some appear to be intact and well-preserved such as at sites: GT, HU and BZ, and at RR, where in 1999 a small stone structure or hearth was noted (ACT fieldwork). Therefore a striking feature of the Gwithian Mesolithic sites is that material appears to be *in situ* and the potential for further fieldwork and palaeo-environmental sampling is high.

Site HU/NE is an obvious target, an accessible major site surrounded by about six nearby (minor) scatters or chipping-floors. It lies within a late nineteenth century enclosure which has rarely been ploughed until recently. In 1977 Susann Palmer referred to the Hudder Field archive as a major 'type-site' (Palmer 1977). The initial density patterns from quadrant collection since the late 1980s reveal good correspondence between concentrations of bevelled pebbles, non-geometric microliths, core rejuvenators, calcined flints and occasional larger stones. It is possible to pinpoint an area about 30m square which must surely contain, untouched and at no great depth, a relatively long-lived settlement. Here, today, one might at least expect organic material, some dates, and even remnants of more than temporary occupation. A small-scale evaluation exercise

centred on a few well targeted trenches at HU would confirm whether significant buried surfaces are present, and aid interpretation of the character of the enormous lithic and stone-tool archive for this site. Geoarchaeological sampling together with radiometric and/or OLS dating could also be tried. Successful results here are likely to sharpen the focus of interpretation on the date and character of other Mesolithic sites found in the Gwithian study area.

A smaller collection of material has been recorded during the excavations of major sites of later periods, like Godrevy Barrow (GB) and the Romano-British site at Porth Godrevy (GT). Continuing monitoring of previously known sites during watching briefs has produced new data, such as the bevelled pebbles of Mesolithic date found at site GU during work at Godrevy Café in 2003 (Lawson-Jones 2003).

The Mesolithic sites at Gwithian continue to be vulnerable to erosion by climatic and human agencies. Some are currently in National Trust ownership but alongside regular monitoring, some small-scale fieldwork to confirm their real significance is highly recommended in order to mitigate against further erosion, prevent long-term damage and inform conservation programmes.

The wider Early Bronze Age landscape

Our knowledge of the Early Bronze Age landscape at Gwithian remains patchy despite a minimum of 25 Early Bronze Age barrows which have been identified in the wider landscape (see above). Some of these sites were the subject of antiquarian investigations, as at Connor Downs where sherds from at least five decorated ribbon-handled urns with incised Trevisker banded decoration were found in the early 1800s (Patchett 1946, D19). These are now lost. In 1741 a Bronze Age urn was recorded in a stone cist exposed in a cliff face under approximately three feet of sand. This was found half a mile to the south west of present day Gwithian village (Borlase 1872, 170–1). Its discovery on the sandy coastal strip should raise concern about the potential invisibility of these types of funerary sites (which may not always have been marked by mounds) and their continuing vulnerability. Many barrows in the general area were ruined and destroyed, however, and only two were investigated during the 1950s. One barrow (site GB) on Godrevy headland (Fig 3) was partially excavated by the Gwithian team but this was known to be badly disturbed (Thomas 1950). As well as Mesolithic flints, cremated bone

and quartz pebbles were found (Thomas 1958a, 13). Several years later, in April 1957, rescue work by the Gwithian Mobile Team recorded a ploughed out barrow (site RD, part of a group of six, Fig 3) on Reskajeage Downs within the broader coastal plateau (Thomas 1958a, 13). Here, too, work was limited but a cremated burial accompanied by a possible copper-alloy object was found. These items are now lost (Nowakowski 2004, 63–4). Along the coast towards Portreath isolated finds of barbed and tanged arrowheads of likely Bronze Age date have been recovered from ploughed fields near Crane cliff castle (N Thomas 1995, 29, 47). Dense flint scatters, many diagnostic Neolithic and Bronze Age items, have also been detected on Reskajeage Downs and North Cliffs. These have been systematically collected by Mr H J Berryman and studied by M Reed (Reed 2000). An emerging picture of varied use of the coastal belt combining hunting and farming is suggested. During fieldwork in 1995 a potential new barrow was recorded at Hudder Downs (Historic Environment Record PRN 92144; Thomas 1995).

These discoveries need to be considered alongside the evidence for Beaker and Early Bronze Age activities found during the major excavations, as they provide a wider context for discussion. The farming homestead of potential Early Bronze Age date discovered during the excavations at site GMXV still remains the earliest for this period in south-western Britain (see below).

A deepening sense of place during the Bronze Age – future analyses

The discovery of a well-preserved Bronze Age landscape at Gwithian underlines the potential archaeological richness of similar coastal settings (see below). During the 1950–60s little was known about how people lived in the Bronze Age. With the discovery of plough-marks in the sand, Gwithian's archaeology became nationally known for its contribution to the study of prehistoric agriculture (*cf* Fowler 1971; Megaw and Simpson 1981; Nowakowski 2006). Evidence for well-preserved buildings together with their fields, enclosures and human burials was, and continues to be, a unique and exciting discovery of great national and regional importance. Few sites have produced such good qualitative data.

Many aspects of the data have great research potential. The most significant is the discovery of a

long sequence of land use offering a case study of human settlement spanning the best part of 1000 years. On current understanding, a continuous presence within this particular setting over a period of many generations may be suggested, presenting a detailed story of people and land, although it is important to point out that settlement here may not be assumed to have been continuous even though it appears that the fields and enclosures may have been (see above). One of the main priorities for future work is a comprehensive scientific dating programme to confirm the sequence as currently understood and interpreted. The dates currently available show good concordance with the sequence (Appendix 1) although further scientific dates are required and confirmation of an early date for phase 1 remains a key priority. The apparent varied but linked stories within the Bronze Age sequence at Gwithian do indeed suggest local changes through time. Full analysis of the entire sequence in the future will clearly offer new insights into the changing histories of settlement for the second millennium BC within the region and offer commentary on the relationship between people and place.

The variety of structural and artefactual data at Gwithian continues to be exceptional, despite recent advances in research on Bronze Age settlement in the south west (for example, ApSimon and Greenfield 1972; Nowakowski 1991; Nowakowski 2001). This recent work has highlighted the significance of the data for the Gwithian settlement during the latter part of the sequence, particularly during phase 5, and further analysis of all the data will offer a fuller understanding of the ways people were living, farming and working the land during the latter part of the second millennium BC. The distinctive architectural styles of the types of buildings found at Gwithian, as well as the fact that none appear to have been constructed in hollows – *contra* the general trend found at contemporary lowland sites such as Trethellan Farm, Newquay (Nowakowski 1991), Trevisker, St Eval (ApSimon and Greenfield 1972), Penhale Moor, Fraddon (Nowakowski 1998) – provides evidence of more than one building tradition across settlements in lowland Cornwall. The new evidence for the manufacture of pots, metalworking, the presence of worked shale, worked animal bone and the variety of stonework, reveals developed craft technologies which link the communities at Gwithian to a wider Bronze Age world and present a mature picture of Bronze Age life which to date has still not been

recorded elsewhere in the county. Alongside the full study of the architecture of the buildings, the ways in which they were used and the way the land was farmed, there are a number of significant artefact groups which merit full study and publication: pottery, clay moulds, lithics, shale, worked bone objects, animal bone, copper-alloy objects, human bone (cremated and inhumed), stonework, marine molluscs and charcoal, geoarchaeological samples and land snails. With the success of the pilot dating study carried out in 2005 the potential for further scientific dating is high (Appendix 1). The case for further OSL dating can also be strongly made.

The excavations uncovered rare insights into prehistoric land use with graphic evidence for cultivation (colour plate 6) and developed horticultural and animal husbandry practices, all of which took place within an organised farmed landscape. There is great potential here for the study of manuring and farming practices (*cf* Guttman 2005; Guttman *et al* 2005) and even to investigate the cultural significance of the routine creation of middens (Nowakowski in press, and see below).

The results of the excavations at Bronze Age Gwithian have the potential to advance many research themes: early farming practices, the technologies of craft and industry, issues of land tenure and the relationships between hearth, home and death. With excellent site preservation, partly the result of local environmental conditions but also of Bronze Age cultural practice surrounding matters of land use and settlement abandonment (*cf* Nowakowski 2001), the full study of Bronze Age Gwithian offers intimate and wider insights into the creation, history, meaning and significance of place, particularly settlement, within the wider Bronze Age world (*cf* Brück and Goodman 1999).

The extent of this settled landscape is also an area for discussion given the discovery of further Bronze Age pottery at the Sandy Lane sites, 1 km downstream from the main sites (see above). Notable quantities of Bronze Age pottery found as surface finds from OLS, SL and Hockins Pit contained a lot of quite fresh material very similar to that associated with phase 3 on the main settlement sites. A side-looped spearhead of Bronze Age date was also found at Hockins Pit (Sturgess 2001, 11). It is clear that, on a broader canvas, settlement at Gwithian during the second millennium BC was extensive. This prompts us to reconsider how coastal settings fit into our wider picture of the Bronze Age landscape as a whole in the region. Research to date has largely

overlooked the importance of this landscape zone for earlier prehistory but such settings can not be viewed as peripheral or marginal in a sea-bound region like Cornwall. They need to be regarded as fundamental to the successes of Bronze Age communities as they may meet a variety of needs and fulfil particular and perhaps specialised roles. Contact (presumably coastal) with distant places through the exchange of raw materials is characteristic of the phase 5 settlement. Therefore it is clear that on present evidence any perception of marginality seems irrelevant and this strand continues as a constant theme throughout the Gwithian story (see below).

Bronze Age Gwithian's wider significance

With the exceptions of Brean Down in Somerset (Bell 1990) and Stackpole Warren in south-west Wales (Benson *et al* 1990), the long sequence uncovered on the Bronze Age site at Gwithian remains unique for south-west Britain. Further afield, archaeological investigations on similar coastal sandy sites in the Western Isles of Scotland during the past 20 years (Barber 2003; Evans 2004; Parker Pearson *et al* 2004) and in Orkney (for example, Tofts Ness on Sanday: Dockrill *et al* 1994) provide complementary and contrasting stories of early prehistoric settlement and highly developed land-use strategies, in areas where blown sand was a factor of daily life.

In the mid 1970s and marks dating to the Beaker period were found at Rosinish, Benbecula, Outer Hebrides (Shepherd 1976, 214, fig 11 and pl 11; Shepherd and Tuckwell 1977). Earlier, in the 1960s, a late Neolithic and Beaker settlement was excavated at Northton on the Isle of Harris, where two stone-built Beaker structures were associated with an extraordinary array of worked animal bone and antler points (Simpson 1976, 222–4, particularly fig 12.1; Simpson *et al* 2006). In more recent times Niall Sharples' excavations on the machair sites at Silgeanach and Dalmore on South Uist show that Beaker settlement was firmly established by 2200–1750 BC and that the Beaker structures were located alongside clear evidence for continuing cultivation within enclosures. The enrichment of soils – perhaps to create artificial *plaggen* soils – was a distinctive feature of early settlement on these coastal sites. Such practices may be taken as indicators for colonisation, settlement and perhaps wider cultural traditions to stabilise otherwise challenging landscapes (N Sharples pers comm; Parker Pearson *et al* 2004, 50–2). Replenishment of

highly alkaline soils for cultivation has also been documented at the Later Bronze Age site of Cladh Hallan (Parker Pearson *et al* 2004, 80). The creation of artificial *plaggen* soils, therefore, appears to be a constant theme of these early prehistoric coastal settlements and the evidence at Gwithian has the potential to contribute to this growing area of research (Guttmann 2005; Guttmann *et al* 2005). In addition, a contrasting marked cultural practice of adding domestic waste to settlement (rather than spreading it around) has been recorded on the Late Bronze Age South Uist sites. A variation of this practice can be seen in the latter part of the Gwithian Bronze Age sequence during phase 5 (above and Parker Pearson *et al* 2004, 51).

Gwithian during the Iron Age and Roman period

Our view of Gwithian during the Iron Age still remains misty. The scarcity of first millennium BC artefacts does not necessarily indicate that Gwithian was little used during this period as it is increasingly clear that Early Iron Age ceramics are comparatively rare in Cornwall as a whole (Quinnell forthcoming). For the Middle to Late Iron Age the occasional sherds at OLS, HP and GH, as well as at Porth Godrevy and Crane Godrevy, reveal extensive use of the area. It should be remembered that an assemblage of South Western Decorated Ware was found in the sand dunes a few kilometres to the south west at Phillack Towans (Somerscales 1965). It is likely that the whole terrain with its high agricultural potential was used during this period of comparatively dense settlement (Quinnell 1986, 115–7). Gwithian still provides us with the challenge of identifying the local foci for this occupation.

Knowledge of the landscape during the Roman period at Gwithian rests upon two very different types of sites: the small and unusual building excavated at Porth Godrevy (site GT; Fowler 1962) and the early enclosure ditch at Crane Godrevy (site CG; Thomas 1969). The recent re-assessment of the ceramics from Porth Godrevy calls into question its primary agricultural function and now the identification of briquetage (coarsewares associated with salt-making) in the archive, reflects its coastal location (Quinnell 2004b). Two millennia ago, site GT must have been positioned close to the edge of a tidal inlet. There are also some unusual aspects at Porth Godrevy such as the discovery of pots set into the floor of the building, as well as a varied

stonework assemblage. Together with the pottery, all would benefit from a comprehensive re-assessment in the light of recent advances in Romano-British settlement research (Quinnell 2004a). Surviving traces of a probable contemporary lynched field system (PRN 92181), surveyed on Godrevy headland and Godrevy Green in 2003 (Craze 2003), may reveal the extent of a farmed landscape during this period, although it would be desirable to confirm the dates of these fields through small-scale targeted fieldwork. The relationship between these sites and the Roman villa at Magor a few miles upstream (O'Neil 1934) will continue to remain unknown without further modern fieldwork. Isolated finds of Roman coins (see above) continue to be found by metal detectorists on the edges of Gwithian village and so the extent of settlement for this period may be wider than is apparent at present. Future chance finds are likely to add to this picture. A penannular brooch of Roman date, second to third century AD, was found in topsoil during excavation of GB on Godrevy headland (Fowler 1963, 76).

The discovery of a ditched enclosure of Roman date at Crane Godrevy presents a further dimension to the varied texture of human settlement during the first millennium AD at Gwithian. This partially-explored round was resettled during the post-Roman and medieval periods, which obscured the survival of related buildings within its interior. The ditch sequences can however be dated confidently on current evidence wholly to the Roman period (Sturgess and Lawson-Jones 2006a). Excavations have shown that some rounds in Cornwall started life during the late Iron Age (for example, Threemilestone, Truro: Schwieso 1976; Trethurgy, St Austell: Quinnell 2004a). In the wider area around Gwithian there are up to 15 or 20 rounds, mostly identified from air photographs by the National Mapping Programme. Some survive as visible earthworks and others have been documented by earlier reports or as place-names. (Many rounds were described by R Thomas in 1851, and some sketched by Charles Henderson in the 1920s.) In the Gwithian area in general, rounds are spaced at less than a mile interval and appear to be sited on both sides of the Red River and Roseworthy valleys. The relationship between these sites and the later large farms named with *tre-* as a prefix, or with Domesday manors, as at Roseworthy, is unknown. Much further work on these sites is required

A specialised post-Roman industrial quarter

The excavations at GMI, GMA, GMB, GME and GMIV provide an intriguing insight into the varied character and status of post-Roman sites in Cornwall. These investigations merely sampled a rich slice of the landscape and it is certain that equally deep stratified deposits still lie under the sands with high potential for future fieldwork. For the present we have a snapshot of a potentially rich and complex site. This can be best interpreted as a workshop complex comprising a number of very unusual buildings which are likely to have been used seasonally as workshop shelters. A large number of features, principally interpreted as industrial, imply highly specialised craftworks which were perhaps carried out in different zones. Alongside these, artefact-rich domestic waste dumps and middens were found; some were created as a result of industrial and craft activities, as at GMI, but the origin and derivation of others is uncertain. The location of a contemporary residential settlement remains unknown although it is likely to be not far away as evidence for arable cultivation, considered to pre-date the Norman period, was found nearby (site GMXXI: Fowler and Thomas 1962). There is no evidence as yet for a primary residential settlement south of the Red River (for example at Sandy Lane or *Conarton*). Within the broader landscape of the fifth century AD there is only the Carnsew inscription at Hayle and the Phillack *chirho* and inscribed stone some 4km to the south-west (Thomas 1994, 188–94, 197–200). The partial traces of possible 'sunken feature' buildings at Crane Godrevy remain intriguing.

The post-Roman settlement excavated at Gwithian remains without parallel in the south west. It has all the traits of a specialised centre characterised by industrial and craft-related activities. Structurally one major phase of activity centred on likely 'workshop' spaces (phases 3 and 4) has been identified, although the presence of earlier imported wares in the lowest layers (phase 2) indicates a long sequence of activities and their presence merits close discussion. Full analysis of all the datasets from this small but extremely important excavation would form a major contribution towards post-Roman research in south west Britain and beyond. On present knowledge it is clear that a wide range of craft technologies, iron (and perhaps copper-alloy) metalworking (clearly both the smelting and smithing of iron), bone and leather working took place here during the fifth to eighth

centuries AD. Alongside these we may also suggest charcoal burning (perhaps related to 'industrial' fuel production), pottery production and evidence for the re-use and recycling of older artefacts (including fragments of imported wares made into spindle whorls). The variety and quantity of animal bone suggests animal processing for hides, bone, horn and meat. Marine shells were in abundance and smaller quantities of fish bones were also recovered. There is also some slight evidence for salt-making.

The results of this work should be presented in an account which draws in related evidence found at Crane Godrevy and Sandy Lane and the site needs to be discussed within our current understanding of post-Roman Cornwall. There are significant and unique artefact groups for this period available for full analysis and publication: pottery, metalwork, worked bone, animal bone, metallurgical debris, stonework, marine molluscs and charcoal. Given the success of the pilot dating study carried out in 2005 the potential for further scientific dating is high (Appendix 1).

Post-Roman significance and teasers

With apparent chronological depth, the ceramic assemblage is the largest for this period in the south west and is clearly a key dataset. Chronological ceramic issues need addressing. Further work should clearly identify the chronological horizon of the Gwithian Style ware and confirm the nature of grass-marked styles as cohesive. This will greatly aid chronological sequencing and by doing so will be a key contribution to unlocking some aspects of post-Roman Cornwall. The material requires full analysis and publication. Its importance is underlined by its discovery within a localised, intact sequence which can be scientifically dated (Appendix 1). Comprising foreign imports, innovative ceramic techniques such as grass-marking and the appearance of the distinctive bar-lugs, the assemblage reveals a community which is linked to a wider world beyond the shoreline at Gwithian. But for whom were the objects intended and what could be the motivations behind this hive of industry? Surely, more than the support of local farming communities? And what are we to make of the appearance of the distinctive bar-lug pottery which, on current dates, appears early here at Gwithian? The presence of such a unique range of ironwork from the site also poses questions.

The coastal location of GMI seems key to an understanding of how it operated within a wider

social landscape; with its emphasis on specialised activities it shares similarities with the small Romano-British and early medieval coastal site at Duckpool in north Cornwall. Investigations there in 1992 were small-scale but revealed some intriguing data. The site lay at the bottom of a coastal valley close to the beach and, although no buildings were found, a series of industrial hearths with evidence for secondary metalworking (lead, pewter and copper-alloy) was found alongside the manufacture of dyes from marine molluscs (Ratcliffe 1995). Radiocarbon dates suggest that these industrial activities principally took place during one major phase, the third to fourth centuries AD, and although metalworking may have ceased during the immediate post-Roman period, it is clear that Duckpool continued to have significance as a distinctive place during the seventh to twelfth centuries AD when it may have operated as a small harbour linked to the development of the early medieval manor of Kilkhampton (*ibid.*, 116). As Ratcliffe has pointed out, it is interesting to speculate on how widespread specialist coastal sites for this period may be in Cornwall and Devon (*ibid.*, 119), and how they would have fitted into the wider scene, providing opportunities for the development of trade and contacts near and distant.

Within the material excavated at GMI there are clear contacts with distant places like the eastern Mediterranean and the west coast of France, while Irish, Welsh, and even possible Anglo-Saxon influences may be seen in some of the artefacts. The quantity and variety of imported ceramic wares is extraordinary if compared with those excavated from contemporary sites in western Britain such as Dinas Powys, Glamorgan (Alcock 1987), South Cadbury, Somerset (Alcock *et al* 1995; Barrett *et al* 2000), Dunnadd, Argyll (Lane and Campbell 2000), and the Mote of Mark, Dumfries and Galloway (Laing and Longley 2006). These issues need to be considered in our interpretations of the type of community living at Gwithian during this period. Such comparisons underline the significance of the site.

GMI is the only excavated post-Roman site in Cornwall which has, to date, produced a full sequence of local ceramics in addition to imported wares. At present the only useful local comparison may be that of a deep midden recorded on the coastline of Tean on the Isles of Scilly which was partially examined in 1956. Unfortunately this site remains unpublished (archive, courtesy C Thomas, but see Thomas 1985, fig 80, 183–5). The tantalising



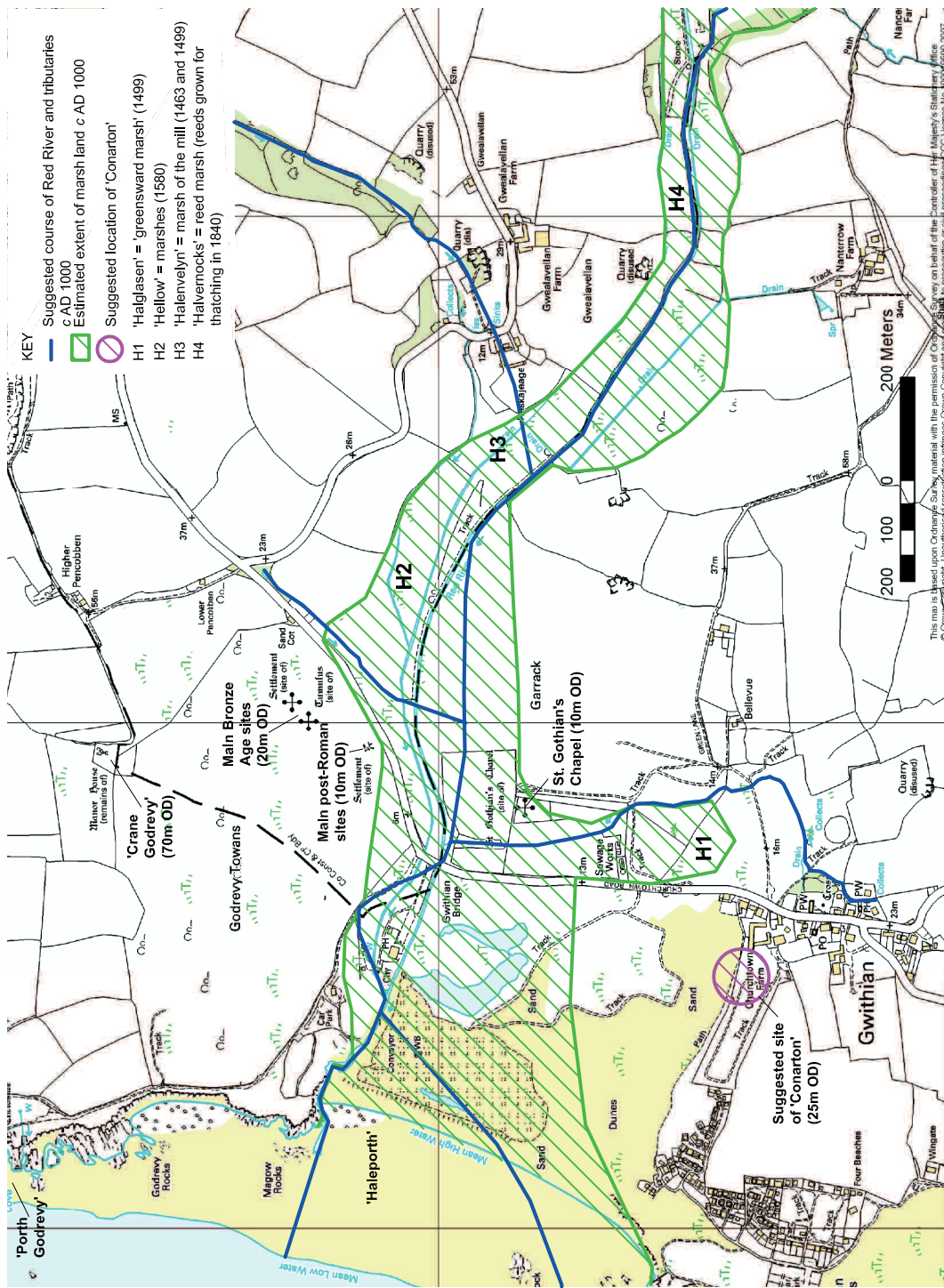
Fig 14 Gwithian churchtown, 11 July 1963. The edge of Sandy Lane is visible in the bottom right-hand corner. The possible site of Conarton is in the field centre right. (AFL03/Aerofilms/A118380 © English Heritage, NMR Aerofilms Collection).

remains of a 'sunken' granite structure ('house 1') were found set within a deep midden. The building bears remarkable similarities in construction to those found at GMI. It was made up of selected granite blocks laid in low courses which stood up to 0.6m high and formed revetted faces. No interior surfaces survived but midden material in and around the building contained grass-marked pottery, Bii amphora and E-ware. It also contained large quantities of animal bone, including horn cores and worked bone, including a highly decorated pin, and distinctive ironwork like the fragment of an iron saw, an iron gouge, a bronze penannular brooch and an unusual decorative bronze fitting (Thomas 1960c). This rich array of data is a striking parallel to the post-Roman assemblage recorded at Gwithian. In 1989 two radiocarbon (C14) dates from the Tean midden were obtained from charred grains. These were 1605 ± 50 BP, cal AD 270–560 (OXA-4699) for the lower half of the midden, and 1355 ± 50 BP, cal AD 600–770 (OXA-4698), for the upper part (Ratcliffe and Straker 1996, 98).

The early medieval period

The early medieval history of Gwithian remains a subject for future research. Pottery found at Sandy Lane and dating from the tenth to thirteenth centuries AD, suggests the presence of a pre-Norman settlement which may be the direct successor of the as yet undetected residential post-Roman settlement

Fig 15 Projected course of the Red River and its tributaries and the extent of estuarine marshland c AD 1000 (© Gwithian archive, J Sturges and C Thomas). The historic place-names are from the following sources: Halglasen, 1499 (Padel and Fox, eds, 2000, 135); Hellow, 1580 (Henderson MSS, Ancient Deeds, VIII, 141, Courtney Library, Royal Institution of Cornwall); Halenvelyn, 1463 (Padel and Fox, eds, 2000, 46, 135); Halvernocks, 1840 (Gwithian tithe survey, Cornwall Record Office); Haleporth, 1650 (Henderson MSS, Ancient Deeds, V, 51, Courtney Library, RIC).



in the area (see above). *Conarton* or *Connerton* was the place-name for Gwithian prior to the medieval period (Figs 14 and 15). The pre-Norman and Domesday manorial centre of *Conarditone* (in 1086: Padel 1988, 71), was later *Conarton* (c 1155: *ibid*).

The name *Conar* is puzzling. It cannot be explained as Old Cornish (noun, or proper name) and, as a label for the original tidal inlet here (*Dour Conar*, Conar Water), it might be referred to Old Irish *conair*, *conar*, among whose meanings was 'way in (to), entry (to)'. If so, external use of, and knowledge of, the Gwithian estuary in pre-Norman times may be linked not only to the appearance of Mediterranean and Gaulish (E-ware) pottery but also to the arrival of new ideas – like the grass-marking of pot bases, rotary querns as hand-mills, possibly bar-lug handles – involving maritime trade and links with Ireland. Archaeological evidence coupled with that of place-names is being used to gradually explain the development of Gwithian's landscape, including a demonstration that large areas now cloaked by sand dunes apparently contained settlement and fields.

Ideally, further work at one intriguing site could further expand our knowledge of the early medieval scene. This is the so-called St Gothian's Oratory or, 'the chapel in the sands', and its accompanying Early Christian cemetery (Edmonds 1856, fig 1; Figs 3 and 15). A structure revealed in 1827 and visible as a ruin until the 1930s suggests a small tenth-century church which was enlarged during the eleventh century and then, after AD 1200, abandoned to the overwhelming blown sand and replaced by Gwithian parish church. Early accounts point to a succession of small churches and associated graves, in a sequence nearly 5m deep (Thomas 1964b, 6–7, fig 2); if the sequence began c AD 700 or so, this would have been contemporary – on the south side of the tidal inlet – with the GMI workshop complex and any associated settlement. On the separate evidence from Phillack and Carnsew, only 5 km south west, Christianity reached this area in the late fifth or early sixth century. Given the known depth of sand here, potential survival of well-preserved material below the present ruins is high. Geophysical survey, even trial trenching, may at some future date establish the nature and extent of this site and any potential settlement alongside. A fenced area around the Oratory, saving it from further damage through intensive cattle-grazing, has at least stabilised what can be seen; any further information would of course

aid the longer-term management and conservation of an important scheduled monument (Preston-Jones and Thomas 2002).

Landscape changes during the medieval and historic periods (AD 1000 to the present day)

Gwithian, as an ecclesiastical parish, was created early in the thirteenth century, mainly out of Phillack, a larger parish covering, until the 1840s, most of Hayle town and harbour. To some extent Gwithian remained a subsidiary of Phillack. The steady encroachment inland of several miles of sand dunes overwhelmed the odd farm, like Upton in the seventeenth century (the remains were briefly exposed in 1808–9), covered arable fields to a depth of 2 to 3m and even threatened Phillack church. Traditionally it was halted by planting the rush-like marram, *Ammophila arenaria*, whose root networks bind the dunes. A small hamlet arose on the subsequent site of Gwithian village, its new church replacing the abandoned 'Oratory'. Whatever, from the ninth to tenth centuries had constituted the manorial focus of Domesday *Conarditone*, the site of Sandy Lane and below Churchtown Farm's present caravan park, was similarly abandoned and remembered only as 'Conner Wartha' in 1659 (Thomas 1964b, fig 1; Fig 14). The long tidal inlet, the original Conar, became progressively choked; some kind of foot-bridge for use at low tide probably appeared at this time. Certainly in the Bronze Age and to a large extent until the early 1200s this tidal estuary, subsequently the 4 km outflow of the combined Red River and Roseworthy stream, was fringed with reed-beds and lapped both the linear dune with site GMI (to the north) and, almost, St Gothian's 'Oratory' and burial-area (to the south) (Fig 15). Late medieval and indeed recent (to the 1920s) mineral extraction, deep alluvial working or tin-streaming, extended from Gwithian to Tuckingmill, some 8 km (Sharpe 1990b; Buckley 1999; Edmonds 2003). Around 1850 the Tehidy estate canalised the last (seaward) third or so of the Red River. Its former course, as a freshwater but discoloured stream took it across Gwithian beach ('Coner Sandes' in 1433), skirting on the southern shore the now-vanished sites of OLS and Wheal Emily with their prolonged archaeological history. Today the former sand quarry and beach area is a nature reserve; delightful, full of birds and ponds, but entirely artificial with no visible indication whatsoever of its history.

Under the sand here, by the former river course, estuarine deposits were recently recorded at depths of 4m (Wessex Archaeology 2002). A detailed picture of *Conar*, the inlet of the first millennium AD and earlier, is still lacking, despite borings a century ago in search of early tin-bearing gravels intercalated with peats and clays (Stephens 1900). Today, winter flooding after heavy rains often reproduces the form of much of the inlet but further research on its prehistoric extent remains a desirable aim.

The northern part of Gwithian parish, effectively the subordinate Manor of Crane Godrevy, was detached from Camborne and the lands of the Bassetts of Tehidy in the early thirteenth century. In the abandoned round, site CG, a small new homestead – a sunken-walled rectangular structure, associated with Sandy Lane pottery – had appeared in the late tenth or early eleventh century, possibly a continuation of life at the now sand-choked abandoned site GMI downslope. In due course, a larger two-roomed structure, with appended north wings, replaced this, its inhabitants assuming the name of ‘de Godrevy’ from their holding. To its west, on the sunny decline to the shore (by site GT), a series of long widely-spaced strip fields was laid out; detectable below more recent conversion into rectangular closes, this is the arable and pasture of Godrevy Farm. A hollow way with low bank divided these fields from a large tract of unenclosed dunes and hillside (‘Godrevy Towans’), probably mainly used for sheep.

Excavation of the Crane Godrevy manorial site, if incomplete, remains one of the most important in Cornwall; the range of finds, ending as they do with a farthing of Charles II (1672–5 or 1679) and the large door-key on the sandy floor of the abandoned dwelling, includes pottery from Cornwall and further afield, iron artefacts, and stone objects and implements and large quantities of animal bone that in part continue what was used here in post-Roman times (Freeman 2004; Foster 2004; Hammon 2004). Although not the subject of recent detailed work, the excavations of the later medieval manor of Crane Godrevy represents one of the few excavations of a medieval rural settlement in the county and analysis of this site remains a key recommendation for future work. Its history as documented by excavations in the 1950–60s, reveals the rare survival of an essentially unaltered medieval farm where the full medieval period is represented by the artefacts.

By the early 1600s the last Godrevy heiress had married out, the family disappeared and Crane

Godrevy itself must have been tenanted; by 1750 or so, its ruins overgrown with sandy turf, it became a mowhay or rickyard. In the 1920s when the Bassett wealth collapsed and the vast Manor of Tehidy was sold off, this northern part of Gwithian – indeed, also the northern fringe of Camborne – with all its holdings of medieval origin (Godrevy, Crane Godrevy, Pencobben, Reskajeage and Gwealavellan) passed to the Thomas family of Camborne. Most of the open land was given or covenanted to the National Trust. What remains in family hands is Crane Godrevy itself, the probable ‘holy well’ of St Gothian, and about 100 acres containing the major archaeological sites discussed in this paper. Protected by half-a-dozen statutory designations (including SSSI), this land – fenced-off as agricultural grazing – remains available for archaeological work in the foreseeable future.

Exploring the changing face of coastal landscapes

Gwithian is a coastal parish and the archaeological investigations that have taken place over the last 50 years or so have much to teach us about the potential of coastal zones for the study of human communities since prehistory. It is clear that the present sand dunes are largely a medieval feature and that these have played a role in influencing land use and settlement patterns in the area. The long history of settlement and arable cultivation documented here during the second millennium BC, the first millennium AD and in the historical period suggests that while sand blows may have been a daily hazard they did not deter settlement or indeed prohibit cultivation. Indeed the archaeological evidence points strongly to successive generations flourishing and actively exploiting the range of resources offered by the coastal zone. This questions any preconception that the coastal belt can only be regarded as socially and economically peripheral and marginal. So while there is clear evidence for settlement and arable cultivation which may have presented challenges, there was clearly a strong and enduring attachment to place and land. This was just as true for communities during the second millennium BC as it was during the post-Roman chapter of the Gwithian story.

A key feature of the study of human settlement down through the ages at Gwithian is its coastal location and the role of the sea. From the Mesolithic

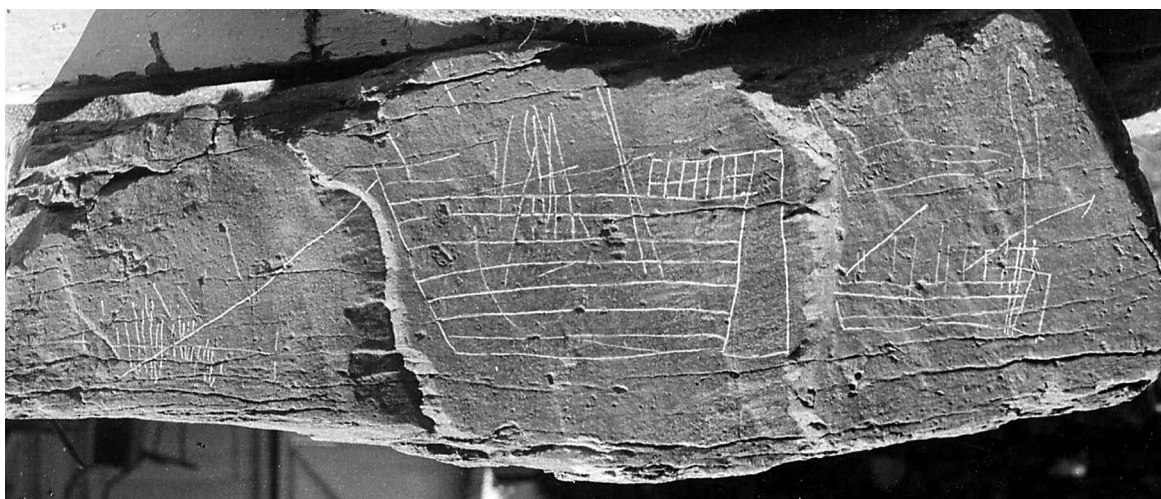


Fig 16 An image of two moored boats incised with a knife-point on a block of slate, found at Crane Godrevy (site CG). The slate had been reused as building stone in one of the medieval buildings (© J V S Megaw, Gwithian archive).

period right through to the post-Roman times the beaches and shores were demonstrably the source of many aspects of surviving material culture, as beach pebbles were modified into tools. In the Roman and post-Roman periods briquetage reveals episodes of salt production, and during the post-Roman period, the raised beach concretions permitted small-scale iron working. The presence of imported resources, like gabbroic clays from the Lizard and fine non-local wares, underpins the importance of maritime trade from the Bronze Age through to the early medieval period. It is possible that the gabbroic clays derived from the Lizard (some 20 km to the south east) may have reached Gwithian by boat during the second millennium BC. One of the more intriguing archaeological discoveries made at the medieval site of Crane Godrevy is a late medieval graffito representation of two sailing ships moored within presumably local marshes scratched onto a slate (Fig 16).

Gwithian in the twenty-first century and looking ahead towards analysis

Our recent return to the archaeology of Gwithian has had two aims: to present the emergent results of a major archaeological study and to promote the significance and importance of this coastal landscape

to a wide audience. The excellent preservation of the archaeological resource as demonstrated by the Gwithian project provides valuable insights into the rich potential of the unique historic environment of similar duned landscapes. Such knowledge can inform the long-term future management of the Gwithian area as well as pointers for other significant dune landscapes in the south west. Although sand extraction has now ceased at Gwithian, the area once a quarry and now a Nature Reserve managed by Cornwall County Council and purchased with funds from the Aggregate Scheme (ALSF), continues to require careful management.

While there may seem to the casual visitor nothing particularly special about the Gwithian area, this summary has delved beneath the shifting sands of time to reveal a complex archaeological story. The scope for further fieldwork has been demonstrated but full analysis of the majority of the data summarised above remains the outstanding priority. A precious, if minor, part of the area is now preserved through National Trust ownership, a nature reserve, ancient monuments scheduling and status as an SSSI. Happily, it covers the majority of the known archaeological sites. But what is the future of 'the Gwithian area'? The future protection of the archaeological richness of this coastal setting has to be based on a sound understanding of what we already know. Our responsibility to present that

knowledge to a wide community is all too clear and this fresh if selective account is intended to start to fulfil these aims.

Appendix 1 Gwithian: scientific dating

*D Hamilton, P Marshall, H M Roberts,
C Bronk Ramsey and G Cook*

Radiocarbon dating

A total of 20 carbonised residue samples adhering to the interior of pottery sherds were submitted for dating by Accelerator Mass Spectrometry (AMS) to the Scottish Universities Environmental Research Centre (SUERC), East Kilbride, and the Oxford Radiocarbon Accelerator Unit (ORAU) in 2005. The samples submitted to SUERC were prepared using methods outlined in Slota *et al* (1987) and measured as described by Xu *et al* (2004). Those submitted to ORAU were prepared according to methods given in Hedges *et al* (1989) and measured as described in Bronk Ramsey *et al* (2004).

In addition, one sample of unidentified, bulk charcoal was submitted to the National Physics Laboratory (NPL) in 1961. The sample was prepared according to methods outlined by Callow *et al* (1963) and measured by gas proportional counting (carbon dioxide).

Both the SUERC and ORAU laboratories maintain continual programmes of quality assurance procedures, in addition to participation in international inter-comparisons (Scott 2003). These tests indicate no laboratory offsets and demonstrate the validity of the measurements quoted.

The calibrations of these results, relating the radiocarbon measurements directly to calendar dates, have been calculated using the calibration curve of Reimer *et al* (2004) and the computer program OxCal (v3.10) (Bronk Ramsey 1995; 1998; 2001). The calibrated date ranges for these samples are given in Table 1 and have been calculated using the maximum intercept method (Stuiver and Reimer 1986). The calibrated date ranges cited in the text are those for 95% confidence. They are quoted in the form recommended by Mook (1986), with the end points rounded outwards to 10 years if the error term is greater than or equal to 25 radiocarbon years, or to 5 years if it is less. The graphical distributions of the calibrated dates, given in outline in Figures 17–21,

are derived from the probability method (Stuiver and Reimer 1993).

Optically Stimulated Luminescence dating

Two sand units, interpreted to be aeolian in origin, were sampled by the Aberystwyth Luminescence Research Laboratory for a pilot study examining the feasibility of using optically stimulated luminescence (OSL) dating at this site. Samples were collected using a 25cm length of 5cm diameter opaque plastic pipe driven horizontally into the sand units. The dose rate (Gy/ka) to each sample was determined using *in situ* field gamma spectrometry coupled with laboratory-based beta counting of finely ground bulk sample material. Coarse-grained quartz of 180–210 µm diameter was prepared in the laboratory using standard methods (outlined in Table 2). Measurements were made using an automated Risø TL/OSL reader equipped with a combined high-power blue LED/ infra-red laser diode OSL unit, and a beta source for irradiations. The combined OSL unit was employed at 80% of full diode current, providing approximately 17mW/cm² power from the blue LED unit (470nm), and 370mW/cm² from the IR laser diode (830nm). The OSL measurement procedure employed was the Single Aliquot Regenerative dose (SAR) protocol (Murray and Wintle 2000) which corrects for sensitivity change (see Table 2 for further details). Several checks and screening criteria were applied to the OSL dating aliquots, and also to additional aliquots prepared from the samples, to ensure that the equivalent dose (D_e , Gy) data included in the final age calculation were of the highest quality (Roberts 2007).

The SAR measurement protocol was appropriate for these samples and the sensitivity correction worked well. Using large aliquots, the samples proved sufficiently sensitive and responsive to facilitate well-resolved dating using OSL. A comprehensive account of the OSL dating is given in Roberts (2007). The equivalent dose (D_e) data, the results of laboratory dosimetry measurements, with corrections being made for attenuation by water and for grain size, and the final age determinations, are presented in detail in Table 2. The error shown for the D_e determination (Table 2) is the standard error (i.e., the standard deviation divided by the square root of the number of independent estimates of D_e). The average percentage error on the OSL ages is small, being < 5.0 %.

Table 1 Gwithian radiocarbon dating results

Laboratory number	Sample ID	Phase	Context	Material	σ ^{13}C ‰	Radiocarbon age (BP)	Calibrated date (95% confidence)
OxA-14488	GMXV 22	BA 3 or later 1	none	carbonised residue, undecorated body sherd	-27.3	3245 \pm 40	1620–1430 cal BC
OxA-14489	GMXV 20	BA 3	[1512]	carbonised residue, decorated rim sherd	-26.5	3039 \pm 37	1410–1130 cal BC
OxA-14568	GMXV 25A	BA earlier 1	[1507]	carbonised residue, undecorated body sherd	-28.0	3430 \pm 50	1890–1610 cal BC
OxA-14490	GMXV 25B	BA earlier 1	[1507]	carbonised residue, undecorated body sherd	-26.2	2961 \pm 36	1310–1040 cal BC
SUERC-6162	GMX 27	BA 5	[433]	carbonised residue, decorated rim sherd	-27.4	2835 \pm 35	1120–900 cal BC
OxA-14525	GMX 27B	BA 5	[433]	carbonised residue, decorated rim sherd	-26.5	2946 \pm 29	1270–1040 cal BC
OxA-14526	GMI 7	PR 3	[2208]	carbonised residue, undecorated body sherd	-25.9	1448 \pm 28	cal AD 560–660
SUERC-6159	GMI 7B	PR 3	[2208]	carbonised residue, undecorated body sherd	-26.7	1525 \pm 35	cal AD 420–610
weighted mean	GMI 7	PR 3	[2208]	T⁺=3.0, T⁻(5%)=3.8, v=1		1478 \pm 22	cal AD 545–640
OxA-14527	GMX 16	BA 5	[576]	carbonised residue, undecorated body sherd	-26.2	2878 \pm 29	1190–940 cal BC
OxA-14528	GMI 1	PR 2	[2210]	carbonised residue, Gwithian-style base sherd	-27.3	1460 \pm 27	cal AD 550–650
OxA-14529	GMI 9	PR 2	[2210]	carbonised residue, base sherd	-26.3	1534 \pm 29	cal AD 420–600
OxA-14589	GMX 17	BA 5	[546]	carbonised residue, Base sherd with matting impressions on exterior of base	-25.0	2944 \pm 33	1270–1020 cal BC
OxA-14590	GMIX 30	BA 5	[1088]	carbonised residue, undecorated rim sherd	-27.1	2836 \pm 32	1120–900 cal BC
SUERC-6158	GMI 6	PR 2	[2210]	carbonised residue, undecorated body sherd	-27.2	1455 \pm 35	cal AD 540–660
SUERC-6160	GMI 13	PR 3	[2238]	carbonised residue, grass-marked base sherd	-26.1	1310 \pm 35	cal AD 650–780
SUERC-6161	GMX 26	BA 5	[433]	carbonised residue, sherd with incised herringbone decoration	-28.3	3430 \pm 35	1880–1630 cal BC
SUERC-6163	GMX 28	BA 5	[343]	carbonised residue, decorated body sherd	-26.6	2980 \pm 35	1380–1110 cal BC
SUERC-6167	GMXV 19	BA 3	[1504]	carbonised residue, base sherd	-26.2	3180 \pm 35	1520–1400 cal BC
NPL-21	GMX	BA 3 or 5	—	charcoal, unidentified, bulk from four features		3070 \pm 103	1530–1010 cal BC

No *posterior density estimates* are quoted because at present we do not have a preferred model.

Table 2 Gwithian OSL sample details, equivalent dose and dose rate data, and OSL ages

<i>1 Gwithian OSL samples - section GMXVII</i>		
<i>2 Aberystwyth Luminescence Research Lab. number</i>	<i>3 101 GWT</i>	<i>4 101 GWT 6</i>
<i>Sample description</i>	<i>Context 602a (Phase 4)</i>	<i>Context 606 (Phase 2)</i>
<i>Depth down-section (m)</i>	0.45 ± 0.02	0.85 ± 0.02
<i>Material used for dating</i>	Quartz	
<i>Grain size (µm)</i>	180–212	180–212
<i>Preparation method</i>	HCl (10% v.v.); H ₂ O ₂ (20 vols.); dry sieving; density separation (sodium polytungstate); 40% HF etch 45 mins; 37% HCl 45 mins; re-sieve	
<i>Measurement protocol</i>	SAR; OSL 470nm; detection filter 7.5mm Hoya U-340; OSL measurements made @ 125°C; preheat range 160–300°C	
<i>No. aliquots measured</i>	24	24
<i>No. aliquots used for D_e</i>	13	13
<i>Equivalent Dose, D_e (Gy)*</i>	3.60 ± 0.09	3.77 ± 0.10
<i>Water content</i>		
<i>(% dry mass)</i>	7 ± 5	7 ± 5
<i>U (ppm)</i>	0.62 ± 0.04	0.63 ± 0.04
<i>Th (ppm)</i>	1.71 ± 0.11	2.49 ± 0.14
<i>K (%)</i>	0.65 ± 0.05	0.73 ± 0.05
<i>Layer removed by etching (µm)</i>	10 ± 2	10 ± 2
<i>Infinite β dose rate (Gy/ka)</i>	0.599 ± 0.008	0.734 ± 0.015
<i>External β dose rate 'wet' (Gy/ka)</i>	0.484 ± 0.029	0.593 ± 0.036
<i>External γ dose rate 'wet' (Gy/ka)</i>	0.287 ± 0.020	0.340 ± 0.022
<i>Cosmic (Gy/ka)</i>	0.214 ± 0.002	0.189 ± 0.002
<i>Total dose rate (Gy/ka)</i>	0.99 ± 0.04	1.12 ± 0.04
<i>OSL Age[#] (a)</i>	3650 ± 160	3360 ± 160

[#] Ages are expressed as years before 2005 AD, rounded to the nearest 10 years. All calculations were performed before rounding.

*The error shown is the standard error on the mean.

General approach

The Bayesian approach to the interpretation of archaeological chronologies has been described by Buck *et al* (1996). It is based on the principle that although the calibrated age ranges of radiocarbon measurements accurately estimate the calendar ages of the samples themselves, it is the dates of archaeological events associated with those samples that are important. Bayesian techniques can provide realistic estimates of the dates of such events by combining absolute dating evidence, such as radiocarbon and OSL results, with relative dating evidence, such as stratigraphic relationships between radiocarbon samples. These 'posterior density estimates', are not absolute. They are interpretative estimates, which will change as additional data become available or as the existing data are modelled from different perspectives.

The technique used is a form of Markov Chain Monte Carlo sampling, and has been applied using the program OxCal (v3.10) (<http://units.ox.ac.uk/departments/rlaha/>), which uses a mixture of the Metropolis-Hastings algorithm and the more specific Gibbs sampler (Gilks *et al* 1996; Gelfand and Smith 1990). Details of the algorithms employed by this program are available from the on-line manual or in Bronk Ramsey (1995; 1998; 2001). The algorithms used in the models described below can be derived from the structure shown in Figures 17–21.

Aims

The scientific dating programme for the project had three main aims:

1. To test whether the proposed Bronze Age sequence of 'layers' (eight principal archaeological

horizons or banded phases of archaeological activity: 1–8) identified across the site in the 1950s and 1960s can be verified by dating the carbonised residues surviving on the internal surfaces of pottery sherds.

2. To test whether the proposed post-Roman sequence of ‘layers’ (three principal archaeological horizons or banded phases of archaeological activity: A–C) identified across the site in the 1950s and 1960s can be verified by dating the carbonised residues surviving on the internal surfaces of pottery sherds.
3. To determine the applicability of OSL dating to the aeolian sand units found between the main occupation horizons at Gwithian.

The sampling strategy for the first two aims was to submit a minimum of 15 pottery sherds with carbonised residues from throughout the sequence of each of the two identified occupations, Bronze Age and post-Roman. Fifteen sherds from Bronze Age deposits were identified during the assessment; however, only five from post-Roman deposits could be obtained.

To achieve the third aim, a 2m by 4.6m trench (site GMXVII) was excavated in 2005 between GMX and GMIX, as it was expected that sand phases 6, 4, and 2 would be fully exposed in the profile at this location. However, phase 6 was no longer visible and so samples were taken from phases 4 and 2.

The Bronze Age sequence

Layers

Two carbonised residues on sherds from different vessels, both undecorated body sherds of Trevisker style vessels, were dated from [1507] a house floor level identified at site GMXV and assigned to phase 1. The two measurements (OxA-14490, 2961 ± 36 BP, and OxA-14568, 3430 ± 30 BP) are not statistically consistent ($T'=59.0$; $v=1$; $T'(5\%)=3.8$; Ward and Wilson 1978) and are clearly of different ages.

A single carbonised residue (OxA-14488) when submitted was thought to come from the upper horizon of phase 1, however subsequent analysis of the stratigraphy suggests that it might actually be either this horizon or phase 3.

A single OSL sample (ABER-101/GWT-6) was taken from phase 2, a layer of windblown sand which sealed the earlier phase 1 horizons.

The unidentified bulk charcoal sample from the four cremations pits identified in phase 3 or 5 (NPL-21) provides a *terminus post quem* for the funerary activity. In addition, two carbonised residue samples were dated from phase 3 site GMXV [1512] and GMXV [1504], OxA-14489 and SUERC-6167 respectively. Both contexts were linked to the ruined building [1503] during phase 3 at site GMXV.

Phase 4 had previously been interpreted as representing a sand inundation that covered part of the entire site, sealing all traces of human activity beneath it (belonging to phase 3). Subsequent analysis following fieldwork in 2005 indicates that the earlier interpretation of phase 4 as being a wholly natural sand blown deposit unaffected by anthropogenic activity needs to be reconsidered. A single OSL sample was obtained (ABER-101/GWT-4).

Six carbonised residues were dated from phase 5: OxA-14590 comes from the central hearth [1088] of posthole structure [1134] and SUERC-6163 comes from the fill of gully [343] to the south of structure [724/725], house 1. Two samples come from contexts that are part of phase 5: OxA-14527 from site GMX [576] and OxA-14589 from GMX [546].

Two samples were submitted from (433), a general context number given to all contexts within phase 5 in the area of structure [724/725]. Replicate measurements (OxA-14525; 2946 ± 29 BP and SUERC-6162; 2835 ± 35 BP) on sherd GMX 27 are not statistically consistent ($T'=6.0$; $v=1$; $T'(5\%)=3.8$; Ward and Wilson 1978). This might be due to different residues being dated or to one of the measurements being a statistical outlier. Even at the two sigma error term ($\pm 2\sigma$) there is still a 1 in 20 chance that the true age of a sample lies outside this range (Bowman 1990).

Sherd GMX 26 (SUERC-6161) was submitted as it was an example of an unusual ceramic style with incised close-set rows of herringbone, to date unique for Cornwall. This is a decorated body sherd intrusive within the midden in which it was found.

Contexts

The ‘layers’ as recorded by the Gwithian team in the 1950s and 1960s are a cultural concept and in essence represent what could be termed an ‘activity horizon’ related to a specific period of time. The use of such an approach and terminology to understanding the site today would be viewed as too simplistic, given the obvious episodic nature of activities across the site and between structures.

Re-analysis of the stratigraphy has made it possible to construct a model based only on the stratigraphic relationships between samples, as would be defined by modern excavation.

Unfortunately, however, given the original aims of the scientific dating pilot project, material was not preferentially selected from contexts with direct stratigraphic relationships, which were unknown during the initial selection process. Therefore the stratigraphic model only contains a relatively small number of samples that can be directly related to one another. From GMXV cutting 22 the two residue

samples from [1507] (OxA-14490 and OxA-14568) are overlain by OxA-14489 [1512]; that in turn is overlain by SUERC-6167 [1504]. The other two samples with an identifiable relationship are the OSL samples from GMXVII phase 2 and phase 4.

Results

The Bronze Age layers model

This model is based on the eight principal archaeological horizons identified during the 1950s

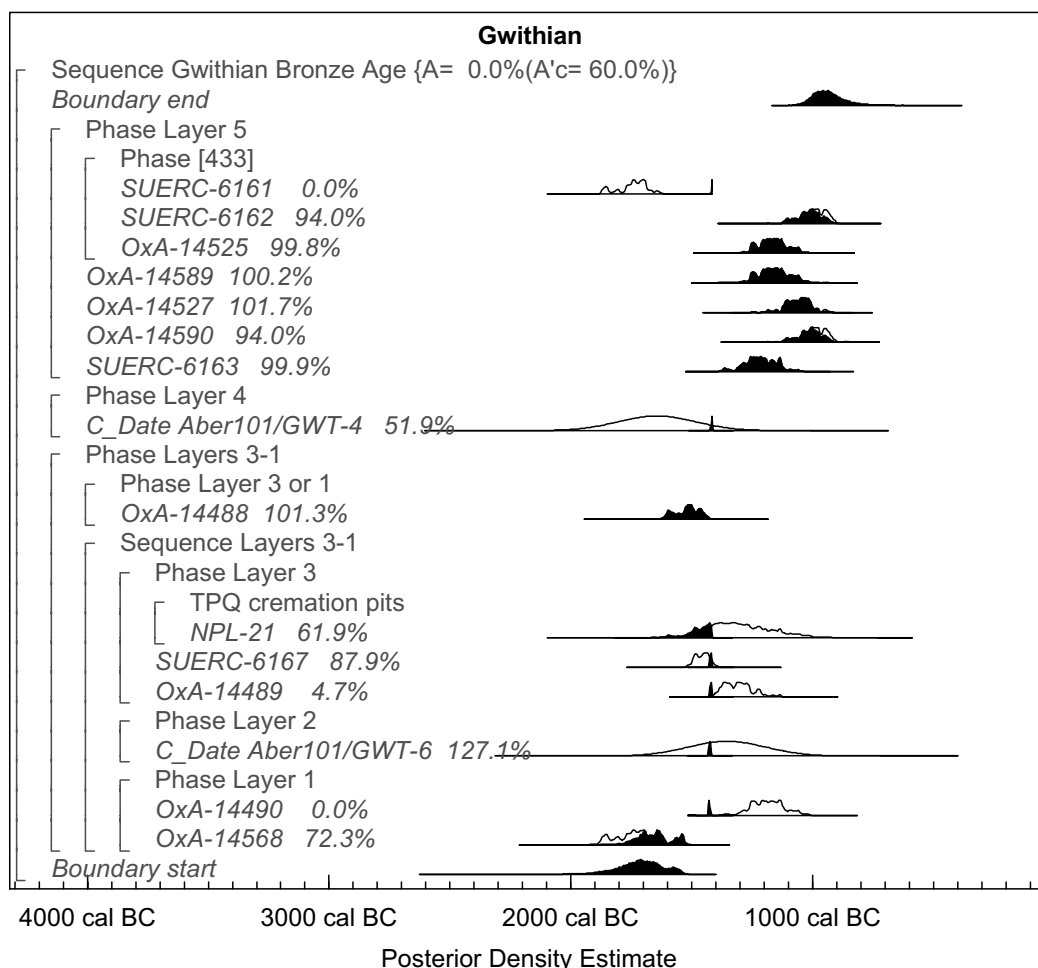


Fig 17 Probability distributions of dates from Gwithian (Bronze Age layers): each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon and OSL dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. The large square brackets down the left hand side along with the OxCal keywords define the model exactly.

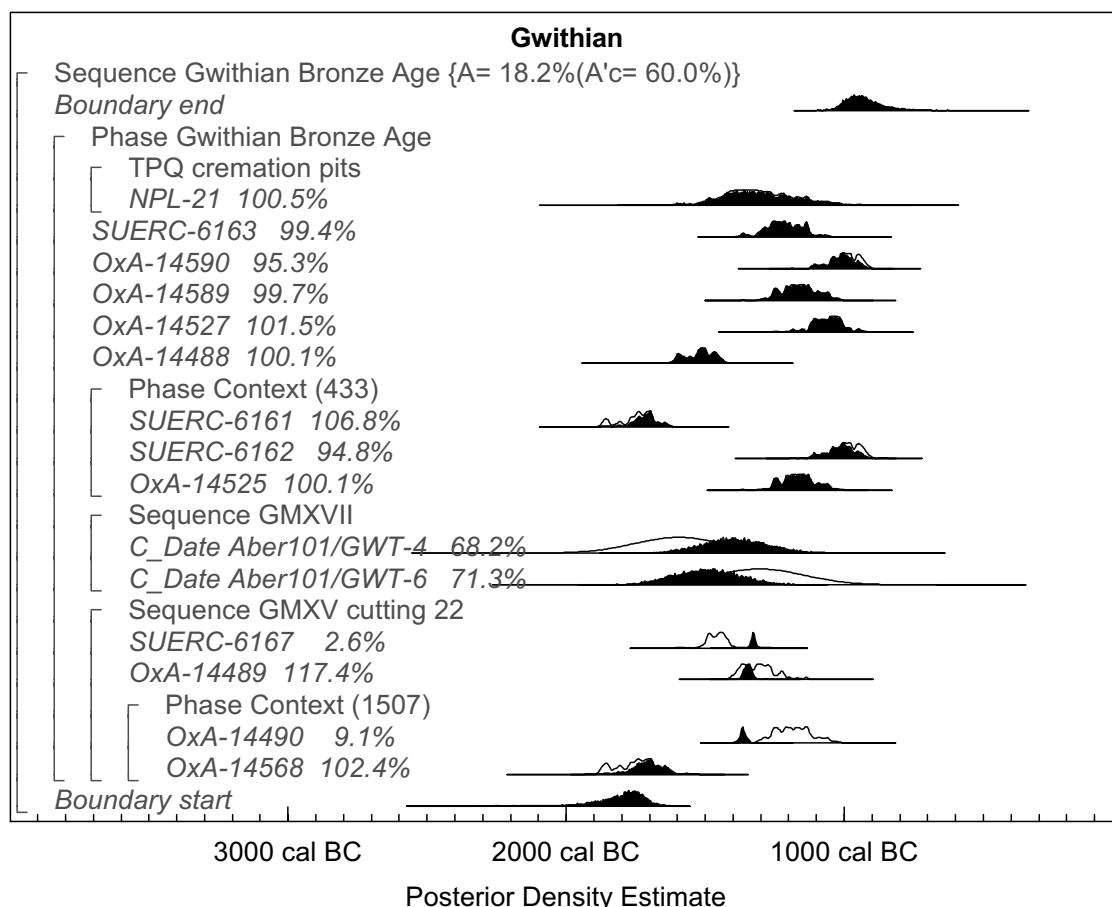


Fig 18 Probability distributions of dates from Gwithian (Bronze Age contexts): each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon and OSL dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. The large square brackets down the left hand side along with the OxCal keywords define the model exactly.

and 1960s excavations at Gwithian. These have now been identified as major phases (see above). The model (Fig 17) shows poor overall agreement ($A_{\text{overall}}=0.0\%$) indicating that the scientific dating results and stratigraphy as outlined above are not in agreement. A number of samples show very poor individual indices of agreement (OxA-14490, SUERC-6161 and OxA-14489).

Because this model makes it very difficult to evaluate the reliability of the questionable samples to date their associated phases, a second model was constructed using the stratigraphic relationship

between individual samples outlined above. This model is shown in Figure 18.

The Bronze Age context model

The overall index of agreement for the model shown in Figure 18 is poor ($A_{\text{overall}}=18.2\%$). Two samples have low individual indices of agreement (OxA-14490 and SUERC-6167). OxA-14490 is a small sample and could easily have moved down or fallen out of the baulk. SUERC-6167 appears to have been glued together, most probably with HMG glue, a

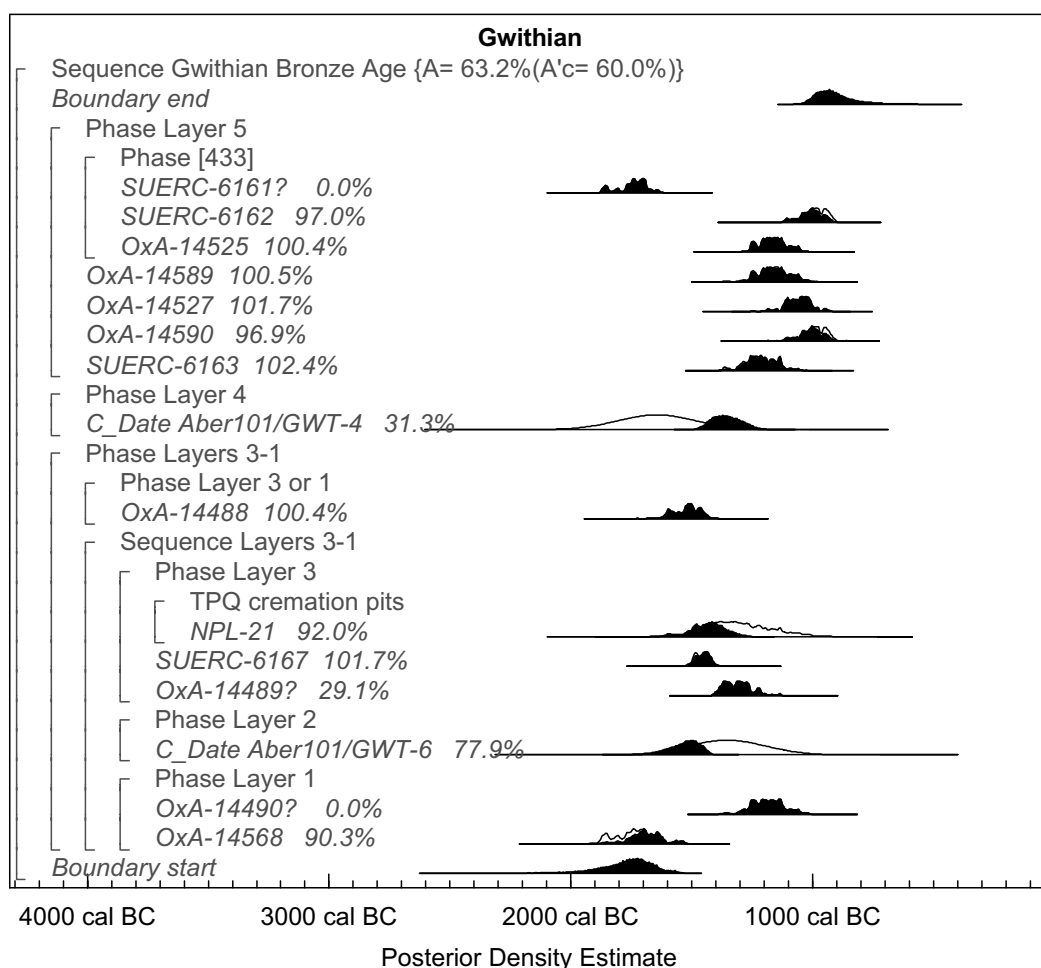


Fig 19 Probability distributions of dates from Gwithian (Bronze Age Layers): each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon and OSL dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. A question mark (?) indicates that the result has been excluded from the model. The large square brackets down the left hand side along with the OxCal keywords define the model exactly.

cellulose nitrate adhesive, although this would not contain 'old' carbon and therefore does not provide an explanation for the older than expected date. It is thus more likely that the sample (OxA-14489) stratigraphically below SUERC-6167 is too young.

The OSL measurements from Site GMXVII show good agreement and suggest they provide accurate ages for the sand horizons (phases 2 and 4). On the basis of these results therefore, OSL dating seems to

hold excellent potential for dating the sand levels across the site.

The Bronze Age layers model (ii)

In the model shown in Figure 19 we have chosen to exclude OxA-14490, SUERC-6161 and OxA-14489, for the reasons outlined above. Even with these three measurements excluded, the model still only just

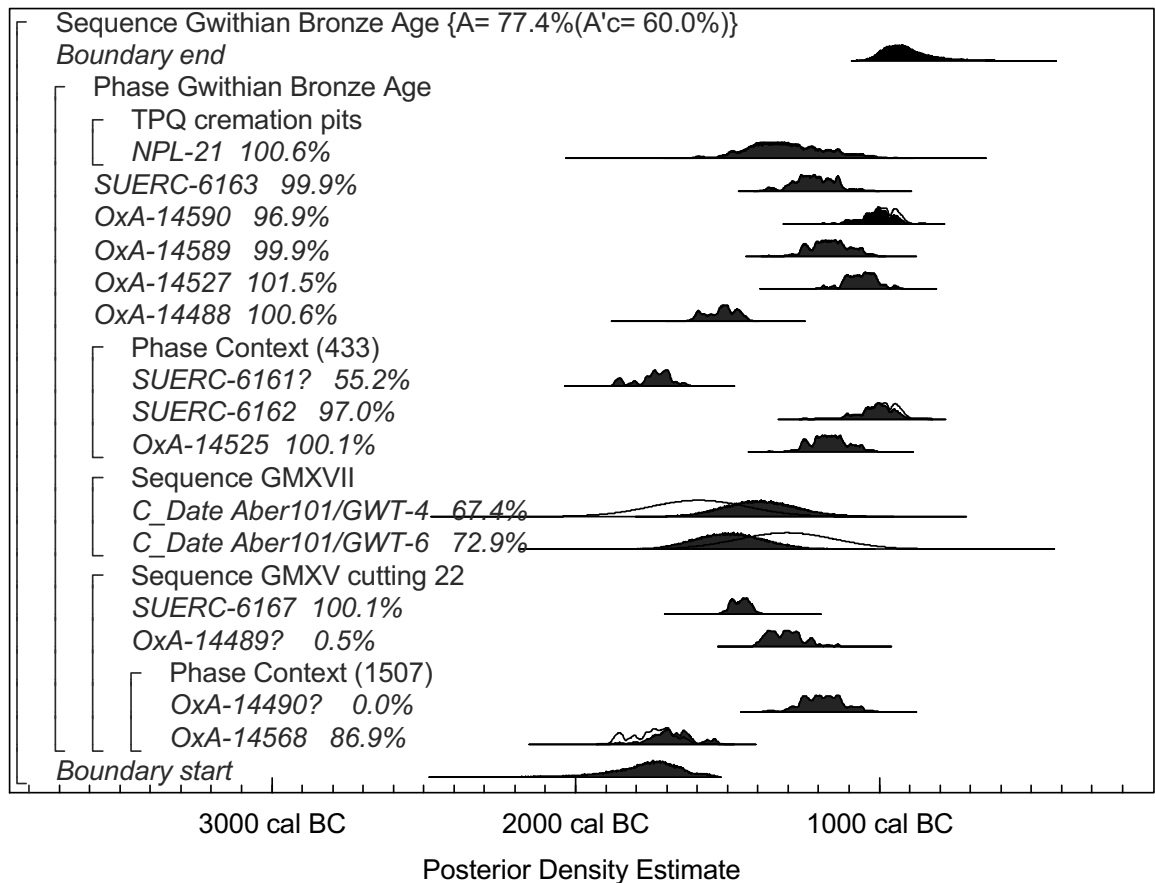


Fig 20 Probability distributions of dates from Gwithian (Bronze Age Contexts): each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon and OSL dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. A question mark (?) indicates that the result has been excluded from the model. The large square brackets down the left hand side along with the OxCal keywords define the model exactly.

shows agreement between the scientific dating results and the stratigraphy ($A_{\text{overall}}=63.2\%$), just above the rejection threshold ($A_{\text{overall}}<60\%$; Bronk Ramsey, 1995)

One sample (Aber101/GWT-4) has a low individual index of agreement ($A=31.3\%$) suggesting the OSL date is inconsistent with its stratigraphic position. This deposit was sampled based upon the assumption that it was a sterile aeolian sedimentary unit. However, the subsequent geoarchaeological and land snail assessments suggest that attempts to stabilise this horizon were also evident (Guttmann

2006; Davies 2006). Furthermore, there is evidence of plough marks at the top of the context immediately below the one that was sampled, indicating that ploughing through the sampled context [602a] and [602b] probably occurred. The associated anthropogenic processes could account for the incorporation of older material into the unit sampled, giving an older date than expected.

Although in an ideal situation this would be investigated through the use of smaller aliquots (2mm diameter) or even single-grain measurements, this is unlikely to be feasible in this case due to the

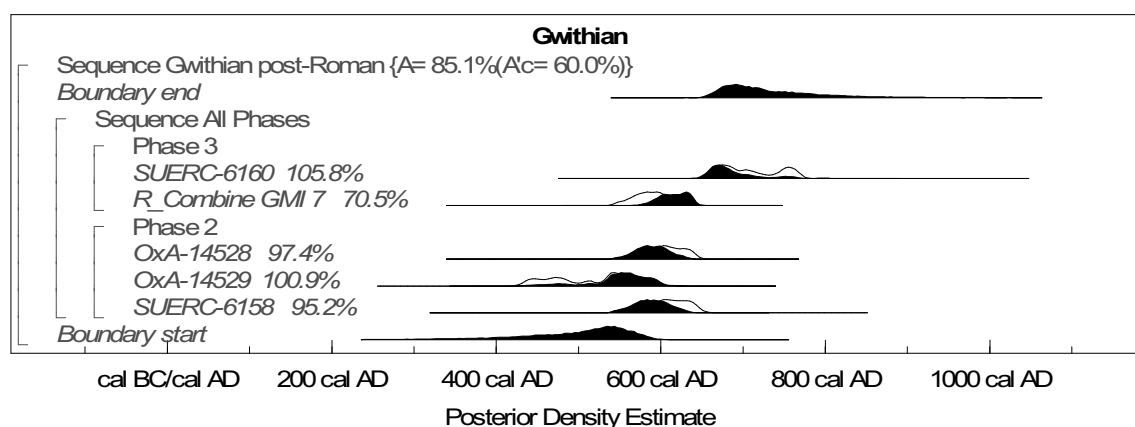


Fig 21 Probability distributions of dates from Gwithian (post-Roman layers): each distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon and OSL dates two distributions have been plotted, one in outline, which is the result of simple calibration, and a solid one, which is based on the chronological model used. The large square brackets down the left hand side along with the OxCal keywords define the model exactly.

already low-levels of light emitted from the larger (8mm diameter, <1000 grains) aliquots used.

The model suggests that the broad site horizons termed 'layers' proposed by the Gwithian team in the 1950s and 1960s are correct. However, this sequence needs further investigation and clarification. One way this might be possible is through targeted OSL sampling of sand units (phases 6, 4, and 2) in areas of the site where firstly there is little disturbance through agriculture, and secondly there are already radiocarbon dates on carbonised residues or the potential to submit further samples with a secure taphonomic relationship to their context.

The Bronze Age context model (ii)

The model shown in Figure 20 also excludes OxA-14490, SUERC-6161, and OxA-14489, increasing the overall index of agreement for the context model to $A_{\text{overall}} = 77.4\%$, showing that the radiocarbon results and stratigraphy are in good agreement.

The post-Roman sequence

Stratified occupation 'layers A, B and C' (phases 4, 3, and 2) were recorded during the excavations at GMI and dated by pottery to the post-Roman period. The artefactual record from the horizons suggests a developing sequence.

The three samples from phase 2 (OxA-14528, OxA-14529 and SUERC-6158) are statistically consistent ($T' = 4.5$; $v = 2$; $T'(5\%) = 6.0$; Ward and Wilson 1978) and could therefore be of the same actual age.

Replicate measurements on sherd GMI 7 (OxA-14526, 1448 ± 28 BP, and SUERC-6159, 1525 ± 35 BP) from phase 3 are statistically consistent ($T' = 3.0$; $v = 1$; $T'(5\%) = 3.8$; Ward and Wilson 1978) and allow a weighted mean to be calculated before calibration (GMI 7; 1478 ± 22 BP). Unfortunately no samples from phase 4 could be obtained as part of the assessment.

The post-Roman layer model

This model is based on the three principal post-Roman archaeological horizons identified during the 1950–60s excavations at Gwithian. The model (Fig 21) shows good overall agreement ($A_{\text{overall}} = 85.1\%$) indicating that the radiocarbon measurements and stratigraphy as outlined above are in agreement.

Discussion

The pilot scientific dating programme at Gwithian has shown that the combination of radiocarbon and luminescence dating does provide a broad

chronological framework for interpreting activity at the site. However, to provide a more precise chronology and a better understanding of the intra-relationships between features/contexts and excavated parts of the site, the dating programme would need to be extended. This would require:

1. Evaluation of the potential residues on pottery sherds not considered for the pilot study (i.e., those that had not previously been assigned to layers).
2. A list of all other potential samples meeting strict taphonomic criteria so that they provide a date for their context; i.e., articulated/articulating bone, charcoal with a direct functional relationship to contexts (e.g., hearths).
3. Identification of areas with low human impact and opportunities for subsequent fieldwork to undertake an extensive OSL sampling programme.

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A copy of the digital archive created during this project has been deposited with the Archaeological Data Service (www.ads.ahds.ac.uk) at the University of York. The original material and site documentation has been placed in the Royal Cornwall Museum, Truro, under accession number TRURI: 2007.94.

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References

- Adams, J H, 1967. A new type of cresset stone?, *Cornish Archaeol*, **6**, 47–56
- Aitken, M J, and Weaver, G H, 1962. Magnetic dating; some archaeomagnetic measurements in Britain, *Archaeometry*, **5**, 2–24
- Alcock, L, 1987. *Economy, society and warfare among the Britons and Saxons*, Cardiff
- Alcock, L, Stevenson, S J, and Musson, C R, 1995. *Cadbury Castle, Somerset: the early medieval archaeology*, Cardiff
- ApSimon, A M, and Greenfield, E, 1972. The excavation of the Bronze Age and Iron Age settlement at Trevisker Round, St Eval, Cornwall, *Proc Prehist Soc*, **38**, 302–81
- Atkinson, R J C, 1946. *Field archaeology* (2nd revised edition 1953)
- Austin, D, Gerrard, G A M, and Greeves, T A P, 1989. Tin and agriculture in the middle ages and beyond: landscape archaeology in St Neot Parish, Cornwall, *Cornish Archaeol*, **28**, 5–251
- Barber, J, 2003. *Bronze Age farms and Iron Age mounds of the Outer Hebrides*, Scottish Archaeological Internet Reports: www.sair.org.uk/sair3/index.html
- Barrett, J C, Freeman, P W M, and Woodward, A, 2000. *Cadbury Castle, Somerset: The later prehistoric and early historic archaeology*, English Heritage Archaeol Rep **20**, London
- Barrowman, R C, Batey, C E and Morris, C D, 2007. *Excavations at Tintagel Castle, Cornwall, 1990–1999*, Repts Research Committee Soc Antiqs London **74**, London
- Bell, M, 1990. *Brean Down excavations 1983–1987*, English Heritage Archaeol Rep **15**, London
- Benson, D G, Evans, J G, Williams, G H, Darvill, T, and David, A, 1990. Excavations at Stackpole Warren, Dyfed, *Proc Prehist Soc*, **56**, 179–245
- Berridge, P, 1994. Cornish axe factories: fact or fiction, in *Stories in stone*, N Ashton and A David, eds, Lithic Society Occasional Paper **4**, 45–56
- Berridge, P, and Roberts, A, 1986. The Mesolithic period in Cornwall, *Cornish Archaeol*, **25**, 7–34
- Boase, H S, 1832. Contributions towards a knowledge of the geology of Cornwall. Chap II: The Carn Brea District of Cornwall, *Trans Roy Geol Soc Cornwall*, **4**, 29–355
- Borlase, W C, 1872. *Naenia Cornubiae*, London and Truro
- Bowman, S, 1990. *Radiocarbon dating*, London
- Bronk Ramsey, C, 1995. Radiocarbon calibration and analysis of stratigraphy, *Radiocarbon*, **36**, 425–30
- Bronk Ramsey, C, 1998. Probability and dating, *Radiocarbon*, **40**, 461–74
- Bronk Ramsey, C, 2001. Development of the radiocarbon calibration program, *Radiocarbon*, **43**, 355–63
- Bronk Ramsey, C, Higham, T, and Leach, P, 2004. Towards high precision AMS: progress and limitations, *Radiocarbon*, **46** (1), 17–24
- Brown, D, Thompson, R, and Vince, A, 2006. The pottery, in Saunders 2006, 269–300
- Bruce-Mitford, R, 1997. *Mawgan Porth. A settlement of the late Saxon period on the north Cornish coast. Excavations 1949–52, 1954 and 1974*, English Heritage Archaeol Rept **13**, London
- Brück, J, and Goodman, M, 1999. *Making places in the prehistoric world: themes in settlement archaeology*, London
- Buck, C E, Cavanagh, W G, and Litton, C D, 1996. *Bayesian approach to interpreting archaeological data*, Chichester
- Buckley, J A, 1999. Historical evidence of alluvial tin streaming in the river valleys of Camborne, Illogan and Redruth, *Jnl Trevithick Soc*, **26**, 87–99
- Burgess, C, 1976. The Gwithian mould and the forerunners of South Welsh axes, in Megaw 1976, 69–75 (appendix II)
- Callow, W J, Baker, M J, and Pritchard, D H, 1963. National Physics Laboratory radiocarbon measurements I, *Radiocarbon*, **5**, 34–8
- Clarke, D L, 1970. *Beaker pottery of Great Britain and Ireland*, Cambridge
- Clough, T H McK, and Cummins, W A, 1988. *Stone axe studies, volume 2: the petrology of prehistoric stone implements from the British Isles*, CBA Res Repts **67**, London
- Coope, G R, 1979. The influence of geology on the manufacture of Neolithic and Bronze Age stone implements in the British Isles, in *Stone axe studies: archaeological, petrological, experimental and ethnographic*, T H McK Clough and W A Cummins, eds, CBA Res Repts **23**, London, 98–101
- Craze, N, 2003. *Godrevy Headland, Cornwall: topographical and archaeological survey*, Truro (Cornwall Archaeological Unit report: 2003R010)
- Crone, A, and Campbell, E, 2005. *A crannog of the first millennium AD. Excavations by Jack Scott at Loch Glashan, Argyll, 1960*, Edinburgh
- Cubbon, M, 1998. An incised pendant from Castletown, *Isle of Man NH and Antiq Soc Proc*, **10**, **4**, 435–9
- Dark, K, 2001. *Byzantine pottery*, Stroud
- Davies, P, 2006. Land snail assessment, in Nowakowski, Sturgess and Lawson-Jones 2006
- Davis, R V, Howard, H, and Smith, I F, 1988. The petrological identification of stone implements from south-west England: sixth report, in Clough and Cummins, eds, 14–20
- Dockrill, S J, Bond, J M, Milles, A, Simpson, I A and Ambers, J, 1994. Tofts Ness, Sanday, Orkney: an integrated study of a buried Orcadian Landscape, in *Whither environmental archaeology?*, R Luff and P Rowley-Conwy, eds, Oxbow Monograph **38**, Oxford, 115–32
- Dudley, D, 1956. An excavation at Bodrifty, Mulfra, near Penzance, *Archaeol Jnl*, **113**, 1–32
- Edmonds, R, 1856. The lost church in the sands of Gwithian, Cornwall, *Archaeol Cambrensis*, 3rd ser, **9**, 52–4

- Edmonds, E W A, 2003. Alluvial dredging in Cornwall, *Jnl Trevithick Soc*, **30**, 3–42
- Edwards, N, 1996. *The archaeology of early medieval Ireland*, London
- Evans, J G, 2004. Land snails as a guide to the environments of wind-blown sand: the case of *Lauria Cyclindracea* and *Pupilla Muscorum*, in *From sickles to circles: Britain and Ireland at the time of Stonehenge*, A Gibson and A Sheridan, eds, Stroud, 366–79
- Evens, E D, Grinsell, L V, Piggott, S, and Wallis, F S, 1962. Fourth report of the Sub-Committee of the South-Western Group of Museums and Art Galleries on the petrological identification of stone axes, *Proc Prehist Soc*, **28**, 209–66
- Fletcher, R J, 2005. *The role and significance of bevelled pebbles in the British Mesolithic*, unpublished undergraduate dissertation, Univ Bristol, Dept Archaeology
- Foster, J, 1990. Other Bronze Age artefacts, in Bell, 158–75
- Foster, J, 2004. Appendix 27: Report on metalwork, clay moulds, sand object, stone mould and briquetage, in Nowakowski 2007
- Fowler, E, 1963. A note on a penannular brooch from Godrevy Headland, Gwithian, *Cornish Archaeol*, **2**, 76
- Fowler, P J, 1962. A native homestead of the Roman period at Porth Godrevy, Gwithian, *Cornish Archaeol*, **1**, 17–60
- Fowler, P J, 1971. Early prehistoric agriculture in western Europe: some archaeological evidence, in *Economy and settlement in Neolithic and Early Bronze Age Britain and Europe*, D D A Simpson, ed, Leicester, 153–82
- Fowler, P J, and Thomas, A C, 1962. Arable fields of the pre-Norman period at Gwithian, *Cornish Archaeol*, **1**, 17–60
- Freeman, C, 2004. Appendix 24: Gwithian medieval and post-medieval pottery assessment, in Nowakowski 2007
- Fulford, M G, and Peacock, D P S, 1984. The pottery and other ceramic objects from the sites, in *Excavations at Carthage: the British Mission. Vol 1, 2: The Avenue du President Habib Bourguiba Salammbô*, H R Hurst and S P Roskams, eds, Sheffield, 1–284
- Gale, R, 2004. Appendix 25. Gwithian archive: charcoals assessment, in Nowakowski 2007
- Gale, R, 2006. Charcoal assessment, in Nowakowski, Sturgess and Lawson-Jones 2006
- Gelfand, A E, and Smith, A F M, 1990. Sampling approaches to calculating marginal densities, *Jnl American Statistical Association*, **85**, 398–409
- Gilks, W R, Richardson, S, and Spiegelhalter, D J, 1996. *Markov Chain Monte Carlo in practice*, London
- Gossip, J, 2005. *Richard Lander School Development, Threemilestone, Cornwall. Archaeological recording: archive report*, Truro (Historic Environment Service, Cornwall County Council)
- Gossip, J, forthcoming. *The evaluation of a multi-period prehistoric site at Boden Vean, St Anthony-in-Meneage, Cornwall, 2003*
- Gossip, J, and Jones, A M, 2007 *Archaeological investigations of a later prehistoric and a Romano-British landscape at Tremough, Penryn, Cornwall*, Brit Arch Repts, Brit Ser **443**, Oxford
- Guthrie, A, 1969. Excavation of a settlement at Goldherring, Sancreed, 1958–61, *Cornish Archaeol*, **8**, 5–39
- Guttmann, E B, 2005. Midden cultivation in prehistoric Britain: arable crops in gardens, *World Archaeol*, **37**, **2**, 224–39
- Guttmann, E B, 2006. Gwithian 2005: Soil assessment, in Nowakowski, Sturgess and Lawson-Jones 2006
- Guttmann, E B, Simpson, I A, and Davidson, D A, 2005. Manuring practices in antiquity: a review of the evidence, in *Fertile ground: papers in honour of Susan Limbrey*, M Brickley and D Smith, eds, Symposia of the Association of Environmental Archaeology **22**, Oxford, 68–76
- Hammon, A, 2004. Appendix 22: Gwithian, Cornwall. Assessment of the vertebrate remains, in Nowakowski 2007
- Hammon, A, 2006. Gwithian, Cornwall 2005 fieldwork (GMXVII). Assessment of the vertebrate assemblage, in Nowakowski, Sturgess and Lawson-Jones 2006
- Harding, J R, 1950. Prehistoric sites on the north Cornish coast, *Antiq Jnl*, **30**, 156–64
- Hatton, G, 2004. Appendix 29: Gwithian metallurgical debris, in Nowakowski 2007
- Hedges, R E M, Bronk, C R, and Housley, R A, 1989. The Oxford Accelerator Mass Spectrometry facility: technical developments in routine dating, *Archaeometry*, **31**, 99–113
- Hill, P, 1998. *Whithorn and St Ninian: the excavation of a monastic town 1984–91*, Stroud
- Hines, J, 2007. Appendix 5: Metalwork finds from post-Roman sites excavated at Gwithian, Cornwall, 1953–58, in Nowakowski 2007
- Hutchinson, G, 1979. The bar-lug pottery of Cornwall, *Cornish Archaeol*, **18**, 81–108
- Jacobi, R M, 1979. Early Flandrian hunters in the south-west, *Proc Devon Archaeol Soc*, **37**, 48–93
- Jacobi, R M, 1980. The Early Holocene settlement of Wales, in *Culture and environment in prehistoric Wales*, J A Taylor, ed, Brit Arch Repts, Brit Ser **76**, Oxford, 131–206
- Jones, A, 1998. *Upton and Gwithian Towns: an archaeological assessment*, Truro (Cornwall Archaeological Unit report: 1998R062)
- Jones, A M, 2004–5. Settlement and ceremony; archaeological investigations at Stannon Down, St Breward, *Cornish Archaeol*, **43–44**, 1–140
- Kirkham, G, 2005. *Gwithian stream works and Godrevy café, Cornwall*, Truro (Cornwall County Council Historic Environment Service report: 2005R209)

- Lane, A, and Campbell, E, 2000. *Dunadd, an early Dalriadic capital*, Oxford
- Laing, L, 1975. *The archaeology of late Celtic Britain and Ireland c 400–1200 AD*, London
- Laing, L, and Longley, D, 2006. *The Mote of Mark. A Dark Age hillfort in south-west Scotland*, Oxford
- Lawson-Jones, A, 2003. *Godrevy café: an archaeological watching brief*, Truro (Cornwall County Council Historic Environment Service report: 2003R018)
- Lawson-Jones, A, 2004. Appendix 23: Gwithian flint assessment, in Nowakowski 2007
- Light, J, 2004. Appendix 30: Assessment of mollusc shell deposits, in Nowakowski 2007
- Light, J, 2006. Gwithian 2005: Marine shells assessment, in Nowakowski, Sturgess and Lawson-Jones 2006
- Longworth, I, and Cherry, J, 1986. *Archaeology in Britain since 1945: new directions*, London
- McAvoy, F, 1980. The excavation of a multi-period site at Carngoon Bank, Lizard, *Cornish Archaeol*, **19**, 31–62
- McKinley, J I, 2004. Appendix 26: Gwithian, Cornwall (GM/X), human bone assessment, in Nowakowski 2007
- Marsden, J G, 1922. Flint implements of Le Moustier type from Camborne, *Jnl Roy Inst Cornwall*, **21**, 1, 48–55
- Megaw, J V S, 1976. Gwithian, Cornwall: some notes on the evidence for Neolithic and Bronze Age settlement, in *Settlement and economy in the third and second millennia B.C.*, C Burgess and R Miket, eds, *Brit Arch Repts*, *Brit Ser* **33**, 51–79
- Megaw, J V S, and Simpson, D D A, 1981. *Introduction to British prehistory*, Leicester
- Megaw, J V S, Thomas, A C, and Wailes, B, 1961. The Bronze Age settlement at Gwithian, Cornwall, *Proc West Cornwall Field Club*, **2**, 5, 200–15
- Mercer, R, 1981. Excavations at Carn Brea, Illogan, Cornwall – a Neolithic fortified complex of the third millennium bc, *Cornish Archaeol*, **20**, 1–204
- Mercer, R, 1986. The Neolithic in Cornwall, *Cornish Archaeol*, **25**, 35–80
- Mitchell, J C, 1988. *Stone implement petrology and source rock geology*, unpublished undergraduate dissertation, Univ Bristol
- Mook, W G, 1986. Business meeting: Recommendations/Resolutions adopted by the Twelfth International Radiocarbon Conference, *Radiocarbon*, **28**, 799
- Morris, E L, 1980. The pottery, in F McAvoy, 1980, 49 – 52
- Morris, C D, and Harry, R, 1997. Excavations on the Lower Terrace, Site C, Tintagel Island 1990–94, *Antiq Jnl*, **77**, 1–144
- Murray, A S, and Wintle, A G, 2000. Luminescence dating of quartz using an improved single-aliquot regenerative-dose protocol, *Radiation Measurements*, **32**, 57–73
- Needham, S P, 1981. *The Bulford-Helsbury manufacturing tradition: the production of Stogursey socketed axes in the Later Bronze Age in southern Britain*, British Museum Occasional Paper **13**, London
- Needham, S P, 1996. Chronology and periodisation in the British Bronze Age, *Acta Archaeologica*, **67**, 121–40
- Needham, S P, 2007. Appendix 3: Assessment report on Bronze Age refractories from Gwithian, Cornwall, in Nowakowski 2007
- Norden, J, 1728. *Speculi Britanniae Pars: a topographical and historic description of Cornwall*, London [facsimile reprint, Newcastle, 1966]
- Nowakowski, J A, 1991. Trethellan Farm, Newquay: the excavation of a lowland Bronze Age settlement and Iron Age cemetery, *Cornish Archaeol*, **30**, 5–242
- Nowakowski, J A, 1998. *A30 Project, Cornwall. Archaeological investigations along the route of the Indian Queens bypass 1992–1994: assessment and updated project design*, Truro (Cornwall Archaeological Unit report to English Heritage and the Highways Agency, 4 vols)
- Nowakowski, J A, 2001. Leaving home in the Cornish Bronze Age: insights into planned abandonment processes, in *Bronze Age landscapes: tradition and transformation*, J Brück, ed, Oxford, 139–48
- Nowakowski, J A, 2004. *Archaeology beneath the Towans. Excavations at Gwithian, Cornwall, 1949–1969*, Truro (Cornwall County Council Historic Environment Service: updated project design for assessment, analysis and publication to English Heritage)
- Nowakowski, J A, 2006. Life and death in a Cornish valley, *British Archaeol*, **89** (July–August 2006), 13–17
- Nowakowski, J A, 2007. *Excavations of a Bronze Age landscape and post-Roman industrial settlement 1953–1961, Gwithian, Cornwall. Assessments of key datasets (2005–2006)*, Truro (Cornwall County Council Historic Environment Service report to English Heritage. 2 vols)
- Nowakowski, J A, in press. *Living in the sands – Bronze Age Gwithian, Cornwall, revisited*, in *Land and people: papers in honour of John G Evans*, N Sharples and T O'Connor, eds, Prehistoric Society Research Papers
- Nowakowski, J A, and Quinnell, H, forthcoming. *Trevelgue Head, Cornwall: the importance of C K Croft Andrew's 1939 excavations for prehistoric and Roman Cornwall*
- Nowakowski, J A, Sturgess, J, and Lawson-Jones, A, 2006. *Gwithian, Cornwall. Report on palaeoenvironmental sampling fieldwork, Scheduled Monument Cornwall 771*, Truro (Cornwall County Council Historic Environment Service report to English Heritage: 2006R042)
- Olson, L, 1994. Lammana, West Looe: C K Croft Andrew's excavations of the chapel and Monks House, 1935–6, *Cornish Archaeol*, **33**, 96–169
- O'Mahoney, C, 1989a. *The medieval pottery from Tintagel Castle*, Inst Cornish Studies Special Report **8**, Truro
- O'Mahoney, C, 1989b. The pottery: Bunnings Park, in Austin *et al* 1989, 133–47

- O'Mahoney, C, 1994. The pottery from Lammana: the mainland chapel and Monks House, in Olson 1994, 115–25
- O'Neil, B H St. J, 1934. The Roman villa at Magor Farm, Camborne, *Jnl Roy Inst Cornwall*, **24**, 1–2, appendix volume 1, 1–59
- O'Neil, H, 1964. Excavation of a Celtic hermitage on St Helen's, Isles of Scilly, 1956–58, *Archaeol Jnl*, **121**, 40–69
- Padel, O J, 1988. *Cornish place-names*, Penzance
- Padel, O J, and Fox, H S A, eds, 2000. *The Cornish lands of the Arundells of Lanherne, fourteenth to sixteenth centuries*, Exeter
- Palmer, S, 1977. *Mesolithic cultures of Britain*, Poole
- Parker Pearson, M, 1990. The production and distribution of Bronze Age pottery in south-west Britain, *Cornish Archaeol*, **29**, 5–32
- Parker Pearson, M, Sharples, N, and Symonds, J, 2004. *South Uist: archaeology and history of a Hebridean island*, Stroud
- Patchett, F M, 1946. Cornish Bronze Age pottery, *Archaeol Jnl*, **107**, 44–65
- Peacock, D P S, 1969. A Romano-British salt-working site at Trebarveth, St Keverne, *Cornish Archaeol*, **8**, 47–65
- Peacock, D P S, and Thomas, A C, 1967. Class 'E' Imported post-Roman pottery: a suggested origin, *Cornish Archaeol*, **6**, 35–46
- Peacock, D P S, and Williams, D F, 1986. *Amphorae and the Roman economy: an introductory guide*, London
- Preston-Jones, A, and Thomas, N, 2002. *St Gothian's Oratory, Gwithian, Cornwall: survey and fencing*, Truro (Cornwall County Council Historic Environment Service report for English Heritage: 2002R065)
- Poole, C, 2000. Structural materials, in Barrett, Freeman and Woodward, 212–4
- Quinnell, H, 1986. Cornwall in the Iron Age and the Roman period, *Cornish Archaeol*, **25**, 111–34
- Quinnell, H, 1993. A sense of identity: distinctive Cornish stone artefacts in the Roman and post-Roman periods, *Cornish Archaeol*, **32**, 29–46
- Quinnell, H, 2004a. *Trethurgy. Excavations at Trethurgy Round, St Austell: community and status in Roman and post-Roman Cornwall*, Truro
- Quinnell, H, 2004b. Appendix 17: Assessment of the prehistoric and Roman period pottery, in Nowakowski 2007
- Quinnell, H, 2004c. Appendix 18: Baked clay, in Nowakowski 2007
- Quinnell, H, 2004d. Appendix 19: Stone artefacts, in Nowakowski, 2007
- Quinnell, H, 2007. Appendix 1: Assessment of pre-grass-marked pottery, in Nowakowski 2007
- Quinnell, H, forthcoming. Chapter 7: The pottery, in Nowakowski and Quinnell forthcoming
- Quinnell, H, and Thorpe, C 2006. Bronze Age pottery and fired clay assessment, in Nowakowski, Sturgess and Lawson-Jones 2006
- Ratcliffe, J, 1995. Duckpool, Morwenstow: a Romano-British and early medieval industrial site and harbour, *Cornish Archaeol*, **34**, 81–171
- Ratcliffe, J and Straker, V, 1996. *The early environment of Scilly. Palaeoenvironmental assessment of cliff-face and intertidal deposits, 1989–1993*, Truro (Cornwall Archaeological Unit)
- Reed, M, 2000. *Lithic finds at North Cliff, Reskajeage Downs, Illogan, Cornwall*, unpublished HND dissertation, Truro College
- Reimer, P J, Baillie, M G L, Bard, E, Bayliss, A, Beck, J W, Bertrand, C J H, Blackwell, P G, Buck, C E, Burr, G S, Cutler, K B, Damon, P E, Edwards, R L, Fairbanks, R G, Friedrich, M, Guilderson, T P, Hogg, A G, Hughen, K A, Kromer, B, McCormac, G, Manning, S, Bronk Ramsey, C, Reimer, R W, Remmele, S, Southon, J R, Stuiver, M, Talamo, S, Taylor, F W, van der Plicht, J, and Weyhenmeyer, C E, 2004. IntCal04 Terrestrial radiocarbon age calibration, 0–26 Cal Kyr BP, *Radiocarbon*, **46**, 1029–58
- Riddler, I, 2007a. Appendix 2: Bronze Age objects and waste of bone and antler, in Nowakowski 2007
- Riddler, I, 2007b. Appendix 4: Post-Roman objects and waste of bone and antler, in Nowakowski 2007
- Roberts, A J, 1987. The Later Mesolithic occupation of the Cornish coast, at Gwithian: preliminary results, in *Mesolithic Northwest Europe: recent trends*, P Rowley-Conwy, M Zvevibel and H P Blankholm, eds, Sheffield, 131–7
- Roberts, H M, 2006. Optically stimulated luminescence (OSL) dating of sands from GMXVII, in Nowakowski, Sturgess and Lawson-Jones 2006
- Roberts, H M, 2007. *Gwithian, Cornwall. Optically Stimulated Luminescence (OSL) dating of sands from a Bronze Age archaeological site: scientific dating report*, English Heritage, Centre for Archaeology Research Department Report Series 103/2007
- Robinson, D E, 2006. Pollen assessment, in Nowakowski, Sturgess and Lawson-Jones 2006
- Rogers, W, 1910. A kitchen-midden on Godrevy Towans, *Jnl Roy Inst Cornwall*, **18**, 1, 238–40
- Rowlands, M, 1976. The bronze pin fragments from Gwithian, Layer 3, in Megaw 1976, 67–8 (appendix 1)
- Saunders, A, 2006. *Excavations at Launceston Castle, Cornwall*, Society for Medieval Archaeology Monograph **24**, Leeds
- Saville, A, ed, 2004. *Mesolithic Scotland and its neighbours: the early holocene prehistory of Scotland, its British and Irish context and some Northern European perspectives*, Edinburgh
- Schwieso, J, 1976. Excavations at Threemilestone Round, Kenwyn, Truro, *Cornish Archaeol*, **15**, 50–67
- Scott, E M, ed, 2003. The Third International Radiocarbon Intercomparison (TIRI) and the Fourth International Radiocarbon Intercomparison (FIRI) 1990–2002: results, analysis, and conclusions, *Radiocarbon*, **45**, 135–408

- Sharpe, A, 1990a. *Hockins Pit, Gwithian*, Truro (Cornwall Archaeological Unit; short report of visit with P Steele, July 1990)
- Sharpe, A, 1990b. *The Red River Trail: an archaeological assessment*, Truro (Cornwall Archaeological Unit report: 1990R001)
- Shepherd, I A G, 1976. Preliminary results from the Beaker settlement at Rosinish, Benbecula in *Settlement and economy in the third and second millennia B.C.*, C Burgess and R Miket, eds, Brit Arch Repts, Brit Ser **33**, Oxford, 209–20
- Shepherd, I A G, and Tuckwell, A N, 1977. Traces of Beaker-period cultivation at Rosinish, Benbecula, *Proc Soc Antiq Scot*, **108**, 108–13
- Simpson, D D A, 1976. The later Neolithic and Beaker settlement site at Northton, Isle of Harris, in *Settlement and economy in the third and second millennia B.C.*, C Burgess and R Miket, eds, Brit Arch Repts, Brit Ser **33**, Oxford, 221–31
- Simpson, D D A, Murphy, E M, and Gregory, R A, 2006. *Excavations at Northton, Isle of Harris*, Brit Arch Repts, Rep. Brit Ser, **408**, Oxford
- Slota Jr, P J, Jull, A J T, Linick, T W and Toolin, L J, 1987. Preparation of small samples for ^{14}C accelerator targets by catalytic reduction of CO , *Radiocarbon*, **29**, 303–6
- Somerscales, M, 1965. Further sherds from Phillack Towans, *Cornish Archaeol*, **4**, 86–7
- Stephens, F J, 1900. Alluvial deposits in the lower portion of the Red River valley, *Trans Roy Geol Soc Cornwall*, **22**, pt v, 324–35
- Straker, V, 2006. Assessment of soil samples, in Nowakowski, Sturgess and Lawson-Jones 2006
- Stuiver, M, and Reimer, P J, 1986. A computer program for radiocarbon age calculation, *Radiocarbon*, **28**, 1022–30
- Stuiver, M, and Reimer, P J, 1993. Extended ^{14}C data base and revised CALIB 3.0 ^{14}C age calibration program, *Radiocarbon*, **35**, 215–30
- Sturgess, J, 2001. *Hanson Quarry (ARC) site, Gwithian, Cornwall: archaeological assessment*, Truro (Cornwall Archaeological Unit report: 2001R051)
- Sturgess, J, and Lawson-Jones, A, 2006a. *Crane Godrevy, revisited. Archaeological excavation of the enclosure ditch between 1956 and 1969 in Cornwall*, Truro (Cornwall County Council Historic Environment Service report: 2006R066)
- Sturgess, J, and Lawson-Jones, A, 2006b. *Bronze Age Gwithian, revisited. Archaeological excavations between 1956 and 1961 in Cornwall*, Truro (Cornwall County Council Historic Environment Service report: 2006R067. 2 vols)
- Sturgess, J, and Lawson-Jones, A, 2006c. *Post-Roman Gwithian revisited. Archaeological excavation between 1953 and 1958 in Cornwall*, Truro (Cornwall County Council Historic Environment Service report: 2006R072. 2 vols)
- Thomas, A C, 1950. The dig, *Spectator*, 10 Nov 1950 [Undergraduate £5 prize essay, describes work at site GB]
- Thomas, A C, 1953. A preliminary report on the Mesolithic and associated sites at Godrevy . . . with notes on the geochronology of the area, etc, unpublished essay, Sir Edward Nicholl essay competition, Royal Cornwall Polytechnic Society, Falmouth; with Gwithian files: A4, green covers, labelled Lowenac MS C.67)
- Thomas, A C, 1954. Excavation of a Dark Age site, Gwithian, Cornwall: interim report 1953–54, *Proc West Cornwall Field Club*, ns, **1**, **2**, 59–74
- Thomas, A C, 1955. Excavations at Gwithian, 1955, *Proc West Cornwall Field Club*, ns, **1**, **3**, 122–3
- Thomas, A C, 1956. Excavations at Gwithian, 1955. The Early Christian settlement, the Bronze Age barrow group, and a medieval manor, *Proc West Cornwall Field Club*, ns, **1** (appendix)
- Thomas, A C, 1957a. Some imported post-Roman sherds in Cornwall and their origin, *Proc West Cornwall Field Club*, ns, **2**, **1**, 15–22
- Thomas, A C, 1957b. *West Cornwall Field Club, Field guide no 4. Notes on the Late Bronze Age site at Gwithian, Cornwall*, Gwithian (excavation staff and West Cornwall Field Club)
- Thomas, A C, 1957c. Medieval Britain in 1956, *Medieval Archaeol*, **1**, 160
- Thomas, A C, 1958a. *Gwithian. Ten years' work (1949–1958)*, Gwithian (excavation staff and West Cornwall Field Club)
- Thomas, A C, 1958b. The Palaeolithic and Mesolithic periods in Cornwall, *Proc West Cornwall Field Club*, ns, **2**, **2**, 5–12
- Thomas, A C, 1960a. People and pottery in Dark Age Cornwall, *Old Cornwall*, **5**, **11**, 452–60
- Thomas, A C, 1960b. Archaeology and folk-life studies, *Gwerin*, **3**, **1**, 7–17
- Thomas, A C, 1960c. Excavations on Tean, Scilly, 1956 and problems of the Scillonian submergence, unpublished mss, Lambessow, Truro
- Thomas, A C, 1964a. Minor sites in the Gwithian area (Iron Age to recent), *Cornish Archaeol*, **3**, 37–62
- Thomas, A C, 1964b. *Gwithian. Notes on the church, parish and St. Gothian's Chapel, Gwithian*, Gwithian (church guide; reprinted 1969, 1976, etc)
- Thomas, A C, 1968a. Grass-marked pottery in Cornwall, in *Studies in Ancient Europe. Essays presented to Stuart Piggott*, J M Coles and D D A Simpson, eds, Leicester, 311–32
- Thomas, A C, 1968b. Roman coin from Gwithian beach, *Cornish Archaeol*, **7**, 107
- Thomas, A C, 1969. Excavations at Crane Godrevy, 1969: interim report, *Cornish Archaeol*, **8**, 84–8
- Thomas, A C, 1970. Bronze Age spade-marks at Gwithian, Cornwall, in *The spade in northern and Atlantic Europe*, A Gailey and A Fenton, eds, Belfast, 10–16

- Thomas, A C, 1981. *A provisional list of imported pottery in post-Roman western Britain and Ireland*, Institute of Cornish Studies Special Report 7, Truro
- Thomas, A C, 1985. *Exploration of a drowned landscape. Archaeology and history of the Isles of Scilly*, London
- Thomas, A C, 1990. *Gallici Nautae de Galliarum Provinciis* – A sixth/seventh century trade with Gaul reconsidered, *Medieval Archaeol*, **34**, 1–26
- Thomas, A C, 1991. Early medieval pottery, in Ratcliffe 1991, 87–92
- Thomas, A C, 1994. *And shall these mute stones speak? Post-Roman inscriptions in western Britain*, Cardiff
- Thomas, A C, 2004. The round in the Gwithian area, unpublished background paper (details of 32 rounds, mostly destroyed, with plans and maps), September 2004, Gwithian archive
- Thomas, A C, 2005. Post-400, pre-1200, native pot and imported wares, Cornwall and Scilly, unpublished background paper (updated distributions, etc, accompanied by working card-index), June 2005, Gwithian archive
- Thomas, A C, Thorpe, C, and Quinnell, H, 2004. Appendix 21: Gwithian: post-Roman pottery – initial appraisal, in Nowakowski 2007
- Thomas, N, 1995. *Godrevy and the North Cliffs, Cornwall. An archaeological assessment*, Truro (Cornwall Archaeological Unit report: 1995R001)
- Thorpe, C, 1996. *Gwithian Road, Connor Downs. A Watching Brief report*, CAU report: 1995R053, Truro, Cornwall
- Thorpe, C, 2001. *Godrevy Headland toilets, Cornwall: archaeological watching brief* (Cornwall County Council Historic Environment Service report: 2001R088)
- Tyers, P, 1996. *Roman pottery in Britain*, London
- Ward, G K, and Wilson, S R, 1978. Procedures for comparing and combining radiocarbon age determinations: a critique, *Archaeometry*, **20**, 19–31
- Wessex Archaeology, 2002. *Gwithian Sand Pit, Hayle, Cornwall. Archaeological baseline survey. Auger survey results and archaeological significance* (report 52079.1)
- Whitley, N, 1870. Indications of glacial action in Cornwall, *Jnl Roy Inst Cornwall*, **3**, pt ix, 184–6
- Whitley, N, 1906. The earth-cliffs at Godrevy, *Trans Roy Geol Soc Cornwall*, **13**, pt ii, 135–49
- Whittle, A, Healy, F, and Bayliss, A, in prep. *Gathering time. Dating the Early Neolithic enclosures of southern Britain and Ireland*, Oxford
- Woodman, P C, Anderson, E, and Finlay, N, 1999. *Excavations at Ferriter's Cove, 1983–95: last foragers, first farmers in the Dingle peninsula*, Bray
- Woodward, A, and Cane, C, 1991. The Bronze Age pottery, in Nowakowski 1991, 103–31
- Wymer, J, and Bonsall, C, eds, 1977. *Gazetteer of Mesolithic sites in England and Wales*, CBA Res Rept **22**, London
- Xu, S, Anderson, R, Bryant, C, Cook, GT, Dougans, A, Freeman, S, Naysmith, P, Schnabel, C, and Scott, EM, 2004. Capabilities of the new SUERC 5MV AMS facility for ^{14}C dating, *Radiocarbon*, **46**, 59–64

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*Colour plate 1 The main Bronze Age sites during excavation in 1960
(© J V S Megaw, Gwithian archive).*



*Colour plate 2 June 2005, site
GMXVII. Joanna Sturgess and
Professor Charles Thomas cleaning up
the cultivation horizon of phase 3.
Professor Bernard Wailes, a member of
the original excavation team looks on
(© Cornwall County Council, J
Nowakowski).*



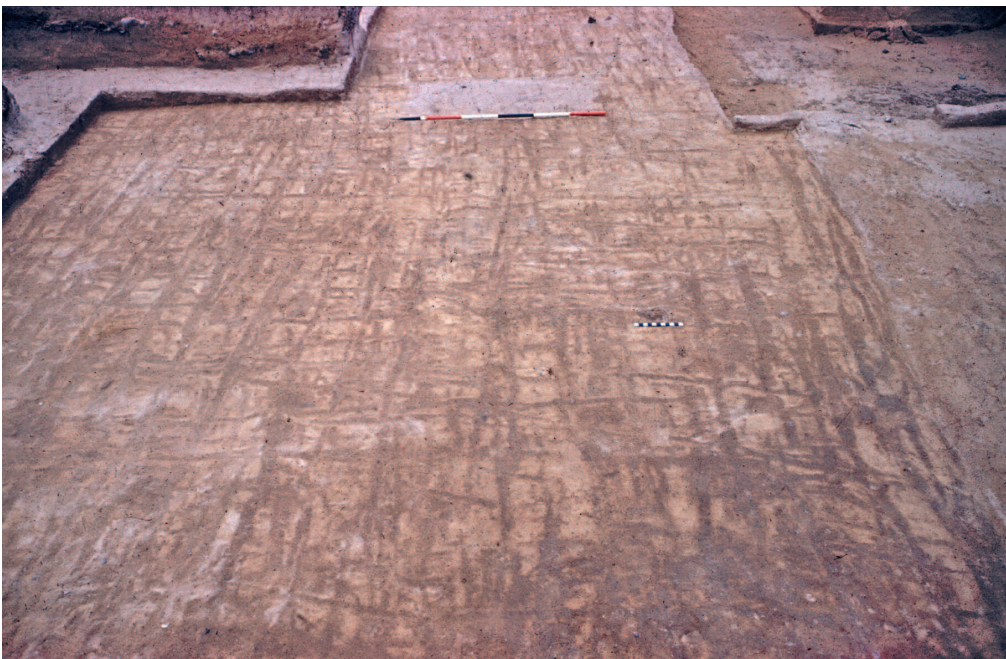
Colour plate 3 'Layers 1 to 9', now understood as horizons, phases 1 to 6, as revealed in GMX cutting 5. 'Layer 3' (phase 5) contains the banked stone and 'Layer 8' (phase 1) is visible as a dark basal layer overlying bedrock (© J V S Megaw, Gwithian archive).



Colour plate 4 View of Early Bronze Age building [1642] (phase 1) at site GMXV. Wooden stakes have been placed along the line of the enclosure and at the entrance of the structure (© J V S Megaw, Gwithian archive).



Colour plate 5 The main north-south field wall in GMX cuttings 41, 39, 36 and 33, looking south. This was a major boundary maintained throughout the Bronze Age occupation (© J V S Megaw, Gwithian archive).



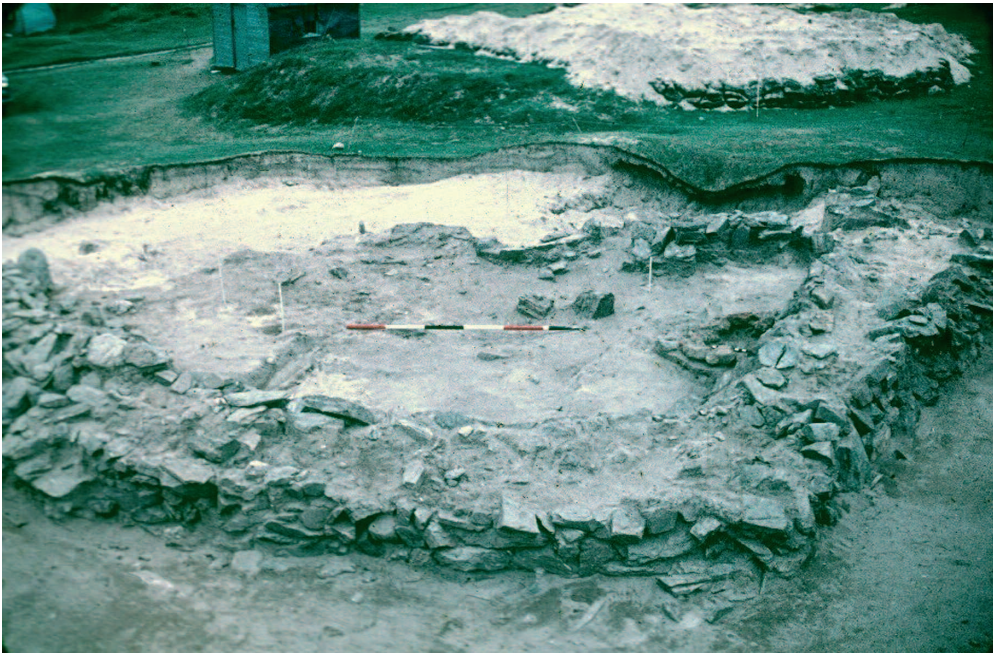
Colour plate 6 The criss-cross pattern of 'plough marks' found within the main GMX site at the base of 'layer 5' (phase 3) (© J V S Megaw, Gwithian archive).



Colour plate 7 A close-up view of some of the spade marks, probably the result of an episode of vegetation clearance during phase 5 of the Bronze Age sequence. Note the similarity to the shape of a modern Cornish shovel (© J V S Megaw, Gwithian archive).



Colour plate 8 Looking north east across post-built structure [724/725] (phase 5b) in GMX cutting 3. Note the pebble-lined hearth (© J V S Megaw, Gwithian archive).



Colour plate 9 Looking south west across the stone building [1079] in GMIX cuttings 5, 6 and 7 (phase 5c). Note the clay oven constructed against the internal northern wall and the pale sandy collapse to the south (© J V S Megaw, Gwithian archive).



Colour plate 10 The rim and shoulder of a jar with incised decoration and lugs from phase 5, site GMX (© J V S Megaw, Gwithian archive).



Colour plate 11 Half-sectioned wooden bowl found below the floor in structure [724/725] (© J V S Megaw, Gwithian archive).



Colour plate 12 Post-Roman buildings [2241] and [2242] at site GMI (looking west), rebuilt by the excavators (© I Cossar, Gwithian archive).

Colour plate 13 A selection of reconstructed post-Roman bar-lug pots excavated at Gwithian (© J V S Megaw, Gwithian archive).



Colour plate 14 South-facing section of the Romano-British ditch at Crane Godrevy in cutting AB and 1 (1969). Richard Thomas with scale 1 x 6ft (© J Stengelhofen, Gwithian Archive).



Colour plate 15 A watercolour painting by M Somerscales of Crane Godrevy during excavation, looking north west across the site
(© M Somerscales, Gwithian archive).