

## 14

# Post-Medieval, Industrial and Modern

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## Introduction

The western aspect of the South West was important in earlier times, but during this period it became paramount as the strategic interests of Britain developed, first across the Atlantic and then globally. The development of the great naval base at Devonport is an indication of this (Coad 1983). Understanding the archaeology of the South West is therefore interdependent on archaeological work on an international scale and vice versa. The abundance of resources in the region (fuels: coal and natural gas, raw materials for the new age: arsenic, calamine, wolfram, uranium, china clay, ball clay, road stone, as well as traditionally exploited materials such as copper, tin, lead, agricultural produce and fish) ensured that the region played a full part in technological and social changes.

It follows that our constituencies also have to be viewed from an international perspective. The Post-Medieval archaeology of the West Indies, or of the North American colonies, cannot be understood in isolation from the archaeology of South West England. Thus, whether one is characterising the interests of individual people (the general public), specialist sectors (education, heritage management, environmental management) or specific interest groups (academic institutions, societies), all have an international dimension. Fortunately, through improved communication, there are many new opportunities and initiatives to foster closer international collaboration and to share and to test interpretations with a wide audience.

### 14.0.1 Broad themes

There are several broad themes that are relatively under-explored:

- From c.1540 there was a step-change in the rate of exploitation of our natural resources leading to radical changes to the landscape. The exploitation of water for power, transport and later the demand for clean drinking water produced spectacular changes which apart from individual monument studies have been largely undocumented. Later use of coal-based technology led to the concentration of production and settlement in towns/industrial villages.
- Exploitation for minerals has produced equally distinctive landscapes and has remodelled some of the “natural” features that are now regarded as iconic of the South West, for example, the Avon and Cheddar Gorges, the moorland landscapes of Bodmin Moor, Dartmoor and Exmoor and lengths of the Cornish and Dorset coastline.
- The period is also characterised by an exponential increase in the amount of waste produced by human society which has both provided the means of transforming landscapes, particularly in towns, and an enormous opportunity for archaeology.
- Use of “artificial” fertilisers and more intensive cultivation in agriculture has affected habitats and wildlife.
- The rise of the 19th- and 20th-century chemical industries has produced significant pollution and contamination.
- Transport improvements have taken up much land and exhaust gases and smoke add to pollution.

- Above all, the “Industrial Revolution” marked a significant change in our relationship with the environment, for example, William Smith’s work on geological strata enabled engineers to better understand and thus exploit mineral wealth much more extensively. Conversely, recent appreciation of environmental problems has led to a change to “greener” ways of looking at our relationship with the environment and the growth of the conservation movement.

Given the urgency of our need as a society to understand these mechanisms in order to find strategies to mitigate their future impact, the neglect of archaeological investigation seems almost perverse.

## 14.1 Material Culture

This section is structured using seven artefact-based headings adapted from those used in Geoff Egan’s *The Medieval Household, Daily Living c.1150–c.1450* (Egan 1998). These are followed by a list of significant large published groups of material and syntheses. Drawing a line between archaeological research and work concerning standing buildings, extant artefacts and collections is problematic. The emphasis here is on context and consumption rather than production, trade and typologies.

Material culture studies take on a different form for the later period as, for the 18th and to the greatest extent for the 19th and 20th centuries, there is a wide range of social and folk-historical studies and of specialist work driven by art and design history and by connoisseurial concerns. These are complimented by specialist museums and collections. Specialist journals in the UK include the *Journal of Material Culture*. These later periods tend to have a corresponding shortage of archaeological research.

**Fabric of Buildings** Post-Medieval roof tile and roof furniture has a clear regional character across the study area. Slate and pennant roof tiles are locally widespread. There is a discussion of the South Devon types and their distribution in Allan (1984, 300–303). Ceramic was used primarily for ridge tiles and finials until late in the period. Clay chimney pots were an emerging form in the later 18th century. Many archaeological reports include finds reports of this material (for instance Burrow 1988, 131). Acton Court (Rodwell and Bell 2004, 235–42) gives a good Late Medieval and 16th-century group associated with one building. Other material from this excavation includes stonework from fireplaces and screens.

**Fixtures, Fittings and Security** Early Modern and Post-Medieval window glass has received limited attention. A range of 16th-century domestic plain

glass and lead cames have been recorded from excavations at Acton Court together with one example of painted glass (Rodwell and Bell 2004, 261–3). Most archaeological reports include a selection of metal fittings amongst small finds including padlocks, hinges, and nails (for example, C Burrow in Burrow 1988, 134–5). Linda Hall has provided a survey of fixtures and fitting from standing rural houses in South Gloucestershire (Hall 1983, 43–82) and (Hall 2001) including windows, stairs, cupboards, hinges etc but also racks, dressers, chimney furniture and privies placed in the context of the wider architectural context of specific houses.

**Heating and Lighting** There are no published examples of ceramic stove tiles from the South West but ceramic ovens built into chimney structures are a south-west peninsula regional form exported over a wider area. Brears suggest that these first occur in the early Post-Medieval (Brears 1971, 247) but most examples appear to belong to the 19th and 20th centuries. The relationship with the similar tradition in Spain has not been explored. Hearth fittings in ceramic are a regional speciality in North Devon in the 17th century, where relief decorated fire-dogs and fire-backs as well as flat-irons occur alongside distinctive tiles (Grant 1983). Metal artefacts associated with heating and lighting are archaeologically scarce, but there are examples of candlesticks from Acton Court (Rodwell and Bell 2004) and Exeter (Allan 1984). Ceramic candlesticks and candleholders are common occurring in many Post-Medieval assemblages from the 16th and 17th centuries.

**Tableware and other Household Equipment** Pottery studies are extensive both for regional and imported wares. Some of the work is regional and international in scope, but much is more local. Studies include Donyatt (Coleman-Smith and Pearson 1988), Exeter (Allan 1984), Bristol, especially tin-glaze (Price forthcoming), Barnstaple and North Devon (Watkins 1960; Grant 1983) and Verwood (Draper and Copland-Griffiths 2002). Peter Brears’ and Andrew McGarva’s broad surveys of rural potteries are also useful (Brears 1971; McGarva 2002). There are major producers, such as those of Barnstaple, Great Torrington, Wrangway, Bridgwater and others, which have not yet been fully studied but most major consumption centres have pottery type-series. A general form guide for common types found in the Bristol area has been published (Good and Russett 1987) and there are good local collections in Taunton, Bristol and Exeter. New techniques promise a means of reconciling these (Taylor in Allan 1999, 57–59).

The main emphasis has been on trade, dating and distribution. Art historical approaches have been

applied to the Bristol and Wincanton tin-glaze industries (for example by Pountney 1922; Ray 1968; Britton 1982; Lipski and Archer 1984). For the 19th and 20th centuries, published accounts by potters of their own practice include William Fishley Holland (1958) and Peter Brannam (1982).

There are several significant groups of ceramic finds as single assemblages published: Taunton (Leach 1984); North Petherton (Pearson 1979); King Street, Bristol (Barton 1964); Narrow Quay, Bristol (Good 1987), several from Exeter (Allan 1984; 2003) and Plymouth (Allan and Barber 1992). There are also several important unpublished groups from Bristol and North Somerset.

A recent study of copper alloy domestic utensils by Butler and Green (2003) has radically changed our understanding of the nature and location of this industry and complements excavated material from Exeter (Blaylock 1996; 2000), Taunton (Blaylock 2000, 84–85) and, prompted by its publication, South Petherton (Butler and Green 2006). Silver and gold-work have received their own specialist studies for example Tim Kent's study of 17th-century Somerset silver spoons and goblets (Kent 2004).

There is extensive specialist work on tobacco from the region, most directed at identification and dating. Detailed discussions of individual examples and their context include Davey (2003).

Timber artefacts from waterlogged deposits include good groups from Exeter (Allan 1984, 305–22) and Greyfriars, Bristol (Ponsford 1975). These include barrel and other stave-vessel parts, wooden vessels and utensils such as spoons and combs as well as fragments of furniture. The furniture made and used in the West Country is distinctive and has been best studied in the more general works of Chinnery (1979) and Cotton (1990).

**Other Activities – maintenance, reading, writing, leisure, religion, personal tools and weapons** Many of these fall into small-finds categories and there have been few specific studies. A leather tennis ball c.1660 from Exeter is a rare survivor (Allan 1984, 333 and pl. 4). Two long-bows from Acton Court (Humble in Rodwell and Bell 2004, 405–8) date from the mid-16th century. A fire-pot from a 16th-century wreck off Teignmouth has contributed to wider discussion of this artefact type (Martin 1994).

**Textiles and Clothing** Waterlogged deposits have produced and leather artefacts. Two examples of late 16th-century knitting from Goldsmith Street are part of three small 16th- and 17th-century assemblages of wool and silk fabrics from Exeter (Hedges in Allan 1984, 334–6). There are a few other published groups

from the region, for example from, Acton Court (Crowfoot in (Rodwell and Bell 2004, 399–403) and Taunton (Janaway in Burrow 1988, 150–1).

Leather is more common, including footwear, clothing and accessories with examples from Exeter (Friendship-Taylor in Allan 1984, 323–333), Taunton (Good in Leach 1984, 160 and C Burrow in Burrow 1988, 136–9), Acton Court (Mould in Rodwell and Bell 2004, 403–5) and Bristol (Good 1987, 110–120).

**Transport and Trades** Numismatic evidence is widespread. When required, Bristol was the primary location of the mint serving the region (Grinsell 1986; North 1960). It contributed to the issue of the Chamberlain Coinage of 1549 and was licensed to produce copper farthings in the reign of Elizabeth I. During the Civil War the Bristol mint was re-established from 1643 to 1645, together with mints at Exeter (1643–6), Truro (1642–3), Weymouth/Sandsfoot Castle (1643–4) and in North Devon where the precise location of the Lundy and Combe Martin mints has to be determined. The local availability of silver played an important part in the choice of Exeter and Bristol as mints to contribute to the great recoinage of 1696–8.

Thanks to the classic general corpuses of material (Dalton and Hamer 2004; Williamson 1970) and specific local studies such as for example in Somerset (Minnitt *et al.* 1985; Minnitt and Young 1990; Whittet 1986), there is a deal of work which has recorded and interpreted how token-coinage has contributed to our understanding of the minutiae of economic life in the region. Du Quesney-Bird (1970) has shown that a study of regular coinage can add further to our understanding of wider interactions. There is no synthesis which seeks to combine numismatic evidence with that of similar material such as bale-seals.

### General Studies and Syntheses

Studies of material culture in relation to household units (such as Allan 2003) are rare. There are a few studies from the later period (Brears 1998; Turner 1947). Syntheses which bring artefact and documentary evidence together to examine consumption are also uncommon and rarely have a regional focus. Exceptions include Oliver Kent's unpublished PhD thesis, *Pots in Use* which uses examples from the South West to demonstrate ways in which this might be achieved (Kent 2005). More specialised examples include Brears (1991), on vessel use for storage and Richards (1999), on the consumption of ceramics in the 18th century. A number of studies of Devon pottery have been carried out by American researchers following up the archaeology of the eastern USA (for example Watkins 1960).

Large published groups of material culture are dominated by ceramic assemblages but the material

from the moat at Acton Court provides a generous cross-section of materials and artefacts from a single domestic context (Rodwell and Bell 2004, 294–408). The waterlogged 16th-century pits from 5–8 Fore Street, Taunton have also produced a range of finds including leather, textiles and metal work as well as pottery (Burrow 1988). Faunal analysis of these latter groups is also able to add information about diet and health.

Themed exhibitions and their catalogues often bring together material culture within a specific thematic context. Examples of exhibitions that draw attention to links between material culture and particular people, events and meanings include Bristol City Museum and Art Gallery's *Bristol and Transatlantic Slavery* (Dresser and Giles 2000), the Hidden Legacy's *The Jews of Devon and Cornwall* (Frielander 2000) and Somerset County Museums Service's *Farming in Somerset* (Walker 2001).

## 14.2 Identities

The following issues related to identities in the Post-Medieval period could be considered:

### Regional

- Cornish. Considered by some as a national identity.
- Forest of Dean, which certainly seems to have a very distinct cultural identity in the 20th century.

### National

- English/Welsh. The southern end of the Welsh border is within the region; is this reflected in differences in the archaeological record between Dean and Gwent?
- English/French. Perhaps not strictly relevant for this period – but earlier the concept of “England” and “France” as separate nations separated by the Channel was presumably still forming, and there are continuing links between Cornwall and Brittany.

### Broader geographic/maritime

- Can we see elements of an “English Channel identity” along the southern seaboard, and/or of a “Bristol Channel identity” along the north western seaboard?
- To what extent does the region (especially the south-west peninsula) form part of a broader “Atlantic province”?

### Social/religious/ethnic

- Gender
- Class identities (obvious at a crude level, but also more subtle differentiations)
- Are there identifiably-discrete local/occupational groups (for example fishing, industrial communities vs agricultural; distinct coal- and metal-mining communities)?
- Nonconformity, Puritanism, Anglicanism, recusancy
- Rural/urban (notably Bristol)

#### 14.2.1 Evidence for identity

- Monument/site types. There is probably not much at this level, except for the few specifically-Cornish monument terms, but, perhaps, the surviving distribution of crosses, holy wells and similar?
- House types, especially internal use of space.
- Styles/extent/absence of decoration.
- Use of space in the landscape.
- Eating habits, for example styles of cooking, joints used, cutlery, eating from communal bowl/individual place settings – all recoverable to some extent from finds/animal bone/environmental assemblages.
- Other choices in artefact types, styles etc.

#### 14.2.2 Existing work

- John Allan's work on Breton influence on house-types.
- The substantial literature on Cornish culture and its material manifestations.
- Dan Hicks' and Mark Horton's work on identities/communities in Bristol.

#### 14.2.3 Historic Environment Records

As the site-identifier level, most HER records do not address this issue. Exceptions are the specifically-Cornish sites types in the Thesaurus, and the distribution of site-types such as crosses and holy wells, to the extent that this represents survival and continuing acknowledgement (and possibly construction within the period!) of these sites during the period, and conversely areas where the record/memory have been obliterated.



### 14.2.4 Identities in the Modern period

At the beginning of the 21st century, the concept that our historic environment is an important element in determining the identity of a community has become embedded in national, regional and local planning practice. From it has flowed the ideas underpinning “characterisation” of urban, village and rural landscapes using techniques drawn from historical geography and architectural history as well as landscape archaeology. What is as difficult as ever, is defining “community” to which an identity is to be attached when attempts are made to consider the individual person rather than the places where they live and work. An individual may consider themselves belonging to many communities and therefore having many identities.

Anthropological/archaeological studies of these identities help provide a way into analysing the manifestations of these identities. Some identities display themselves through specific insignia – the cross of St Pirran for Cornwall is a recent phenomenon – but some older symbols are remarkably prevalent, largely through 19th-century revival. The golden dragon of Wessex is widely used – most obviously in the arms of the County of Somerset and badge of the Army’s former Wessex Division. Specific types of artefact are associated with many types of organisation, for example Friendly Society pole-head badges, chapel and trade-union banners, insignia of municipal corporations and religious communities (see for example, Fuller 1964; Frieland 2000). As individuals our identifiers tend to be language/dialect/accents and our material culture (see Section 14.1 on page 214).

## 14.3 Food Production

The South West has been (and still is) an important source of food products with major fisheries along its coasts and rivers and diverse farming landscapes ranging from the high moorland of Bodmin Moor, Dartmoor and Exmoor to the rich arable lowlands of east Devon and part of Dorset and Wiltshire. Archaeological coverage of farming and food processing industries in the South West, as in other parts of England and Wales, has been partial (Harvey 1980; Trinder 1993). Landscape archaeologists have, however, taken a keen interest in field systems. The study of the strip lynchets of Worth Matravers and their possible relationship to an open field system is a good example of site specific analysis (Hinton and Trapp 2002). English Heritage’s Monuments Protection Programme has covered the minor categories of dove farming and ice houses (steps 1–4 completed) and some of the South West’s Industrial Archaeology gazetteers and surveys have included agriculture, processing and support activities more comprehensively than in some other English regions.

### 14.3.1 Raised in the Region

The South West has some of the earliest farming landscapes in the country and many surviving features from the prehistoric, Roman and Medieval periods, but from the Post-Medieval period onwards agricultural “improvement” has been the dominant “shaping” force. Key features of this movement have been the enclosure of arable “open” fields by agreement or, later, by act of Parliament, and the enclosure and reclamation of waste or common land to extend the cultivated area. This was not an even or sequential process – open fields did not exist in some parts of the South West – but three continue to this day in north Devon (Braunton Great Field), Dorset (Portland) and Cornwall (Boscastle). Most, however, have been replaced by the larger rectangular fields of the successive waves of enclosure that have remained until recent mechanisation of arable farming favoured the removal of hedges and a return to larger fields – but without subdivision into smaller holdings as in times past (Taylor 1987).

The enclosure of former “wastes”, moors, and the open downland of Wiltshire and Dorset was a response to increasing population and, in the case of downland, was facilitated by the introduction in the latter part of the 19th century of steam-hauled ploughing sets. Renewed enclosure and “improvement” of Dartmoor dates from c.1780 (Somers Cox 1970) and enclosure of the Mendip plateau began after 1770 (Williams 1971). The enclosure of the Royal Forest of Exmoor in 1818 and its subsequent “improvement” by Worcestershire ironmaster John Knight had the “most dramatic and profound effect” on the landscape: when sold in 1898, the estate had been provided with a network of roads, farms, fields, a village and a parish church, moorland had been drained and some converted to good pasture (Riley and Wilson-North 2001).

In lower-lying areas, attempts were also made to reclaim land that was frequently flooded. Plans to drain the Fleet in Dorset never came to fruition but much peatland has been reclaimed in Somerset; the oldest engine house to retain a working steam engine in Somerset has been preserved at Westonzoyland (Stanier 2003). Current arrangements followed the enclosure and drainage acts of the 18th century and early 19th century but many earlier attempts were made by the local monasteries and those who inherited their estates. Sea walls were also built on either side of the lower Avon valley near Bristol and a successful scheme was completed c.1814 to enclose some 1300 acres of land at Braunton Marsh in north Devon under the direction of the engineer James Green (Otter 1994).

Other features in the rural landscape include development of water meadows in parts of Dorset, Wilt-

shire and Devon to protect grass from frost and to encourage its early growth in order to maintain an increased number of sheep (Bettey 1977; 2000; Corfield 1978; Minchinton 1986; Ross 1994). On Exmoor and elsewhere, catchwater-lead (or field-gutter) systems were introduced widely in 19th century for similar reasons (Riley and Wilson-North 2001). Fast-flowing water was also controlled to produce watercress in lowland valleys in Wiltshire. On the moors, warrens were constructed and maintained throughout the period to farm rabbits (Minchinton 1986). Decoys were also constructed to catch ducks, that at Porlock, one of many in Somerset, is thought to date from the 18th century and was recorded before its recent submersion in a salt-water lagoon (Riley and Wilson-North 2001). Others at Abbotsbury (Prendergast 1984) and Slimbridge (Heaton 2001) survive.

Inland fisheries were another important source of fresh food. Fish was obtained from ponds and by way of extensive dams, weirs and fish passes on rivers (Dickinson 1987). Attempts to replenish stocks in hatcheries and rearing ponds such as those at the Exe Valley Fish-Breeding Establishment were in operation in the late 19th century (Strong 1889).

Changes in the farming landscape were accompanied by improvements in stockbreeding, crops and treatment of the soil. Major drainage schemes have been mentioned above but much heavy land was drained by provision of underground clay drain pipes or tiles in the later part of the 19th century, many of these produced in Somerset (Warren 1996). The most important soil conditioner in the South West was lime and this industry has left a rich archaeology that has attracted considerable attention. Kilns are located throughout the region and along its coasts, rivers and canals and their survival gives a vivid picture of the importance accorded to lime (Stanier 1993; Isham 2000). Later, "artificial" or imported manures, such as superphosphates and guano, were distributed to rural areas from the ports and manufactories in places such as Bristol. The local pattern of introduction of some of these has been studied from the traces recovered by fieldwalking at Shapwick (Gerrard and Aston forthcoming).

Farm buildings and surviving implements of this period constitute an important archaeological resource and, as Harvey observes, few other industries can show such a comprehensive series of buildings with which to illustrate their past (Harvey 1980). Minchinton (1986) included traditional farm buildings in the final edition of his *Industrial Archaeology* guide to Devon; the first of the four editions to include "agriculture" as a category. Whilst some traditional buildings, such as the longhouse, were still being built in the early Post-Medieval period, most surviving farm buildings date from the long period of improvement

which began c.1680. In arable areas of the South West, the most distinctive building is the corn barn which has been adapted to meet the changing technological needs for the storage and processing of the crop before the age of the threshing machine and combine harvester. The tall barn that accommodated manual threshing and winnowing was gradually changed in the early 19th century to house threshing machines driven by horsewheels and, later, by fixed steam engines on larger farms. The "roundhouse" and farm engine house are distinctive features of this transition (Stanier 2002). When corn was processed in the yard or field, the barn continued in use for storage until replaced by more specialised structures such as silos or Dutch barns.

Other surviving buildings include granaries, poultry houses and the distinctive dovecots, which were sometimes situated away from the farmyard. The dovecotes of Somerset have recently received detailed coverage (McCann and McCann 2003). Crops and milk were originally processed on the farm. Dairies are perhaps the most common survivals, as is equipment for making cider. Some small maltings and breweries also survive (Slocombe 1989). Detailed archaeological and architectural surveys of farmsteads have been carried out in East Cornwall (Barnwell and Giles 1997).

Increased use of the horse, and the introduction of more expensive carts, waggons and implements, led to the construction of specialist sheds and stables. Further changes have been made to accommodate tractors and larger harvesting equipment introduced during and after the Second World War. In the 19th century, major changes were also made to house and feed livestock and to the layout of the farmstead, reaching a peak of development with the "model" and "industrial" farms of the later 19th century, the era of "High Farming" (Wade Martins 1991; Harvey 1980). Further mechanisation, industrialisation and a period of recession and restructuring of agriculture in the 20th century saw the end of local traditions of farm building and the use of larger, prefabricated units.

Wade Martins (2002) has provided a synopsis of model farms by county. Examples in the South West include the home farm for the Longleat estate in Wiltshire (1860), powered by a 16hp Clayton and Shuttleworth horizontal steam engine, and Eastwood Manor Farm in Somerset of 1850 which included a stackyard tramway and a 27ft waterwheel to drive machinery. This elaborate farmstead had two covered yards with flanking buildings for livestock and was designed by Frederick Knight's Exmoor agent, Robert Smith. The farm buildings of the Knight's on Exmoor have been covered by Wade Martins (1991) and Riley and Wilson-North (2001).

### 14.3.2 Imported and from the Sea

The growth of the railway network and development of the steamship brought cheap, imported food to the South West and the construction of port facilities, warehouses, icehouses and depots, including Second World War and Cold War storage depots, to handle these imported supplies. The extensive coastline of the South West also provided for an important offshore sea fishing industry. Most of Cornwall's coast has been engaged in the pilchard fishery (Noall 1972) and the later offshore drift fishery. Apart from surviving craft, the structures for the support of the fleet and reception/packing of the fish constitute the archaeology of this industry (Kittridge 1989). The study of fish cellars in St Ives is a good example (Newall 2005). Dorset and Devon have had a long association with deep-sea fisheries and facilities for the landing, sale and dispatch of fish survive at Brixham, Sutton Harbour in Plymouth and Weymouth (Rule 1976). The inshore fisheries of the Bristol Channel have left their own distinctive traces for example in the fish traps of Minehead Bay and further up the Severn.

### 14.3.3 Food Processing (off farm)

The growth of the railway network also stimulated the belated industrialisation of off-farm food processing, one of the last major industries to experience an industrial revolution (Trinder 1993). The subsequent development of motor transport and the modern road system and a "retail revolution" has accelerated this trend. Wind and water mills in the South West constitute some of the earliest processing plant and have received much attention from industrial archaeologists, but more as a source of power than for their role, as grain mills (Addison and Wailes 1963; 1964; 1969). A number of tide mills, also, were once worked in Devon and Cornwall (Minchinton and Perkins 1971). The later transition to steam and electrically-driven roller mills and their concentration in the ports has received less attention. Bread and the baking of biscuits and cakes was, apart from that carried on at the Royal William Victualling Yard in Plymouth, a small-scale operation for much of the 19th century. Many of the small neighbourhood units that are shown on the Goad insurance plans have gone unrecorded but some early steam bakeries survive (Chitty 1971). Many of the larger plants put up in the inter-war years in places such as Bristol have come and gone without much attention from the archaeologist.

The railway provided a major boost for the South West's dairy industry and enabled fresh milk, cream and cheese to be taken to London and to other large cities. One area to prosper in this way was the Blackmoor Vale, and the dairies in and around Gillingham profited greatly from the opening of the railway to London in 1859. There was also a large

creamery at Sturminster Newton which closed in 2000 (Stanier 2002) as did another large plant in Torrington. Other creameries were established in Yeovil, at Castle Cary station, Ansford and at Evercreech in Somerset (Stanier 2003). Former textile factories in Chippenham and Staverton were taken over by the Anglo-Swiss Condensed Milk Co, later Nestlé Ltd, for milk processing. Wiltshire is also well known for its bacon manufacture, pigs being fattened on the by-products of cheese making. Harris's of Calne began as a butchers dealing in Irish pigs being driven to London by road and expanded its operations by use of cooling technology to become one of the UK's largest curers. In Trowbridge, bacon and meat industries also took over old textile plants (Corfield 1978). There is much scope for further study of bacon and meat trades in the South West.

Food industries based upon imported crops were also significant. Bristol was a major centre of the sugar-refining industry from the 17th to the 19th centuries and some traces of this survive. Cocoa was also processed in the city's confectionery plants (J S Fry and Sons was probably the first chocolate firm in the world) until the industry was moved to a modern factory in Keynsham (D Jones 1996; Stiles 1969).

### 14.3.4 Beverage Production (off farm)

The production of alcoholic and soft drinks was mainly locally-based until the 20th century when a period of concentration led to the closure of most South West plants. The major raw material for brewing, beer vinegar and for distillation of spirits is malted barley. Malting has been a specialist trade throughout the period and malhouses were located in most larger villages and towns across the region. A number of these survive but only two of the old floor maltings (in Newton Abbot and Warminster) are currently working. Brewing was a domestic or small-scale industry for much of the period. Larger brewhouses were introduced in the towns from the 16th century with larger-scale commercial breweries developing in the latter half of the 18th century, employing horse and, later, steam power. Brewery construction peaked in the late 19th century and many towns and the larger villages throughout the South West have remains of this era. The last large breweries to close were the Bristol Brewery, the Dorchester Brewery and Ushers in Trowbridge but breweries are still at work in St Austell, Bridport and Blandford Forum and brewing has recently returned to the old Wickwar Brewery. Breweries and maltings await comprehensive survey but studies include those of Bath (Bone 2000), a small malting at Halse (Miles 1989) and a detailed record of the brewhouse and later malting at Haven Banks, Exeter (Parker 2003).

Some of the first large-scale businesses in the drinks trades were the malt distilleries which made spirit to be later rectified to produce gin. Bristol's last distillery – there were many in the 18th century – closed in the 20th century but the Plymouth Gin Distillery remains in business and has some historic equipment (Minchinton 1986; Gaskell Brown 1980). In times of dearth, spirit was also distilled from molasses. Bristol was also a major centre for vinegar brewing and distillation but little is known of this trade. Cider has provided an historic alternative to beer in the South West and has been produced on a small scale throughout the region. In the early 20th century, some larger cider and perry plants developed, at Norton Fitzwarren, Shepton Mallet and Wickwar, where the former brewery was so-employed (Stanier 2003). Farmhouse cider continues to be made and equipment is displayed at Sheppy's Cider Centre near Wellington. Many breweries also produced non-alcoholic or soft drinks and many small firms also specialised in this trade in the 19th century (Edginton 1976). The equipment of the Bath manufacture, JB Bowler, has been preserved and displayed at the *Museum of Bath at Work*, together with equipment from his engineering business (Andrews 1998).

### 14.3.5 Distribution and Support Services

Whilst our knowledge of the archaeology of the food and drinks trades is limited, we know even less of the distribution and support services that were an essential part of the organisation of these trades. Warehouses and bonded stores have been noted in studies of ports but little has been done on such features as brewers' depots and bottling stores or food packaging plants. The manufacture of packaging and containers such as glass bottles, once important industries in the Bristol region, have been similarly neglected. The South West is well known for its distinctive covered markets and many are recorded by Schmiechen and Carls (1999). Pubs have also been the subject of a recent national study (Brandwood *et al.* 2004). The development of agriculture and food processing has been supported by agricultural societies and the Bath and West has been studied; once itinerant, it now has a permanent showground at Shepton Mallet.

## 14.4 Rural Settlement

### 14.4.1 Agricultural settlements

The main pattern of rural settlement, dispersed hamlets and farmsteads in Devon, Cornwall and other isolated parts of the South West such as south-east Somerset (Taylor 1983, 175) and villages in much of the lowland areas of the eastern half, is inherited from the Medieval period. Further colonisation/enclosure

of woodland and downland was accompanied by new dispersed farmsteads (Taylor 1983, 206–7) and in some cases by entire new villages such as Simonsbath on Exmoor (Taylor 1983, 225). Some landowners reordered their villages into more regular settlements from the picturesque like Blaise Castle Hamlet (1810–12) and Selworthy Green (c.1850) to the more staid like Treslothan (1841), Dartington (1920s), Canford Magna (1850s), Hatherop (1860s) and Talbot Village (1850s–60s) (Darley 1978) or took a cheaper option of remodelling the facades to produce an air of conformity as at Hinton St George (Rowley 1978, 172). Similar in concept are the villages established as utopian model settlements – most notably the Moravian village of East Tytherton (1745) and proto-hamlet at Kingswood (1745), the failed Chartist colonies at Snig's End (1847–53) and Lowbands (1846–58) and the Tolstoyan Whiteway colony (1898).

There are small-scale new settlements in the 19th century which are the result of piecemeal enclosure of marginal land: New Moreton is an example (Taylor 1970, 155). In the 20th century, to meet housing shortages, many villages have had extensions of council and estate housing, often as estates discreet from their parent villages, such as Battleton outside Dulverton and Avebury Trusloe outside Avebury. There are also examples of caravan parks becoming established as permanent settlements in the period after the Second World War; Pathfinder Village west of Exeter is probably the earliest in the South West.

Overall, there is relatively little systematic archaeological survey; unfortunately, programmes such as that started by the CRAAGS never reached fruition.

### 14.4.2 Industrial Settlements

Some settlements grew because advantages were created to exploit a particular resource. Rowley cites the ribbon development of Curload along the newly canalised Tone as being established to exploit opportunities for planting new withy beds (Rowley 1978, 140). More common are those settlements specifically planted to house the workforce for extractive industries especially in Cornwall (Halsetown and the ports of Charlestown and Portreath) and the coalfields of Gloucestershire and Somerset (such as Watley's End, Engine Common). Some of these especially the more isolated centres of activity such the Brendon Hill village associated with the iron mines have almost totally disappeared (Riley and Wilson-North 2001, 145). Further model settlements are associated with particular industries (for instance, Champion's brass works at Warmley in the 1760s or Clark's leather manufactory at Street from 1829). The prison on Dartmoor has Princetown. The armed forces have been the most prolific producer of new and enlarged settlements, Bovington for example, as well as the



cause of the depopulation of villages like Imber and Tyneham.

Transport developments have also stimulated new settlements: canals (Sharpness, Westport near Hambridge, Brimscombe Port), turnpikes (Covesfield Gate) and railways (especially the London and South Western Railway's habit of establishing junctions in the middle of nowhere, such as, Halwill Junction, Seaton Junction, South Chard).

Again there is little systematic archaeological survey with the notable exception of the Cornish Industrial Settlements Initiative which has published surveys of over 50 settlements across the county (see <http://www.historic-cornwall.org.uk>)

### 14.4.3 Buildings

Houses of the "Great Rebuilding" have probably received the most attention with detailed surveys and studies, such as those by Hall (1983), in what is now South Gloucestershire, and Penoyre (2005) in Somerset, and valuable fieldwork by dedicated groups such as the Somerset Vernacular Building Research Group. There are also good case studies of farms in particular areas such as Exmoor (Riley and Wilson-North 2001) and individual types of building such as dove-cots (McCann and McCann 2003). There is a relative sparsity of work related to the 19th and 20th centuries.

## 14.5 Urban Settlement

The South West offers a rich pattern of urban settlement and substantial potential for future work. In 1972, the Council for British Archaeology identified no fewer than 188 such places in the region (Heighway 1972) and highlighted the scale of the risk to archaeological evidence. The majority of these places are small in scale and confined to the agriculturally richer lowland areas or the coast. Research by historians and historical geographers in the 1950s and 60s set the general tenor of our understanding of urbanism in the South West (Hoskins 1954; Millward and Robinson 1971; Finberg 1975).

### 14.5.1 Urban Growth and Change: 16th and 17th Centuries

There are the examples of town centre rebuilding and infilling from many places such as Bristol, Exeter, and Poole and the building of new suburbs such as Sherborne Newlands and Frome. There were even new towns founded, notably Falmouth (1613/1660) and Devonport (1695), as others declined, often for no apparent reason (Aston and Bond 1976, 130–2). The impact of the Civil War in stimulating the building of defensive works and the impact of the course of the war is discussed in Section 14.12.1 on page 244.

### 14.5.2 Towns in the Industrial Era: 18th and 19th Centuries

The period is characterised by the expansion and increased industrialisation of many market towns and larger settlements. Bridgwater, Bristol, Exeter, Truro, Wimborne Minster and Totnes are a few examples out of many. Some came to be dominated by single industries: Stroud and Bradford-on-Avon by woollen manufactories, Tavistock and Camborne/Redruth by mining. A few, like Bristol and to a much lesser extent Exeter and Gloucester, grew to be major industrial and commercial centres, partly based on their ports – their importance as nodal points in the increasingly complex transport networks giving them even better access to raw materials, labour and markets. Other successful market towns and ports individually developed a remarkably broad agricultural and industrial base which has only been eroded since about 1950. Their prosperity is reflected in the quality of their rebuilding – a particular instance being the rebuilding of Blandford Forum after the disastrous 1731 and earlier fires. Not all succeeded, some, as described graphically by Hoskins (1954), dwindled into sleepy backwaters. Milton Abbas was even removed wholesale between 1771 and 1790 to a new model village.

This too is the era when ideas of urban design come to be applied on a large scale. The major spas of Bath and Cheltenham provided a grand canvas for such ideas as urban terraces, squares and crescents which can be seen imitated in the new seaside resorts of the late 18th/early 19th century (such as Exmouth, Weymouth, and Sidmouth), and also realised in contexts as different as the model town of New Swindon (for the Great Western Railway) and the Bedford estate at Tavistock.

There are also many good examples of later 19th-century thinking: villas as in Torquay, the picturesque as in Lynton and Bournemouth and growing influence of the garden-city concept, applied in places as modest as Street and Glastonbury and later influencing the development of suburbs such as Sea Mills in Bristol. This was the time of growing municipal power and awareness. Local government was reformed to oversee and often provide everything: health (sanitation, public baths, clean water supply, hospitals), education, transport, utilities (gas, later electricity) and leisure. Even places as small as Lyme Regis and Beaminster had their own gasworks and Taunton boasted the first large-scale electric town-lighting scheme.

### 14.5.3 Towns in the 20th Century The Planning Age

The application of concepts of planned zoning and sectors from 1905 has had a profound effect on urbanism. Larger scale industry was already moving

out of cramped inner urban areas to new locations on the periphery of cities and towns (Fry's removal from the centre of Bristol to Somerdale at Keynsham, for instance) and the century saw the growth and proliferation of industrial estates, Avonmouth being one of the earliest and eventually the largest in the region. It is probable that the development of electric tramways helped shape the form that rapid urban expansion took, especially in the case of what is now the Poole–Bournemouth–Christchurch conurbation as well as more established cities such as Bath, Bristol and Exeter. Planned housing with the semi-detached house replacing the terrace as the norm demanded ever increasing amounts of land. The pressure on boundary extensions, leading sometimes to the amalgamation of settlements (such as Plymouth and Devonport in 1914), grew and was steadily accommodated until the whole issue was side-stepped by the local government reforms of 1974. The process of zoning has also influenced the way in which towns expanded; the peculiar shapes of Taunton and Bridgwater are determined by mineral extraction licences. By the end of the century even the smallest and dreamiest of Hoskins' urban settlements was pressured into expansion to accommodate new housing for the ever increasing population of the South West.

### War

Plans for the redevelopment of most of the larger towns and cities were prepared and adopted in the 1930s. The emphasis lay on renewing the central business district, removing industrial activity to new peripheral locations and clearing sub-standard housing and its replacement in new spacious estates. In many of these plans, there is a curious disregard of the individual character of a particular urban centre and thereby the topography, buildings and other features that comprise its historic heritage. Damage during the war provided the opportunity post-1945 to apply these principles to the whole of the centre of Plymouth, to the Broadmead area of Bristol and the High Street area of Exeter and later in smaller doses to the many other towns.

### Traffic

The post war period is characterised by continued change driven by a circle of ever growing population, greater fluidity in working and greater mobility. The motor car which was seen as a vehicle for delivering the prewar concepts of segregated activity can also be seen as an agent for the destruction of so much of the historic fabric of towns: road-widening schemes, pedestrian zones, car parks. Archaeologically, little attention has been paid to the agent or this process. The petrol-station has yet to be studied in the same way as the public house.

What has disappeared is the fine grain of many of our towns: the outbuildings behind the architecturally grander main street frontages, anything ramshackle or industrial in character and most startling of all whole swathes of modest terraced urban housing condemned as "slums" and "insanitary". There is now a huge acreage of undeveloped brownfield sites in the South West mostly representing sites of earlier urban activity of this period.

## 14.5.4 The Archaeological Response

### Urban buildings

The Royal Commission on the Historical Monuments of England (now English Heritage) led the way with recording buildings. The volumes covering Dorset (the only county to be completely surveyed in the traditional comprehensive way in the South West) record, for example, Blandford Forum (RCHME 1971, 16–40) and Poole (RCHME 1970, 189–240). In addition, there are individual studies of Salisbury (RCHME 1980), of the Trinity area of Frome (entirely devoted to a Post-Medieval suburb, Leech 1981a), and of the Railway Village at Swindon (Cattell and Falconer 1995). In addition there is a growing but unquantifiable number of reports and records of individual structures usually commissioned prior to demolition or refurbishment amongst which there are those that relate to this period. In a few rare instances they are published, such as, Christmas Steps, Bristol, but in many cases of full archaeological activity on a particular site it is common to find that structures of this late period are not mentioned at all or just mentioned in passing (for example, the model dwellings for the Poor at St Bartholomew's Bristol in Price and Ponsford 1998). Buildings have been recorded in places such as Exeter but few have been published although this is changing, (see for example Parker 2001; 2004). It is perhaps, therefore, not surprising that there are few published syntheses such as Michael Laithwaite's study of 16th- and 17th-century houses in Totnes (Laithwaite 1984) and no such work from an archaeological viewpoint.

### Urbanism

Since the CBA report (Heighway 1972) there has been a great deal of archaeological activity in towns. There are good studies of the archaeological potential of small towns across substantial parts of the region, for example, Avon (Leech 1975), Somerset (Aston and Leech 1977) and Dorset (Penn 1980) and more recently the English Heritage *Extensive Urban Surveys* of many parts of the region (see Section 1.2.4 on page 11). However, these are primarily designed as planning tools and secondarily as statements of archaeological analysis and in this are unwittingly fettered by the concepts, structure and processes of modern planning law. Rarely, as in the case of the EUS studies,

is the attempt made to address the whole archaeological spectrum rather than considering urban sites only up to and including the Medieval period.

There has been much excavation and recording especially in towns known to be significant in the Post-Medieval and Modern period such as Bristol, Exeter, Barnstaple, Poole, Bath and Gloucester. Some of the pioneering excavations of Post-Medieval archaeology have been in such places (for example Barton 1964). However despite all the fieldwork carried out, the situation seems little changed from the reported position in 1987 and there seems to be little evidence of the application of the research priorities suggested then (Davey 1987, 69–70). The English Heritage *Urban Archaeological Database* project (see section 1.2.4 on page 11) may address some of these concerns, although they mostly have a cut-off date in the 18th century and only Bristol and Bath are nearing completion of the assessment of the development and significance of those cities.

Relatively little of the work relates to the Post-Medieval and Modern period and of that relatively little has been published. Many such as James Deetz have argued that the added perspective that archaeology brings to urban studies is essential (Deetz 1993, 159–163). This applies more so now that our understanding of urban places is so dependent on their analysis as places of spatial activity within a temporal context. It is clear that good archaeological fieldwork furnishes evidence for the kind of fine-grained study that is being applied to places as diverse as Roman Pompeii and the slums of New York and Melbourne (Laurence 1994; Mayne and Murray 2001). Here archaeological evidence complements and often allows new readings of the evidence of standing structures and documents. Work is being done that points the way: Roger Leech's detailed analysis of the buildings and records of the St Michael's precinct in Bristol and Oliver Kent's comparative analysis of two pottery groups from Bristol and Exeter both pose a series of questions that archaeology can address (Leech 2000, Oliver Kent pers. comm.). Both demonstrate that there is much valuable evidence that needs putting into the public domain if the investment already made is to be properly realised (see also Section 14.6).

## 14.6 Designed Landscapes

### 14.6.1 Rural

#### Agricultural

Issues here include the consolidation of open fields, pre-parliamentary enclosure of arable land, enclosure of waste and uplands, parliamentary enclosure, small-holdings, model farm complexes. The so-called 20th-century "prairie" landscapes may not be too far away from the open fields of the Medieval pattern.

#### Parks

Much work has been done on designed parks and gardens but the majority of this has been by documentary study, for example comparing the Repton Red Books with known, unscrubbed existing garden plans (Bond 2000; Harding and Lambert 1994; Mowl 2002). Apart from the excavation of No 1 The Circus, Bath no excavation work has been carried out.

#### Forests and National Parks

There has been extensive new planting, particularly following the establishment of the Forestry Commission after the First World War; the first of the Commission's plantings was in the South West at Eggesford Forest, Devon, on 8 December 1919 (<http://www.forestry.gov.uk>). The years after the Second World War saw the creation of "designed" access for visitors; maintaining a supposedly "natural" beauty in areas such as Dartmoor, Exmoor and the AONBs.

### 14.6.2 Urban c.1540–1920

#### Urban planning

Many Medieval towns were extended – mostly in the first instance using traditional Medieval suburban forms: narrow burgage plots lining linear ribbon development (such as in Somerset: East Reach, Taunton; Lyewater, Crewkerne; Garston Street, Shepton Mallet and possibly Bow Street, Langport) or more ambitiously using planned grids of streets as exemplified by the Trinity district of Frome (Leech 1981a). In the 17th century, the traditional Medieval row was transformed first into a regular street form as in New King Street, Bristol (laid out in the 1650s), and shortly afterwards in mid-century using new materials, principally brick and pantile, into the Classical terrace and the new planning form – the square – St James Square (1707) in Bristol, and Castle Street (1723) and King Square in Bridgwater are good examples.

In the 18th and 19th centuries, these new forms were not only applied to the polite face of our towns and cities – Cheltenham, Bath, Clifton and Exeter – but to the burgeoning suburbs for the rapidly growing workforce such as Russell Town and Somer's Town in Bristol and the Kingsmead and Beechen Cliff areas of Bath (all swept away since 1970 without any systematic record). There are relatively few detailed analyses of the development of individual suburbs, of how earlier field patterns and rural settlement were moulded into a new suburban environment. The architectural and historical study of the development of Westbury Park, Bristol, from city-fringe rurality in 1835 to today's mixture of substantial villas, cottages and terraces through to detached housing together with places of worship, pubs and schools, is an excellent example (Bishop and Hurran nd).

A new range of public buildings and monuments was used to provide focal points in planning, such as the civic centres of Plymouth (all gone) and Devonport and the new Council House and remodelling of College Green, Bristol, though rarely (unlike on mainland Europe) were railway stations used in such a way. New roads such as Victoria Street, Bristol, were carved through the urban fabric to provide speedier access but the stations they serve do not provide the visual focus of attention.

### Changing functions

The archaeology of the response to the many changes towns have undergone has hardly been addressed. The CBA Historic Towns survey (Heighway 1972) identified Sidmouth, Weymouth and Lyme Regis as particularly good surviving examples of the early development of seaside resorts – all from pre-existing settlements. Responses to changes in patterns of industrialisation of transport, manufacturing and agriculture and in particular in the 20th century the growth of the commercial and service sectors have had a significant impact on the growth and character of most towns in the region.

### 14.6.3 Urban from 1920

#### Early Planned Suburbs

A radical point of change comes with the Town and Country planning acts. Before this much development, even on a large scale, was field by field thus accidentally trapping an enclosure landscape particularly visible, at least on maps, in the areas such as that around Bedminster, Bristol. From 1920, discreet areas were set aside to ensure geographically separate development of industrial, commercial and domestic activities. The concept was further applied to replanning existing town centres though the opportunity to put them into wholesale practice did not come until after 1945 (see the pre-war schemes for Taunton and Bristol, for example).

#### Post Second World War Planned Estates

Some Extensive Urban Surveys (see Section 1.2.4 on page 11) were carried through to the late 20th century. Indeed some, for example, Filton and Avonmouth concentrated on these late developments.

## 14.7 Transport and Communications

The importance of the South West region since the Post-Medieval period as an industrial and trading area went hand-in-hand with developments in transport systems. As with other parts of this assessment, topography and geology have influenced the develop-

ment of these and have provided plenty of variety in the surviving monuments. Land transport was often difficult in the far west in earlier times but proximity to the sea and navigable rivers provided ample opportunities to move goods by coastal shipping and river navigation. Bristol's historic role in the transatlantic trade encouraged the development of the UK's second largest port and many smaller harbours also had important overseas connections.

### 14.7.1 Roads

#### Roads Before Motors

The South West has examples of some of our oldest trackways and sections of Roman routes, such as the Fosse Way, are still in use today (Otter 1994; Cragg 1997). Road development was much influenced by varied topography and geology and as late as the 1790s travellers such as William Marshall commented upon the lack of wheeled vehicles in areas such as north Devon (Marshall 1796). Whilst many roads remained the responsibility of the parishes, it was the formation of the turnpike trusts that brought surfaces fit for wheeled vehicles and carried out numerous route improvements on the more-used routes. The Bath (1707) and Bristol (1727) trusts were amongst the earliest, the latter becoming the largest outside London, and both were employers of John Loudon McAdam, famous for his cheap and efficient road surfaces. Within the region, the most detailed surveys of routes have been carried out in Dorset (Good 1967), Somerset (Bentley and Murless 1985; 1987) and on Bodmin Moor (Herring *et al.* forthcoming).

Whilst most old road surfaces have been replaced and renewed over time, many of the other structures of the parish and turnpike eras have survived and have attracted more attention from archaeologists. Most obvious are surviving masonry bridges, many dating from medieval times and modified over the years to accommodate vehicles of greater width and weight, such as the Long Bridge at Bideford and that at Barnstaple (Otter 1994). Thousands of examples of more prosaic structures survive in the South West (see, for example, Jervoise 1930; Wallis 1974; Kentley 2005). Bridges did not span every stream, river or estuary and examples of fords and ferries have survived into the motor age (Kittridge 1989). Cuttings and embankments, often the product of the turnpike era, have had relatively little attention, unlike the South West's rare and fine examples of turnpike-era road tunnels, such as the 1832 Horn Hill near Beaminster (Eedle 1994). Many former coaching inns survive in the numerous cities and small towns of the region, although pub-closures and new routes have seen many close to customers. Many, such as those in Barnstaple, had extensive stables and grain stores to the rear of their elegant facades (Bone 1973).



The most visible and numerous survivals of the turnpike era are the tollhouses and milestones that still survive on many of the region's old roads. A number of studies of tollhouses have been made as many of these roadside dwellings were threatened by road-widening and traffic accidents in recent years and in many cases this has led to their protection (Kanefsky 1976). Milestones of this period also survive on many roads and there is now a national society to promote their study and conservation. A number of attractive direction signs also survive. There are fewer surviving vehicles from this period than from the early days of the motor age but significant collections are held at Bristol Industrial Museum and at Arlington Court in north Devon.

### Motor Roads

Railway competition finished off much long-distance road travel and most turnpike trusts did not renew their legal powers in the 1870s. Major roads returned to local authority control until the growth of motor traffic encouraged central government to become involved via the Ministry of Transport of 1919. Government funding was hit by the financial crises of the 1920s but progress was made and few roads were not tarred by 1930. With economic recovery, the Trunk Road Act of 1936 intended to create a national system for through traffic and this was accomplished after further delays during World War Two. The most recent phase of road-building in the South West has involved the creation of by-passes, especially on tourist routes that were often congested in the summer months, ring roads and the building of motorways, in particular the M4 and M5 that cross the region E–W and N–S respectively.

New road schemes have created new civil-engineering features and many bridges have been replaced, widened or strengthened. Examples of significant viaducts are those taking the A30 through west Cornwall and significant suspension bridges have been built to cross the Tamar between Saltash and Plymouth and the Severn Estuary, the latter via the “old” (1966, Listed Grade I) and “second” (1996) crossings.

Many signposts on minor roads date from the earlier part of the last century, such as the cast-iron finger posts that have become increasingly vulnerable to damage. The motor age has also created a number of new structures to replace the old infrastructure provided by coaching inns and wayside pubs. These include parking areas, multi-storey car parks in larger towns (1925), garages, filling stations (from 1919) and motorway and trunk-road service stations. Train, bus and coach travel has also created depots and stables (for horse-drawn trams), power stations for electric trams, bus and coach stations. There were

some fine examples of bus and coach stations in the South West, that at Barnstaple was opened by the borough in 1922 on the site of the old town quay and has now been conserved. Black and White Motors created their important coach station at Cheltenham in the 1930s – it was known as “the Charing Cross of the coach network” – with booking hall, snack bar, waiting and cloak rooms, cafes and offices for 50 clerical staff. The Bournemouth Bus and Coach Station of 1931 was built in reinforced concrete and was complete with ramps to assist arrival and departure of vehicles (Jeremiah 2004). Road freight depots were created by railway stations and, as long-haul freight took increasingly to the roads, close to the trunk and motorway systems. Many of these features are now being replaced – the Bournemouth Bus and Coach Station, once described as “the finest in the country”, has been demolished – and have attracted far less attention than their turnpike-era predecessors. Motor vehicles and tramcars have fared better with many collections (such as Bristol Industrial Museum) and a number are owned and operated by enthusiasts who maintain a national register. A number of early cycles and cars have also been preserved, including some made in the South West in the early days of motor transport.

### 14.7.2 River Navigation and Canals

At first glance, the South West does not appear to be an important area for the study of river navigation and canals but its situation, topography and transport needs gave rise to a number of schemes that have left some significant remains.

Whilst much of the region is within easy reach of the sea, the River Tamar, the Bristol Avon, the Severn and the Parrett and Tone in Somerset were all important for navigation during the Post-Medieval and Industrial periods. In particular, Bristol's trading connections owed much to its links to the Midlands by trow and barge with the Severn navigable to Pool Quay near Welshpool (Hussey 2000). Powers had been granted as early as 1619 to make the Bristol Avon navigable above the tidal limit at Hanham and this was eventually achieved in 1727 when the first boat from Bristol reached the developing city of Bath and its growing stone quarrying industry (Buchanan and Cossons 1969). The Wiltshire Avon was also made navigable from Salisbury to Christchurch in Dorset in the late 17th century but this has left few traces (Corfield 1978).

The region also has the UK's first (Exeter, c.1560) and second (Gloucester and Sharpness of 1827) ship canals, the latter with its impressive docks in Gloucester dating from 1812–1890 and fine warehouses, the earliest of 1827. The Stroudwater Canal Company was formed as early as 1730 but was not completed

until 1779 and navigation was extended to the Thames near Lechlade by the Thames and Severn Canal of some ten years later. The Sapperton Tunnel on the summit of this canal was, when built, the longest canal tunnel in the country (Mills *et al.* 1992). An ambitious programme to restore these Cotswold canals is currently in progress. The most impressive canal restoration in the region has been the Kennet and Avon Canal (1816). Of particular note are, from Bath eastwards, Widcombe Locks at its junction with the Avon, the early Coalbrookdale cast-iron bridges in Sydney Gardens, Bath, Claverton water-powered pumping station, the Dundas Aqueduct at Limpley Stoke, Avoncliffe Aqueduct, and the flight of 17 locks at Caen Hill, Devizes (Corfield 1978; Cragg 1997).

Further west, the canals take on a different character from the grander “trunk” schemes in Gloucestershire and Wiltshire. The St Columb in Cornwall was built as two canals in the 1820s to carry sea-sand inland to improve the land. Like the Bude Canal of 1825, it was a tub-boat canal and employed inclined planes to change levels. More successful was the Liskeard and Looe Union Canal of 1828 which used 24 locks on its 6-mile route to the coast to carry granite and copper ore for shipment and return cargoes of coal and lime inland (Stanier 2005). Impressive structures of these waterways survive, in both restored and abandoned routes, and there is scope for further discoveries as at Nynehead on the Grand Weston Canal where James Green’s tub-boat lift has been excavated by the canal trust. Many West-Country canals opened late and soon fell victim to railways, the Chard Canal, for example, opened in 1843 and closed just over 20 years later (Stanier 2002). A few examples of the boats and barges that used these canals survive, some abandoned in or near the waterways.

### 14.7.3 Railways

In his survey of the archaeology of railways, Richard Morriss comments on the immense volume of both the archaeological resource and research output (Morriss 1999). This is certainly true of the South West, with its variety of early mineral lines, Brunel’s Great Western Railway main lines to Bristol, Exeter and Cornwall and a number of scenic cross-country routes and branch lines. The resource is therefore well known though, as with railways in general, not all aspects have received the same depth of coverage.

The pre-locomotive railway developed in the coal-fields of the north of England but the problems of moving a bulky load across difficult surfaces to navigable waterways or the sea were the same in the South West and a number of these early lines were constructed in the region. The Branch Tramway (1812) in the Forest of Dean remained in use as a horse-drawn line until 1947 and has substantial

remains (Mills *et al.* 1992). To the south of Gloucestershire, the “Dramway” took coal from pits to the east of Bristol to the Avon Navigation near Keynsham (Barber 1986). In Dorset, Fayle’s Tramway was built in 1806–7 as a plateway to take ball clay from Norden for shipment on Poole Harbour at Middlebere Quay and some earthworks and stone sleeper blocks survive. On Portland, the Merchant’s Railway of 1826 reached Castleton by a massive incline (Stanier 1989). The best-known of the Devon tramways is that of Haytor (1820) which used granite for its track (Ewens 1966). In Cornwall, the mining district around Camborne and Redruth was linked to the north and south coasts by the Portreath tramroad of 1812 and the Redruth and Chasewater Railway of 1826 which took minerals to Devoran (Barton 1966). In Bath, the entrepreneur Ralph Allen had applied northern railway technology to move stone blocks from his quarries on Combe Down to the newly-opened Avon Navigation in 1731 (Buchanan and Cossons 1969).

Richard Trevithick was a pioneer of steam locomotion but his first railways ran outside Cornwall. The first true steam railway to be opened in the county was that from Bodmin to Wadebridge, opened in 1834 and, since closure, adapted as a cycleway/footpath, followed by the Hayle railway in 1837. Steam railways replaced earlier systems, locomotives took the place of horse power on the Redruth and Chasewater Railway and a railway took over much of the route of the Liskeard and Looe Union Canal. However, the railway age proper in the South West began with the construction of IK Brunel’s broad-gauge Great Western Railway (GWR) from London Paddington to Bristol Temple Meads, opened throughout in 1841. The line was soon extended to Exeter (1844) and Plymouth (by 1848) and linked with the Cornwall Railway when Brunel’s Royal Albert Bridge over the River Tamar was opened in 1859. Other major routes were constructed by the Midland Railway, which gained access to Bristol by taking over the Bristol and Gloucester Railway, and the London and South Western Railway which extended its routes from Waterloo to Exeter and beyond some twenty years after the GWR’s initiative. The railway map was completed in the later 19th and early 20th centuries with branch and cross-country lines, many of which were closed in the 1960s. In addition to these standard-gauge lines (the GWR was converted to this gauge in 1892), light railways, such as the narrow-gauge Lynton–Barnstaple (1898–1935) were built to connect with the national system. The South West also has some funicular railways, such as the Lynton Cliff Railway (1890), the Clifton Rocks Railway in Bristol (1893) and more recent examples in the resorts of Torquay and Bournemouth.

Many of the larger towns developed urban tramways in the later 19th century which helped

to ease congestion in town centres and also played a significant role in enabling the growth of suburban districts, as in trams where the transport entrepreneur Sir George White built his business empire upon tramways, early motor transport, urban development and, finally, aircraft manufacture at Filton in south Gloucestershire. Bristol's trams started in 1874, were converted to electric traction from 1895 and closed in 1941 when bomb damage interrupted power supplies. Other tramways in the former County of Avon operated in Bath and Weston-super-Mare (Buchanan and Cossons 1969).

Much of the literature on railways has, as Morriss (1999) observes, featured locomotives, rolling stock and company history. Likewise, preservation has concentrated its efforts on the "moveables" rather than the architectural and engineering infrastructure. The railways have left a rich heritage with surviving examples and traces of early tramways, cuttings, embankments, tunnels and viaducts across the region. Listed items have been recorded by Biddle and Nock in 1983 and the former's much-expanded gazetteer of 2003 (Biddle and Nock 1983; Biddle 2003). Many railway station buildings have been converted for other purposes in recent years and have been catalogued by Oakley in Dorset, Somerset, Gloucester and Wiltshire (Oakley 2001; 2002; 2003; 2004). The railway works and new town of Swindon is one of the most impressive survivals of the steam railway in the UK and has been recorded and interpreted in a Royal Commission/English Heritage publication (Cattell and Falconer 1995). Many of the less prestigious features of railways, such as goods yards and warehouses, have attracted less attention. Fewer remains survive of the region's urban tramways though examples of depots, stables and electric power stations survive in Bristol (Buchanan and Cossons 1969). National collections of locomotives, rolling stock and trams include South West examples and Swindon has a large railway museum ("Steam") in part of the old GWR Swindon works.

#### 14.7.4 Shipping

The South West is a diverse area but has in common a significant maritime heritage; some of the UK's greatest sailors were born here, countless voyages for war, international trade, exploration and emigration started from its ports, and its coast and estuaries were hosts to a substantial coastal trade until the railway and, crucially, the lorry came on the scene. For most of the Post-Medieval period, Bristol was the Britain's second port. Only Wiltshire has no coast while Devon is the only English county to have separate north and south coasts. In recent times, past maritime greatness has been replaced by the rise of the coastal resort and the popularity of the western counties as tourist

areas, creating new demands for maritime facilities and transport.

As with railways, shipping, voyages, ports and maritime facilities have received much attention from historians and archaeologists and most of the South West's ports, harbours and quays have been studied and recorded. Bristol and Plymouth have been the region's largest ports in recent times. Bristol's historic quays were at the heart of the city and the early 19th century saw the dockisation of these quays when the Floating Harbour was constructed under William Jessopp's direction. This has only recently been closed to commercial traffic but facilities for larger ships were developed at Avonmouth and Portishead in the later 19th century. Much of the Floating Harbour's civil engineering features survive as a leisure facility but development around its quays has threatened many dockside buildings (Lord and Southam 1983). Plymouth has an important fishing and naval tradition. Sutton Harbour's primacy was challenged by the development of Millbay Dock where Brunel carried out improvements to meet the needs of the new railways; mail and passenger traffic was established here and liners called until the 1960s. Much has been demolished but some historic structures survive in the modern marina and ferry port (Gaskell Brown 1980).

Many of the smaller ports of the South West have had important overseas trades in addition to their coastal business. In Dorset, Poole and Weymouth made use of fine natural harbours for their trade whilst Lyme Regis, with its historic Cobb of Medieval origin, and Bridport (latterly known as West Bay) had to undertake various schemes to keep their harbours open in difficult situations; all had an extensive North American trade (Payne 1953). In Devon, the rival ports of Barnstaple and Bideford in the north and Exeter in the south took advantage of sheltered quays on their river estuaries. All three developed important overseas and coastal trades and maritime features survive (Duffy 1992; Duffy *et al.* 1994).

Cornwall's maritime heritage is particularly varied and important. There are few beaches and coves in the county that have not seen some trading activity. Vessels were run aground on "Porths" to unload at low tide and float off when the tide returned. In this way, coal and lime were unloaded for use in local agriculture and general supplies delivered. As volumes increased, especially mineral and china clay cargoes, small ports were developed by construction of piers and basins as at Porthleven towards Land's End where the present harbour was completed in 1818. It was rebuilt and improved after storm damage in 1824 and purchase by Harvey's of Hayle in 1855 for use in the mining trade. Charlestown was developed by Smeaton 1791–1801 as a floating dock and handled copper ore and, latterly, china clay from the St Austell area. In addition to these coastal harbours, the Tamar

and Fal estuaries were also significant shipping places, there are numerous quays on the Devon and Cornwall banks of the Tamar (such as Morwellham and Cotehele Quays) and the deep waters of the Fal have been used to lay up ships during slack times. Many ports had shipbuilding businesses and Falmouth retains a large working yard and dock (Kittridge 1989).

In addition to these piers, basins and docks, the South West has many surviving examples of warehouses, bonded stores and customs houses – Exeter has a fine group at its historic quay which includes the Custom House of 1681 – and numerous survivals of the land-bound trades that serviced ships and their cargoes. The social archaeology includes premises for the welfare of seamen, such as Ilfracombe's Sailors' Institute and Bethel and the Bristol Sailors' Home (Kennerley 1994). Safety at sea has also produced its archaeology, the region having some historic lighthouses, such as the re-erected part of Smeaton's Eddystone lighthouse on Plymouth Hoe, and the Lizard, famous for its powerful light. Accommodation for lighthouse staff and coastguards also survives throughout the region (Minchinton 1986; Tarrant 1990).

There are many maritime collections in the South West, including the new maritime museum in Falmouth and the museum of Trinity House and its lighthouses in their depot at Penzance of 1866. A number of harbours in the region offer temporary or permanent homes to historic ships. These include Bristol, where the *SS Great Britain* is kept in the dock in which it was built and the steam tug *Mayflower* of 1861 is maintained in working condition, and Charlestown where historic sailing ships are based. There are many hulks of historic craft in South West estuaries and, offshore, a number of Modern wrecks that will yield important data on ships, trade and material culture on archaeological investigation.

### 14.7.5 Air Travel

The South West has a significant history in pioneering flight and in aircraft production, notably at Filton where Sir George White established his British and Colonial Aeroplane Company in 1910. Later, the Brabazon Hangar was built in 1949 for the first "jumbo" aircraft and wings for the Airbus organisation are now assembled here. Nearby is the Rolls-Royce engine factory which houses its historic collection in former engine test houses. The Bristol Aero Collection is also based at Filton. Apart from military and factory airfields, the region's largest civil facilities at Bournemouth and Bristol International airports have recently been expanded but retain earlier features. Bristol's original airport at Whitchurch served as Britain's main civil airport during the Second World War (Berryman 2006).

### 14.7.6 Pipelines

Long-distance pipelines have been built in the South West in the latter part of the 20th century to transport gas and oil and in Cornwall to transport liquid china clay to the dressing floors (Herring *et al.* forthcoming). An earlier pipeline system, that of IK Brunel's short-lived "atmospheric" system of traction for his South Devon Railway, has left some original pipeline (at Goodrington) and a number of pumping houses on its route. These were employed to remove air from the pipes to create a vacuum in front of the piston that was attached to the train (Hadfield 1967).

### 14.7.7 Communications

This is an exceptionally wide subject, which has developed particularly rapidly throughout the 20th century. Many of these developments were technical or equipment matters, which may be preserved in museums, but have not left any tangible monuments on the ground. A major challenge is the current exceptionally rapid development and convergence of both telecommunications services and computers together with the planned obsolescence and short in-service lives of the technologies.

The following attempts to identify some (but certainly not all) of the major milestones and concentrates on those which may have produced surviving sites or monuments or locations where major events in the history of communications took place. A number of military examples are quoted as the needs of defence have often driven the development of communications and associated technologies. It has not been possible to consider the telecommunications industry nor to provide a list of sources and references.

There do not appear to have been any systematic surveys of communications systems and their associated sites, although some individual sites and infrastructure have been recorded. A major exception is Cornwall, where much work has been achieved, particularly on early visual signalling, wireless, submarine cable and satellite sites.

#### Visual Signalling

**Fire Beacons** Fire Beacons have been used since the Armada days and between the mid-16th century and the 18th century this was the principal method of attracting attention and raising the alarm. Armada Beacon sites are known by tradition and place names but no systematic survey has been carried out.

**Visual Signalling Stations** During the Napoleonic wars shore-to-ship and ship-to-shore signalling stations were established along the coast. The typical setup was a signal staff (code flags, canvas balls and cones) and a temporary or permanent building for



the signallers. Some regional and national research exists but few sites have been assessed or entered adequately into HERs.

**Visual Telegraphy** The first visual telegraphy using shutters appeared from 1806 and in 1816 the Admiralty Shutter Telegraph from London to Plymouth ran thorough Dorset and Devon. Some ruined stations may still exist (such as Lambert's Castle in Devon and Blandford Camp in Dorset). The terminal at Mount Wise in Plymouth has recently been excavated and published (Watts, MA in JP Gardiner 2000, 282–285).

**Coastal Lookouts and Harbour Signalling** By the late 19th century the Coastguard Service was formed with a network of coastguard stations. These had flagstaffs used for signalling the weather forecast by means of tarred-canvas storm-cones. Little has been done to record the surviving remains along the coast, of which there are many. There are a number of lookout huts on estuaries and harbours where Trinity House and other Pilots waited for ships to enter harbour; these have not been fully researched. Harbour signalling may also include Semaphore signals, for example, that along the Avon Gorge for entry to the Port of Bristol. In Cornwall and South Devon, pilchard fishing and “huer's huts” used a unique system of coded semaphore signals by means of battens, paddles or gorse bushes to guide the seine boats to the shoals of pilchards. Safety flags on beaches and firing ranges might just also be included.

**Lighthouses, lightships, lighted buoys and navigation beacons** Some studies have been carried out, particularly in Cornwall. Air navigation aids and beacons are a huge associated subject, which has not yet been addressed. These include the special RAF radio navigation bombing aids used in the Second World War, which were developed at Boscombe Down.

**Aviation Visual Signals** Airfields displayed visual beacons and also used ground displays to warn aircraft of conditions before landing, such as the wind direction or, in wartime, whether the station had been attacked with gas. Approach path lighting, beacons and obstruction markers could also be included here. Air gunnery and bombing ranges often had ground markers to guide practising aircraft (such as the 3 recorded around Bridgwater Bay in the Somerset HER). In the Second World War, Royal Observer Corps (ROC) Posts were equipped with rockets to give warning of airborne or seaborne landings and later Totter rockets were used to indicate low flying raiders to fighters. Flares were used in some ROC posts to warn aircraft of nearby high ground (“Granite” flares).

## Postal Services

Royal Mail stagecoaches and the Royal Mail are a theme that obviously develops throughout this period. A posthouse was established in 1637 at Charing Cross for the Western or Plymouth Road mail coaches. An Act of Parliament in 1657 fixed rates for sending letters and established the system for the British Isles. The first Mail Coach service ran between Bristol and London via Bath, on 2 August 1784. Coaching inns, with their associated stables and perhaps smithy, abound across the South West. The improvements offered by turnpike roads significantly reduced mail delivery times.

From the early 1800s, local post offices were set up but the first Crown Offices opened in 1854. Post offices and mail-sorting offices have often moved from their original buildings but many older letterboxes survive. To illustrate the scope of more recent activities, in 1948 Taunton Head Postmaster was responsible for postal and telegraph services in one of the 62 Postal and Telegraph Districts in the South West under a Regional Director in Bristol. His area covered 300 square miles of Somerset and included 108 sub post offices.

The first night mail train formed exclusively of postal vehicles was inaugurated by the Great Western Railway (GWR) on 4 February 1840, conveying mail for Bristol, Bath, Gloucester and Stroud. By 1846 the railways had taken over and mail coach services ceased, although a mail coach parcels service was reintroduced in 1887. “Ocean Mail” landing through Plymouth and the GWR Travelling Post Office trains picking up and dropping mail at speed (known from early OS mapping at Bridgwater) are examples of former postal services with associated infrastructure. The recent Royal Mail move from rail back to road transport appears to have resulted in some sorting offices and depots at railway stations being abandoned for more economic sites.

Other message carrying agencies include the railways and later carriers using motor transport. The Army even ran a pigeon service in 1940 but no infrastructure has survived. Extensive networks of Signals Dispatch Services and Air Dispatch Services were run throughout the Second World War, including in-flight pick-ups and drops of messages from Lysander aircraft based at RAF Westonzoyland.

## Aural Signalling

This topic covers the traditional alarm bells, school bells and the ringing of church bells as a warning of invasion, through the use of foghorns, fire sirens and maroons. Even in the Cold War, air raid sirens and maroons were still used to give warning of imminent attack or the arrival of radioactive fallout. Some Army “Flag Stations” or establishments (such as Larkhill in

Wiltshire) fired a noonday gun or lowered a ball (for example at Plymouth) to give a local time.

### Electric Telegraphy

Electric telegraphy by landline became feasible in the 1830s. In 1870 the previously privately owned inland telegraph system was transferred to the State and the Post Office took over the service with 1058 telegraph offices and 1874 offices at railway stations connected by some 60,000 miles of wire. Many village post offices had telegraph facilities and these are marked on OS 5th Edition 1-inch maps.

The railways were an early user of telegraph both for communicating between stations and as “block signalling” between signal boxes to control trains, which the GWR pioneered. The latter subject (including railway semaphore and colour light signals and signal boxes) is well documented although few, if any, appear to be recorded in HERs. Fire alarm boxes or pillars also used telegraphy techniques to report the location of the caller.

After the First World War, the use of Morse telegraphy by the Post Office declined and teleprinters came into use. Telegraph offices were then concentrated in towns (in 1948 Taunton District still had 59 subordinate telegraph offices).

The military followed the trend and established teleprinter links and networks; including the wartime Defence Telegraph Network or DTN. A DTN “South-west Switch” was established underground at Box (Corsham) and at Cheltenham. This defence network was three times larger than the civilian network and elements survived until 1999. After the Second World War, an Army Telegraph “Tape Relay Centre” was established in protected accommodation near Boddington in Gloucestershire and was an important node the Commonwealth Army Communications Network or COMCAN.

**Submarine Cables** A submarine cable was laid from England to France in 1850. By 1858, the first transatlantic submarine cable had been laid from Ireland. Cable stations were established at Sennen, Treen, Porthcurno, Bass Point and Kennack Sands. Porthcurno is the largest cable station in the world and has a museum of submarine telegraphy. There are also cable landings in Dorset and Devon for cables to the Continent and Channel Islands and for trans-Atlantic cables at Weston-super-Mare.

During the Second World War, a Severn Defences submarine cable was laid connecting the gun batteries on Flat Holm, Steep Holm, Lavernock Point and Brean Down. After D-Day, submarine cables were laid to the Normandy invasion beaches including a cable from Swanage to Querqueville and Southbourne (Bournemouth) to Longues.

**Telephony** Telephony arrived in the late 1870s with telephone exchanges opening in 1879 including at Bristol. Some trunk lines connecting towns followed a year later and the Post Office trunk telephone system was opened to the public in 1895.

The first public call offices were established in 1886 and there is a significant number of Listed telephone boxes of the famous K series thought the region. Some Police, AA and RAC telephone boxes have also been Listed. After the liberalisation of telecommunications in the early 1980s, new operators have provided public telephone boxes but some of these have already disappeared (for example, Mercury Communications).

A hierarchy of interconnected “trunk exchanges” was set up in the late 19th century to which local exchanges were connected over “junction” lines. Even small villages had their own small manual telephone exchange, often sited within a post office or shop.

On 1 January 1912, the Postmaster-General took over the system of the National Telephone Company and, by the late 1920s, the country was divided into 14 telephone trunk zones with a Zone Centre in Bristol, which served the whole of the South West. Growth of the network in 1930s resulted in an additional Zone Centre at Plymouth with subordinate Group Centres at Penzance, Falmouth and St Austell. The Bristol Zone then served the Group Centres at Exeter, Barnstaple, Taunton, Minehead, Yeovil, Weymouth, Bridgwater, Frome, Devizes, Bournemouth and Chippenham. Cheltenham and Gloucester were connected to the Birmingham Zone. Some buildings may survive.

Automatic telephone exchanges appeared in about 1912 but the main trunk network remained manual until after the Second World War. The last local manual telephone exchange was automated in 1972. None of the “Strowger step-by-step automatic local exchanges” has been preserved. A significant number of telephone exchange buildings are still in use, including those that housed the small “Rurax” automatic exchanges introduced to provide services for rural communities. There is a range of standard GPO and BT buildings for such purposes but no surveys appear to have been made of these. Many are marked on the larger scale OS maps although the description “telephone exchange” appears to be used for most buildings shown, irrespective of their actual use.

In 1958 the first Subscriber Trunk Dialling (STD) telephone service was opened at Bristol. None of the pre-STD manual switchboards or Auto-Manual trunk boards of the initial phases of STD survive, although in many cases the buildings do. There is a splendid example of a GPO Manual Trunk Switchboard in the former Government War HQ at Corsham.

Some major exchanges were provided with underground protected switchboards for the “Emergency Manual Switching System”: Taunton was an example. These were abandoned at the end of the Cold War.

The Post Office had a Regional Headquarters at Bristol with seven subordinate Telephone Areas in the South West. The Taunton Area was the second largest of these and covering 1700 square miles of Somerset, North Devon and parts of West Dorset. In the late 1930s an Area Headquarters, "Telephone House", was built in The Crescent in Taunton.

**Line Transmission Systems** The telephone system originally used open wire "aerial lines" on telegraph poles but increasing use was made of underground cables. A variety of poles from former trunk routes may still survive along main roads like the A30 or A38 (such as on the A30 at Windwhistle Hill near Chard). Local "open wire" lines using insulators on cross arms are becoming increasingly rare.

Underground cables were laid in ducts to reduce the effects of weather and other forms of damage but had significantly poorer transmission qualities. Ducts, joint pits and cable chambers normally continue to be used and the system expanded. Occasional manhole covers still bear the "Post Office Telegraph" name and there is a wide range of other surviving "street furniture" including distribution pillars and cabinets.

The use of "loading coils" inserted at regular intervals in both underground and aerial cables improved transmission significantly. This is an example where relatively simple technology significantly improved services but nothing visible remains. Occasionally cable loading "pots" may survive on former junction routes (for instance at Lillesdon in Somerset).

From 1915 onwards, amplifiers in "Repeater Stations" were used to overcome the attenuation of overhead lines and, in particular, cables. Many repeater station buildings have survived (for instance Hamilton Road, Taunton was on the original London–Marlborough–Bristol–Tavistock–Plymouth route).

"Carrier systems", which allowed a number of speech channels to be carried over two pairs of wires, were introduced into repeater stations but additional repeater stations were needed; initially every 22 miles along the route (the one at Rooksbridge in Somerset on the A38 is about 22 miles from Taunton). The world's first 12-channel carrier cable for commercial traffic was laid between Plymouth and Bristol.

With the advent of coaxial systems in the late 1930s, both telephony and television broadcast circuits were provided but repeaters were now needed every 6–7.5 miles. Such cables were important in some Second World War radio counter measures (RCM). The site at Fairmile in Devon was specially connected to the GPO coaxial cable at Honiton for the "Meacon" Luftwaffe beacon jamming system.

Special repeater stations were established on certain routes to provide wartime diversity for key links and a semi-protected example survives near

Stockland Hill in Devon. This was on the Salisbury–Exeter route and carried trans-Atlantic telegraph traffic. The next repeater was at Windwhistle Hill on the A30 near Chard.

Later fibre optic systems were introduced with vastly increased capacity. With the opening up of the market to competition from 1981, the first commercial network competitor to BT, Mercury Communications, commenced building networks by laying fibre optic cables alongside railway lines. More recently, Energis laid their communications fibres woven around the wires between electricity pylons, while other cables have followed motorways.

**Microwave "Line of Sight"** Although a "wireless" technology, these systems act in the same linear (as opposed to broadcast) way. In 1932 the first ultra-short-wave radio telephone link, used as part of the inland telephone network, was set up across the Bristol Channel, over a distance of 13 miles.

Immediately after D-Day the first mobile "line of sight" systems were used to set up telephone and telegraph links into the Normandy Beachheads from Prawle Point and Godingston Hill. The "Number 10 Set" equipment used the then revolutionary digital "Pulse Code Modulation" or PCM for the first time.

The introduction of civilian "line of sight" systems in the late 1950s provided alternative and cheaper circuits for the trunk network, together with TV broadcast circuits and military links. In this respect, microwave systems offered a survivable and high capacity alternative to the Post Office underground cable system. A spur from the Government "Backbone Radio System" ran from the Bristol Purdown tower via East Harptree and Heath Poulter Cross in Somerset to Whitstones and Halwell in Devon then onwards to Plymouth and Cornwall. The distinctive lattice masts and buildings are still in use. Spurs connected TV transmitters to the network; for example, the Mendip Pen Hill, Stockland Hill or Caradon Hill transmitters. Increasingly, such links are being used by telecoms companies and private firms to provide cheap and effective point-to-point circuits.

**Broadcast Communications** The development of radio included the first over-the-horizon transmission (to the Isle of Wight) from Bass Point in Cornwall. The original wireless hut survives in National Trust care and is the oldest wireless building in the world. Marconi's wireless telegraph link across the Channel to France was established in 1901 and the first transatlantic wireless transmissions were made from Poldhu Wireless Station in Cornwall to Newfoundland.

**Ship-to-Shore Wireless** From 1908 onwards, ship-to-shore wireless stations were established including Bolt Head and the Lizard. In 1909 the Post Office acquired the Marconi coastal wireless stations but the Marconi Company retained its licence for its long distance stations at Poldhu and Clifden (Ireland). In the 1920s, ship-to-shore stations included a station at Devizes. As services expanded, a new transmitter site was built at Portishead, with the associated receivers and control at Burnham-on-Sea. The station was used by the Royal Navy in the Second World War. The advent of satellite systems brought an end to commercial ship-to-shore radio except for local port VHF systems. Operational Royal Navy radio stations are currently mentioned in the Defence Estates List at Penhale Sands near Newquay and Portland.

**Transatlantic Radio Telephony** The first successful both-way transatlantic telephone communications were established on 7 Feb 1926 and used a transmitter at Rugby with and a receiver at Wroughton, Wiltshire.

**International Wireless Stations** From about 1925 international "Beam Wireless" telegraph services were established with Montreal, Melbourne, Cape Town and Bombay. Stations included Dorchester (receivers) with the associated transmitters at Somerton. Bodmin transmitted to Canada, South Africa and Australia with the receivers at North Petherton. Some buildings survive. In the Second World War, the Army Wireless Chain operated a receiver station at Windmill Hill on Salisbury Plain with links from Accra, Pretoria, Nairobi and Belgrade.

**Ground-air communications** These include radio sites associated with airports and sites belonging to the National Air Traffic Control Organisation. In addition, most military airfields and radar stations should have associated remote transmitter and receiver sites. A defence site, currently in the Defence Estate Listing is situated at Queen Camel and serves RNAS Yeovilton.

**Mobile Radio Communications** During the Second World War the Home Office provided broadcast transmitters to enable instructions to be passed one-way only to police cars. An example was at Shapwick in Somerset. Radio systems were also provided for National Fire Service (NFS) Fire Forces. In the South West this would have included Fire Forces 16, 17, 18 and 19 but little is known of these systems.

After the war, the Home Office provided shared "Police and Fire Wireless Schemes" with the characteristic remote unmanned twin-mast hilltop "main station" sites linked by line and often wireless to "main

controls" in police and fire stations, with "mobile outstations" installed in emergency service vehicles. A typical "multi-station shared scheme" might have 3 or more remote main stations on hilltops serving a county. These current schemes are being replaced by the Tetra System.

This Home Office infrastructure was used during the Cold War for the Home Office Emergency Communications Network (ECN) and also for the introduction of radio links for some Royal Observer Corps (ROC) posts. There was a Home Office Wireless Depot at Shapwick in Somerset providing police and fire users with maintenance services across Region 7 (see Section 1.2.3 on page 4) with a sub-depot at Tavistock for Cornwall and Devon. In 1967, as a result of the wide spread issue of personal radios and the introduction of "alerters", for retained firemen, the Home Office Directorate of Telecommunications (D TELS) opened its first maintenance unit at Bishop's Cleeve.

Other commercial VHF radio networks were set up including the Automobile Association Patrol network. More recently, "private mobile radio systems" have flourished. These include radio networks for taxis, local authorities, motoring organisations and public transport. Today "trunked radio systems" share a common infrastructure but provide services similar to those offered by private radio networks.

**Cellular Mobile Telephony** In the early 1980s, public commercial cellular mobile radio systems were introduced with the BT-Cellnet and Racal-Vodafone networks. The growth of these and competing networks is well-known. Mobile data systems followed and various packet radio systems. There have been rapid changes in the infrastructure of such networks and, in particular with the masts and base stations used on cell sites, which are now in perhaps their 5th generation. Some technologies had a short life span of months; for example the unsuccessful "Telepoint Service" offering users the ability to make calls, using a personal handset, when near a telepoint.

Mobile Data Services, not using the mobile telephone networks, are currently provided in the UK by three national licensed operators, while another provides an Automatic Vehicle Location (AVL) service. Mobile data services have their own distinctive masts. Increasingly mobile Internet access is being provided for roaming computer users by "wireless hot spots" in stations, airports or hotels.

**Public Broadcasting** Public broadcasting started in the 1920s and the BBC was set up by Western Electric, Marconi, General Electric, British Thomson-Houston, Radio Communication and Metropolitan Vickers. 1924 saw more expansion with the opening



of a relay station “SPY” in Plymouth on 28th March. A regional BBC medium-wave transmitter at Washford was built in 1933 to provide services across the South West. The building is Listed but the masts are not. This transmitter was also used for radio counter measures against Luftwaffe navigation aids after D-Day. Additional high power regional transmitting stations were also established at Clevedon and Start Point. The latter was used for Forces Broadcasting to the Allies after the Normandy Landings.

Short Wave HF broadcast stations providing overseas services included the BBC station at Rampisham in Dorset. In the Second World War the BBC installed a network of 61 low-power relay stations around the UK called “Group H”. Another type of emergency transmitter site with mast survives alongside a Cold War emergency VHF broadcast relay station in Taunton.

In December 1955, the BBC started VHF FM radio broadcasting for the West of England and South Wales from a high power transmitter at Wenvoe, near Cardiff. VHF FM Broadcasting services from North Hessary Tor commenced in 1956. Local radio services were first transmitted from Bristol in 1969. The advent of commercial radio has allowed a large number of local radio stations to flourish.

**Television** Television service was first introduced to the South West from the BBC Wenvoe transmitter in August 1952. Major transmitter sites in the South West included North Hessary Tor, Stockland Hill, Caradon Hill and Mendip. Cable television services, including telephone and broadband services, are now available in some major towns, particularly in their built-up residential areas. These run in street ducting and have numerous roadside distribution cabinets.

#### **Satellite Communications**

In 1962 the Post Office Satellite Communications Station at Goonhilly Downs, built on the site of Dry Tree Radar station, in Cornwall began working. The first transatlantic signals were received there and the original dish aerial is now a Listed. The “hotline” between the US and USSR travelled via Goonhilly. A military satellite site of the Defence Communications Network (DCN) was set up at the former Second World War RAF airfield at Colerne.

#### **Communications Intelligence sites**

A number of wireless intercept stations were used during the Second World War. In particular, the RAF Y Service station at Strete in Devon played a significant role in intercepting Luftwaffe ground-air communications. The RAF Radio Counter Measures deployed to jam or “bend” the navigation beams used by the Luftwaffe used some 23 sites in the South West.

During the Cold War, the Government Communications Headquarters (GCHQ) was moved to Cheltenham (1952). The “Composite Signals Organisation Station Culmhead” was built after the Second World War on the former RAF Culmhead Airfield for GCHQ. It closed in February 1999.

#### **Automatic Data Processing (ADP) and IT**

The vast scope of this subject precludes any in-depth treatment. Nevertheless, some mention is necessary for completeness. The advent of ADP resulted in a number of major data centres being set up in the South West. These include the Defence “Bureau West” at Devizes and a Debenhams’ data centre in Taunton. The RAF Personnel Management Centre at RAF Innsworth was supported by a major IT system. It is impossible to catalogue the growth of this area and it may be necessary to concentrate on what, if anything, remains of the pioneering systems and the sites that contained them.

#### **14.7.8 Conclusions**

The study of communications does not appear to be a mainstream of archaeology and, even within the industrial archaeology sub-discipline, this does not seem to have been given any priority. While major undertakings like the BT and the BBC have excellent archives, the modern IT industry does not. The increasingly rapid developments, together with the planned obsolescence of modern systems, pose a real threat as equipment is scrapped and there is often little permanency of buildings, masts or other infrastructure. There is an enormous wealth of the communications heritage across the South West and many sites where pioneering work was carried out. If these are to be fully identified, understood and recorded for posterity, this subject urgently needs to be reviewed.

### **14.8 Technology and Production c. 1540–present**

In recent times, the South West has not acquired an “industrial” identity in the way that one thinks of parts of the North East and North West of England. Its geology and agricultural base have, however, produced at least two industries of international importance: non-ferrous metal-mining and woollen-textile production. Whilst these have pride of place, this large and diverse region has always had a varied industrial economy. Its people have also made an important contribution to technical progress and innovators, such as Thomas Newcomen, Richard Trevithick, Thomas Savery and Abraham Darby I, were born or worked in the region

The archaeology of technology and production has attracted significant attention from industrial archaeologists over the years but, as in other areas of this assessment, coverage has been patchy. Most of the industries referred to below have been noted in gazetteers but systematic recording, study and analysis is less evident. The MPP's coverage of the extractive and manufacturing industries that were important in the region is better than that of other manufacturing, processing and motive power categories in that programme (English Heritage 2002). Preparatory work for the World Heritage Site bid for mining landscapes in Cornwall and West Devon provided further stimulus for synthesis and study of this area. An extensive select bibliography (some thirteen and a half pages) forms part of the project and Greenwood's bibliography for the archaeology and industrial history of the South West is comprehensive for the period up to 1998 (Greenwood 1999).

#### 14.8.1 Obtaining Raw Materials

The availability of raw materials has had a major influence on developments from the Post-Medieval period onwards. The absence of coal in much of the South West has undoubtedly hindered industrial growth in modern times. It has been worked in quantity in the Forest of Dean, north Somerset, Bristol and south Gloucestershire since Medieval times and less successfully in unlikely areas such as north Devon, but the nature of the deposits rarely justified large "industrialised" pits such as those of the Midlands and the North. The survivals have, however, often avoided frequent modernisation and large scale reclamation, and now constitute a varied and important archaeological resource (Cornwell 1983; Acworth 1991; Gould 1999). A shortage of local coal has encouraged use of alternative fuels such as peat on Dartmoor and shale extraction in Somerset and Dorset, where "Kimmeridge Coal" was quarried from the cliffs and supported salt and glass working in the 17th century (Crossley 1987). In recent times, the UK's largest onshore oilfield has been developed in Dorset at Wytch Farm.

The exploitation of the South West's rich geology has produced some world-class products and archaeological sites. Most significant have been non-ferrous metal mining in Cornwall and west Devon and the quarrying, mining and working of granite and limestone, primarily in Devon and Dorset. Whilst these areas are of major significance, other non-ferrous sites have been studied on Dartmoor, Exmoor and Mendip (Newman 1998; Atkinson 1997; Gough 1967).

Iron ore was also quarried or mined in many South West counties. Ore from Hengistbury Head in Dorset in the 19th century was sent via Southampton to South Wales (Poplewell 1985), as was that mined in



**Figure 14.1:** *Wheal Betsy in the care of the National Trust on the western fringes of Dartmoor. A type of engine house once commonly found from Gloucestershire to Cornwall and a reminder of the rich mineral heritage of the South West and of how little is known and understood about the archaeology of its exploitation. Photograph: David Dawson.*

the Brendon Hills in Somerset (Sellick 1970). Deposits in Wiltshire and around Bristol were smelted close to source at Seend and Ashton Vale but the most significant ironworkings in the region were those in the Forest of Dean where both mines and blast furnaces survive (Hart 1971; Mills *et al.* 1992; Hooper 1978).

Granite quarries in Devon and Cornwall expanded rapidly in the industrial age and quarries, spoil tips and arrangements for handling and transporting the stone survive (Stanier 1985a;b; 1999). The South West is also famous for its limestones. There are numerous quarries in the "Isles" of Purbeck and Portland, the latter being dominated by the remains of its historic trade. Bath stone was also very important and extensive stone mines on Combe Down are currently receiving detailed study prior to stabilisation works. Less-prestigious limestones were quarried widely throughout the region for building and for burning into lime and numerous kilns survive. Sand and gravel were quarried and the latter also dredged

from river estuaries and the sea. Fuller's earth was mined and processed on an industrial scale at Odd Down in Bath (Perkins *et al.* 1979; Stanier 2000).

The South West is also noted as a source of china and ball clay. China clay has created some of the most spectacular landscapes in the region and a significant challenge to ventures such as the Eden Project that have sought to deal with this legacy. The industry has been centred in east Cornwall but is also found in west Devon. Ball clay has been mined and quarried in south and north Devon and Purbeck and has provided the raw material for important pottery industries in both counties as well as supplying a national and international market. The legacy of its extraction is much less spectacular than that of china clay and pits are much sought after for landfill (J Smith 1992; Strong 1889).

South West agriculture has also been a major source of industrial raw materials. The woods and forests of the region have provided fuel, wood for manufactures and bark for the tanning of leather by traditional means, once one of the UK's major trades. The Forest of Dean produced much oak for naval yards after 1688 and charcoal for the iron industry before coke smelting was firmly established (Hart 1971). Indigenous cattle provided some of the hides for the tanneries and the extensive flocks of sheep in Devon, Dorset and Wiltshire grew wool for a historic textile industry. Hemp and flax were once important crops in Somerset and Dorset until replaced in the last century by imported supplies.

Imported "industrial" raw materials have also been significant in the economy of the South West throughout the period. Silk and cotton were worked at a number of mills and Bristol obtained tobacco, cocoa and molasses from its extensive trading networks (Buchanan and Cossons 1969). Much timber was imported for shipbuilding and the building trade, as was much of the coal used in the region and most of its oil. These activities have left a heritage of ports, docks, warehouses, storage depots and timber yards throughout the region.

### 14.8.2 Processing Raw Materials

Whilst many of these raw materials went elsewhere for processing, much was processed locally. Attempts were made to carbonise peat for fuel in the late 1870s at Rattlebrook Head on Dartmoor and a naphtha works at Shipley Bridge was supplied from the moor from 1846–50 (Minchinton 1986; Harris 1992). In Somerset, a retort survives at Kilve from an abortive attempt in the 1920s to extract oil from local shale (Warren 1996). A number of oil storage and distribution depots have been established at the larger ports in the South West in recent times.

Processing of iron ores has been mentioned above but the archaeology of the Forest of Dean ironworks

merits further mention; its importance peaked in the 17th century and Guns Mill and Newent Furnace survive from this era, as do later coke-fired sites such as Whitecliff Furnace (1798–1810). The conserved remains of Darkhill Ironworks included the Forest Steelworks of David Musnet where problems in the manufacture of bulk steel by the Bessemer process were overcome. Parkend was a major industrial centre in the Forest with blast furnaces and tinplate works (Mills *et al.* 1992). A comprehensive gazetteer of charcoal-fired furnaces has been published and includes those in the region (Riden 1993). Other processing activities included an important arsenic industry in Cornwall and west Devon. Detailed surveys of the late 19th century works at Gawton Mine and the 1920s works at Devon Great Consols have been published (Pye and Weddell 1992; Pye and Dixon 1989). There is also the important brass, zinc and copper smelting industry in and around Bristol.

Whilst much stone was worked at the quarries, sawmills were established in many towns and ports as were smaller masonry yards in many towns (Stanier 1999). Limekilns and larger limeworks were once widespread throughout the region and have attracted much attention from industrial archaeologists over the past 30 years (Isham 2000; Leach 2002). Cement was also produced from local limestone at Lyme Regis (Draper 2001).

Local forest and woodland products were processed throughout the region as were imported bulk timber supplies. Estate and urban sawmills provided wood for local builders and manufacturers whilst logwoods were crushed for dyes for the local textile industry around Bristol and Bath (Day 1974). Tanyards existed in many market towns and the larger urban centres, those in Bristol relying also on hides from the New World. The tanyard at Colyton (and until recently that at Grampound) is a rare survivor. Flax, hemp and wool were prepared and worked in a widespread textile industry (Bone 1986). Important remains exist of the fulling mills, workshops and cottages employed in these trades in the Post-Medieval period, as do remains of later textile spinning, weaving and finishing plants. Detailed studies of the mills of Gloucestershire, Somerset and Wiltshire have been made and a study of the social archaeology of the South West industry has recently been published (Tann 1967; Rogers 1976; Palmer and Neaverson 2005). English Heritage has undertaken a preliminary survey of textile sites in the South West which has revealed a more-widespread industry than was previously thought to exist and this has provided a basis for further, detailed study (Williams and Stoyel 1999). One of the earliest textile factories in the UK was the Sherborne silk mill and the later industry in Somerset has recently been studied by a local group (Doble *et al.* 2001). Cotton mills were also established



in the South West but the Great Western Factory in Bristol was one of the few to work into the later 19th century and parts of this survive (Buchanan and Watkins 2001). Other agricultural-processing works, such as soap manufacture and glue manufacture factories were started in the larger cities such as Plymouth and Bristol (Gaskell Brown 1980).

### 14.8.3 Production of Capital and Consumer Goods

Whilst some of the above industries produced for retail sale, much of their output went to manufacturers of capital and consumer goods. Non-ferrous metal goods were produced in craft workshops throughout the region and, later, in larger industrial plants. The Bristol area is known for its brass-making which continued into the early 20th century, and for the production of lead sheet and shot (Day 1973; 1988). Copper goods for distilleries, breweries and other industrial plants were also made in the South West and iron and steel were forged, founded and fabricated throughout the region (Carter 2001). It is difficult to summarise the extent of this branch of manufacture and its remains vary from small, rural water-powered edge-tool works, such as that at Sticklepath in Devon, to significant sites such as Perran Foundry and Harvey's Hayle Works in Cornwall, the iron and steel shipyards and dry docks of Plymouth, Falmouth and Bristol, the galvanising works of Lysaght in Bristol and the once extensive crane and engineering works of Stothert & Pitt in Bath, part of which survives (Andrews and Burroughs 2003; Todd and Laws 1972; Ferguson 2000). Several small foundries are also known from cities such as Exeter, producing domestic wares such as bronze skillets and pots, and also church bells (Blaylock 1996; 2000). There are similar sites known from towns such as Taunton (Blaylock 2000, 84–85) and an industry of regional dimensions has recently been identified based on the villages of South Petherton and Montacute in Somerset (Butler and Green 2003; 2006).

Brickworks were once widespread throughout the region as this material gradually replaced “vernacular” building materials such as cob and rubble-masonry from the later 18th century. The kilns and works were often short-lived in the larger towns as they were built to provide for a particular project or scheme and, in turn, themselves built over in the next phase of development. Larger works near good clay deposits using continuous kilns had a longer life but the concentration of the industry in the last century has seen many losses. The industries in Somerset and Cornwall have been studied and there are survivals in the former county of small and larger kilns (Murless 2000; Ferguson and Thurlow 2005). Dorset also produced large amounts of “sanitary” and architec-

tural ware in its large industrial potteries. The manufacture of clay roof-tiles was important in Somerset but has now disappeared (Stanier 2002; 2003). Dorset also sustained its rural-craft industry in and around Verwood into modern times (Draper and Copland-Griffiths 2002). Other traditional potteries of note were those of north Devon and the Bovey Tracey area where both historic and modern features survive (Brannam 1982). There are still a few remnants of a once-important glass-making industry in the South West, such as excavated kiln-bases at Nailsea and Bridgwater. Another survives as part of a modern hotel complex in Bristol, which was a major centre of the industry in the South West (Witt *et al.* 1984) and has recently seen important further excavation (Williams and Jackson 2006).

It is only in recent years that locally-sawn timber has been replaced as a major component of a wide range of commodities ranging from brushes to furniture, vehicles and ships. Carpenters, joiners and wheelwright's shops were once widespread throughout the South West but have often gone largely unnoticed. The development of machine-made furniture, often employing American technology, developed from the mid-19th century and most of the large Shapland & Petter works survives in Barnstaple. This was built over an old shipyard, one of many around the South West coast. These old yards often had little fixed equipment but later docks for fitting out wooden ships constructed in North America survive at nearby Appledore (Strong 1889). Little attention has been paid to vehicle manufacture in the many smaller carriage works and the larger, industrialised carriage and waggon works that produced a massive range of vehicles for both road and rail in the 19th century (Buchanan and Cossons 1969).

Whilst leather and textile fabrics were produced on an “industrial” scale throughout the South West, factory production of footwear and clothing was a feature of the latter half of the 19th century. Many factories were established for boot and shoe manufacture in Somerset and the Bristol area, as were plants for leather and fabric glovemaking (particularly in Yeovil). Shirt and collar factories were also widespread with many taking over mills constructed for other purposes (Mounfield 1995; Stanier 2003).

The paper-making industry has been studied by historical geographers and historians of the paper trade but little is known of the related and extensive board, stationery and packaging plants that grew to provide for the new consumer industries of the later 19th century. Similarly, the history of local newspapers has received attention but their production less so (Shorter 1971).

Whilst our knowledge of many “traditional” industries of the South West is patchy, it is almost non-existent as regards the “newer” manufactures based



upon advances in our knowledge of science and the application of electricity. Some chemical industries have a long ancestry and notice has been taken of gunpowder and explosives manufacture (for instance, Pye 1994), match production, and soap and tobacco manufacture in Bristol (Mills *et al.* 1992; Buchanan and Cossons 1969). There has been much interest in aircraft but much less on their manufacture in the South West: in Dorset (Bournemouth), Somerset (Yeovil, Warren 1996) and Gloucestershire (Brockworth, Filton, Gillett 1997). Likewise with motor vehicle production. Much modern manufacture has been located on industrial estates, about which we know little (Scott 2001).

#### 14.8.4 Distribution and Support

Modern industry is dependent on much wider and tighter networks of support and distribution. Little work has been done in the region on this aspect – warehouses have perhaps received most attention, but little has been done on the archaeology of technical support from colleges, research establishments and employers' organisations.

### 14.9 Trade and Interaction

#### 14.9.1 Means of Exchange

See Section Section 14.1 on page 215.

#### 14.9.2 Places of Exchange

Most places of exchange are in towns – market places, corn exchanges, ports, etc. and are discussed under urban settlement (Section 14.5 on page 221). However in the South West whilst the study of minor ports and wharfs has received some attention, little research has been published on the archaeology of inland rural markets like the Priddy sheep fair.

#### 14.9.3 Spheres of Interaction

The development of the archaeology of interaction is dependent largely on the study of the nuances of material culture and not enough has yet been done to test historical evidence except in a few points of detail. Certainly there has been no study on the scale of the post-1994 earthquake excavations in California where documentary sources are being tested against extensive archaeological excavation. The archaeological evidence of trade still mostly derives from numismatic and ceramic studies, though it can be questioned how much this represents trade in the pots themselves or in their contents, let alone any wider aspects of "trade".

#### Within the South West

Detailed historical studies indicate that there has been a movement of population from the countryside to the towns all through the period. It is only within the last twenty years that the reverse movement has also become significant with the development of more extended commuter zones round cities and towns and the widespread encouragement of second homes so that the continued move from the countryside is as much forced by the lack of affordable housing. In the 19th century, movement into smaller towns was encouraged by industrialisation: the shoe-making and associated industries in Street and Glastonbury are an example (Mozley and Hill-Cottingham 1991).

Pottery studies in Exeter and Plymouth demonstrate how archaeological evidence can elucidate the patterns of sourcing different kinds of ware for different kinds of consumption. The use of redware from South Somerset which must have come overland from an inland production area provides some clue as to the importance of land-borne communication (Allan 1984; Allan and Barber 1992). There is little archaeological work on other aspects of trade for example the large scale annual movements of cattle across the region to supply the market in Bristol.

#### The South West Littoral and Western Approaches

The seas around the South West have been an important means of communication in the past. There is good argument to regard the Bristol Channel as an early equivalent of the M5 except that the crosswise traffic was just as important. Movement of people in this area has followed similar patterns to those mentioned above with the added dimension of immigration to Bristol from South Wales after a period of reverse movement in the late 18th and early 19th centuries to provide labour for the rapidly expanding industries of South Wales. To a more limited extent there has been movement from the off-shore islands to the mainland.

The main archaeological studies have again centred on ceramics (Good 1987; Barton 2003; Dawson 2004), although there are good surveys of specific monument types which are associated with aspects of trade. The coastal distribution of limekilns to provide lime to enrich the poor soils of large parts of the region has much to do with access to culm from South Wales. Iron mining on the Brendon Hills and in Kingswood (Cleeve) was stimulated and, in the case of the former financed, by the demands of the iron industry of South Wales. The case study of Porlock and its harbour at Porlock Weir provides a snapshot of the local complexities of such links (Riley and Wilson-North 2001, 161–3).

## Western Europe

The refuges provided to people subject to religious persecution on mainland Europe, groups like the Jews (since the “readmission” of 1656) and the Huguenots (particularly from 1681, see Mayo 1985), have been reasonably well documented but as Susser (1996) has shown, considerable light on the complexity of such movements can be shed by considering archaeological, particularly epigraphic evidence. The phenomenon of religious and political persecution sadly characterises the whole of our period with later influxes of such groups as Armenian Christians. Not surprisingly most of these communities established themselves in the port towns of the South West, for example early Jewish communities in Penzance, Falmouth, Plymouth and Exeter, and Huguenot churches in Bristol, Barnstaple, Bideford, Plymouth, Dartmouth and Exeter. At certain times, particularly in the 16th and 17th centuries, there were people, such as William Tyndale, fleeing the other way either to Catholic France and Spain or the Protestant Low Countries. The “total” wars of the 20th century displaced so many people that many others have found a refuge in the region but have yet to register in archaeological study.

Trade with Western Europe was and remains vital to the economy of the South West right through the period. Archaeological studies have again tended to focus on ceramics: either the identification and distribution of imported wares such as Allan and Barber (1992) or more occasionally the study of the manufacture and marketing of particular wares and their influence here. Gaimster’s (1997) study of German stonewares is a good example.

Initiatives such as that led by the Medieval Pottery Research Group in establishing a Europe-wide database of ceramic production centres will change our perspectives and a reflection of much closer collaboration with archaeological colleagues from the mainland as interest in the later periods develops.

## The Wider World

Through the development of closer collaboration with colleagues in North America over the past thirty years, the role of archaeology in elucidating our understanding of the period is growing apace. It is probably true that this has led to an emphasis on the North American connection that is unwarranted by the sheer potential of addressing the issues of a world-wide archaeology but to some extent it is counter balanced by work for example on the slave-stations of West Africa and the ceramics trade with China.

The historical role of the South West is well-studied: in early exploration and attempts at colonisation (for example Quinn 1974), in the development and use of indentured labour and later slaves from West Africa, in the development of trades such

as sugar and tobacco, and its contribution to the maritime business which underpinned all this activity. It is known to be a period of mass migration in which, willingly or unwillingly, people from the South West participated and an era of the development of a true world-wide trading network.

What is developing in a most exciting way is the contribution archaeology is making to provide another viewpoint, illuminating, and sometimes forcing a re-reading of, the historical data. It is now almost impossible to consider Post-Medieval and later archaeology without an international perspective. One has only to look at the papers in Egan and Michael (1999) as an example to see how this is happening and how many of these contributions consider evidence from the South West of England – the Donyatt potteries (Coleman-Smith 1999) and the South West ports (Allan 1999) for instance.

## 14.10 Religion and Ritual

The region had a large recusant population and relatively quickly developed a radical nonconformist tradition, including local denominations like the Bible Christian Methodists and Plymouth Brethren. A wide and relatively sophisticated network of social organisations like Friendly Societies developed.

### 14.10.1 Places of worship/veneration

There has been relatively little systematic archaeological study in the South West. The potential for investigating the continuing impact of the Reformation on the totality of society must be enormous. Some of the ways in which the discipline can contribute to our general understanding of how our modern world developed have been discussed but greater awareness among archaeologists is necessary if the opportunities that arise through planning- and developer-led archaeology are to be recognised and seized (see Gaimster and Gilchrist 2003).

### Features in the landscape

The Dissolution of the monasteries might be held to have had most impact on the Post-Medieval landscape. There has been no overview archaeological analysis to complement the published historical analysis: see Bettey’s (1989) analysis for Gloucestershire, Wiltshire, Bristol, Somerset and Dorset. As work at, for example, Torre Abbey and Glastonbury (Woods 1994) have shown, there is much archaeology can contribute at a detailed level.

There have been relatively few attempts to put places of worship in their archaeological context within the landscape (see Dawson 1982; 1987, for Bristol). The Cornwall Industrial Settlements Initiative (<http://www.historic-cornwall.org.uk>) is





**Figure 14.2:** Wesley Chapel, Kingswood, built in 1844 as the successor to the original Colliers' School and Meeting House. It closed in 1978. It is increasingly apparent that nonconformity played an integral part in the industrial development of the South West, promoting entrepreneurship and education, and providing centres of social activity. Photograph: David Dawson.

a good example of where, at a level of detailed conservation planning, such places are recognised as an integral part of the character of a settlement. The value of county-wide survey and assessment is further demonstrated from Cornwall (see Lake *et al.* 2001).

There are some Listings of such features as holy wells and preaching places but coverage is very patchy. A few, like Gwennap Pit and Hanham Mount, are preserved and maintained as public open spaces.

### **Buildings for worship**

Most of the research on churches, chapels, meeting houses and other places of worship has been architectural (for example, the Hagues' 1986 study of Unitarian churches and Kadish's 2006 of Jewish heritage) or historical (for example, Thorne's 1975 study of the Bible Christians in Devon). There is wealth of evidence to be unravelled of the changes to parish churches but little has been done in identifying significant evidence in surviving buildings. Some commentary has been published on a local basis (see Francis 1995 for Exeter).

For chapels and meeting-houses of pre-1850 date recently surviving, we have the monumental surveys of Christopher Stell to provide a (near) comprehen-

sive inventory and, in each county preface, a commentary on buildings and places of particular significance (Stell 1986; 1991). For surveys including post-1850 buildings, there are some local studies such as for Cheltenham and Kingswood (Blake 1979; Spittal and Dawson 1983). There must be concern that where detailed survey work has been done, for example that of Ron Martindale for the Kingswood Chapels Survey, there remains a major issue of finding a suitable vehicle for publication. Further, there must be a concern that without some form of assessing buildings post-1850, there is a grave danger that places of significance will be lost without record.

Little, if any, assessment seems to have been published on 20th-century places of worship: of changes in building materials such as concrete (for instance, Sidwell Street Methodist Church, Exeter) or tin tabernacles, or new build and conversions to serve new movements (such as the monastic revival) or newly established world religions.

### **Liturgical spaces**

Liturgical spaces are by their nature most vulnerable of all. The South West preserves a small number of pre-Commonwealth arrangements, for example at

Hailes and Deerhurst Priory, and rather more of the 18th century, for example Didmarton and Old Dilton, and on a grander scale, St George Reforne, Portland: all in the care of the Redundant Churches Fund. Nineteenth-century and later arrangements are less well documented and in nonconformist places of worship, the situation is far less certain. A very few, like Loughwood meeting-house (National Trust) have long-term protection, and a deal of work has been done to conserve some others such as the Friends meetings at Come-to-Good and Long Sutton. There is however the interior of only one great meeting left – Mary Street Unitarian Church in Taunton – and the classic Victorian chapel interior such as that of the well-cared-for Bridgwater Baptist Church seems to be disappearing at an ever increasing rate. It is rare to find record and analysis for the change and development of liturgical space for this period.

Isolated fittings and furnishings in parish churches are well catalogued. All county archaeology society transactions/proceedings carry listings of such artefacts as bells and plate and there are a number of national listings of furnishings from acoustic jars to wall-paintings. Most however do not cover the period from 1800. There are few such listings for places of worship of other denominations and religions.

#### **Associated structures**

Schools, day as well as Sunday, institutes, manses, rectories and many other buildings are associated with places of worship. There is much scope for analysis in the form of surviving but again a rapidly dwindling number of structures.

#### **Associated settlements**

There is much scope for recording in greater detail the relationship between settlement and place of worship. There are places where this is close such as the Moravian settlement at East Tytherton (there are remnants of another more partial attempt in Kingswood). As again the Cornwall Industrial Settlements Initiative shows, there can be a less explicit connection between extensions to existing or completely new housing. Such connections may not be so obvious or so well recorded elsewhere, for example at Upton Cheney.

#### **Associated industrial and commercial activity**

It is becoming increasingly clear that a substantial amount of commercial and industrial activity in the region is associated with nonconformity. How close this relationship is remains a matter of debate. Archaeological evidence has an important contribution to make here. A better understanding of the kinds of evidence discussed above is one part. Looking for explanations for some of the changes in artefact assemblages such as in ceramics might be another. It

must be understood that archaeology provides valid evidence in its own right but also provides a stimulus for those in other disciplines to see their basic evidence in a new light. The finding of the potter from Over Stowey with the Low Countries name of Renger during the course of the Victoria County History research on Bridgwater is one example.

### **14.10.2 Burial rite and practice**

#### **Interment**

The primary rite up until about 1920 was interment. Whilst the Church of England tried to retain a monopoly of burial in the parish ground, this was lost in the 17th century and, in towns and cities, the responsibility was eventually ceded to cemetery companies and municipalities. There are no comprehensive listings of cemeteries, though individual structures such as chapels, lodges and the amazing neo-Egyptian necropolis in Exeter are individually protected by Listing.

There are a few detailed studies of funerary practice: the complete excavation of the parish church of Bristol St Augustine-the-Less provides a well-documented analysis of the use of the interior of a church for personal vaults and the study of the Poulett vault at Hinton St George, an insight into the ritual attendant on the wealthy (Litten *et al.* 1988). A sample of stone-walled middle-class graves was recorded Bathampton during development work (Cox and Stock 1995). Despite the nature of this work, it is one of the very few archaeological records of 19th-century burial practice in the region.

#### **Cremation**

Relatively little work has been devoted to the widespread introduction of this new burial practice but see Section 14.11.3 on page 242.

#### **Memorialisation**

The headstone is probably the simplest kind of memorial. As work in the United States has shown, this kind of memorial can be the source of much interesting analysis (see for example Benes 1978). Little has been attempted here of this kind of record and analysis although there are still huge numbers of such memorials remaining in cemeteries across the South West. Attention has been drawn to some special cemeteries such as those of the Jews (Susser 1996) and to those where the memorials are of significant variety and importance, such as Arnos Vale, Bristol. Detailed listings and records of individual graveyards have been made and are usually deposited with the local record office, for example, Clifton parish yard and Redland Green chapel yard. A number of individual headstones are also Listed such as that of Scipio Africanus in Henbury churchyard.



Memorials inside places of worship have often been recorded as part of the building and most of those that are notable have been published by either the Royal Commission on the Historical Monuments of England or in the Penguin Buildings of England series. Some have also been treated by art historians especially when originally commissioned from a respected sculptor such as Rysbrack (the monument to Sir John Dutton 1749 at Sherborne). It should be noted that little has been produced of the kind of archaeological analysis referred to above.

War memorials have been well served by the UK National Inventory master-minded by the Imperial War Museum and some have been added to HER records (for example, Somerset). Several commentaries have been published.

### 14.10.3 Institutional ritual

#### Structures

Relatively little has been done to record and evaluate civic spaces and places such as society lodges although many occupy buildings significant for other reasons (for example, Langport Masonic Lodge in the Hanging Chapel).

#### Artefacts

Some especially Friendly Society badges (Fuller 1964) have been well-documented but other forms such as banners have not.

## 14.11 Social Provision

“Social” provision is a wide area which touches upon other areas, such as burial and cremation (see Section 14.10.2 on the facing page). Coverage by archaeologists and industrial archaeologists has been patchy. English Heritage’s Monuments Protection Programme “Power and Utilities” category has included electricity, water and sewage (assessed in steps 1–4) and gas (steps 1–3) and monuments here have been included in the Institution of Civil Engineers Panel for Historic Engineering Works (PHEW) surveys and the gazetteers prepared by the Association for Industrial Archaeology and county Industrial Archaeology societies. Other monuments in this area, such as workhouses and cinemas, occasionally appear in the county surveys whilst many of the others have received little “archaeological” attention. Much, however, may have been done by economic, social and cultural historians. Many surviving structures feature in Historic Environment Records but there is a need to identify and record lost or buried elements or sites to complete the record.

### 14.11.1 Water supply, sewerage and drainage

The main water provision from the 16th century was probably from wells. Large numbers of “holy wells” would have had a more prosaic everyday function. The exception would have been the continuing use of conduits constructed by most of the (dissolved) religious houses. That of St John’s in Bristol still runs and was part of the main city supply during the Second World War. The use of a lift pump to recover the water from wells was a Medieval development. Water carriers were also to be seen transporting water to individual households. In Wells the remnants of a 15th-century supply issues forth from the 18th-century fountain. In Exeter conduits built by the cathedral and city authorities to house the water pipes in the Medieval period continued in use until the 1830s, and are open to the public as the “Underground Passages” (Allan 1994a).

During the 18th century, the use of rainwater cisterns in towns was common to provide water for washing and industrial use if not for drinking. The cloth industry relied on a reliable, if not entirely clean supply. This supply is not always understood and relied on water wheels and channelled, if not piped, water. It was not until the 19th century that piped water supplies were initiated to combat waterborne disease and to supply a growing population. This was speeded up by the cholera epidemics from the 1830s onwards. Edwin Chadwick’s report on the *Sanitary Conditions of the Labouring Population of Great Britain* of 1842 was an important first step followed by the establishment of boards of health with powers to deal with sanitary issues. The boards were at odds with local authorities as set above them and the arrangement failed.

A number of studies of water supply in the South West have been published but fewer on sewage disposal, drainage and flood relief works. Studies of rural water supply include those of Somerset (Warren 1998) and a 17th-century system on the Quantocks (Hawtin 1973). Fullagar has examined a Victorian system at Hop House, Marshfield in south Gloucestershire (Fullagar 1992) and Hardiman has covered water supply, sewage and rainwater disposal in Bath 1714–1830 (Hardiman 1994; 1997). Minchinton has noted a number of water supply sites in his gazetteer of Devon, including conduits from the 16th to 19th centuries in Dartmouth, Beer and Hemyock and has appended an archaeological section to his study of water supply in Exeter which covers Medieval to Modern periods (Minchinton 1986; 1987). The early water supply of Plymouth is covered by Hawkings (1982) and is included in PHEW’s entries for Drake’s and the Devonport leats (Otter 1994). Cragg (1997) deals with Bristol’s improved water supply after 1844 (when the city was described as having the

worst water supply of any large town) as does Binnie (1981). Watts has produced studies of Salisbury's water and sewage works (Watts 1972). Arrangements for pumping water have also received attention from those interested in animal, water and steam power (Cooper 2000; Skinner 1978). Alongside water supply was the provision of sewerage systems. This also began as holes in the ground – cess-pits – to resolve the problem of disposal of domestic waste. It is likely that rivers served as a ready way to dispose of sewage, which is recalled by the row of privies built near Bristol Bridge and recorded by William Worcestre. Public lavatories were only invented in the 19th century to accompany the introduction of piped water. Monastic houses, manor houses and castles had sophisticated water-borne disposal systems that in some cases would have remained in use.

Sewers were probably more widespread than acknowledged as shown by the large numbers of stone drains in evidence (the Law ditches in Bristol were multi-purpose drains). These took away all kinds of waste using springs as sources of water.

Major schemes of flood prevention have been undertaken in the region at places such as Exeter in recent times but historic works have received less coverage. An example of failure to come to grips with this problem until recent times is that of Bath, subject to repeated flooding until the 1960s and 70s, when the river authority undertook relief works between Bath and Salford which included a new weir and flood discharge channel at Pulteney Bridge in the city (Cragg 1997; Buchanan 1998).

### 14.11.2 Heat, light and public power supply

Domestically, the principal source of lighting would have been oil lamps of several types and candles. The source of oil would have been fish, olive oil and whale or train oil.

The provision of better street lighting from oil lamps and later large-scale provision of gas and electricity for light, heat and motive power has been a major feature of modern industrial society and has left a widespread, if diminishing, archaeological resource as national gas and large regional electricity generation stations have taken over from local suppliers. Early oil and gas lighting schemes have sometimes left finely-wrought and cast lamp standards in places such as Cheltenham and Barnstaple (Chatwin 1984; Bone 1973). The history and archaeology of gas-making has been studied throughout the region with contributions on the early years at Falmouth 1819–1896 (Pearson 1988), Cheltenham (Chatwin 1972) and Bristol (Nabb 1987; 1993) where the development of an early oil-gas works, later converted to coal, at Canon's Marsh has recently been assessed by

Croft (2000; 2001). Gazetteer entries on gas are available for Devon (Minchinton 1986) and Dorset (Stanier 1989) which had its first public supply in 1831. None, however, are listed in the HERs.

Electricity was first generated for individual buildings or supplied to a small number of customers at local level, prior to later development of “central” suppliers in the towns and, eventually, of large regional power stations that supplied power via a national grid at high voltage, as originally proposed by Ferranti. Many survivals of early systems in the region have been noted. Hydro-electric power in Devon has been surveyed by Harris (1995) and Tucker (1977a) whilst the supply in towns has been recorded in Bristol (Lamb 1981; 1994), Taunton (Gledhill and Lamb 1986) and Stroud (Wilson 1995). One of the larger power stations in the region at iideNewton Abbot power station has been covered by Warburton (1974) but many larger coastal stations, such as those at Yelland in north Devon and Poole in Dorset, have now been demolished. The UK's first commercial nuclear power station at Berkeley was commissioned in 1962 and closed in 1989, showing both the rate of technical progress and obsolescence in this industry (Mills *et al.* 1992). The MPP has identified significant station survivals in the South West region at Haven Banks, Exeter and Christchurch in Dorset (Trueman 1994).

### 14.11.3 Waste disposal, burial and cremation

Waste disposal became an important issue as urban areas grew by migration and natural population increase throughout the period. Municipal waste collection was initiated from the 17th century with rakers and scavengers employed by cities and towns to remove piles of waste in the streets. This does not appear to have entirely halted rubbish disposal in pits and convenient holes in the time-honoured fashion. In the 19th century areas were dedicated to tipping, euphemistically called reclamation, in marshes, hollows etc. Land reclamation in general was going on apace to dispose of industrial waste as well as domestic and to provide much-needed extra building land.

Landfill has until recent times been the major solution and these “deposits” will constitute a significant resource for the archaeologist of the future seeking evidence of past consumption and material culture. Refuse disposal was linked with power generation from the 1870s to c.1914 when there were about 340 municipal destructors in Britain. Over 80 also generated electricity – some 20% of all “public” electricity supply stations at the time. Further expansion of these was curtailed by the limited capacity (about 20MW) of such stations. In 1977, two sites of these survived at Gloucester and Weymouth (Tucker 1977b).

Rise in urban populations, occasional epidemics and high mortality rates in the Early Modern age put excessive pressure on the burial capacities of established and non-conformist churches/chapels until this was forbidden after 1850. A number of municipal and private cemeteries were established in the 19th century. Early catacombs survive in Exeter – now open to tourists – and a major conservation project in Bristol includes a range of early cremators in the private cemetery complex at Arnos Vale.

#### 14.11.4 Dealing with poverty, sickness and disability

Ongoing economic and social change and the dissolution of many religious foundations in the 16th century focused attention on ways of dealing with problems of long-term poverty and short-term distress. From Late Medieval times, almshouses provided a modicum of health-care and nursing, and were common in towns, cities and occasionally elsewhere. These were usually endowed by local philanthropists. The problem became more acute at the Dissolution, when thousands of people were displaced by the Crown.

In later centuries, private and public responses have created a range of almshouses, homes, orphanages and “poor” and “work” houses, some of which have continued to serve the agencies of the 20th-century welfare state. Patterns of philanthropy have attracted significant historical attention (for example Gorsky 1999, on Bristol) and workhouses have been surveyed by English Heritage (Morrison 1999), as have hospitals (Richardson 1998). Many of these buildings have had a number of uses, Brentry House and Estate near Bristol serving as the first and last reformatory for inebriates in England, a colony for “mental defectives” and latterly as a long-stay hospital (Carpenter 2002).

#### 14.11.5 Emergencies and law and order

Fire was dreaded in settlements where there was a deal of thatch and wood. It was often specified that party walls should be of stone. The early fire services were run by insurance companies with their own badges and water carriers. Water sources had to be supplied by the customer or if lucky from the river. Original fire stations and stables should be sought and their plans discussed.

The police were usually set up in a barrack-like building. Before the peelers of the early 19th century, the organisation of control of law and order was hit or miss. There were some local militias known as the train bands who were also in barrack-like accommodation. The police forces came into being (as so many functions) after the passing of the Municipal Corporations Act of 1835. In the next decade the town forces came into being.

Prisons were already well-established from Medieval times and individual or small-scale lockups became a feature of the time. Large numbers of stocks were set up to impart peremptory justice to those committing minor offences. The ultimate sanction of hanging is demonstrated by the sites of gibbets but hardly any survive as structures. In the Blackdown Hills, burial places of rural felons can be traced near gallows (forches), usually sites on parish boundaries.

The most durable survivals have been prisons which have been the subject of another English Heritage survey (Brodie *et al.* 2002). In the South West, survivals include the Victorian county jails, specialist prisons at Princetown (Devon) and Portland (Dorset) in addition to relics of the “New” gaol of c.1820 at Wapping in Bristol, which was closed in 1883 (Foyle 2004).

#### 14.11.6 Education and learning

Education, both liberal and vocational, has been a feature of the periods with grammar and “public” (i.e. private), schools taking over from church and monastic foundations. Industrialisation triggered competition between the established and non-conformist churches for a stake in elementary education whilst working men sought enlightenment in institutes, such as that in Bridport, Dorset. Many “church” schools survive as do the imposing buildings erected by school boards and the later local education authorities for elementary, vocational and higher education. A recent phase of investment in schools has, however, altered much of this resource as features such as outside toilets are modernised. The 20th century has seen the growth of the historic, provincial and “new” universities of the South West in new, purpose-built sites or housed in redundant buildings such as the Muller Orphan Houses on Ashley Down, Bristol. Historians have linked poor provision of vocational education with economic decline (Sanderson 1999) but few archaeological studies have been undertaken of this area. Public libraries were established in the 19th century and some fine municipal buildings survive. Modernisation can again threaten the integrity of such civic buildings, as in the case of Taunton Library, which has been converted into a public house; the building remains in much its original condition but the character of the internal space has been much altered.

#### 14.11.7 Recreation and leisure

Sport was always an interest of the well-to-do in terms of all kinds of, shooting, fishing and horse racing. This led to the establishment of kennels and stables for the hunt animals as well as those used for business. Horse racing was patronised by the wealthy and followed by

many of the poor and race tracks and grandstands were erected.

More leisurely sports included shooting butts for bows and guns, and . The provision of tennis courts and fives and squash courts is quite late, but they are rapidly being destroyed and replaced. Cricket developed during the 18th century along with the creation of the sports pavilion. Golf is more recent but has had a very significant impact on the landscape.

The 18th century saw the rise of inland spas, seaside resorts and permanent leisure venues but facilities for much of the population were stimulated by cheaper and more efficient transport systems, longer holidays and shorter working hours. Townscapes of leisure in the South West include Bath and Cheltenham and the many seaside resorts of its north and south coasts (Travis 1993) with piers as some of the most noted features.

Theatres are the oldest form of indoor entertainment along with cock-pits and similar attractions. The 19th and 20th centuries saw purpose-built theatres for music hall and later cinema followed by public dance halls and, often earlier, by hotel ballrooms. Private facilities for the rich were incorporated into many a stately home.

Cinemas are probably the most numerous examples of buildings for mass-entertainment and many have closed or are now threatened by multiscreen venues on new retail/leisure parks. Eyles (2001) notes six South West cinemas in his list of best operating sites (one, at least, has now closed) and two in Somerset (Bath and Taunton) that have passed into different use. Roy Day (1985) studied and recorded Bristol's redundant cinemas.

Many amateur and professional sporting clubs trace their origins back to the second half of the 19th century and stadia for rugby and association football are the significant monuments here. Major tragedies in the 1980s have caused many of these to be rebuilt and the open terraces and antique stands at some of the South West's leading soccer clubs have now been replaced (Inglis 1996). The origins and archaeology of football (Association and Rugby) in the South West are worth investigating.

## 14.12 Defence and Warfare

The South West peninsula occupies a crucial strategic location, flanking the western sea approaches to the English Channel – and thence to the commercial and naval ports of the south coast and to London and the south-east – and to the Bristol Channel and the commercial ports of South Wales and the Severn Estuary. The English Channel is also the gateway to northern Europe, as the main sea route to the former overseas empires of the European powers, and to the growing political and economic powers in the

Americas and Far East. As a result, the control of the Channel and of its approaches has been keenly contested in most European and world wars, and the South West has played a crucial role in this.

Its long southern coastline and proximity to the Continent has also made it vulnerable to attack, whether in the form of invasions planned to outflank the narrower and more heavily defended Channel to the east, or intermittent raids on military and commercial targets.

The literature on the subject is extensive with comprehensive overviews such as those by Maurice-Jones (1959), Saunders (1989), Hogg (1974), Coad (1983; 1989), Douet (1998), Duffy (1999) and Evans (2004), together with work on individual complexes, such as Plymouth (FW Woodward 1990; 1998; Pye and Woodward 1996; Coad 1983) or the Severn defences (Barrett 1993) and thematic studies of individual monument types for listing (English Heritage *and a,n*).

### 14.12.1 c.1540–1690

With the exception of the Civil War, the military archaeology of the 16th and 17th centuries is dominated by coastal defence. The earliest batteries are found along the south Devon coast, protecting harbours such as Dartmouth (Saunders 1983) and Fowey. These were usually initiatives of the local townfolk and it was not until Henry VIII's break with Rome, and the consequent threat from continental powers, that state involvement in defence began. Major fortifications were constructed at Portland (English Heritage 2000), St Mawes and Pendennis (Linzey 1999) in a new style based on tiers of conjoined rounded bastions. Between these major forts were smaller works, sometimes only earthworks, but others were like Sandsfoot Castle opposite Portland, where an octagonal gun room was accompanied by a substantial residential block that still survives (Saunders 1989). Coastal defence was later extended to the Isles of Scilly, where some of the best survivals from this period are to be found. Harry's Walls on St Mary's is the earliest design following the Italian theories of bastioned defence in England, although it was unfinished – probably because the designed structure was too large to fit the hill on which it was sited (Saunders 1962). The so-called King Charles's Castle, constructed around the same time, was of a far less modern design which looked back to the Medieval castle (Miles and Saunders 1970). In the 1590s, following the Armada crisis, further defence works were constructed on the Isles of Scilly, principally Star Castle and a bastioned trace cutting off The Hugh on which it stood. At a similar date Henry's fort at Pendennis (Linzey 1999) was surrounded by a bastioned trace, and the first large fortifications



were begun to defend Plymouth. These included the construction of a large bastioned fort which now lies beneath the Royal Citadel (FW Woodward 1987; Pye and Woodward 1996) and the strengthening of the defences of the 1540s on Drake's Island in Plymouth Sound (FW Woodward 1991; Brayshay 1987).

The Civil War in the South West saw few large-scale battles but was characterised by skirmishes and sieges, both large and small. Much of the campaign in the region centred around the retention or capture of the major towns, most of which were besieged, often more than once. Little survives of the defences and siegeworks above ground but excavation is showing that in many places these were extensive. Plymouth's defences are reasonably well-known (Stoyle 1998) while Exeter's – without the benefit of a contemporary plan such as that of Plymouth by Wenceslaus Hollar in 1644 – have seen detailed excavation in some areas (Henderson 2001) but are not yet as well understood (Stoyle 1995). The recent discoveries at Princesshay have however added a lot of new information. A similar situation occurs at Bridgwater, Dorchester, Devizes and particularly at Taunton where, recently, several lengths of ditch have been recorded some of which appear to have belonged to outworks. To the north the war appears to have focused on Bristol and Gloucester (Atkin and Laughlin 1992) with few known sites in the surrounding areas. Bristol has one of the best documented series of sieges and parts of the defences survive. Archaeological evidence has been recorded in several places, including the castle and it has been suggested that areas which now lack pre-17th century buildings were cleared during the conflict. Defensive additions were made to existing castles such as Taunton, Sherborne and Corfe Castle which also saw sieges as did smaller houses such as Abbotsbury in Dorset (Saunders 1989). Other earlier monuments, such as Maumbury Rings at Dorchester (Bradley 1975), Castilly henge (C Thomas 1964) and Castle Dore (Radford 1951), both in Cornwall, were reused and altered to varying degrees but it was the Medieval castles and houses such as Old Wardour and Corfe Castle which suffered the most. Much of the damage at Corfe was caused during slighting of the castle after the conflict and it has been shown that the rubble has sealed archaeological deposits relating to the defence (interim reports in *Proceedings of the Dorset Natural History and Archaeological Society* 1986–91). The Isles of Scilly again contain well-preserved evidence as they held an important Royalist garrison on the route between Ireland and the Channel Islands. The fortifications around Star Castle were improved with earthwork lines and batteries but the Parliamentary forces were able to capture Tresco, build Oliver's Battery and force the surrender of St Mary's. The fortifications on Lundy are also well preserved but did not see action.

#### 14.12.2 c.1690–1914

For most of this period, from the Glorious Revolution of 1688 to the *entente cordiale* of the early 1900s, France, sometimes aided by Spain, was Britain's main political and military rival and the source of most of the perceived threat. Until the development of Cherbourg in the mid-19th century, much of the French navy was based on the Atlantic coast (Brest and Rochefort) or in the Mediterranean (Toulon) as, of course, was the Spanish navy. This reinforced the strategic importance of the South West as a base for monitoring French naval activity and for frustrating any attempts to push up the Channel in support of a planned invasion. This strategic shift, from rivalry with the Dutch prior to 1688 to rivalry with the French, is reflected in Chatham's replacement by Devonport as the second principal naval base after Portsmouth.

After the internal upheaval of the Civil War and the Restoration, the avowed purpose of defence works in the South West was to deter and guard against these external threats; however, some at least may also have had an implicit role of discouraging and, if necessary, suppressing, internal dissent. Thus the Royal Citadel at Plymouth (FW Woodward 1987), built by Charles II in 1665–71, ostensibly against the threat from the Dutch, may also have served as a very obvious reminder to the former Parliamentary stronghold that the Commonwealth was well and truly over. Similarly, the barracks built in several towns during the French Revolutionary and Napoleonic Wars to counter the threat of invasion, raids, and smuggling (Duffy 1999), would also have provided the government with a means of imposing its authority if necessary on a populace made restive by the revolution in France and the privations of a long series of wars (virtually continuous between 1793 and 1815).

Defence works tend to be expensive to construct, maintain and man fully, in terms of finance, labour, resources and time, particularly in the face of the need to keep them fully up-to-date to cope with technological advances. As a result, throughout this period, and indeed before and since, there were spasms of (sometimes frenzied) activity during and immediately after wars or invasion scares, when the expenditure was either clearly needed and/or could be politically justified, interspersed with periods of peace – characterised on the whole by relative neglect and lack of investment. The history of defence works in the South West and elsewhere is thus linked inextricably with national political history, and the need to keep pace with technology and international rivals.

The main types of defence works present in the region during this period include naval facilities, fortifications, garrison facilities, and communications/monitoring facilities. Most, except for some of the barracks, were sited on or near the coast.

### Naval facilities

Prior to this period, the Isles of Scilly anchorage, the deep-water estuaries (such as those of the Fal, Tamar/Plym, and Dart) and the bays of Torbay and Portland had been used for shelter and refuge by naval and mercantile shipping, and as bases for the fleet during emergencies such as the Armada. Several had been fortified during the reigns of Henry VIII and Elizabeth I, but there were few permanent, formal, facilities for the navy itself with the exception of some victualling facilities at Plymouth, for example.

This changed with the establishment of Devonport dockyard in the 1690s. Originally conceived as a dry dock for repairs, it rapidly grew into a fully-fledged dockyard. Further major expansion in the later 18th century and in the mid- to late 19th century put it on a par with Portsmouth, as one of the country's two main naval bases. As well as the main dockyard itself, other facilities were scattered around the Hamoaze and the Sound, such as a watering point at Bovisand (reservoir, pipe and pier), gunpowder mills at St Budeaux, powder magazines at Keyham and then at Bull Point, and victualling facilities at Sutton Pool and Southdown, later (in 1833) concentrated in one purpose-built yard at Stonehouse (the Royal William Victualling Yard). After years of hiring warehouses for the purpose, a naval hospital was built in the 1770s at Stonehouse, matched by a military one nearby, and in 1868 another hospital, for military families, was erected within the Dock Lines.

Torbay was (and is) used by shipping as a refuge from westerly gales, and during the French Revolutionary and Napoleonic Wars victualling facilities were built at Brixham and a naval hospital at Paignton. A breakwater was mooted, but never built. At a similar time a naval depot was also established in the Fal estuary, at Mylor (Duffy 1999; Johnson 2005). After the end of the Napoleonic War most of these facilities were closed or mothballed, and activity and finance was concentrated on Devonport, where the construction of the breakwater in 1812–48 provided a sheltered anchorage in the Sound. Subsequently some facilities were also developed at Portland, after the completion of the breakwater there in 1859.

### Fortifications

Virtually all of the fortifications of this period were sited on or near the coasts to defend the naval base at Plymouth and the anchorages and refuges of the Isles of Scilly, the Fal, Fowey, Dart, Torbay and Portland, both from the sea, and in the case of Plymouth in particular, from attack by an invasion army from landward. Others were sited to defend the smaller ports and landing places, and, from the mid-19th century, the approach to the major commercial ports of Bristol, Cardiff, Newport and Gloucester.

For much of this period Britain was at war, and the periods of peace were punctuated by invasion scares. With each crisis, fortifications were reviewed and sometimes improved, either in anticipation of invasion, or to rectify deficiencies highlighted by the war or scare just past. In the later 19th century rapid technological advances, and the developing arms race with first France and then Germany, had much the same effect. As the key naval base, most attention was paid to Plymouth and as a result all phases of fortification activity are represented there in some form (FW Woodward 1990; Pye and Woodward 1996). In other areas activity was more intermittent.

The Royal Citadel in Plymouth (FW Woodward 1987) represents the earliest substantial new work after the Restoration. It was intended to defend the town and Cattewater anchorage against the Dutch initially, and represented the main seat of the new king's authority in the South West. It was followed by spasms of activity during the continental wars of the early 1700s, the Seven Years War in the 1750s, the War of American Independence (with France and Spain allied to the Americans) in 1775–83, the French Revolutionary War of the 1790s, the Napoleonic War of 1803–15, an invasion scare in the mid-1840s, and another major one in 1858–9. Improvements continued in the later 19th century in response to advances in artillery, culminating in the construction of new batteries for long range breech-loading guns and for short range Quick Firing breech-loading guns in the 1890s and early 1900s and the development of other defences such as minefields and land-based torpedoes. This was essentially the last major phase of activity in coast defence prior to 1914.

By the early 1700s several batteries had been planned or built on the inner approaches to the new dockyard at Plymouth, and in the following years major new lines (the Garrison Walls) were built on the Isles of Scilly, and new batteries added at the mouth of the Fal and at Dartmouth. In the 1750s the defences of the Royal Citadel (FW Woodward 1987) were updated and extended, and the batteries of the Lower Fort were remodelled to cover the approach to the dockyard more effectively. At the same time, the dockyard itself was provided with landward defences, the Dock Lines, for the first time, although initially these were rather weak (FW Woodward 1990; Pye and Woodward 1996; Pye 1998; 2000). They also enclosed defensible barrack squares, surrounded by their own bastioned curtain walls.

The American war, and the panic induced by the appearance of a Franco-Spanish invasion fleet in Plymouth Sound in 1779, resulted in probably the most comprehensive programme of coastal defence works since the blockhouses and forts of Henry VIII's reign. Although many were open batteries thrown up rapidly in turf and timber, some, such as Mount Wise

Redoubt (Pye 2000) and Mount Pleasant Redoubt (Pye 1992), were revetted in stone from the start. Around the naval base at Plymouth the Lines were deepened and provided for the first time with detached redoubts, and a series of redoubts was also built on Maker Heights. Several new batteries were erected on the sea approaches to the dockyard, replacing and adding to the earlier ones. To the east the naval anchorage at Torbay was protected for the first time by new batteries on Berry Head and to each side of Brixham. To the west the naval depot and anchorage at Falmouth was protected by batteries at Pendennis and St Mawes. For the first (documented) time, many of the smaller ports – such as Poole, Swanage, Lyme Regis, the Fowey estuary, Looe and Mevagissey were also provided with batteries, probably through a combination of local initiative and government encouragement (Saunders 1989; Duffy 1999).

The end of the war in 1783 resulted in the curtailment of the building programme, with some of the redoubts around Plymouth either not being finished or perhaps even started, and some batteries being abandoned. Work did however continue on Maker Heights. With the onset of the French Revolutionary and Napoleonic Wars (1793–1815), many of the earlier fortifications were reoccupied and repaired, and subsequently a further redoubt and barracks were added on Maker Heights. Work also began on re-aligning, deepening, and re-facing the Dock Lines in stone, but this was abandoned in 1816 on the orders of Wellington. At Torbay the batteries on Berry Head were rebuilt in stone, and the main ones at the headland were protected from landward attack by walls ditches and a detached fort. Barracks and a hospital were provided for the garrison. Elsewhere along the coast a major development was the provision of a further series of batteries to protect the landing places and smaller ports, from Swanage and Bridport in the east to Mount's Bay in the west, and round to Ilfracombe, Avonmouth and Portishead on the north coast (Saunders 1989). These were manned by the local militia companies who proliferated at this time, particularly with the very real threat of invasion in the early 1800s.

After the end of the war in 1815 there was a period of retrenchment, with most resources being concentrated on Plymouth. The batteries and forts at Torbay were abandoned and the land sold back into private ownership; most of the batteries protecting the small ports were probably also abandoned. To the west, although the fortifications protecting the Fal and the Isles of Scilly mostly remained in military hands, there appears to have been relatively little new activity until the late 19th century. The only place to “benefit” from the next invasion scare in the 1840s was Plymouth, where three new stone-built fortified batteries were built to protect the anchorage

behind the newly completed breakwater, and the inner approach to the dockyard.

The invasion scare of 1858–9 – arising from the French lead in the arms race following the launch of the first steam-driven, armour-clad warship (*La Gloire*), and from fear of what Napoleon III might do with this advantage – resulted in a massive programme of fortification building on the continental model. However, this was largely concentrated on Plymouth, with smaller schemes at Portland and across the Bristol Channel, although a new battery was added at Dartmouth, and open batteries, manned by militia, were also established again at several small ports, such as at Sidmouth and Exmouth, Torquay and Brixham, and on both coasts of Cornwall around to Padstow (Duffy 1999).

The fortifications at Plymouth (Pye and Woodward 1996; FW Woodward 1998) matched those at Portsmouth in number and cost, reflecting the national importance of the Devonport dockyard. A ring of stone-built forts and fortified batteries – linked by a military road, ramparts and defended ditches, and surrounded by landscaped glacis slopes, protected the landward approaches to the dockyard, and new granite casemated batteries protected by iron shields, including one sea fort – were built to defend the approaches to the anchorage and dockyard. Open batteries were also added to existing ones, at Western King and Eastern King for example.

At Portland, the naval anchorage behind the newly completed breakwater was protected by a sea fort and a fort and batteries at each end (Nothe Fort and Verne Citadel), and other batteries were proposed elsewhere. Across the Bristol Channel the approaches to Avonmouth, Bristol, Gloucester, and the South Wales ports of Cardiff and Newport were protected by batteries at Brean Down (Webster 2001), on the islands of Steep Holm and Flat Holm, and at Lavernock Point near Barry in South Wales (Barrett 1993; Saunders *et al.* 2001).

Within 20 to 30 years however, the casemated sea batteries were largely redundant, and were being replaced by earthen and concrete batteries at a higher elevation. Many of the land forts were also being adapted for different armament, including “disappearing” guns. This culminated in the adoption of longer range breech loading guns in the 1890s, and the construction of new batteries – sometimes on new sites and sometimes on or near old batteries – at Plymouth, Falmouth, and on the Isles of Scilly. These were accompanied by a network of concrete command posts, searchlight emplacements, direction range finders, observation posts, and position finders, the latter often being in separate locations some distance from the batteries they served. Quick-firing (QF) breech-loading guns were also introduced at this time, to counter the threat from fast moving motor

torpedo boats, and were often sited within or on the earlier batteries protecting the same narrow pinch points, such as the approach channels around each end of the Plymouth breakwater. New forms of defence were also introduced, including a Brennan torpedo station at Pier Cellars in Plymouth Sound (a rare and very important survival, as yet with no statutory protection), and minefields.

There was then little change until the outbreak of war in 1914, except for some upgrading of the long range guns, the decommissioning of the torpedo station, and the provision of permanent local defence for the most important open batteries, such as Renney Battery and Hawkins Battery at Plymouth.

### **Garrison facilities**

Prior to the French Revolutionary and Napoleonic Wars the army and marines were generally housed within the fixed fortifications they garrisoned, or at or near to naval bases such as Devonport. Barracks (Douet 1998) were provided within separate buildings or casemates under ramparts at the Royal Citadel, at the Garrison Walls on the Isles of Scilly, and at Pendennis and St Mawes by the mid 18th century. At Devonport bastioned barrack squares were constructed within the Dock Lines in the 1750s, followed later in the century by the Marines' Stonehouse Barracks.

During the French wars in the 1790s and early 1800s the country's armed forces increased dramatically in number, supplemented by numerous militia and volunteer units. They all needed to be housed, and the government embarked on a national programme of barrack construction, most to a fairly standard plan. Many of the barracks which survive to any degree are located within the South West, including cavalry barracks at Christchurch, Dorchester (Marabout Barracks) and Exeter (Higher Barracks), and an artillery barracks at Exeter (Wyvern). Smaller cavalry barracks were also established at other locations close to or on the coast, such as Honiton, Totnes, Modbury, Truro and Barnstaple (Duffy 1999). Barracks, and later a hospital, were also provided for the militia garrisoning Berry Head, Torbay, and a stone barrack block was built on Maker Heights for the garrison there. During the years of relative quiet after 1815 some of the smaller barracks were abandoned, as were the barracks and forts at Berry Head. However, some development did continue, with a barrack block and other facilities being built on Drake's Island (FW Woodward 1991) in the 1830s, and a bastioned defensive wall added to Maker Barracks in the 1840s. An apparent barrack complex at Barne Barton in Plymouth may also belong to this period, as it too has a bastioned wall reminiscent of the one at Maker. Architecturally lavish barrack accommodation was also

provided within the new batteries built at Plymouth in the 1840s (particularly at Staddon Point and Picklecombe – built in the style of the medieval Warwick Castle, Figure 14.1 on page 234).

The invasion scares of the 1850s resulted in a revival of the militia and volunteer units, who were to man the new Plymouth fortifications in the event of attack, and manned several of the other coastal batteries established elsewhere at that time. Militia barracks were built in several towns, including Bodmin, Cirencester and Dorchester, and drill halls were built in many others (Duffy 1999; Johnson 2005). Accommodation was also improved for regular units, with the construction of Raglan Barracks in Devonport and extensions to others, such as the Stonehouse marine barracks. There was also more emphasis on catering for dependants, with the provision of married quarters for the first time, and a hospital for soldiers' wives and families at Devonport, for example. Within the fortifications accommodation was also provided, usually in bomb-proof casemates under the ramparts and traverses rather than in separate stand-alone buildings.

With the Cardwell reforms of the 1870s regiments were deliberately dispersed into population centres, in order to foster a sense of ownership by the community and thus to facilitate recruitment. The vastly improved transport links created by the railways made it less important for military units to be located close to the areas most vulnerable to attack, such as the south coast. Localisation depots were built in several towns (Devizes, Dorchester, Taunton and Bodmin, Douet 1998) either as completely new barracks or as a remodelling of an existing militia one. Later in the century more resources were made available for military works, resulting in more architecturally ostentatious buildings being constructed, such as the new barracks at the Royal Citadel (FW Woodward 1987).

Outside the barrack complexes, which themselves included ancillary buildings such as hospitals, magazines, veterinary facilities (if cavalry), guardhouses and, later, churches and schools, were other training facilities for the regular and militia units. At Plymouth permanent firing ranges for the Marines and infantry were built on Staddon Heights in the 1860s where the butts still dominate the skyline. Another similar range was built near HMS Raleigh on the Cornish side of the Tamar, and smaller, less substantial ranges of all periods are to be found on older map editions in many areas around the coast and on rough ground elsewhere. Regular training began on Dartmoor with the establishment of a range and camp at Okehampton in 1875; permanent buildings were added in the 1890s, and facilities were expanded in 1900 with the purchase of the Willsworthy range.

There were also practice batteries for coast and naval artillery, both around Plymouth and elsewhere





**Figure 14.3:** Picklecombe Battery. The castellated barracks of the 1840s battery can be seen at the rear with the 1860s multi-tier casemated battery, converted to flats, in front. Photograph: Andrew Pye, Exeter City Council.

(presumably for the local militia units). Covered batteries or practice facilities of mid- to late 19th-century date survive at Stonehouse overlooking Millbay, and at Shoalstone Point near Brixham. Open practice batteries dating from the mid-19th century onwards are known at Battery Gardens, Brixham (Newman and Salvatore 2003) and around Plymouth at Bovisand, Lentney, the Royal Citadel, and Whitsand Bay (Pye and Woodward 1996). The gun positions at Lentney and the Royal Citadel continued in use, with adaptations, through to the demise of Coast Artillery in 1956. During the latter part of the 19th century, and probably earlier, naval gunners were trained on a series of hulks in the Hamoaze (collectively called HMS Cambridge in the 1890s), and practice firing took place across adjoining mudflats, at the nearby range at Trevol (now in HMS Raleigh), and at sea. In 1956 the modern HMS Cambridge was established as a shore-based facility at Wembury Point, closing in 2001.

### 14.12.3 The First World War

Most of the combat action in the First World War took place outside the United Kingdom. There were however shelling attacks by German naval ships on the east-coast towns and, from 1915, Zeppelin attacks on London, with Gotha aircraft bombing raids from 1917

onwards. The South West was not affected by these bombardments and, unlike the east coast, the region was never under any perceived invasion threat.

The major offensive operations carried out in the South West were primarily by the Royal Navy and Royal Naval Air Service against German naval forces and, in particular, in the crucial Battle of the Atlantic keeping the overseas supply lines to the UK open against German submarine attack.

The main military activities in the United Kingdom were the mobilisation of the nation into the armed forces and, after the Armistice in 1918, the demobilisation of these forces. Over 5.3 million men from the British Empire and Dominions were included. Training of both the new recruits and the continuation training of formations, units and servicemen and women took place in the UK, with the South West and its extensive training areas playing a major role.

Armed forces logistics covered not only forces within the UK but also the supply and maintenance of forces deployed abroad. These included the massive deployments on the Western Front in France and Belgium and also most forces deployed worldwide.

The First World War marks a number of major technological changes in warfare. It was the last war where horses played a major role. The British inven-

tion of the tank and its introduction onto the battlefield during the battle of the Somme on 15 September 1916 marked a radical change in land warfare. The unexpected use of gas by the Germans in April 1915 required the production, storage and movement of war gases within UK and then to France. An estimate suggests perhaps 25,000 tonnes of war gases were produced during the war in Britain.

### Identified sites

It is clear that there are few First World War sites currently identified in the HERs of the region (Webster 2004j). A review of the on-line Defence of Britain (DOB) Database (DOB 2002) similarly showed few sites in the South West with the majority of 44 being in Cornwall. Bristol, Gloucestershire and Torbay, together with Bath and North East Somerset have no recorded sites. Devon has one site, Somerset 3 and Wiltshire 5. The 44 sites recorded in Cornwall include coastal batteries, Territorial Army drill halls, rifle ranges, dockyards, wireless direction finding stations and Royal Naval Air Service airship sites. The associated *Defence of Britain Project Handbook* (Lowry 1996) includes relatively few descriptions of First World War infrastructure and the surviving sites have often been re-used making the separate identification of First World War use difficult. The handbook was a primary source of information for the volunteers who contributed to the DOB Database, which may help to explain the paucity of First World War sites identified. The Project has now been completed and no further reports are being added to the database (DOB 2002).

Many Royal Navy and Army barracks and forts built in the 19th century or earlier continued to be used during both world wars but are not characteristic of the period (similarly, most coastal batteries dating to the 1890s and early 1900s continued in use during the First World War, and a few also during the Second World War, with adaptations to take more modern armament). Moreover, as many new campsites and airfields were simply grass fields with tentage for accommodation, few remains have survived. Other military sites extensively used wooden huts, which were easily removed for re-use elsewhere or destroyed. Many civilian properties were requisitioned and the majority were later returned to their owners with little to show for their military occupation.

### Naval and Military Training

Royal Navy training establishments were concentrated around Plymouth and include HMS Powerful (a new training establishment opened at Devonport in 1913), the RN Engine Room Artificers' School at Plymouth, RN Torpedo School (HMS Defiance) and HM Gunnery School at Devonport. In addition, the RN Engineering

College HMS Thunderer was originally situated alongside the Dockyard wall at Keyham.

The major Army Salisbury Plain Training Area from 1897 (McOmish *et al.* 2002) and Dartmoor Training Area, including Okehampton Camp, were two key facilities. Both areas included rifle and field firing ranges, together with artillery ranges. A number of sites have been identified with trenches for training in trench warfare or trenches dug for training in field fortifications. These include on Salisbury Plain (McOmish *et al.* 2002, 139–143) and at Blandford Camp, where the Royal Naval Division trained and some of their training trenches still survive. Other trenches have been identified near Yeovil and also in the Bristol and Portishead area.

Other British training camps have also been studied including Woodbury Common, by a local group, and the Dartmoor Ranges, by English Heritage. On Dartmoor there is evidence for military training dating from the period of the Boer War with pre-First World War trench systems remain in some areas. Okehampton Camp retains some early buildings. Later remains have been surveyed including target tramways and artillery range observation posts. In Wiltshire many features relate to training and there are well-preserved practice trench systems as well as more exotic features such as the gas training area.

The 1906 Haldane reforms embodied the Militia and Volunteers into the Territorial Force (TF), organised in formations with supporting arms and services, which were an important contribution towards success in the First World War. The TF was still administered by the County Associations and their headquarters may still survive. Drill halls, later to be re-named Territorial Army Centres, exist across the South West from this period and have been studied nationally (Osborne 2006). In addition, the TF used existing Volunteer and Militia campsites for their annual and weekend training camps. Many of these survived into the Second World War and later. These camps were normally tented with perhaps some permanent buildings like cook-houses, latrines, ablutions or palliassed straw stores but hutted camps also survive, including Okehampton. Many ranges dating from the Militia and Volunteers are marked on late 19th-century Ordnance Survey maps although some of these had fallen out of use before the First World War started. In Somerset, 26 rifle ranges have been identified and recorded on the HER.

The recruitment of Kitchener's "New Armies" of 100,000 men (*Your King and Country Need You: A Call to Arms* was published on 11 August 1914) brought a massive requirement for accommodation, training and transit camps. Between 1914 and 1915, a total of six "New Armies" were recruited, equipped and trained. The infrastructure for this was based on the County Regiments and was independent of the Territorial Force. Examples of the extensive infrastruc-

ture required include the village of Fovant in Wiltshire and its neighbours Compton Chamberlayne and Sutton Mandeville which became a vast military camp, complete with barracks, a hospital, parade grounds, rifle ranges, a camp cinema and YMCA huts (see page 260). A military railway was constructed to serve the camp, branching off the main line railway from London. Nearby at Codford there were 15 camps, while the other Wylye valley villages had 12 between them. Such camps would have been primarily constructed of wooden huts and have not survived, although there may be buried deposits and artefact scatters.

An indicative example is the use of early 19th-century cavalry camps at Camp Down near Pimperne and Blandford Race Down in Dorset. These were used both by the Regular Army and also by the Volunteers for their annual camps and “field days”. A rifle range was constructed there in about 1860. In late 1914 a hutted camp was constructed for the Royal Naval Division and a Prisoner of War camp built alongside in 1916. The RAF, after its formation in 1919, moved into Blandford for a short period. After the end of the First World War the huts of Blandford Camp were sold off, with several surviving locally as village halls, and the area returned to agriculture and scrubland. In the interwar years the area continued to be used for training. In 1939 the site was again used for the construction of a large militia camp with wooden huts. After the war, the site was developed and is now the home of Royal Signals.

The massive involvement of the armed forces of the British empire in the war required staging and training camps before formations were moved abroad. The Fovant area of Wiltshire housed Australian and New Zealand troops. The entry ports for arriving Empire troops have not been identified but may have included Plymouth and Avonmouth. No sources have been found describing any effects on the infrastructure within the UK of the entry of the United States into the war on 6 April 1917 but many US troops appear to have been landed directly in France.

The invention of the tank resulted in the Bovington Heath area of Dorset being used as the major tank training ground. A railway spur to the camp for tank transportation was completed in 1918. Tanks were ferried to the Western Front through the port of Avonmouth.

### Medical

In 1907 the War Office devised a scheme for 23 Territorial Hospitals, each with a minimum of 500 beds, to be set up in existing public buildings throughout the country in the event of war. At the outbreak of war, these were supplemented by temporary hutted and tented hospitals, set up with remarkable speed and economy in the grounds of asylums, hospitals, church

halls, schools and converted private houses. In addition, there were Royal Navy hospitals including the Stonehouse Hospital at Plymouth. Numerous convalescence centres were also set up. The enormous numbers of casualties in the war (nearly 1.7 million British wounded), particularly from the Western Front, required a casualty evacuation system from the theatres of operations by sea and rail back to Britain. A study of the architectural history of English military hospitals has been undertaken for English Heritage by Kathryn Morrison. Some of these temporary hospitals have been identified including requisitioned country houses but no comprehensive study or lists of sites in the South West have been identified.

### Demobilisation

After the 1918 Armistice, British forces were rapidly evacuated from France and sent to the nearest, to their home, of 26 Special Area Centres across the UK. Fovant in Wiltshire is an example of these, which later became a rest camp. Resettlement centres were also set up to help soldiers return to civilian life. Chiseldon Camp near Swindon in Wiltshire was an example. In addition, Colonial and Dominion forces had to be retained in the UK until troop ships were available for them to return home. These forces were concentrated near to their final embarkation ports (for example many Canadians near Avonmouth). No studies of the infrastructure used for demobilisation have been discovered.

Post-war housing included “homes fit for heroes” and smallholdings for demobilised servicemen to earn a living. Examples of the latter have been identified near Taunton. Post-First World War Petter-Nissen experimental houses at West Camel in Somerset have been Listed. Other typical housing projects include the ribbon development of small bungalows along main roads.

### Command and Control of the Armed Forces in the UK

The Royal Navy commands covering the South West were Portsmouth Command, which included Portland Subcommand, and Western Approaches Command, which included Devonport, Falmouth and Cardiff Subcommands (the latter covering the Bristol Channel).

There was a major reorganisation of the Army static command structure in 1911 with the introduction of “Commands”. The South West came under the new Southern Command but no study of the command structure and the subordinate headquarters, together with their buildings and supporting infrastructure appears to have been made.

English Heritage is currently commissioning a study of the 20th-century military command centres of the



Royal Navy, Army and RAF together with their associated communications facilities in England, including those used in the First World War. It is not yet clear how far down the three service chains of command the study will investigate and in what depth at regional level.

### **Communications**

Since the Boer War, the Royal Navy had increasingly used wireless communications between ships and for ship-to-shore services. A number of Naval wireless stations were established in the South West. In addition, both wireless directional finding and intercept was carried out on German naval transmissions. Some of the sites used have been identified, particularly in Cornwall. German submarine telegraph cables were cut and diverted to Porthcurno, while other German cables off Emden were cut and re-routed to Falmouth for British use. The English Heritage command centres study should address some of this, while civilian communications are addressed in Section 14.7 on page 224.

### **Logistics**

The Armed Forces logistics organisations supported forces both within the UK also those deployed abroad. This subject covers an exceptionally wide area of activities from the factories to the front line and includes dockyards, depots, dumps, parks and workshops.

Naval logistics sites around Plymouth include the Royal Dockyard at Devonport, the Royal William Victualling Yard in Plymouth and the Royal Naval Ordnance Depot at Bull Point, St Budeaux. No survey of First World War Army Ordnance, Supply or Remount Depots (known to have been sited at Shirehampton, Avonmouth, Gloucester, Templecombe, Sherborne, Bulford and Purton) has been found. Number 3 Western Aircraft Repair Depot, which serviced aircraft engines, was based at Yate.

The vital subject of the infrastructure of the naval and military logistics chains, including their air components, in the South West does not appear to have been studied and they are an element that is not identified by Schofield (2004). Nevertheless, the overwhelming importance of Armed Forces logistics in the First World War cannot be ignored.

### **Transport**

The First World War was still very much in the age of the horse. For example, an infantry division needed 5592 horses while a cavalry division needed 9815. The infrastructure associated with a mounted army includes stables, indoor riding schools, outdoor equitation areas, veterinary hospitals, hay and forage stores, farriers and blacksmiths' shops. A remount depot near Avonmouth has been identified as well as with a depot

for 600 mules at Compton Bishop in Somerset. At the same time, motor transport was increasingly used.

The railways provided the primary means of wartime military transportation within the UK and carried vastly increased munitions and war stores traffic together with troop trains. New sidings and connections to Government dumps were constructed, while some garrisons like Bulford Camp, Fovant and Tidworth enjoyed their own branch railway. Considerable tonnages of coal from the South Wales coalfields were required for naval purposes and coal for warships had to arrive at naval ports to coincide with the berthing of the warships. This placed a considerable load on the Great Western Railway through the Severn Tunnel, and through Gloucestershire for deliveries to Scapa Flow and northern ports.

### **Munitions Manufacture**

The extensive Royal Naval Cordite Factory at Holton Heath dates from the First World War. In Gloucestershire, remains survive from the shipyard and naval college at Beachley and a shell-filling factory at Quedgeley. A wood alcohol factory was developed in the Forest of Dean. A series of industrial plants around Avonmouth and to the north supplied materiel for the Western Front. These included petrol production, a shell-filling plant, and mustard-gas factory at Berwick Farm in South Gloucestershire.

The enormous demands for shells from 1915 onwards lead to the formation of the Ministry of Munitions and the passing out of government contracts for manufacturing shells to civilian firms, for example the GWR workshops in Swindon. The involvement of industry in war and munitions production across the South West may have resulted in some new infrastructure but this requires investigation.

### **Aircraft Manufacture**

The aircraft industry included the British and Colonial Aircraft Company at Filton, the Gloucestershire Aircraft Company at Brockworth and Westlands at Yeovil.

### **Agriculture**

The German blockade of the United Kingdom from 1916 onwards made it imperative to maximise agricultural productivity. This was mainly achieved through the ploughing up of existing pastures, rather than reclaiming land, together with the use of prisoner-of-war labour and women to replace conscripted men.

### **Prisoner of War (POW) Camps**

Several POW camps have been identified in Gloucestershire and one at Sandhill Park, a requisitioned country house near Taunton. A POW camp at Princetown has been surveyed by RCHME. Many POWs



were landed at Avonmouth and moved by rail to camps. The recent English Heritage study of POW camps by Roger Thomas only covers the Second World War. With the number of POWs moved to the UK, particularly in the later years of the war, many more camps must have existed. Repatriation camps are mentioned at Blandford Camp in 1919.

### Naval Ports and Docks

Major ports, for example Portland, Plymouth and Portishead had coast artillery batteries for their seaward defences. Early 20th-century coast artillery sites in Devon, like Renney Battery and Lentney Battery have been studied by Pye and Woodward (1996). Some underwater archaeology recording work has been carried out at the former naval base at Portland and a wreck survey is underway.

The docks at Portishead were at their most active in the early 20th century with their associated oil industry. Activity peaked during the First World War when most of the petrol for the Western Front was shipped from here, after being filled into 2-gallon cans. Avonmouth was used for the concentration and shipping out of motor transport, including tanks, to France. Both the ports of Avonmouth and Portishead were heavily involved in the movement of troops to and from the Western Front, the reception of Empire and Dominions troops in Britain and their return after the war.

The importance of coastal shipping throughout the war and the demands placed shipping and the associated ports and facilities may be a subject worth studying.

### Military Aviation

Military aviation in the South West commenced in 1911 at Larkhill in Wiltshire on an existing civilian site. In May 1912 flying training for the newly formed Royal Flying Corps commenced at the Central Flying School at Upavon in Wiltshire, which is claimed to be the oldest UK airfield that is still operational. By the outbreak of the First World War, there were only seven service aerodromes in Britain and three of these (Larkhill, Netheravon and Upavon) were in Wiltshire. The Army Balloon School was also established at Rollestone in Wiltshire in June 1916 and Old Sarum (Ford Farm) was acquired in 1917. A number of important structures remain including balloon hangers. Flying training also took place at Lake Down (Druids' Lodge) Wilts, Leighterton and Minchinhampton Gloucestershire (for Australians), Stonehenge, Larkhill (Bristol's Flying School) and at Yatesbury.

To west of Salisbury Plain almost all air activity was confined to anti-submarine warfare with landplanes, seaplanes and airships bases mainly around the coast.

In the battle against the submarines in the Atlantic, a number of Royal Naval Air Service (RNAS) airship stations including Merifield and Mullion in Cornwall, together with Moreton and Upton in Dorset, were established along the coastline. Seaplanes were deployed at sites including Newlyn, Portland, Torquay, Falmouth and Mount Batten, the last became an Royal Flying Corps seaplane base in 1917 and retains hangers from that period (Ashworth 1982; A Smith 2000).

On 1 April 1918, the Royal Flying Corps became a separate service: the Royal Air Force. Upavon became RAF Upavon and continued to be the home of the RAF Central Flying School. Blandford Camp was converted for use by the RAF Recruit Wing, Record Office, Equipment and Personnel Depot and Discharge Centre. In addition, a 99-bed RAF hospital was also established there and a railway connection laid, but in 1919 the RAF abandoned the camp.

### Combat Art

English Heritage guidelines (English Heritage 2004) outline this new subject. There are excellent examples of combat art preserved in the 20 surviving military cap badges carved into the chalk at Fovant in Wiltshire together with a single badge nearby at Codford. The distribution of less-formal works is poorly known.

### Commemoration

This subject includes wartime cemeteries and memorials to commemorate the use of sites by units or establishments, exceptionally noteworthy achievements of individuals or the loss of life in major accidents or operational deaths. Military museums form part of this and a significant number are present in the South West. Some museums are in former operational sites or fortifications.

With the appalling casualties and deaths, (over 703,000 killed), particularly on the Western Front, commemoration of the fallen came to the forefront. Large numbers of war memorials were constructed; some of these during the war, and a database has been produced by the Imperial War Museum (UK National Inventory of War Memorials). Nearly 6800 memorials have been identified across the South West and about 93% of these are on the database (July 2005) but more sites are being discovered. Wiltshire has a large number of war cemeteries with links across the empire. For example, 60 British and Australian soldiers are buried in the local churchyard at Fovant but other churchyards in the South West also hold the graves of service personnel.

The Imperial (now Commonwealth) War Graves Commission ordered half a million headstones from a special quarry, which was opened at Wakeham in Dorset. The carefully selected stone were shaped, carved with names and badges and shipped from Port-

land to the Western Front. Portland stone was also used for the Whitehall Cenotaph.

#### **Miscellaneous Government Activities**

Government logistics included food storage, particularly during the submarine blockade of the sea supply routes, to relatively minor activities like storing the Crown Jewels in a place of safety in Truro Prison. Other activities may have included anti-terrorism measures, particularly after the 1916 Easter Rising in Dublin. It is not clear whether any special infrastructure was created to meet these threats. A number of conscientious objectors were locked up in West Country prisons including Portland and Princetown.

#### **14.12.4 The Second World War**

During the Second World War there were two major campaigns where the South West played a unique and decisive role: the Battle of the Atlantic and as the area which hosted and supported the vast American contribution to D-Day and the invasion of Normandy.

A complication, when studying the archaeology of the Second World War is that units moved around and sites were re-used (often for short periods) for a number of differing purposes throughout the war. In particular, the US forces arriving in the South West under Operation Bolero in 1942–1944 used many existing sites that British Forces had previously used. It is therefore obviously not possible to take one single “snapshot” to understand the complexities of the history of military activity. Equally, some older sites were used, sometimes with only modernisation and at other times with completely new roles.

Many Second World War studies concentrate only on the offensive and defensive operations conducted from Great Britain and tend to ignore the vital background activities that were so essential for success. These include the vast organisations that trained civilians to become effective sailors, soldiers or airmen, the logistic chains from the front lines worldwide, and the factories that supplied them.

In this respect, it must not be forgotten that the United Kingdom supplied men and materiel to support offensive operations worldwide. It also exported some goods and received the imports and US support, without which the war could not have been successfully waged and eventually won. Sustaining the civilian population and their will to fight-on was a key factor. “Defence of Britain” was therefore defence of all these crucial activities and not just our homeland.

The much used term “total war” sums up how every facet of life was affected during, and for many years after, the Second World War. It suggests vast avenues of study that might be carried out to better understand the war. The legacy of the war lies not only in the abandoned fortifications as it also affected

greatly the civilian infrastructure of the Region. While some defence works were quickly abandoned, the repair of bomb damage took years and some temporary housing is still in use some 60 years later.

With the Second World War there are still many survivors who can still relate their experiences and share their knowledge. This is important to understand fully the systems that were actually in place and how they worked in practice rather than relying on the official versions. In some cases, there are few surviving records and the knowledge of survivors is crucial; the Home Guard Auxiliaries or the British Resistance Organisation are examples of this problem. If information is to be obtained before it is too late, priority must be given to this research.

The Council of British Archaeology and English Heritage studies by Colin Dobinson, which starting in 1995 in a series titled *Twentieth Century Fortifications in England*, covers many, but certainly not all, aspects of Second World War sites. His works list examples of sites extracted from contemporary documents and give a very good guide to the types of infrastructure.

The Defence of Britain Project Handbook (Lowry 1996) also describes the main items of infrastructure to be found. This led to local surveys of infrastructure by volunteers, which have been recorded in the Defence of Britain Database. The results are variable depending on the knowledge, enthusiasm and whether local researchers could be found to carry out the work. The results have been passed on for inclusion in local HERs and no new information is being added to the national database (DOB 2002).

#### **Barracks and Camps**

Militia camps were constructed between May and September 1939 to accommodate the newly raised 35,000 strong Militia (later 50,000 strong); examples are at Norton Manor camp and Sherford Camp near Taunton. Other major camp construction programmes included the War Office works for units returned to the UK after Dunkirk (some 350,000 men from May 1940 onwards), Prisoner of War camps (from 1941 onwards, RJC Thomas 2003), camps for incoming US units under Operation Bolero (1942–1944) and for UK units moved to provide accommodation for incoming US units.

Between 1941 and 1944 camps were also constructed for the National Fire Service and Civil Defence. In preparation for D-Day, camps were built in 1943 for Phoenix workers and also as “preliminary camps” for D-Day, while in 1944, bomb damage repair workers camps were constructed to cover major D-Day sites. Camps during the Second World War also include temporary and bivouac camp sites and permanent tented camp sites, some of which were established long before the war. Some tented sites

had permanent cookhouses, latrines, straw stores and other buildings for the use by visiting troops. Many temporary hutted camps were also constructed to accommodate personnel based at requisitioned country houses.

### Wartime Housing

Hostels were constructed for ordnance factory workers from 1940 to 1945 and for the Ministry of Aircraft Production from 1941 to 1945. The Ministry of Agriculture built hostels for agricultural workers from 1941 to 1942 including special hostels for the Women's Land Army. Wartime housing includes factory worker housing and married quarters; examples of the latter are can be seen in Corsham. "Prefabs" were used to overcome the immediate post-war housing crisis and 158,748 were produced in the UK. The Ministry of Works designed 9 different types of temporary housing (Arcon, Uni-Seco, Tarran, USA, Phoenix, Spooner, Universal, and Miller) while the Ministry of Supply produced aluminium homes, some of which still survive in Bristol.

### Command and Control

This covers the armed forces and civil command structures, the headquarters sites and their associated communications facilities. It includes the "machinery of government in war" with Regional Commissioners and central government sites prepared for use if London became untenable.

The Royal Navy chain of command in the South West included Portsmouth Command and Western Approaches Command with their associated Sub commands of Portland, Dartmouth and Plymouth, and the supporting RAF 15 Group Coastal Command co-located at Plymouth. The control of convoys in the Western Approaches moved to Liverpool during the Battle of the Atlantic.

The Army chain of command within Great Britain from General Headquarters (Home Forces) in London down through Southern Command at Salisbury changed significantly during the war, in particular with the introduction of the Corps level of command during the summer of 1940 resulting in the formation of III, V and VIII Corps together with some divisional areas. The district, area, sub-district and sub-area organisations were also changed several times.

The RAF organisation in the South West included Groups from Fighter Command (10 Group), Coastal Command (15 Group) plus units from 32 Balloon Group, Maintenance and Training Commands.

From 1942 to 1945, the US Army and US Army Air Force (USAAF) were stationed in the South West. The US First Army headquarters was at Bristol with V Corps at Taunton, VII Corps at Salisbury and XIX corps at Warminster. At least 12 USAAF "AAF

Stations" (mainly ex RAF airfields) were operational in the South West. The US Navy Fleet Air Wing 7 was based at Dunkeswell with headquarters at Plymouth.

No study appears to have been made of these command structures, their locations, hierarchy and boundaries together with the communications infrastructure they used in the South West. Many requisitioned buildings were used, in particular country houses. English Heritage, however, are currently commissioning a study of 20th-century military command centres, and their associated communications, to include those used from the inter-war years onwards. This could prove to be extremely useful but the numbers of headquarters involved, the many moves of army formations and the complexity of the logistic chains may not produce sufficient details at regional level.

The "machinery of government in war" included evacuation plans for central government if London became untenable and sites selected included West Country options. The Regional Commissioner for Region 7 was based in Bristol.

### Air Defence

The Air Defence of Great Britain (ADGB) in the South West consisted of Fighter Command with 10 Group at Box with associated Sector operations centres and RAF fighter stations. Anti-aircraft gun and search-light support came from 5 (AA) Division of the army's Anti-Aircraft Command. In addition, Royal Observer Corps and RAF Balloon Command were an integral part of the defences. After the fall of France in June 1940, the fighter cover, with associated radar and Observer groups, were extended westwards through Somerset, Devon and Cornwall.

**Airfields** RAF airfields are well covered in such works as Ashworth (1982) and Countryside Books' Airfield Series (G Smith 1999; 2000; Berryman 2002; 2005; 2006). Copies of original airfield plans are available from the RAF Museum for most sites. Dobinson's (1997; 1998a) work covers the basics. Management or planning related reports have been prepared on several airfields by Paul Francis: (Exeter, Dunkeswell, Uptonery (Smeatharpe) and Culmhead (Somerset, prior to major demolition there, Francis 2001). These reports suggest that there is considerably more work to be carried out on the other (c.80) airfields in the South West. In addition, there were flying boat stations at Plymouth (Mount Batten) and Poole (Hamworthy) with their own unique infrastructures. Fleet Air Arm stations (such as Culdrose, Henstridge, St Merryn or Yeovilton) must also be included.

**Radar** Dobinson (1999b) gives a clear outline of the development, although there are some gaps, such

as Ground Controlled Intercept and Coastal Defence radars. An ongoing project studying radar in the South West by Andrew and Mike Passmore started at Exminster Radar Station in 2004. Shorter reports are planned for other sites.

**Anti-Aircraft Artillery** Anti-aircraft defences in the South West included gun-defended areas from 5 (AA) Division at Holton Heath, Brockworth, Plymouth, Bristol, Yeovil, Falmouth, and Portland. ADGB logistic installations include the ADGB magazines (such as Burnett Magazine near Keynsham) and Intermediate Ammunition Depots (such as at Dimmer in Somerset). Dobinson (1996a; 2001) explains the anti-aircraft organisation and gives a gazetteer of sites. Chris Webster is studying the unique survival of a rocket (ZAA) battery at a bombing decoy on Mendip.

**Searchlights** During the war there were at least three major redeployments of searchlights in the South West. Before the autumn of 1940, searchlight cover does not appear to have gone further west than a very approximate line from Burnham-on-Sea to Portland with an area around Plymouth. As the searchlights were deployed westwards, they were initially placed singly, later clustered in threes and, later still, deployed in “fighter boxes”. As an example, Somerset had some 58 cluster sites in 1941 and 124 sites in the 1943 “fighter box” deployment. In addition to searchlight sites, there were also Anti-Aircraft brigade, regimental and battery headquarters sites, together with training regiments. Dobinson’s (1999d) report does not give a full list of sites but includes examples from Devon and Dorset.

**Royal Observer Corps (ROC)** The Observer Corps (Royal Observer Corps from 1941) included Group headquarters at Yeovil, Bristol, Exeter, and Truro together with the associated ROC lookout posts. The basics of the Royal Observer Corps has been studied in depth. The standard work is Wood (1976), although this contains some anomalies.

**Balloon Barrages** Barrages in the South West included Plymouth, Bristol, Gloucester, Yeovil, Weston-super-Mare and Portland with Balloon Centres No 11 at Bristol (Pucklechurch) and No 13 at Plymouth. In addition, there was balloon gas production at Weston-super-Mare. John Penny has researched the Pucklechurch Centre and the associated barrages.

#### **Camouflage and Concealment, Deception and Blackout**

Dobinson (1999a; 2000) lists most, if not all decoy sites using the National Archives as his base source.

Not all of those listed have been successfully identified on the ground or surveyed. Daytime decoys were primarily built for all satellite airfields (K sites) while night-time Q sites were provided for many airfields. QL sites had lighting to divert bombers from the target before an attack and QF had fires to divert subsequent waves of bombers after an attack. Special fire (SF) or “Starfish” sites were set up to protect major towns. The site on Black Down to the south of Bristol has been studied (Schofield *et al.* 1998) and subsequently Scheduled. Special decoys were also used for D-Day sites.

Most airfields and many factories were camouflaged and no survey has been made of the schemes used and what survives; particularly in disruptive painting or deception (for example, painting factories to appear like terrace houses, as at the Westland Factory, Yeovil, Gittos and Gittos 2004a). Pillbox and gun emplacement camouflage is a wide subject and few contemporary records or pictures exist of camouflage scheme. The main information source may be older people who still remember some of the details.

#### **Intelligence sites**

**Y Service** Y Service (radio intercept) sites or RAF “Home Defence Units” provided number of “VITAL” wireless intercept stations. In particular, the RAF Y Service station at Strete in Devon played a significant role in intercepting Luftwaffe ground-air communications. A Foreign Office intercept station was sited at Shaftesbury.

#### **Radio Counter Measure sites (RCM)**

The RAF Radio Counter Measures deployed to jam or “bend” the navigation beams used by the Luftwaffe used some 23 sites in the South West. Some of these sites have been identified by name but progress is slow as the contemporary records in the National Archives are almost devoid of any grid references. The initial search for the German beams was carried out from RAF Boscombe Down.

#### **Radio Navigation Aids**

Radio navigation aids together with flying control and radio aids became increasingly important as the war progressed. Some of these were associated with individual airfields, while others were deployed to give geographical coverage. They range from visual beacons (such as Occult) or searchlights (Sandra Lights) to Standard Beam Approach or Beam Approach Beacon Systems. In addition, some bomber navigation aids like “Gee” had sites in the South West. English Heritage have identified that this subject needs further research.



### Anti-Invasion Defences

This subject is wide and covers beach defences, inland defences, stop lines and anti-tank islands/centres of resistance. The pioneering work of Henry Wills (1985) on anti-invasion defences, and in particular, pillboxes, drawing on appeals to the public and his own research work has resulted in lists of varying accuracy and completeness, dating from the 1980s and covering most of Britain. Wills, however, did not recognise the vast amounts of information available in the National Archives. The Defence of Britain Project led to large numbers of defences being identified by volunteer field workers, which are recorded in the DOB Database (DOB 2002). The results have been passed to HERs but it is not always easy to reconcile the results with information already in the HERs from other sources. Dobinson (1996b) covers the subject well and includes some infrastructure lists.

**Stop Lines** Within the South West at least 13 stop lines were planned and the majority built. The main stop line was the General Headquarters (GHQ) line with Green, Blue and Red sectors. Southern Command stop lines included the Taunton line, Salisbury West, Ringwood and Salisbury East lines, while Corps lines included the Dorchester, Blandford, Sherborne, Bodmin, Exeter and Tiverton lines. A recent combination of documentary research, by David Hunt, and fieldwork has shown that the Taunton Stop Line is one of the best-documented and preserved examples in the country. The states of knowledge of the other lines is not clear although there has been some work on the GHQ line (Alexander 1999; Green 1999).

**Anti-Tank Islands** There were some 60 anti-tank islands, some of which later became “centres of resistance”, across the South West. Some were based on the major crossing points on stop lines, while others were major route centres. The latter appear to have had fewer pillboxes and anti-tank obstacles around them when compared with stop line islands. Some town islands had a significant number of road blocks (for example, Yeovil had 23 blocks), while the defences and blocks in Taunton were significantly changed at least three times during the war. Permanent road blocks were added to the defences in other places. Somerset had some 337 permanent road blocks, in addition to Home Guard blocks, suggesting that the totals throughout the South West would have been large. There were also semi-permanent vehicle check points with some 78 in Devon, Cornwall and Somerset. No serious study appears to have been made of the anti-tank islands and their defences or roadblocks across the Region.

### Home Guard

Jeffrey Wilson (2003) has extensively studied the Somerset Home Guard. There are a considerable number of former sites in the South West including numerous road blocks, check points, defended positions, observation points, ammunition stores, headquarters and ranges, many of which are not documented and are only known to former members. Few sites survive. The Home Guard also manned flame fougasse positions and David Hunt has identified over 80 sites in Somerset. Defence of Key Points (KP) or Vulnerable Points (VP) was also undertaken by the Home Guard and although lists of these are available in the National Archives, the actual sites and their significance are not always obvious. The Home Guard were also deployed in anti-aircraft and coast artillery, including rocket anti-aircraft (ZAA) batteries, beach batteries and railway anti-aircraft defences.

### Home Guard Auxiliaries

Somerset Home Guard Auxiliaries with their operating bases (OB), stores and dumps are being researched by Tim Wray, building on the extensive work of Donald D Brown (1999). This research includes the British Resistance Organisation (BRO) covering both personnel and facilities like message drops, radio stations and control stations. As few records survive and those involved only knew their own duties, it is important to interview survivors before memories fade.

### Coast Defences

Dobinson (1996d) covers the main sites of both coast and emergency batteries with a site gazetteer. There are still many details to research including Coast Artillery radars and beach batteries but there has been some work on individual sites, for example Teignmouth (Shaldon), Brixham (Newman and Salvatore 2003), Kingswear (Wilson-North 1993) and Brean Down (Webster 2001). There is a lot of unpublished research on coast defences by the Fortress Study Group South West, Defence of Britain Project volunteers and Bill Horner of Devon County Council. The Second World War defences of Plymouth have been extensively covered by Pye and Woodward (1996). Other port defences include anti-torpedo boat batteries, beach batteries, block ships, booms, mine fields control towers and flame throwers.

### US Forces (Operation Bolero)

Operation Bolero covered the move of nearly 1.5 million United States troops into Britain between 1942 and 1944 before the Invasion of Normandy. Many of these troops moved into the South West and it was first necessary to move British units out to vacate their accommodation and facilities for the US.

Major railway improvements were made to facilitate the arrival and support of US forces. Accommodation and camps included hutted or tented camps, hospitals, facilities for billeted troops (dining, latrines and recreation) and Overlord camps. US leave centres were also provided.

Depots included General, Quartermasters (QM), QM (fuel), Ordnance Services, Ordnance Ammunition, Ordnance Vehicles, Transport Corps, Chemical Warfare, Engineer and Medical. Special sites included tunnelled headquarters, vehicle parks, post offices, special schools, parachute packing plant, salvage plants and tyre repair shops.

**US Hospitals** Apart from civilian hospitals loaned to the Americans, General Hospitals (1084 beds) and Station Hospitals (834 beds) were specially constructed together with conversions of existing camps (in many cases 1939 “Militia camps”) and tented extensions to existing hospitals. These were provided to primarily meet the needs of the US troops training or working in the UK before D-Day and, afterwards primarily for US battle casualties evacuated from Europe. The final target was 94,000 beds ready by 30 April 1944.

The impact of American forces and the infrastructure they used is a topic that requires more work. Initial research suggests that much relevant documentary information is probably only available in the USA.

### **Research and Development (R & D) Establishments**

No survey appears to have been made of R & D establishments in the South West. The Radar and Telecommunications establishment moved from Bawdsey on the east coast to Worth Matravers in Dorset but later moved to Malvern. Experimental ranges include Pawlett Hams, Chesil Beach, Birnbeck Pier (Weston-super-Mare) and Breaun Down.

### **Production and Manufacturing**

The military aircraft industry in the South West included factories at Brockworth, Filton, Yate (components) and Yeovil. “Shadow factories” for aircraft construction were built at Filton and in 1940 at Weston-super-Mare. Filton was also used to construct aircraft that had been brought from America in kit form. Underground factories include Spring Quarry at Corsham and Temple Cloud. Examples of other factories are the Royal Ordnance Factory built at Puriton, Standard Telephones (evacuated to Ilminster) or torpedo boat construction at Teignmouth but these are only a sample. No study of wartime manufacturing or production in the South West has been identified.

### **Training**

**Ranges and Training Areas** The South West has a number of major training areas including Salisbury Plain, Bovington, Lulworth and Okehampton. During the Second World War other areas were requisitioned and extensively used, including parts of Exmoor and the Devon South Hams. Artillery ranges, tank gunnery ranges, armoured vehicle driver training, field firing ranges, anti-aircraft gunnery ranges (such as Doniford or Bude) and a large number of temporary rifle ranges were used, including Home Guard ranges and training areas. Naval ranges in coastal waters are marked on some wartime “overprinted” maps. Fighting-in-built-up-area sets included the villages of Imber, Tyneham and around Slapton Sands. At least 20 bombing and air-gunnery ranges have been identified in the South West, some well inland and others on coastal sites. Examples are Chickerell, Crichel Down, Lilstock, Steart and Pawlett.

It is difficult to establish the full range of service training units and establishments across the South West. They range from major prestige establishments like the Britannia Royal Naval College Dartmouth to smaller training centres like the Infantry Training Centre in Taunton.

### **Civil Defence**

This subject does not appear to have been researched to any extent. In Dobinson (1999c) most of the information is about shelter policy and design, and no infrastructure lists are included. The implementation of such policy was at local level. A survey by Colin Lacey in Southampton reported a significant survival rate for exterior domestic shelters. The following topics indicate the scope of this subject: Civil Defence controls, warden posts, shelters (public, works, private, domestic and military), Air Raid Precautions (ARP) rescue (bases, training facilities), gas and decontamination, emergency feeding and British Restaurants. Most information is likely to be in local sources and a quick search in the Somerset Record Office indicates that the records are likely to be extensive.

**Fire Service** The fire services in war include from 1937 onwards the Auxiliary Fire Service (AFS) and the National Fire Service (NFS) from 1941, when all local authority fire brigades were taken over. The NFS was disbanded and local authorities regained control in 1948. The NFS organisation from Region level consisted of Fire Forces, typically split into Divisions of 100 pumps, Columns of 50 pumps, Companies of 10 pumps and Sections of 5 pumps. The organisation changed during the war but the South West was covered at various times by Fire Forces 16, 17, 18, 19 and 39. The NFS organisation used

existing fire stations together with new accommodation; particularly for headquarters, maintenance, training and supply facilities. In addition, regional reserve camps, and patrol bases were set up at various times. NFS observation posts, together with firewatcher/fireguard posts were also used in major urban areas. Water supply includes special tanks, basins, dams on streams and rivers, static water tanks, flooded cellars and steel surface water mains. On rivers borehole pumps, moored pontoons with pumps, sunken barges (on tidal rivers) and pump access routes including draw docks were used. There is little evidence of any research into the AFS and NFS and its infrastructure. Moreover most of the pre-war fire stations have been superseded by more modern buildings, particularly in rural areas and smaller towns. Military depots, airfields and some camps had their own fire stations and "passive air defence" (PAD) water tanks.

### **Government Storage**

Considerable government storage was needed in the Second World War ranging from coal dumps (for example at Hewish, Somerset, on the Southern Railway), to stores for the Ministry of Supply, the Stationery Office and the Ministry of Works. The Ministry of Food storage included meat cold storage, grain silos and food "buffer depots". Near major ports "inland sorting depots" for imports were established to provide a quicker unloading and turn-round of ships. Safe repositories for national treasures included Shepton Mallet Prison and Montacute House.

### **Preparations for D-Day**

**Operation Overlord Preparatory Sites** Some aspects of the subject have been studied by Dobinson (1996c) but he covers a very restricted range of sites. The scope of this subject is, in contrast, wide and includes "Mulberry" harbour construction sites, "Phoenix" block-ship building sites, maintenance and repair areas for landing craft, embarkation sites, hards, dolphins, reserve landing craft storage, fuel pipelines and fuelling facilities, hard masters' offices, roads, bridges and embarkation camps.

Other D-Day associated sites include decoys, bomb-damage repair-workers camps, and camps for National Fire Service redeployment to cover Overlord. Advanced landing grounds were brought into use to allow aircraft to fly the minimum distances from the South West to support the Normandy landings.

Training for D-Day included such areas as Slapton Sands, Woolacombe Amphibious Training Area with concrete mock-up landing craft or simulated German defences of the Atlantic Wall. There has been a lot of unpublished work by Richard Bass, Bill Horner, Defence of Britain Project volunteers and English

Heritage (MPP) on the US Assault Training Centre at Woolacombe, embarkation facilities in South Devon estuaries and other D-day preparations such as hospitals and depots. These include Paul Francis's 1997 report for the planning authority on the US Naval Amphibious Supply Base at Exeter. British training camps have also been studied at Woodbury Common (by a local group), Appledore/Northam/Instow (by Appledore Maritime Museum) and Dartmoor Ranges (by English Heritage).

**D-Day Logistics** The logistic systems to support both the American and British landings included depots, dumps and other installations. The use of coastal shipping for cross channel transportation and road and railway transport within the UK needs further study to give a full overview.

**Medical** The expansion of the medical systems to cope with battle casualties post D-Day includes the provision of additional hospitals. These included requisitioned hospitals, hutted hospitals, Militia camp conversions, convertible/dual-purpose huts and tented expansions. Ambulance trains, stabled at key railway junctions, supported the air and sea evacuation routes, while airfields were supported by road transport. Some had on-site tented hospitals (such as Merryfield in Somerset).

### **Armed Forces Logistics**

The logistic infrastructure and organisations of the armed forces during the Second World War does not appear to have been studied in depth. Logistics were critical for the success of all operations. The infrastructure was extensive with storage depots, parks and dumps for rations (supplies), petroleum, ammunition, vehicles, stores, engineer stores, salvage, returned stores and medical stores, workshops maintenance and repair facilities, bakeries, laundries together with remount depots and veterinary hospitals. Little is recorded about Royal Navy logistics.

RAF logistics was based on Maintenance Units (MU) (an example of which was 67 MU in Taunton, which was responsible for the recovery of crashed aircraft throughout the South West). RAF storage included "satellite landing grounds" for aircraft storage (5 are listed in the South West) and ammunition depots (forward, advanced parks and reserve depots).

Underground storage facilities included Chilmark (RAF), Corsham and Monkton Farleigh (Army) and Copenacre, Monks Park and Beer (Royal Navy).

### **Personnel Services Facilities**

These include recruiting facilities, basic training, holding/drafting units, training establishments, rehabilitation units and military prisons. Welfare facili-

ties included clubs, the Navy, Army and Air Force Institutes (NAAFI), chapels, cinemas and voluntary organisations like Church Army, Young Men's Christian Association (YMCA), Young Women's Christian Association (YWCA) and Toc H.

### Medical and Hospitals

The infrastructure programmes for hospitals and medical facilities covered the Emergency (Civilian) Hospital Programme (1939 to 1943) and the US hospitals described above (page 258). In addition, British armed forces provided their own military hospitals and medical reception stations (MRS). These were supported by blood banks and medical stores depots. Veterinary hospitals were also required.

### Inland Transport – Railways

Railway wartime Air Raid Precaution measures included black-out sheds, blast protection, shelters, protected accommodation, decontamination and water supply. From 1943 onwards, Home Guard Light Anti-Aircraft guns protected key railway facilities (such as Taunton, Exeter, Axminster and Templecombe).

At least 15 major government funded infrastructure schemes for improving rail transport in the South West were funded during the Second World War, primarily on the Great Western Railway (GWR). These included passing loops, sidings, marshalling yards, rail access to military sites and loading facilities. In addition, "capacity measures" such as "interconnects" to allow alternate routing between railway companies (for example, an interconnect was built between the GWR and the Southern Railway (SR) at St Budeaux Junction in 1941 allowing GWR and SR trains to use each other's routes between Plymouth and Exeter) or the quadrupling of lines between Gloucester and Cheltenham for the GWR and London, Midland and Scottish (LMS).

Additional works for Operation Bolero (the arrival of US Forces in the South West) and D-Day included further capacity interconnects (such as between the GWR and SR at Launceston, Lydford and Yeovil in 1943), additional passing loops to increase line capacities including, in 1943, nine places on the GWR between Bristol and Plymouth, and additional sidings.

### Countryside at War

English Heritage (Schofield 2004) suggests this as a subject for research including activities by the Ministry of Agriculture such as land drainage schemes, reclamation of moorland and hill fields, and forestry. No studies have been identified that cover this aspect in the South West.

### Submerged archaeology and aircraft crash sites

Underwater archaeology is active in the South West and some aircraft crash sites have been listed.

### Combat Art

English Heritage guidelines outline this new subject (English Heritage 2004). Significant Second World War examples survive in the Corsham underground aircraft factory but the overall distribution and survival is poorly known.

### Commemoration

This includes wartime cemeteries and memorials to commemorate the use of sites by units or establishments, exceptionally noteworthy achievements of individuals or the loss of life in major accidents or operational deaths. These include military, enemy, allied and civilian war cemeteries. An example of the latter is at Bath where 400 civilians were buried after the initial "Baedeker" raids on the city from 25–26 April 1942. To date 392 war memorials have been identified in Somerset from the United Kingdom National Inventory of War Memorials. Examples of other monuments and statues include the 43 Wessex Division memorials at Wynards Gap and Mere.

### Conclusions

The topic of the Second World War in the South West is enormous as "total war" affected all facets of life. Much of the research appears to have been carried out on a local or county basis or to have been part of national initiatives. There is little evidence of regional studies but Cornwall is probably the main exception.

There are some major topics in the South West concerning the Battle of the Atlantic or the US Contributions to D-Day, where full regional studies would be invaluable. Equally, there are areas where most of the records are local and research can be carried out effectively on that basis. Such studies may offer opportunities to students or amateur researchers.

The importance of collecting information from veterans before their memories fade or they pass away is important and, in some areas, personal knowledge may be the only information available.

Many of the "unfashionable" areas of war like logistics deserve study; although these are complicated.

Lastly, Second World War studies should not be confined to the period of hostilities between September 1939 and August 1945. Much significant work was carried out in the period of re-armament from 1933 onwards (for example, the RAF Expansion Scheme) while the challenges of repairing the damage, demobilising the Armed Forces and returning the country from a state of war took many years.



### 14.12.5 1946–1989

The period after the Second World War was dominated by the Cold War but there were many other major military activities including the enforcement of the terms of surrender on Germany and Japan, occupation duties in Germany, the maintenance of security within the diminishing Empire and the re-establishment of British influence in the world, particularly in the Middle East. These include major wars like the Korean War (1950–53) or internal security operations like Kenya, Cyprus, Aden, Malaya, the Suez Crisis in 1956 and Borneo, often against the threat of Communism. The Defence Review of 1957 initiated a difficult period of major transition with its requirement for a rapid deployment force with modern weapons and equipment. There was also the increasing threat of terrorism and the deployment of forces in an internal security role in Northern Ireland, particularly from the late 1960s onwards.

The period includes the run down of the wartime armed forces and civil defence, and disposal of land, infrastructure and materiel. This has resulted in camps, depots, dumps, ranges, airfields and training areas vanishing from the landscape. No studies appear to have been undertaken to establish the extent and purpose of this lost infrastructure or any memories of those who worked or served there.

All these post-war activities now cover a span of almost half a century and may be divided into:

- Cold War defences and precautions of the United Kingdom both national and through the NATO Alliance
- UK contributions to NATO, primarily in the NATO Central Region in Germany
- UK national military activities in both the UK and worldwide, including aid to the civil power (for example, disaster relief or during strikes) or on humanitarian missions worldwide

The policy of defence through deterrence implied bluff and deception and well-publicised plans may suggest capabilities that in reality existed only in limited forms. The political use of “spin” should not be underestimated and it is therefore important to capture the views and experiences of those actually involved in Cold War activities to ensure that a balanced view can be recorded for future generations. The attitudes, beliefs and fears of the ordinary civilian are also definitely worth recording.

This report gives some limited examples of the scope of all these activities in the UK with particular reference to the Cold War and the South West; it cannot be comprehensive and relies on personal knowledge backed by limited research.

### Previous Studies

Much information about the Cold War infrastructure and planning still remains to be uncovered. The “30-year rule” for the release of public documents means that documents are not available for the latter half of the 60 years since the end of the Second World War. Many of those with personal experience or knowledge may feel unable to contribute due to their life-long obligations under the Official Secrets Act. Moreover, much was kept on a “need to know” basis and there are few, if any, who enjoyed the complete, detailed picture. Researchers may therefore be unaware of major areas worthy of investigation. However, there is much conjecture and guesswork, not to mention expanding rumours from enthusiastic amateurs, in particular on some of the websites devoted to the topic.

There is no obvious evidence that the Cold War in the South West has been researched in depth although a number of installations have been identified and recorded. The earliest sources appear to be two books: *Beneath the City Streets* (Laurie 1979) and *War Plan UK* (Campbell 1982), both of which were believed at the time to be the work of “moles”. Some consider that Campbell got a surprising number of things right but certainly not in every case and there are said to be many omissions and misunderstandings!

Two carefully researched books by McCamley (2000; 2002) cover radar stations, the Central Government War Room at Corsham, Regional Government Headquarters (RGHQ) together with many local authority “bunkers”. His lists, however, are incomplete. *Subterranea Britannica* has investigated a number of sites, concentrating on underground bunkers (see <http://www.subbrit.org.uk>).

The recent English Heritage book *The Cold War* (Cocroft and Thomas 2003) is an authoritative study of many, but not all, aspects of the Cold War. The “30-year-rule” limited the authors’ access to public documents from the later years of the period, although access to abandoned sites (for example Cruise Missile facilities) enabled them to partially overcome this limitation. Activities like Military Home Defence (MHD), the formations assigned to MHD, their war headquarters and associated communications were not included in the scope of the book. The Ministry of Defence Joint Operation Centre, the national Northwood facility and the major NATO headquarters in the UK (CINCCCHAN and UKAIR) are also omitted (none of these were in the South West). Royal Navy, Army or RAF fixed and strategic communications and the Defence Communications Network or earlier defence systems are also not covered.

The *Defence of Britain Project Handbook* (Lowry 1996) describes the basic infrastructures of the period. The DOB database lists the sites identified

by local enthusiasts in the early 1990s including those categorised as “Cold War” but the list is primarily of Royal Observer Corps (ROC) sites with a few radars; the database is no longer being updated DOB (2002). An authoritative book describing the Royal Observer Corps systems is *Attack Warning Red* (Wood 1976).

Documentary research on the Cold War by Colin Dobinson in the National Archives (Dobinson 1998b) concentrated on just four topics: 1950s “Rotor” programme radar sites, Bloodhound surface-to-air missiles, Thor missiles, and ROC warning and monitoring posts. Neither Bloodhound nor Thor was deployed in the South West.

English Heritage has issued discussion document *Modern Military Matters* (Schofield 2004) aimed to give a clear and coherent statement of the state of knowledge, with future research priorities relating to 20th-century military remains in Britain. This identifies a number of specific areas for research and lists objectives for improving the understanding of the built and surviving resource, including the period since the end of the Second World War.

English Heritage are currently commissioning a study of 20th-century military command centres and their associated communications in England including those used in this period. This could prove to be extremely useful but the Official Secrets Act may restrict the scope of this study, particularly where facilities are still in active operational use.

### **The NATO Alliance in the UK**

**UK Independent Deterrent** The UK maintained, and continues to maintain, an independent nuclear deterrent, which included the Polaris submarines and, from 1955 to 1982, the V-Bomber Force. Although independent, these forces could also be included in the UK contribution to NATO. Associated infrastructure identified in the South West includes V Force dispersals at St Mawgan, Yeovilton, Boscombe Down, Lyneham, Tarrant Rushton and Kemble. “Gee-H” bomber navigation transmitters were operated from a South West Chain Master Station at RAF Sharpitor (Dartmoor) with secondary stations at Sennen and Worth Matravers. Submarine maintenance facilities were built at Devonport in 1980, which included nuclear submarines.

**NATO Infrastructure** Funding for NATO infrastructure for both UK and US assigned forces produced some facilities in the UK. These include NATO war headquarters for NATO Major Subordinate Command-Channel (CINCCCHAN) at Northwood (Middlesex, alongside but separate from the headquarters of Commander in Chief Fleet) and Principal Subordinate Command UKAIR (High Wycombe, Buckinghamshire) collocated but separate from the

headquarters of the Air Officer Commanding in Chief of RAF Strike Command. Significant parts of the sea and air defences of the UK were therefore integrated into the NATO system.

Other NATO Funded Infrastructure includes Cruise Missile bases (GLCM) reinforcement facilities, ammunition storage, port facilities, control and reporting centres, UK Air Defence Ground Environment (radar) (for example at RAF Portreath), communications, fuel facilities including pipelines, forward ammunition storage facilities, airfield survival measures (ASM), training facilities and ranges. Very few of these NATO funded infrastructure facilities were built in the South West but no systematic review of any possible NATO infrastructure in the region appears to have been undertaken.

**UK Contribution to NATO** There are a number of UK sites, which were primarily concerned with the UK’s contribution to NATO but were not NATO funded. These include the UK Air Defences including the RAF Rotor and Chain Home sites, such as the Chain Home Extra Low (CHEL) site at West Myne, Minehead (ongoing study by Chris Webster) and GCI radar at Charney Down. During the Cold War, up to 12 radar stations of varying types are listed in the South West. Training for some NATO navies was carried out at Portland. The Naval headquarters at Mount Wise Plymouth, which reused Second World War tunnels, is understood to have had a role in the NATO Channel Command; it has recently been decommissioned.

**US Facilities in the UK** There were relatively few US facilities in the South West. US sites include the US Forces Hospital at Little Rissington airfield, RAF Fairford (used for in-flight refuelling tankers) and the GCHQ/US site at Morwenstow. The USAF also used RAE Boscombe Down as a reserve base during the 1980s where NATO Airfield Survival Measures (ASM) hardened structures were constructed. Some US installations and facilities in the UK may not be associated with NATO and may be provided through bilateral UK-US agreements.

**Intelligence Sites** Intelligence was particularly critical throughout the Cold War and key sites in the South West include GCHQ (which moved to Cheltenham in 1952 on the site of a former US hospital – the original buildings have now been demolished.), the associated Composite Signals Organisation Station at Culmhead (which closed in February 1999) or the GCHQ/US site listed at Morwenstow. The Official Secrets Act is likely to hinder detailed research and other sites may have existed.

**Support for the UK NATO Assigned Forces on the Central Front** These forces were primarily 1st (British) Corps in Northern Army Group and RAF Germany units for 2nd Allied Tactical Air Force (2ATAF). The equipping and logistic support of NATO assigned forces remained a national responsibility. To support these assigned forces, the British Rear Combat Zone in Germany and British Lines of Communication from the channel ports to Germany, required major reinforcement from Regular and Territorial Army (TA) units; together with RAF and RAFVR units from the UK, including the South West. Associated operations included the possible evacuation of service families from the Continent in times of increased tension to sites across the UK including in the South West.

**Logistics** Significant quantities of war materiel needed to be out-loaded from depots in the UK to Germany. Typical installations in the South West include the Central Vehicle Depots at Ashchurch (wheeled vehicles) and Ludgershall (armoured fighting vehicles), (now BVD Ludgershall), the Petroleum Reserve Depot West Moors, Dorset, or 3 Supply Reserve Depot near Taunton. There would also have been a need to re-supply the forces in combat and for battle casualties to have been evacuated to the UK. However UK installations served not only NATO assigned forces but also other UK forces deployed in the UK on Home Defence and also UK forces deployed worldwide. An example is the Admiralty Hydrographic Office at Taunton (whose collection of maritime surveys is an outstandingly important archaeological research resource for the Post-Medieval and Modern periods).

**Training** The units assigned to supporting UK forces on the Central Front required training in the UK including use of the Dartmoor and Larkhill range complexes, Lulworth Tank Gunnery Range or the special "Fighting in Built-up Areas" (FIBUA) facilities at Copehill Down, Wilts. Other training facilities included air gunnery and bombing ranges (such as at Lillstock and Steart) or anti-aircraft ranges (Doniford from 1925), all on the north Somerset coast. The large number of TA units required to support British Forces in Germany and the Lines of Communications in a period of tension and in war all needed a number of local TA Centres, pre-stocked unit equipment (PUE) stores, Weekend Training Centres (such as Cribbs Causeway, Bristol), rifle ranges (for example, Yoxter on Mendip) and training areas in the UK. Dr Mike Osborne is carrying out a national study of TA Centres and Drill Halls which will cover this period.

**National Service** An important feature of this period was National Service. The 1948 National Service Act, effective from 1 January 1949, fixed the period of National Service to eighteen months with 4 years in the reserves. In 1950, the Korean War led to an increase in the period of service to two years, with three and a half years in the reserves. The "call-up" finally ended on 31 December 1960 and the last National Servicemen left the Army in May 1963. The training organisations for National Servicemen (such as recruit training centres, War Office Selection Board sites (WOSB), Officer Cadet Training Units or OCTU), the barracks and camps they occupied and the welfare facilities that were provided (for example, NAAFI, Toc H, Salvation Army, Church Army, YMCA, YWCA, Malcolm clubs etc) have not been specifically recorded. Neither have the Navy, Army and Air Force recruiting offices, through which volunteers joined the services. The Regular Commissions Board at Leyton House, Westbury assessed all potential regular Army officers.

**Cadets** The inevitability of National Service for most of the youth of the nation led to a growth in the volunteer cadet organisations like the Sea Cadet Corps, Army Cadet Force, Air Training Corps, Junior Training Corps, the Combined Cadet Force, the Senior Training Corps, University Officer Training Corps and the University Air Squadrons. There is unique infrastructure associated with these cadet forces and university training units, and examples include training huts, miniature rifle ranges, small aircraft hangars and gliding centres. Some will be found in schools or universities (such as Bristol), others in public areas or associated with TA Centres.

**Training Establishments** Armed forces training establishments with specific Cold War roles in the South West included the Defence Nuclear Biological and Chemical Defence School at Winterborne Gunner or the Joint Service School of Languages (JSSL) at Bodmin for Russian courses. Other military training establishments include the Britannia Royal Naval College Dartmouth, RAF Radio School Locking, Defence ADP Training Centre Blandford Camp, RAF Central Flying School Little Rissington, RNAS Yeovilton, Royal School of Artillery at Larkhill, School of Infantry at Warminster, School of Signals at Blandford Camp, Royal Armoured Corps Training Centre Bovington and the Lulworth Tank Gunnery Ranges. The services also ran junior training organisations like the Army Junior Leaders Regiments (Denbury in Devon and Norton Manor camp in Somerset) or the RAF Apprentices School at Locking. No comprehensive study of services post-war training facilities in the South West has been undertaken.

### **UK Home Defence (UKHD)**

The Cold War also required both Civil Defence and Military Home Defence (MHD) to protect the UK and the population. These activities were a national responsibility and not part of the NATO commitment.

The role of the reserve forces, and in particular the TA, included both units committed to the NATO role and others specifically for Home Defence, including Civil Defence roles. From 1955 to 1959 the Mobile Defence Corps was formed from Army reservists trained in Civil Defence skills, particularly light rescue. In the early 1960s, Territorial Divisions assigned to NATO in Germany were re-rolled into Civil Defence. Army District headquarters became Divisional Districts and took on an additional Civil Defence role. The HQ of Southwest District and 43 (Wessex) Division in Sherford Camp Taunton and, later, Bulford was responsible for Region 7. This included manning some communications for regional government headquarters, light rescue, maintenance of law and order, support in evacuation from fall-out, ambulance transport, field engineering, damage repair and reconnaissance. Some RAF units were also included (for example University Air Squadrons were assigned to post-strike reconnaissance and radioactivity survey).

**Defence of Vulnerable Points (VP)** A key part of MHD was the defence of VPs against terrorist or Special Forces (such as Soviet *Spetsnaz*) threats. Some defences (such as “Yarnold Sangers”: circular pillbox-like structures made of concrete pipe sections, seen for example at RAF St Mawgan) may have been built to protect VPs. The threat posed by Irish terrorism and the deployment of substantial forces into the Province in an internal security role warrants a mention. Special urban training facilities were provided for units assigned to this role. Many defences and security measures at military establishments may originate from the threat of Irish terrorism, particularly in the late 1980s, rather than the Cold War. The revival of the Home Guard between 1952 and 1957 is unlikely to have left any associated infrastructure or defences.

**Coast and Anti-Aircraft Artillery** In the early stages of the Cold War, the UK was still protected under national (not NATO) forces by Army coast and anti-aircraft artillery. These were disbanded in 1955–56. Although RAF Bloodhound surface-to-air missiles were deployed to replace anti-aircraft guns, none were considered necessary to protect facilities in the South West. Colin Dobinson’s English Heritage report (Dobinson 1996d) and book (Dobinson 2001) give an excellent background and identifies the key sites. These include:

- Anti-aircraft defences (pre- the 1955 disbandment). Bristol: Lansdown, Plymouth: Crownhill, Portland: Ridgeway Hill and Cheltenham: Ullenwood, and in Cornwall at Carkeel and St Winnolls.
- Coastal Artillery (pre-1956) at Plymouth and Portland

### **Civil Defence (CD)**

The Home Office provided central training facilities like the Fire Service College and School (Moreton-in-Marsh) and the CD School (Eastwood Park, Gloucestershire). It also provided equipment and training sets for rescue including the Mobile Defence Corps and the Auxiliary Fire Service (AFS). Home Office Reserve Stores Depots were also set up. After the return of fire fighting responsibilities from the National Fire Service to local authorities in 1948, many pre-war, wartime and even post-war fire stations have been replaced. At local authority level, training facilities (including rescue-training sets, such as Exeter City Council’s at Alfigton) may have been provided, and buildings earmarked for warden’s posts and emergency feeding facilities (often school-meal service kitchens) identified. Civil Defence and Fire at local authority level has not been studied in depth but records are likely to be available in local Records Offices.

### **Machinery of Government in War (MGW)**

There were several major changes in the government war regional structure over the period. Government installations include the unique Central Government War Room at Hawthorne-Corsham. This facility deserves in-depth study both of the infrastructure and the associated communications and support facilities. The Regional Government Headquarters (RGHQ) was established at various times in Bristol, Exeter and at Hope Cove (Devon). The former Anti-Aircraft Operations Room at Ullenwood, near Birdlip, was selected as one of the Sub-Regional Controls for Region 7 and later became RGHQ 7.2. The site closed in the late 1980s and was replaced by a purpose-built bunker at Chilmark in Wiltshire. The changing MGW plans through the Cold War in the South West need further study and site visits.

### **Armed Forces War Headquarters (AFWHQ)**

Sites for AFWHQs for each military district were planned and many cases equipped while County Military Headquarters were set up primarily in existing service establishments, such as RAF Locking (covering the former County of Somerset). This aspect of the Cold War has not been studied, although there has been some survey work at Locking.



**Local Authorities** In addition, local authority war headquarters (or controls) and their alternative sites were planned and, in many cases protective accommodation constructed, for example, Somerset County Council beneath County Hall, with Taunton Deane Borough Council in their own protected accommodation nearby. In Plymouth, the city council built an emergency command centre in the gatehouse of Fort Austin, a 19th century fort on the fringe of the city. In Cornwall, the County Council had an emergency bunker and others were provided for the District Councils of Penwith, Kerrier and North Cornwall. Other authorities initially re-used their Second World War facilities; in 1960–61 Exeter used their former control in St Germans Road.

*Subterranea Britannica* has carried out some work but this is more concerned with the infrastructure and not the rationale behind it or the *modus operandi* of government in war. The subject is covered by McCamley (2002) and also by Cocroft and Thomas (2003) but no source covers all the changes nor has any comprehensive study been carried out, particularly of the earlier headquarters or MHD sites, their locations and current status.

**Warning and Reporting** The Royal Observer Corps has been well studied and facilities like ROC Group Headquarters (Yeovil, Bristol, Exeter, Truro), ROC Posts (both Orlit and underground posts) are well-documented. The UK Warning and Monitoring Organisation at Corsham/Box and its Sector Operations Centres are not so well known. Neither are the locations of individual sirens nor the carrier receiver points recorded.

**Population Survival in War** This covers central government funded facilities like grain silos, cold stores (such as at Wells), buffer depots, bore holes for water supply, emergency docking facilities at small ports, fuel storage and civilian pipelines. While Cocroft and Thomas (2003) explain some of the principles, there is no list of the facilities provided in the South West Region. The Cold War measures undertaken by the gas, water, electricity and sewage utilities are also not documented. An example is the partially constructed hardened control bunker for Bristol Water at Stoke Bottom. Little is known of measures that may have included water bore holes, alternative supply routes or stand-by power systems. Plans for the emergency feeding and accommodation (including the earmarking of disused service camps) or emergency hospitals are not obvious. The subject is massive and needs extensive documentary research, both locally and in the National Archives.

## Cold War Communications

**Communications in War** Communications were vital in the Cold War. In a period of tension, the Government needed to consult with international allies worldwide and particularly alliance partners. Broadcasting overseas (for example from the Rampisham, Dorset, transmitters) and monitoring of foreign broadcasting was another key activity. If hostilities commenced, secure survivable communications were vital for controlling the NATO response and coordinating with allies within NATO. At the same time, communications were still needed to British forces around the world. Were Britain to have been attacked with nuclear weapons, communications to warn the population would be paramount. After an attack, survivable communications would have been vital to assess the damage and to coordinate the post-strike survival. These would include international communications. Emergency broadcasting to the surviving population was essential, particularly if other communications failed.

**Defence Communications** A Defence Telegraph Network or DTN “Southwest Switch” established in the Second World War remained in use underground at Box (Corsham) and an Army Telegraph “Tape Relay Centre” was sited in protected accommodation near Boddington in Gloucestershire. This relayed traffic within the worldwide “Commonwealth Army Communications Network” (COMCAN) and to sites within the UK. Later, the Controller of the Defence Communications Network (DCN) was located underground at RAF Rudlow Manor near Corsham. A DCN Satellite ground terminal was sited nearby at Colerne. In the 1980s HQ 2 Signal Brigade, which was responsible for Army national communications across the UK, moved to Corsham. Single service networks including a UK-wide Army fixed VHF Home Defence radio system.

**GPO and BT Communications** Significant Government investment was made in increasing the resilience of the GPO, and later BT, networks across the UK. Key GPO/BT repeater stations were hardened and some placed underground. The incidence of these in the South West requires investigation. The Emergency Manual Switching System to provide a limited alternative to the public trunk network was provided in semi-protected accommodation at certain GPO/BT Group Switching Centres. The subject is vast but BT has excellent archives.

**Microwave Systems** The introduction of civilian “line of sight” radio systems in the late 1950s provided alternative and cheaper circuits for the trunk network, together with TV broadcast circuits and military links.

In this respect, microwave systems offered a survivable and high capacity alternative to the Post Office underground cable system. A spur from the Government "Backbone Radio System" ran from the Bristol Purdown tower via East Harptree and Heath Poulton Cross in Somerset to Whitstones and Halwell in Devon then onwards to Plymouth and Cornwall. The distinctive squat lattice masts and associated buildings are still in use. Spurs connected TV transmitters to the network.

**Home Office Emergency Communications Network (ECN)** After the Second World War, the Home Office provided shared "Police and Fire Wireless Schemes" with the remote unmanned hilltop "main station" sites linked by line and often wireless to "main controls" in police and fire stations, with "mobile outstations" installed in emergency service vehicles. This Home Office owned infrastructure was used during the Cold War for the Home Office Emergency Communications Network (ECN) and also for radio links from some ROC posts to their associated Group Headquarters (such as Yeovil). Some work on this subject appears to have been carried out by Subterranea Britannica but on a site-by-site basis.

**BBC Broadcasting** Survival measures were provided for BBC transmitters and studios. These included the BBC controls (such as Wotton-under-Edge), hardened transmitters and VHF relay stations serving major towns (for example, Taunton). Further study is needed.

#### **Defence Research and Development Industries**

The demands of the NATO role in the Central Region in Germany required the UK to develop tanks, guns and other major equipments specially to counter the Soviet threat in that theatre. This had repercussions on infrastructure (larger tank hangars to take bigger tanks) and ranges, where more powerful weapons required significantly increased safety zones (such as at Lulworth Tank Gunnery Ranges). Important sites in the South West associated with the Cold War include the Chemical Defence Establishment (CDE) Porton Down with outstation at Nancekuke, Cornwall and the Microbiological Research Establishment (MRE) at Porton Down. Both these establishments, together with the Defence NBC School at Winterborne Gunner, were very much involved in countering the massive threats of Soviet nuclear/biological/chemical (NBC) weapons.

Other Research and Development sites in the South West included:

- Admiralty Torpedo Development Unit ATDU (Helston)

- Aircraft and Armament Experimental Establishment (A&AEE, Boscombe Down)
- Royal Aircraft Establishment guided weapons testing range at Larkhill
- Military Engineering Experimental Establishment (MEXE) (later became part of the Military Vehicles Engineering Establishment, MVEE) at Christchurch
- Proof and Experimental Establishment (P&EE at West Lavington)
- Royal Radar Establishment trials of over-the-horizon radar at RAF Downberry in Cornwall
- Royal Navy Gunnery Establishment at Portland
- Torpedo testing stations at St Martins (Scilly) and Porth Kerris – Nare Point
- Wild Goose swing-wing aircraft experiments at Predannack Airfield

#### **Defence Communications and Electronics Industries**

Cocroft and Thomas (2003) note a marked concentration of defence communications and electronics industry in the Bristol region. The aircraft industry in the South West may also be worthy of study. These subjects do not appear to have been investigated.

#### **Other aspects of armed forces' activities**

##### **Military Aid to Civil Power and Humanitarian Missions**

These include such activities as support after the oil pollution following the wreck of the Torrey Canyon, flood relief, fire cover during firemen's strikes, running temporary prisons (such as Rolleston Camp in Wiltshire) and disposal of carcasses after foot and mouth disease. Some of these activities may have left some infrastructure or traces in the countryside. The important role of RAF Lyneham as the mounting base for many overseas missions and the supporting camps and infrastructure for mounting and recovering overseas operations deserves a mention.

English Heritage's *Modern Military Matters* (Schofield 2004) has identified the topics of the "Peace Movement in the Cold War", "Cold War Combat Art" and "Commemoration". These are outlined in the following paragraphs.

**The Peace Movements** To give the Cold War relevance in considering social inclusion and cultural diversity, English Heritage are assessing the material remains of the peace movement (Schofield and Anderton 2000). No work appears to have been undertaken in the South West to study this and other associated aspects (such as local authorities declaring "nuclear free zones").

**Combat Art** The English Heritage guidelines on *Military Wall Art: Guidelines on its Significance, Conservation and Management* (2004) outline this new subject but no Cold War examples are known in the South West.

**Commemoration** This subject includes cemeteries and memorials to commemorate the use of sites by units or establishments, exceptionally noteworthy achievements of individuals or the loss of life in major accidents or operational deaths. No commemorative sites relating to the post-war period appear to have been identified in the South West.

### **Conclusions**

Over the past half century, there has been an enormous change in the facilities and infrastructure used by British armed forces and also for civil defence and emergency planning in the South West. Some areas have been well researched, particularly on a national level. There are many other areas, outlined above, that are worthy of study, both nationally and locally. Although many of the national and NATO facilities used in the Cold War were not in the South West, the region played an important role in the support of both UK military operations worldwide and the NATO assigned forces in Germany. This deserves recording for posterity.

### **Acknowledgements**

The original structure of the project envisaged two groups, one looking at the Post-Medieval period and the other looking at the Industrial and Modern periods. Very early on, the groups decided to amalgamate as no clear chronological boundary could be defined. We are grateful to many other colleagues who commented at the seminars and since.