

# Industrial Archaeology in Devon

WALTER MINCHINTON



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Cover: **Royal Albert Bridge, Saltash** — Brunel's famous railway bridge across the Tamar under construction in 1858

# Industrial Archaeology in Devon

## INTRODUCTION

When this booklet was first published in 1968 it was appropriate to argue that Devon's industrial heritage was largely unknown or forgotten. Now the growth of interest in industrial archaeology — the discovery, recording and preservation of the physical remains of past industrial activities and obsolete technology — makes it superfluous to state this case. Devon is clearly a county rich in surviving monuments of its industrial development.

On the face of Devon can be seen the evidence of the changing ways in which men and women have earned a living in the county: in mining and cloth manufacture, in papermaking and cider production, in fishery and trade, in engineering and quarrying, in pottery and brewing. Visible too are the survivals of the power resources they used and the transport facilities necessary for their operation.

Moreover it is important to remember that behind the physical remains were the activities of men and women, many humble, some distinguished. In particular some of the men prominent in England's industrialisation lived or worked in Devon. The county can be proud of the steam engine pioneer, Thomas Newcomen of Dartmouth, and of the work of the engineers, James Green and John Rennie. It can be proud too that the great engineer, Isambard Kingdom Brunel, carried out some of his most exciting engineering works in Devon, notably the South Devon atmospheric railway and the Saltash Bridge, which was his dying achievement.

This booklet gives a brief glimpse of the county's richness in industrial archaeology. To the five categories used by industrial archaeologists, water and steam power, transport (road, rail and canals), raw materials, manufacturers and housing, has been added a sixth concerned with trade and the ports. Sites have been arranged under these heads but, in addition, two areas have been selected — Dartmoor and the Tamar valley — where there are particularly rich concentrations of industrial remains which the visitor might wish to explore.

Each section starts with a brief summary of the general theme; and this is followed by a list and description of some of the places which can be seen or visited. Each of these places has a number and its rough position is shown by that number on the centre-page map or on the small maps on other pages. For each place, a grid reference is given in the generally recognised form (two initial letters and six figures) which is fully explained on the 1:50,000 Ordnance Survey maps. Greater detail may be found on the 2½-inch, 6-inch and 25-inch Ordnance Survey maps. The 1:50,000 maps sheets covering Devon are sheets 180 (Barnstaple and Ilfracombe), 181 (Minehead and Brendon Hills), 190 (Bude and Clovelly), 191 (Okehampton and North Dartmoor), 192 (Exeter and Sidmouth), 193 (Taunton and Lyme Regis), 201 (Plymouth and Launceston) and 202 (Torbay and South Dartmoor). See also the 1-inch Exmoor and Dartmoor Tourist editions.

Most of the sites described in this booklet are on private property. Although many of them can be viewed from public areas, access to them is by courtesy of the owners. Visitors are requested to make prior arrangements and on no account to regard access as automatically forthcoming. Although some firms welcome individual visitors and even parties, others do not, and often for reasons of safety cannot permit entry to their sites.

Though the illustrations and numbered sites remain as in the first edition, a great number of changes have been made in the text to bring the account up to date, to give a fuller picture where appropriate, to note what has already been demolished and to correct errors. The bibliography, provided for those who wish to take the subject further, has also been revised and more recent publications are listed on page 22.

## WIND, WATER AND TIDAL POWER

Before the invention of the steam engine man relied on natural sources of power. Of greatest importance in Devon was the harnessing of the rivers. Nearly every parish had a grist mill powered by a water-wheel; and water power was also used for cloth manufacture, paper-making, edge-tool manufacture and many other purposes. Water-wheels can be of several types — overshot where the water, carried to the top of the wheel by a leat or launder, strikes the top of the wheel; undershot where the water impinges against the lower vanes of the wheel; and pitchback or high breasted and low breasted where the water strikes the wheel above or below the centre point. Scattered through Devon are many water-wheels, some disused and dilapidated and some still in use.

Of lesser importance in the county were attempts to harness the sea by tidemills. Usually built near the mouth of a tidal inlet, the tidemill was driven by the power of the water escaping along the channel as the tide ebbed. Tidemills were never very common but 13 such mills operated at one time or another in Devon.

While Celia Fiennes at the end of the 17th century reported that she saw no windmills, and only four windmills are shown on Donn's Devon map of 1765, it is now known that over the centuries at least 30 windmills (and possibly a further 20) existed in Devon, mainly for corn-grinding.

### WATER-WHEELS

**1 Orleigh Mill, Buckland Brewer SS 437225**

A four-storey grist mill near Bideford. The date 1884 on the wall refers to a rebuilding. The water-wheel is a pitchback or 'ten o'clock' type. Formerly used in the Barnstaple town mills, the cast iron wheel, 18ft in diameter and 8ft wide, was brought to Orleigh in 1939. The mill is still working and may be seen on application to the owner, Mr W H Sanders.

**2 Dawlish Water-wheel SX 962767**

Familiar to visitors to Dawlish, this 30-ft cast iron pitchback water-wheel used to drive a mill. Of late construction, it was built by A Bodley of Exeter. It can only be viewed from the Strand.

**3 Monkokehampton Mill SS 581054**

A three-storey stone building with two pitchback wheels, each driving two pairs of grinding stones. The mill, of 19th-century origin, is in full working order, with all its machinery intact. Visits by arrangement with the owners, S J Murrin & Sons.

**4 Parracombe Mill SS 669449**

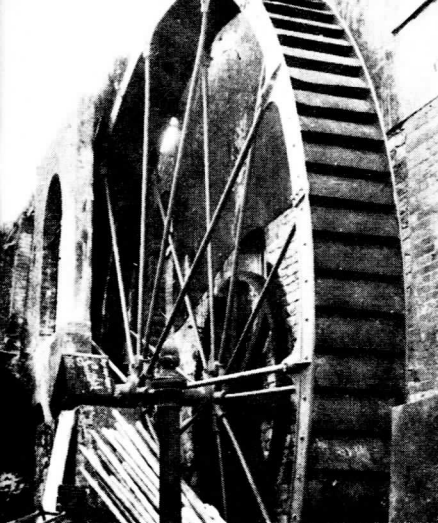
A small two-storey grist mill, thought to be of 16th-century date, on the Barnstaple-Lynton road four miles south-west of Lynton. An overshot wheel, 15 ft in diameter with a cast iron rim and wooden buckets, is now used for generating electricity. The mill itself has been converted into a house and none of the machinery remains.

**5 Tumbling Weir, Ottery St Mary SY 095953**

Not a water-wheel but an almost unique circular weir at the Ottery Serge Mills (built 1790), now Ottermill Switch Gear Ltd. This weir fed water not required to drive the water-wheel through a tunnel under the factory to rejoin the river downstream. The weir is signposted from the road and is visible from a path by the millstream. See also site 72, page 18.

Many other watermills can be seen. Among these are **Belford Mill, Ashburton SX 754716**, **Bidlake Mill SX 487885**, **Bovey Tracey Mill SX 813782**, **Yeo Farm Mill, Chagford SX 678866**, **Chudleigh Town Mill SX 872795** and the cattle food mill of Sargents at **Tipton St John SY 092925**.





2 Dawlish Water-wheel



8 Broadclyst Windmill

#### TIDEMILLS

6 **Pomphlett Mill, Plymouth SX 504537**

On the left bank of the Cattewater, near Plymstock. Demolished 1968.

7 **Bridge Mill, Topsham SX 971883**

Until 1960 this tidemill was working with its original machinery and water-wheel but it has now been dismantled except for the building which can be seen from the outside.

#### WINDMILLS

8 **Broadclyst Windmill SX 991966**

The best surviving example in Devon, built in 1786 by Samuel Flood, this mill bears the words 'Vive l'ingenies' Disused since 1815, it was converted into flats in 1870 to house the homeless after a disastrous fire in Broadclyst. Three floors and a chimney were added at this time. The building is now in a dangerous condition but can be viewed from the road.

Other windmill ruins exist at **Brixham SX 926557**, **Churston Ferrers SX 889567**, **Heanton SS 491103**, **Instow SS 482312**, **Northam SS 457296**, **North Whilborough SX 872658**, **Paignton SX 875624** and **Torquay SX 908658**.

5 **Tumbling Weir, Ottery St Mary**



## TOLLHOUSES, MILESTONES AND BRIDGES

The great improvement of roads by turnpike trusts began in Devon soon after 1750. The London road from Exeter was turnpiked in 1753 and in the following years trusts were set up in most towns of Devon to improve the neighbouring highways. As the map shows, a web of roads was built within the next century. Tolls levied for the use of such roads were collected at tollhouses.

With the improvement of the roads came also the construction of new bridges. Until 1808 bridges in the county had been maintained by local builders and quarrymen but the scandal of the collapse of the new bridge at Fenny Bridges in that year led to the appointment of James Green, a qualified engineer, to be responsible for the building and maintenance of all road bridges in Devon. A pupil of John Rennie, he was responsible for many fine engineering achievements in Devon.

To mark the distances along the roads, many milestones were erected, mostly made out of local stone. Those which still survive are marked on the 1:50,000 Ordnance Survey maps. Historic direction posts are also worth attention.

### TOLLHOUSES

**9 Cheriton Cross Tollhouse SX 774929**

A good example of a two-storeyed tollhouse which retains its original front door and porch and two side windows.

**10 Newton Poppleford Tollhouse SY 079895**

Now converted into an antique shop, it is the only thatched rectangular tollhouse in Devon.

Other tollhouses are to be found at **Goodleigh Road, Barnstaple SS 574333, Chapelton SS 581249, Clapworthy Mill SS 673240, Colleton Mills SS 665157, Copper Castle, Honiton** (which still has its gates) **ST 172005, Salcombe Road, Sidmouth SY 128878, Fiveways, Tavistock SX 451713, Yealm Bridge SX 591519** and elsewhere. That at **Buckfastleigh SX 746671** (see picture opposite) was demolished in 1972.

### ROAD BRIDGES

**11 Bowcombe Bridge SX 745432**

When first built in 1845, this bridge had a swing section to let barges through to the mill and limekiln, the remains of which can be seen farther up the creek on the north side. The fulcrum of the swing section was formed by cannonballs. This section was replaced by stone-work during the late 19th century.

**12 Cowley Bridge SX 909954**

A fine three-arched bridge over the Exe, designed by James Green and built in 1813.

**13 North Road Iron Bridge, Exeter SX 918927**

Spanning the Longbrook valley between North Street and St David's Hill, this cast iron bridge of six arches was built by a Worcester firm, Russell and Brown, and completed in 1834. Each arch has a 40-ft span. Including the stone causeway the whole bridge is 800 ft long.

**14 Iron Footbridge, The Close, Exeter SX 924927**

Built in 1814, this is an early example of a decorated iron footbridge and retains its original iron lamp brackets. It carries a footpath which runs along the old city wall across The Close.

**15 Laira Bridge, Plymouth SX 502543**

Built by Rendel in 1824, this has been replaced by a modern concrete bridge.

**16 Road bridge, Seaton SY 252899**

The second concrete bridge in England, built in 1877, has simulated joints as if built of stone.

**17 Totnes Bridge SX 807603**

This three-arched bridge over the Dart was designed by Charles Fowler in 1828.

Other bridges of interest include the **Chain Bridge, Bampton SS 938208, St Saviour's Bridge, Ottery St Mary SY 094951** and clapper bridges as at **Postbridge SX 648789**.



14 Iron Footbridge, The Close, Exeter

#### MILESTONES AND DIRECTION POSTS

##### 18 Copplestone Milestone SS 764034

Other milestones worth noting include those at **Shaldon Bridge** SX 931730, **Kingswear** SX 882511, **Lower Beardon** SX 518843 and **Chollacott** SX 485732.

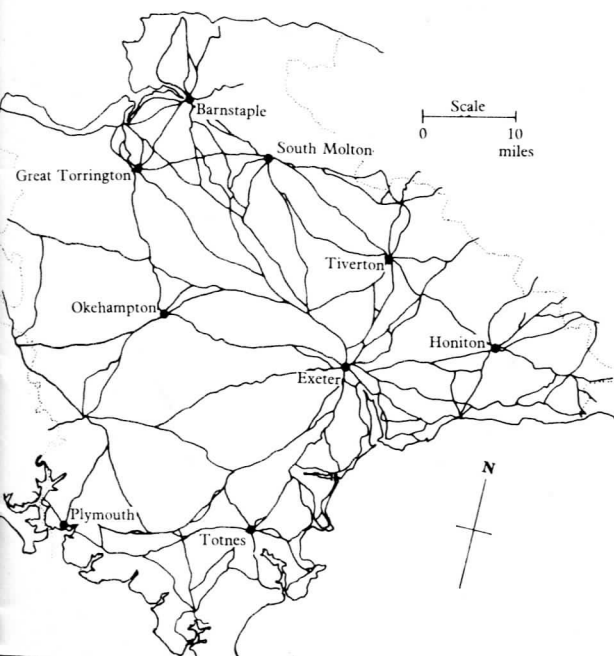
##### 19 Sourton Cross Direction Post SX 547918

A 17th-century direction post made from a 6th-century pillar with incised letters on each face. A post with similar lettering can be seen near **Cranbrook Camp** SX 742887.

##### 20 Shaugh Prior Direction Post SX 545631

See also direction pillar at **Otterton Cross** SY 072853 and direction stones at **Cross Furzes**, **Buckfastleigh** SX 699668, **Harberton** SX 761560 and **Place Cross** SX 564945.

#### Turnpike Roads of Devon



#### Buckfastleigh Tollhouse (demolished 1972)



## CANALS

Canals in Devon were built to supplement the roads and rivers. The earliest was the Exeter Ship Canal, the first in the country to have genuine poundlocks, opened in 1566 and subsequently improved. No more canals were built until the demands of industry led to a flurry of activity from the end of the 18th century. Between 1794 and 1825 was the main canal building period in Devon, with the Hackney Canal being the last built in the county in 1843. Most of the mileage was on the tub-boat and inclined-plane system which is only found in the west country and in Shropshire. Before the coming of the railways, the canals provided a useful means of transport for heavy commodities — coal, stone, sand and lime. Much of this canal system still survives and can be traced.

In addition to the waterways themselves, with their locks or inclined planes, the wharf houses, lock keepers' or inclined plane keepers' houses and the warehouses should be noted. Sometimes there are mile posts along the canals, as along the Bude Canal. Associated with the canals were tramways linking industrial enterprises with the canals.

### 21 Bude Canal (length 35½ miles)

The longest tub-boat canal in England, the Bude Canal, built by James Green, was opened in 1825. It has three branches. Tub-boats operated on this canal system, which had inclined planes at Marhamchurch, Hobbacott Down, Vealand, Marrifield, Tamerton and Werrington, but larger craft worked the short length of broad canal between Bude and Marhamchurch. At **Bude** see the canal basin SS 204065, the wharf buildings SS 206064 and the warehouse SS 207060.

There is a path along the Alfordisworthy branch from **Tamar Lake** SS 296109 to **Pancrasweek** SS 291068. The Holsworthy branch is dried up and less accessible but can be traced from the minor roads which cross it at Thornemoor, Parnacott, Chilsworthy and Holsworthy. Blagdonmoor Wharf can be reached from the Stanbury Cross-Woodcott road. The Launceston branch can be traced from **Red Post** SS 264052 though the first three miles have been ploughed over.

### 22 Cann Quarry Canal (length 2 miles)

Built in 1829 by the Earl of Morley, the Cann Quarry Canal runs from his quarry at **Cann** SX 524596 to **Marsh Mills** SX 521569 where it used to connect with a tramway which crossed the river Plym and joined the Plymouth and Dartmoor horse tramway at Crabtree. This 6-ft wide canal was used for the transport of paving stones and slates until about 1835 when it was replaced by the tramway which was extended alongside the canal to the quarry. The track alongside the canal can be followed easily between Plym Bridge and Cann Quarry but the lower length is less easy to follow except for a stretch above Marsh Mills.

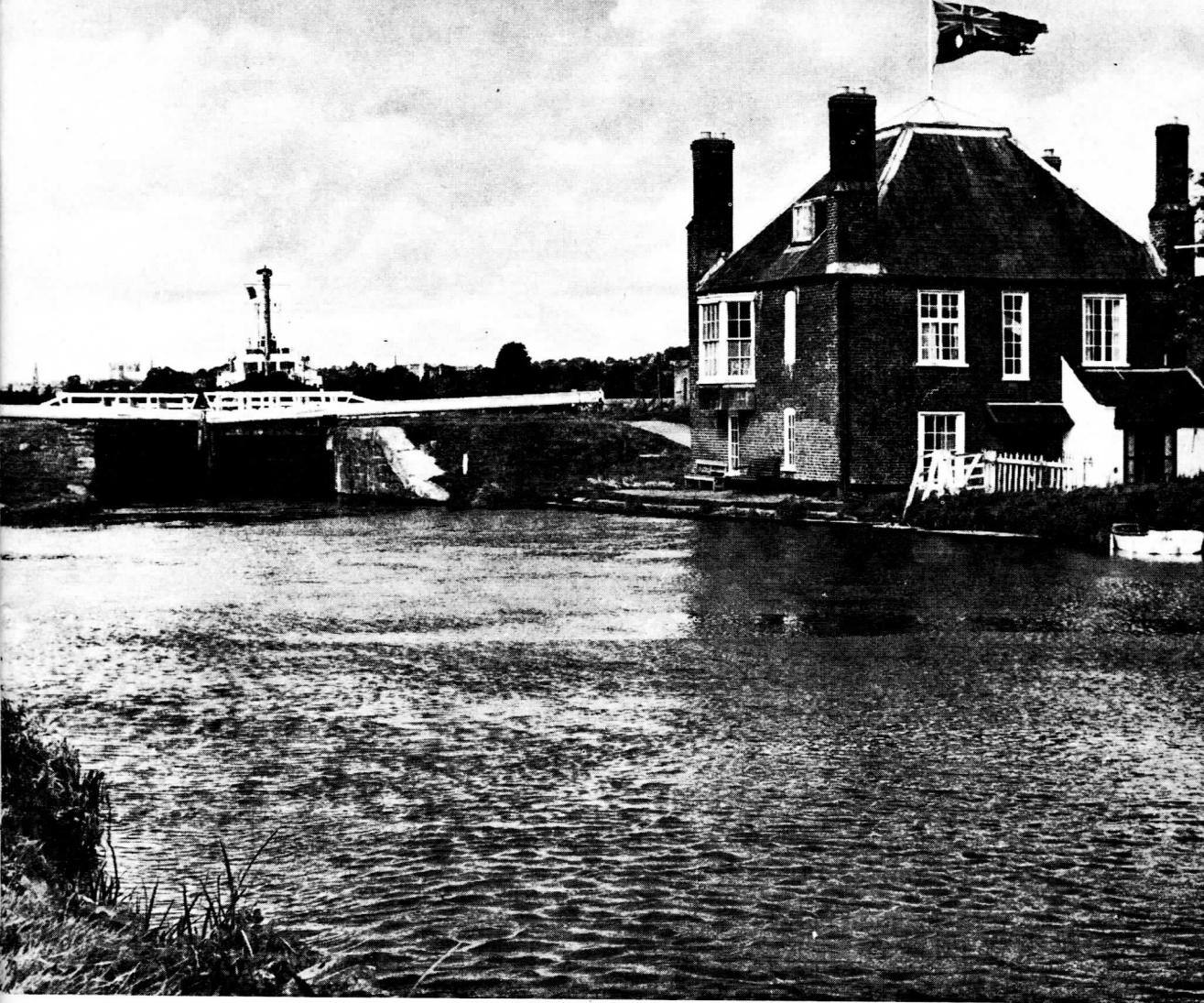
### 23 Exeter Canal (length 5 miles)

Constructed by John Trewe of Glamorgan (whose name is commemorated in Trew's Weir) in the 1560s, the Exeter Canal was improved in the 1670s, about 1700 and by James Green in 1824. Of particular interest is the basin (with its warehouses) SX 921918 Green built at the Exeter end to relieve congestion. He also extended the canal to the Turf Inn about a mile below Topsham. The tow path can be followed for the whole length of this canal. Topsham can be reached by ferry.

### 24 Grand Western Canal (length 11 miles)

This level waterway running between Tiverton and Lowdells was constructed 1810-14 as a branch of a canal intended to link the English Channel and the Bristol Channel, with terminals at Topsham and Taunton. The canal was never completed but until about 1924 this section was used for the carriage of stone and coal. At **Harberton** SS 997122 the canal crosses the railway in a cast iron trough aqueduct. A leaflet published by Devon County Council provides a walking guide to the canal and associated works. The canal has now been restored as a pleasure waterway.





### 23 Exeter Canal

#### 25 Hackney Canal (length 5 furlongs)

This canal was built by Lord Clifford in 1843 for the transport of clay from pits near Chudleigh and Kingsteignton to the river Teign near **Newton Abbot** SX 868727. The site of the terminus with basin and warehouses can be seen and the towpath can be followed.

#### 26 Stover Canal (length 2 miles)

Constructed in 1790-5 by James Templer of Stover House, this canal was used to carry clay, Bovey lignite and stone to the Teign at Newton Abbot. The canal cannot be followed but is accessible at **Ventiford** SX 848748, at **Teigngrace** SX 849742 and at **Newton Abbot** SX 864718.

#### 27 Torrington (or Rolle) Canal (length 6 miles)

This canal, financed by Lord Rolle, was built in 1823-5 to link Torrington to Bideford and to bring limestone to Lord Rolle's kilns at Torrington. The canal can be traced easily from the Bideford-Torrington road (A 350). There was an inclined plane near **Weare Gifford** SS 476217 and the canal crossed the Torridge by **Beam aqueduct** SS 474209 which now carries the drive to Beam House.

For **Mill Hill Cut**, the **Tamar Manure Navigation** and the **Tavistock Canal**, see page 30.

## STEAM POWER, TRAMWAYS AND RAILWAYS

The story of steam in Devon is unmistakably linked with two men — Thomas Newcomen and Isambard Kingdom Brunel. Thomas Newcomen (1663-1729), the Dartmouth blacksmith, invented an atmospheric steam engine which enabled mines to be drained. Brunel, the railway engineer, built his broad gauge line from London via Bristol to reach Exeter in 1844 and Plymouth in 1848. The section between Exeter and Newton Abbot was the scene of his experiment with atmospheric traction. Brunel's great Saltash bridge was opened in 1859. Because the terrain of Devon is steep and rugged, these and subsequent lines built in Devon exhibit excellent examples of Victorian ingenuity in viaducts, tunnels and embankments and also possess great scenic charm. Through them the economy of Devon was transformed.

The broad gauge system of the Great Western and associated railways was finally converted to standard gauge in 1892. The only local remaining example of broad gauge rolling stock is Tiny, a South Devon 0-4-0 vertical boiler engine at Newton Abbot Station. On **Sutton Wharf, Plymouth SX 483543** there survives what is reputed to be the last *in situ* length of broad gauge rail in the country.

### STEAM POWER

#### 28 Newcomen Engine, Dartmouth SX 879515

An original Newcomen engine is now housed in Coronation Park, Dartmouth. Originally used at Griff Colliery at Nuneaton in Warwickshire, it was re-erected in 1963 by the Newcomen Society to commemorate the 300th anniversary of Newcomen's birth.

Other stationary steam engines exist in Devon: for example at **Fox Brothers, Uffculme**, a Pollet engine of rather late date, 1911.

### RAILWAYS AND TRAMWAYS

#### 29 The Atmospheric Railway

The atmospheric system was installed between Exeter and Teignmouth in 1847 and then to Newton Abbot in 1848. Services ended on 5 September 1848. The atmospheric tube was removed and a piece can now be seen in the Swindon Railway Museum. Only the pumping engine houses survive. The **Starcross engine house SX 977817** and the **Torre engine house SX 898663** remain and parts of the buildings are visible at Exeter and Totnes.

#### 30 Bideford, Westward Ho! and Appledore Railway (length 7 miles)

Constructed between 1901 and 1908, this line was never a commercial success and was closed by the war in 1917. Once out of Bideford much of the track can be followed. The engine and carriage sheds at Bideford are now used by a dairy and a private coach firm.

#### 31 Cann Quarry Tramway (length 2 miles)

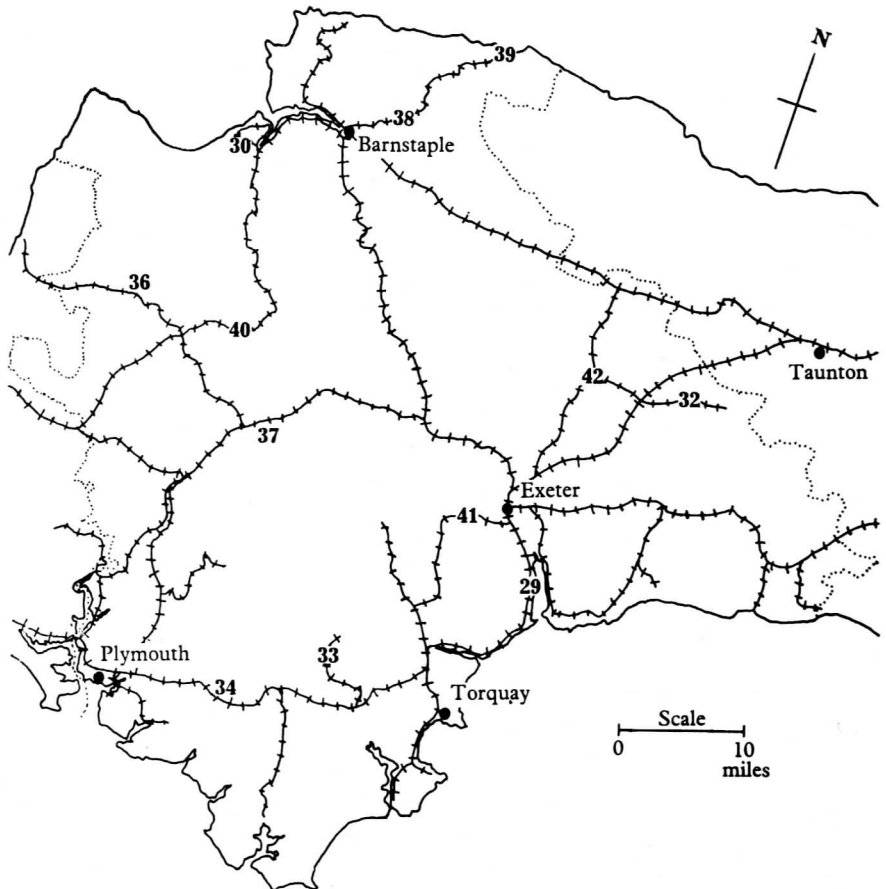
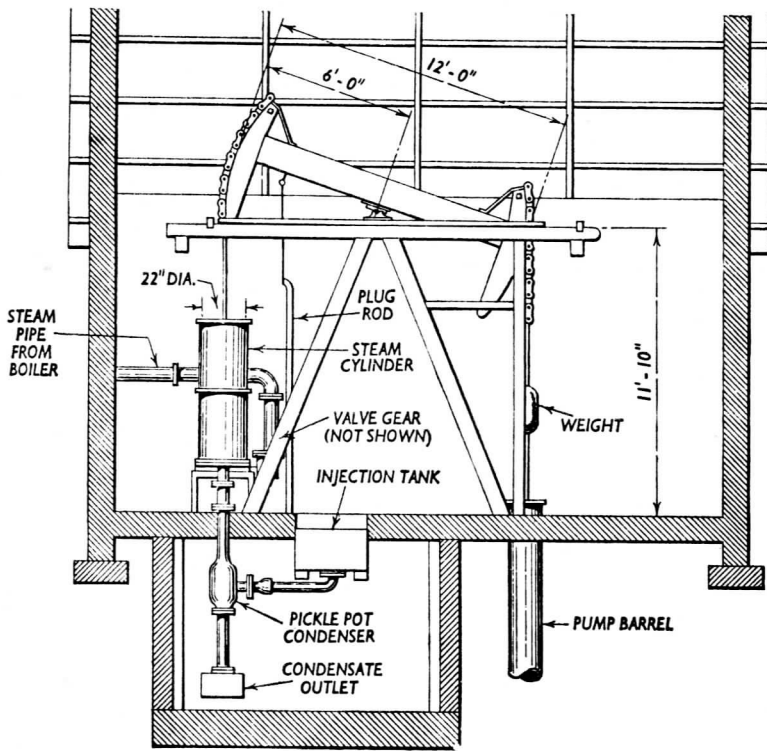
Opened in 1829 with a 4 ft 6 inch gauge, engineer Mr Soper, this tramway operated until 1900 (see Cann Quarry Canal, page 6). The bridge, rails and house at the southern end of the tramway can be seen at **Marsh Mill SX 521568**.

#### 32 Culm Valley Light Railway (length 7½ miles)

Opened in 1876, the line closed to passenger service in 1963 but was used for milk transport until October 1975. Now interrupted by the M5, the line follows the river and most of it can still be traced from Tiverton to its terminus at Hemyock.

### The Great Western Railway

Many branch lines are worth looking at. The **Exe Valley Railway** (19½ miles) which ran from Stoke Canon to Morebath Junction SS 952247 can still be traced. The **Kingsbridge Railway** (12½ miles) from South Brent to Kingsbridge has also been closed but stretches of it provide attractive walks through the South Hams. The **Moretonhampstead line** (12 miles) and the **Tavistock line** (16 miles) have ceased operation.



A map of the railways which once operated in Devon

Scale  
0 10 miles

### 33 The Dart Valley Railway

This line was built as a broad gauge line in 1872, converted to standard gauge in 1892 and closed in 1962. Branching from the main line at Totnes, it runs for most of its length along the River Dart. Now restored for operation in the manner of the Great Western, it terminates at Buckfastleigh SX 667743 where a historical collection has been established.

The Dart Valley Railway also operates the **Paignton — Kingswear line** under steam.

The main WR line from Exeter to Plymouth has a number of notable engineering features: see particularly **Exeter St Thomas station** SX 915919, **Starcross station** SX 977819, and the **seawall at Dawlish** SX 965761 (1846).

### 34 Ivybridge Viaduct SX 636569

Originally built by Brunel of timber on stone piers, this viaduct was rebuilt in stone in 1893.

### 35 Royal Albert Bridge, Saltash SX 435587

To bridge the Tamar, Brunel was faced with the problem of a 1,000-ft wide estuary, 70-ft depth of water and a strong tidal current. Opened in 1858, the bridge is 100 ft above high water, the distance between the piers is 440 ft and the total length of the bridge is 2,190 ft.

### London and South Western Railway

This railway had a notable viaduct at Tavistock and two others worth seeing.

### 36 Holsworthy Viaduct SX 346036

Built in 1898, it consists of nine 50-ft arches and was one of the first all-concrete viaducts in the country. It carries the railway across the River Deer.

### 37 Meldon Viaduct SX 565924

This 540-ft long wrought-iron trussed viaduct, completed in 1874, crosses the West Okement with six girder spans, supported by lattice piers, the tallest of which is 120 ft high.

## OTHER RAILWAYS

### 38 Lynton and Barnstaple Railway (length 19½ miles)

The only narrow gauge (1 ft 11½ in) passenger railway in Devon, this line operated between 1898 and 1935. **Chelfham Viaduct** SS 610356, spanning the river Yeo with eight 24-ft wide arches, is the main engineering feat on the line. **Lynton Station** has been converted into a private house and its goods shed into a pair of cottages.

### 39 Lynton Cliff Railway SS 721496

Opened in 1890, this railway is powered by water from the West Lyn. The water is piped to the top station and flows into a large tank slung beneath the passenger car. The weight of the water counterbalances the emptied tank of the car at the bottom: as the top car goes down, it pulls the bottom one up. The railway was built to a Swiss design by a local family called Jones.

### 40 North Devon and Cornwall Junction Light Railway

This standard-gauge line was built in 1925, the last line of any length to be built in the west. It replaced a 3-ft gauge railway still in use at the clay works at Marland and Petrockstow.

### 41 Teign Valley Railway (length 15 miles)

The section from Heathfield via Chudleigh Knighton to Christow, opened in 1882, was linked via Dunsford to Exeter City Basin in 1903. The line was closed in 1958. The track can still be followed and most of the stations are accessible.

### 42 GWR Collet 0-4-0T, 1442 SS 961126

This GWR steam locomotive is preserved in the open beside the A 373 Tiverton—Taunton road.

For the tramways and railways of **Dartmoor** see pages 26-7; for those of the **Tamar Valley** see page 31.



## PORTS, HARBOURS AND WAREHOUSES

With coastlines on the Bristol and English Channels, Devon has played an important role in the maritime history of England. Fishing, trade, privateering and enterprises of war have all been carried on from her ports. The quays and wharfs themselves, their furniture (bollards, cranes and so on), Custom Houses, shipbuilding yards, warehouses and lighthouses, are all of interest. For most of the ports their busier days were in the past. Exeter has virtually ceased to be a port. Plymouth, despite the decline of the navy, still has substantial activity in its Dockyard but its commercial trade has much declined.

**43 Appledore Shipyards SS 466307**

Before 1800 ships were built on the beaches between Bideford and Appledore, leaving little trace, and Benson's New Quay was built in the 18th Century. In 1850-6 the Richmond Dry Dock was built to meet the needs of James Yeo who sent ships built in Prince Edward Island, Canada to Appledore for finishing. Appledore Shipbuilders Ltd are open to visitors.

**44 Queen Anne's Walk, Barnstaple SS 557332**

Here merchants did business, settling their bargains on the Tome Stone in the Colonnade. Originally built in 1609, extended in 1633, rebuilt in 1713, it was restored in the 1790s.

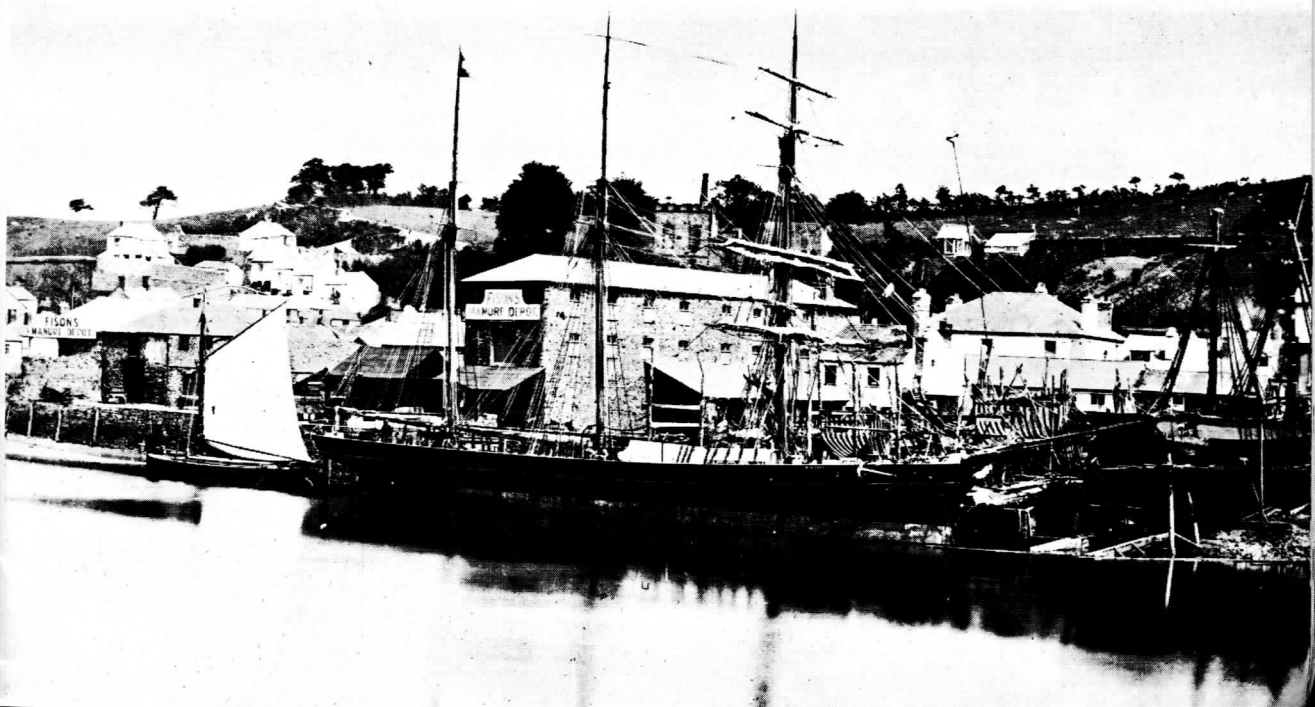
**45 Bideford Quay SS 265454**

The 19th-century quay was widened in 1905. Warehouses and the site of the old ropewalk survive.

**46 Dartmouth Harbour SX 878512**

Important as a port in the 13th and 14th centuries, Dartmouth played a major role in the Newfoundland fisheries in the 16th, 17th and 18th centuries. The New Quay of 1584 still remains but much else was altered when the north and south embankments were built in 1882. The Butterwalk and the group of waterfront houses at Bayard's Cove were built in the 17th century. **Philip's Shipyards** on the east side of the river SX 880531 was in operation from 1890-1 to 1974.

**45 Restarick's shipyard at Bideford-East-the-Water in 1879-80**



**47 Exeter River Quay SX 921921**

The port is divided into two parts, the old river quayside and the newer dock basin, the terminus of the Exeter Canal. Particularly noteworthy on the river quay are:

**The Custom House**

A handsome red-brick building of 1681 with white facings and fine plaster ceilings. The King's Beam (A & W C Bodley, 1838) still exists in the shelter of the fish market shed.

**Bonded warehouses**

These two five-storeyed warehouses were built in the 1830s. One of them, built of limestone with red sandstone dressing, has the date 1835 and the name of Mayor de la Garde inscribed on it. Part is now occupied by **Exeter Maritime Museum**.

**Plymouth** (see map inside back cover)

From the middle ages Plymouth has owed much of its importance to the navy. The area developed after 1698, when William III decided to build a naval dockyard at what is now known as Devonport. Most of the **Millbay Complex SX 468540** was designed by Brunel and opened in 1857. The contemporary railway station serving it was demolished in 1975.

**48 Sutton Harbour SX 485542**

The old harbour from which the Pilgrim Fathers sailed. The new Custom House designed by David Laing was built in 1810. A crane by John Mare of Plymouth dates from 1850.

**49 Smeaton's Tower, Plymouth Hoe SX 478538**

When the present Eddystone lighthouse was built, Smeaton's Tower, the third lighthouse in use between 1759 and 1882, was taken down and re-erected on a new base on the Hoe.

On Lundy, See the **Old Lighthouse SX 132443**.

**50 Plymouth Breakwater SX 485533**

To protect the anchorage, this breakwater, designed by John Rennie, was built between 1812 and 1847 at a cost of £1.4 million.

**51 Royal William Victualling Yard SX 460535**

This impressive building was erected by John Rennie in 1826-35 to centralise naval supplies and manufacturers in one area. It covers fourteen acres and consists of three parallel buildings, the central one with a cupola lying further back than the other two.

**52 Royal Naval Dockyard SX 448552**

Founded in 1691 by William III, this dockyard now covers 240 acres. The Gun Wharf was built in 1718-25 by Vanbrugh. There are several slips of which No. 1, built in 1816, is a splendid example of timbered construction. Two roperies, both 1,200 ft long, are most impressive. Parties are conducted round the dockyard on application to the main gate.

**53 Salcombe Harbour SX 740389**

During the 19th century shipyards along the Salcombe waterfront built schooners. The Salcombe Hotel was built on the site of one such yard. Most of the other yards are now quays and small boatyards. **Kingsbridge SX 735442** was also once an important port, with shipyards, a tidemill, a flour mill and a large foundry, Lidstones, of which the main building still stands.

**54 Topsham SX 967879**

The old quay is easily accessible with Custom House and King's Beam. Nearby are several limestone warehouses. The slips of Holman's and Popham's shipyards have now been filled in.

**55 Torquay Harbour SX 918634**

Improved from the 1820s by the construction of quays and breakwaters with Sir John Rennie as adviser. Remains of **Livermead Harbour SX 905629**, created by building out from either end of Livermead Head, are still visible at low tide.

Other harbours of interest are those at **Lynmouth, Combe Martin, Ilfracombe, Clovelly** and **Hartland Quay** (now abandoned) in north Devon; and **Teignmouth, Paignton** and **Brixham** in south Devon. Good warehouses are at The Plains, **Totnes**.

## LIMEKILNS, MINES AND QUARRIES

The mineral resources of Devon have been exploited for centuries. Lime was used for agricultural purposes; china and ball clay were worked; stone was quarried for building and slate for roofing; and tin, copper, lead, silver and other ores were obtained.

Limestone was burnt in kilns to produce lime for mortar from Roman times and since at least the 16th century it has been used by farmers to reduce the acidity of the soil. Remains of limekilns survive all over Devon especially along the coasts and estuaries. At least 375 are known to have existed. Limestone (and coal) was brought to north Devon from south Wales. The ketches were unloaded on the beach and the limestone was then carried to the kilns in horsedrawn butts or carts. The V-shaped kilns, heated originally with charcoal and later with coal, were filled with the pieces of limestone. The stone would disintegrate gradually: the residue was then raked out and, when cooled off, collected by farmers for spreading on the land and by local builders for making lime-mortar. The industry flourished until the 1900s when the product was superseded by ground limestone and patent manures.

China clay, which is produced by the kaolinisation of granite, has been mined on Dartmoor and its foothills since the early 19th century; but its most extensive exploitation has come in this century. Similarly the deposits of ball clay (pipe clay or potter's clay) in south Devon (especially around Bovey Tracey and Kingsteington) and in north Devon (at Fremington near Barnstaple and Peters Marland between Okehampton and Torrington) have been known for centuries but production is now greater than in the past.

Arsenic, copper, iron, lead, silver and tin are to be found in various parts of Devon. Iron was mined near North Molton and Molland in the 16th century and at Brent, Ashburton and Holne in the 17th century. Between 1796 and 1802 iron was worked at Combe Martin. Lead is associated with silver and these two metals were often mined together on Dartmoor and in north and south Devon from at least the 13th century. The most active period of tin mining in Devon was in the middle ages but a few mines were worked into the 19th century. 'Wheal' — the Cornish word for mine — is sometimes used in Devon. In the 17th and 18th centuries the copper ores of Devon were worked periodically: but the great period of the industry was in the middle third of the last century, when Devon Great Consols was the most prosperous single copper company in the south-west. Arsenic is found in association with copper and was sometimes worked after copper mining had ceased.

Cutting Ball Clay in the 19th century



## LIMEKILNS

**56 Annery Limekilns SS 462228**

These kilns are ruinous and partly covered with ivy. They could be approached by barges both from the river Torridge and from the Torrington canal. The loading ramp is clearly visible.

**57 Bucks Mills Limekilns SS 355237**

These kilns, in a dramatic position on the north Devon coast, have now been restored. To unload, vessels stood on hards on the beach and discharged via a gangplank arrangement. A steep inclined plane leading from the kilns to the village also survives.

**58 Lynmouth Limekiln SS 722496**

This kiln has been restored by Lynmouth Urban District Council. Other kilns in north Devon are to be seen at **Heddons Mouth** SS 655497, **Lee Bay** SS 694495, **Woody Bay** SS 676492, **Northam** SS 455281, **Huntshaw** SS 470236 and **Meldon** SX 522896.

**59 Hallsannery Limekiln, Landcross SS 460246**

This 19th-century kiln on the Yeo has two wells and a slipway to the water's edge with iron rails. It is best seen from the river.

**60 Shinnars Bridge Limekilns SX 788622**

This well-preserved pair of medieval kilns stands beside the Dartington Hall shop. In south Devon see also **Wonwell Beach** SX 621479, **Cockwood** SX 968806 and **Countess Wear** SX 939902. For limekilns in the Tamar Valley, see page 31.

## BALL AND CHINA CLAY

The tips of waste products can be seen in the Bovey Tracey, Kingsteignton and Lee Moor areas but as abandoned shafts are filled in and old pits filled with water, the visible remains of early clayworking are limited.

**61 Zitherixon Quarry SX 864726**

An extensive former working, now used by a sailing club.

For the **Lee Moor**, **Shaugh Prior** and **South Brent** clay works, see page 24.

An extensive exhibit of the history and technology of china clay working is included in the William Cookworthy Museum created in the **Old Grammar School, Kingsbridge** SX 734445 (see also **98** below).

## MINES

**62 Combe Martin Silver and Lead Mines SS 597466**

This village was famous for its silver mines in the 13th century. These ceased working in 1490. With the discovery of a new lode, they were reopened in 1587 and worked intermittently until 1875. Shafts and adits are visible in the vicinity but the chimney of the Knap Down Mine is the only ruin to be seen on the surface.

### North Molton

In Domesday Book four iron workers are recorded under the royal manor of North Molton. Mines were also mentioned here in 1346 and 1528. At the end of the 17th century Cornish miners worked in the mines for copper and iron. The last working was in 1942 to meet war needs. Ore from these mines may be seen in the South Molton Museum SS 714258.

**63 Bampfylde Mine SS 738328**

This mine is situated a mile east of Heasley Mill along the river Mole, beyond the Methodist chapel. Extensive workings can be found on both sides of the river. The timber bridges which led from the road to the mine building have now been removed, except for one in ruins.

**64 Florence Mine SS 755325**

This mine lies south of Heasley Mill. Extensive workings can be seen between South Radworthy and Tabor Hill. There were also mines at Molland and Stowford.





100 China Clay works at Lee Moor (see page 24)

**65 Upton Pyne Manganese Mines SX 902977**

Manganese was first found in Devon at Upton Pyne and Newton St Cyres in 1770 and for some years supplied the whole country. It was used in the potteries and for purifying glass. In the early 19th. century as much as 2-3,000 tons was shipped annually from Exeter.

For **Dartmoor** mines, see page 24; for mines in the **Tamar Valley**, see page 28.

**QUARRIES**

**66 Beer Quarries SY 215895**

Beer stone is a chalk rock of cream-grey colour, which turns darker and harder with exposure. It was extensively employed in the interior of Exeter Cathedral and in a number of east Devon churches. Quarrying was at its height in the 15th. and 16th. centuries but declined with the cessation of church building: the quarries now produce lime.

**67 Chudleigh Limestone Quarries SX 864787**

In south Devon, the limestone belt stretching from Plymouth to Chudleigh produced excellent stone which was used for many buildings in Plymouth, Torquay and Newton Abbot. Chudleigh quarry is now disused but can be seen from the road. Working limestone quarries are to be found in Plymouth at Cattedown and Mountbatten.

**68 Wonford Quarry, Heavitree SX 949921**

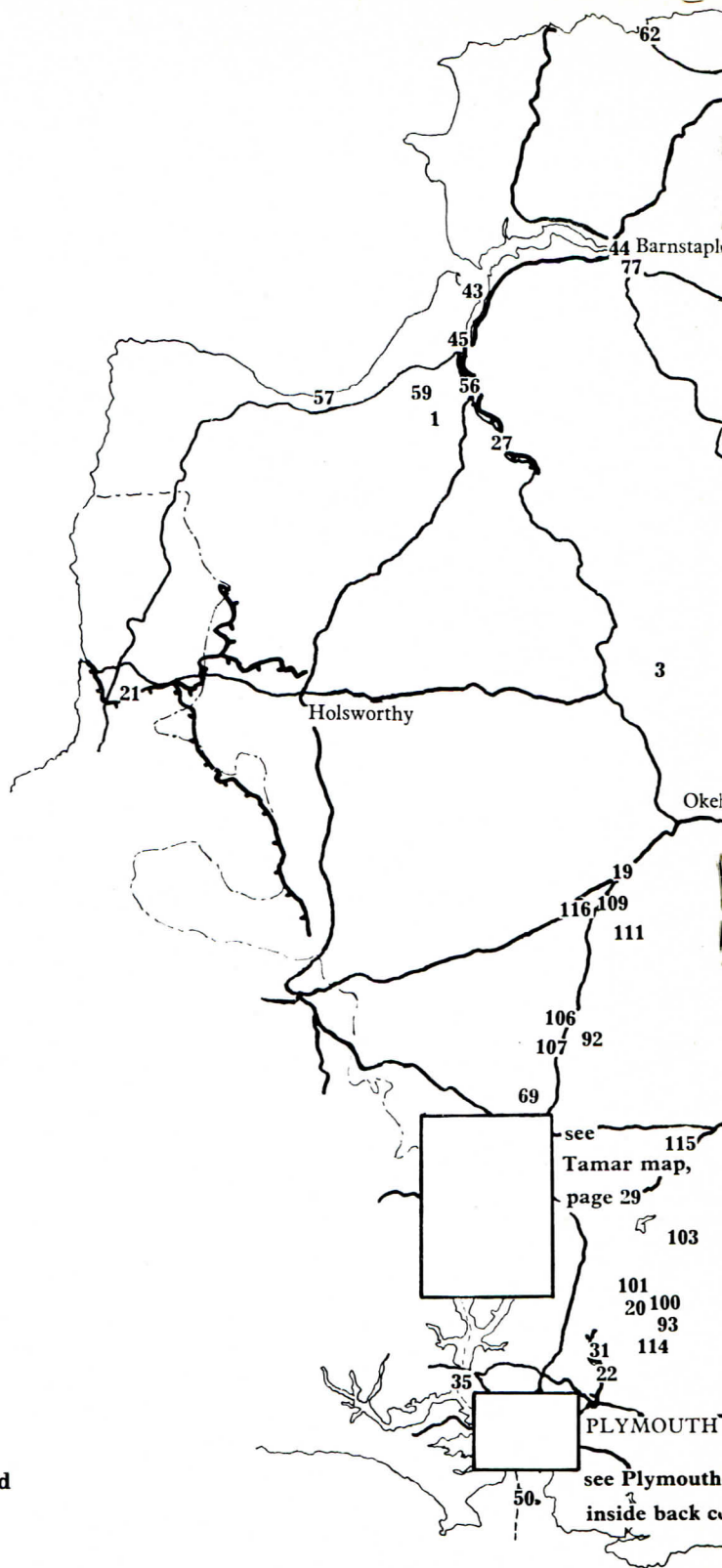
From 1390 red sandstone from this quarry was extensively used for buildings in and around Exeter. Quarry Lane runs through the centre of the now disused quarries.

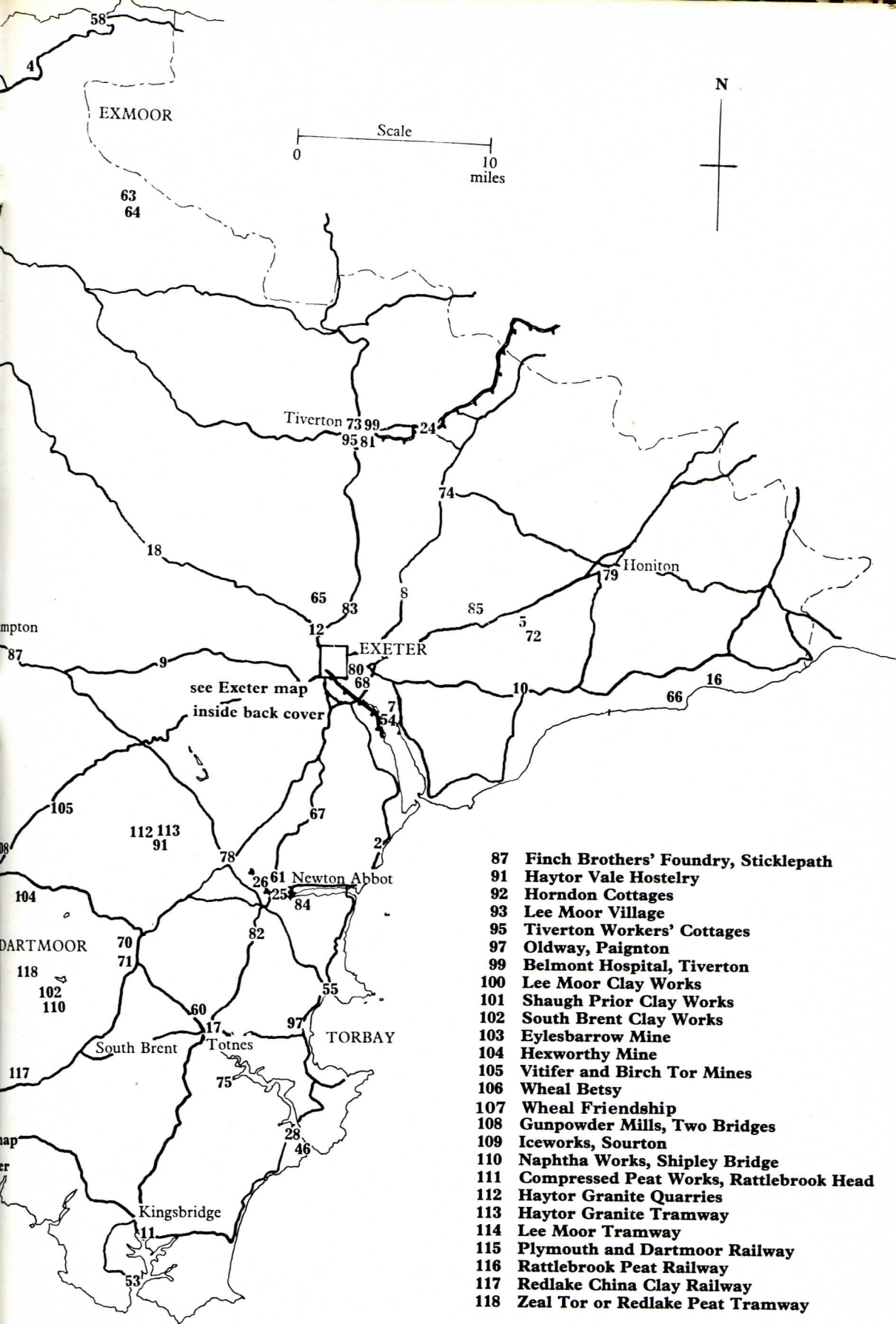
**69 Hurdwick Quarry SX 475766**

This quarry produced the famous green trapeeas ash stone of which so much of Tavistock is built. Situated on the Brentor road about a mile north of Tavistock, it is no longer in use.

This map shows the approximate position of most of the sites described in this booklet. Other sites are shown on the maps on pages 9 and 29 and on the inside back cover. Those shown on this map are:

- 1 Orleigh Mill, Buckland Brewer
- 2 Dawlish Water-wheel
- 3 Monkokehampton Mill
- 4 Parracombe Mill
- 5 Tumbling Weir, Ottery St Mary
- 7 Bridge Mill, Topsham
- 8 Broadclyst Windmill
- 9 Cheriton Cross Tollhouse
- 10 Newton Poppleford Tollhouse
- 11 Bowcombe Bridge
- 12 Cowley Bridge
- 16 Road Bridge, Seaton
- 17 Totnes Bridge
- 18 Coplestone Milestone
- 19 Sourton Cross Direction Post
- 20 Shaugh Prior Direction Post
- 21 Bude Canal
- 22 Cann Quarry Canal
- 24 Grand Western Canal
- 25 Hackney Canal
- 26 Stover Canal
- 27 Torrington (or Rolle) Canal
- 28 Newcomen Engine, Dartmouth
- 31 Cann Quarry Tramway
- 35 Royal Albert Bridge, Saltash
- 43 Appledore Shipyards
- 44 Queen Anne's Walk, Barnstaple
- 45 Bideford Harbour
- 46 Dartmouth Harbour
- 50 Plymouth Breakwater
- 53 Salcombe Harbour
- 54 Topsham
- 55 Torquay Harbour
- 56 Annery Limekilns
- 57 Bucks Mills Limekilns
- 58 Lynmouth Limekiln
- 59 Hallsannery Limekiln
- 60 Shiners Bridge Limekilns
- 61 Zitherixon Quarry
- 62 Combe Martin Silver and Lead Mines
- 63 Bampfyld Mine
- 64 Florence Mine
- 65 Upton Pyne Manganese Mines
- 66 Beer Quarries
- 67 Chudleigh Limestone Quarries
- 68 Wonford Quarry, Heavitree
- 69 Hurdwick Quarry
- 70 Higher Mill, Buckfast
- 71 Woollen Factory, Buckfastleigh
- 72 Serge Mill, Ottery St Mary
- 73 John Heathcoat & Company, Tiverton
- 74 Higher Kingsmill, Cullompton
- 75 Tuckenhay Paper Mill
- 77 Barnstaple Potteries
- 78 Candy & Company Potteries, Heathfield
- 79 Honiton Pottery
- 80 Heavitree Brewery
- 81 Starkey, Knight & Ford Brewery
- 82 Henley's Cider Factory, Abbotskerswell
- 83 Stoke Vale Cider Factory
- 84 Teign Cider Company, Netherton
- 85 Whiteways Cyder Company, Whimble





- 87 Finch Brothers' Foundry, Sticklepath
- 91 Haytor Vale Hostelry
- 92 Horndon Cottages
- 93 Lee Moor Village
- 95 Tiverton Workers' Cottages
- 97 Oldway, Paignton
- 99 Belmont Hospital, Tiverton
- 100 Lee Moor Clay Works
- 101 Shaugh Prior Clay Works
- 102 South Brent Clay Works
- 103 Eylesbarrow Mine
- 104 Hexworthy Mine
- 105 Vitiifer and Birch Tor Mines
- 106 Wheal Betsy
- 107 Wheal Friendship
- 108 Gunpowder Mills, Two Bridges
- 109 Iceworks, Sourton
- 110 Naphtha Works, Shipley Bridge
- 111 Compressed Peat Works, Rattlebrook Head
- 112 Haytor Granite Quarries
- 113 Haytor Granite Tramway
- 114 Lee Moor Tramway
- 115 Plymouth and Dartmoor Railway
- 116 Rattlebrook Peat Railway
- 117 Redlake China Clay Railway
- 118 Zeal Tor or Redlake Peat Tramway

## CLOTH, PAPER AND OTHER TRADES

The industries of Devon have been largely based on its natural resources or have grown up to serve agriculture which, through the centuries, has been the main source of employment. The woollen industry in Devonshire, which dates from medieval times, first used wool from local sheep. It rose to great prosperity in the 17th and 18th centuries, when Exeter was the centre of a large export trade. Until the late 18th century, it was almost entirely a rural handicraft industry; and only the finishing processes of fulling, dyeing and shearing were carried out in town mills. After about 1770 factory production of cloth began in several towns and still survives in a few.

In the 18th century paper-making developed, using water for power and manufacture and local supplies of cloth waste. Some of the mills took over the buildings vacated when cloth-making ceased and employed some of the workers. The port of Exeter provided an outlet for the paper mills concentrated in the valley of the Culm. At one time there were 52 active mills in the county, now there are only four.

Probably because of the cost of obtaining fuel, comparatively little attempt has been made to establish potteries in Devon, despite the rich deposit of clay available. A few small potteries grew up in both south and north Devon; but more recently a number of potteries have been established elsewhere in the county to cater for the tourist trade.

With its neighbouring county Somerset, Devon is one of the major cider areas in the country. Cider is made on some farms in the county as well as factories. As in most counties of England, there were breweries, most of which now only bottle beer. Gin is made in Plymouth.

### CLOTH MANUFACTURE

**70 Higher Mill, Buckfast SX 739674**

Now used by a metal-plate company, the building is early 19th century and has a slate-hung front: at the rear is the wooden launder which used to convey water to the water-wheel.

**71 Woollen Factory, Buckfastleigh SX 737663**

This works, owned by the Co-operative Wholesale Society, includes a number of examples of early Victorian industrial building. It closed in 1975.

**72 Serge Mill, Ottery St Mary SY 095954**

In 1788 John Duntze and Sir George Yonge built this new factory on the outskirts of the town to revive the dwindling woollen trade. But the scheme was not a success and the building was converted into a silk factory in 1823. It is now owned by an engineering firm. The impressive five-storeyed brick building remains unaltered externally. The exterior may be seen from the road.

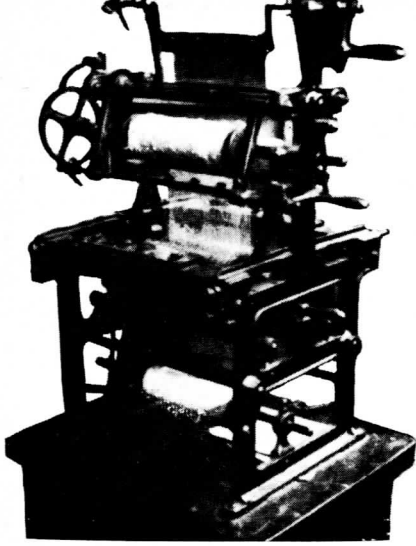
Samuel Fox's **Coldharbour Mill, Uffculme ST 062122**, which is still working, has a large water-wheel and a fine stationary steam engine.

**73 John Heathcoat & Company, Tiverton SS 952128**

In 1803 John Heathcoat invented a bobinette lace machine (see photograph) and in 1809 improved and patented it. In 1816 he moved to Tiverton and started lace-making in a recently-built cotton mill which had proved unsuccessful. The two gateway lodges appear to be the only original buildings.

In north Devon the **Derby Lace Works, Barnstaple SS 562336**, now owned by Small & Tidman, a fine four-storey 19th-century factory building, was damaged by fire in 1972.





73 Bobinette Lace Machine



80 The Coopery, Heavitree Brewery

#### PAPER MILLS AND POTTERIES

**74 Higher Kingsmill, Cullompton ST 029079**

This mill, first mentioned in 1757, has some machines dating from 1866, which make a narrow paper. It is in commercial use and can be seen on application to the company, Messrs Reed & Smith.

**75 Tuckenhay Paper Mill SX 817558**

This mill was converted from cloth to paper making in about 1830. The buildings, now disused, may be seen from the road. In the mid-19th century, Tuckenhay also had a corn mill, sailcloth mill, cider factory, quarries and extensive quays at the mouth of the Harbourne, taking vessels of 160 tons or more. The Harbourne at one time powered at least seven mills including **Harbertonford Serge Mill SX 783563** and **Hill Mill Forge SX 771568**. The water-wheel at **Crowdy Mill SX 791561** and **Beenleigh SX 797566** may be seen from the road.

**76 Trews Weir Paper Mill, Exeter SX 926916**

Originally built as a cotton mill in 1780, it was converted into a paper mill in 1832. Most of the present machinery is modern except for 15 steam-filled cast-iron drying cylinders which were made in Edinburgh in the 1860s and are still in use. Although the mill is no longer water-powered, the old leats may still be seen.

Other paper mills in Devon date from the later 18th or early 19th centuries. **Wiggins Teape Mill, Hele SY 995025** was established in 1762, the **Silverton Mills SY 977010** in 1783, **Tremlett & Company's works at Stoke Canon SY 950982** in 1806. The **Stowford Mills, Ivybridge SX 637565**, has a mid-19th century Donkin machine.

**77 Barnstaple Potteries, Litchdon Street, Barnstaple SS 558330**

Pottery making in Barnstaple can be traced back to the 16th century but these potteries were operated in Barnstaple in 1879 by James Brannam and his son, Charles Hubert Brannam. The latter started a new factory using the red-burning clay of Fremington. It has a large circular kiln built in the 1900s with a beehive shaped chimney. Visits in summer by arrangement.

**78 Candy & Company Potteries, Heathfield SX 832761**

Over a hundred years old, this pottery near Bovey Tracey has been operated by the present owners since 1880. The works, which now specialise mainly in making glazed tiles, have been modernised but parts of the Victorian factory remain. As well as the older parts of the factory, some disused kilns exist. Visitors may be shown round by arrangement.

**Bovey Potteries SX 815773**, founded about 1750 and enlarged in the 19th century, still have three of the old muffle kilns built 1850-1900.

**79 Honiton Pottery ST 167007**

Nothing remains of the earlier pottery founded in 1763 but the present pottery was established in 1881. Formerly it made simple pottery from local clay, now it makes artistic pottery. The present kiln and machinery are modern but traditional methods are used and an older-type thrower's wheel has been preserved. The pottery is open to visitors daily.

**BREWERIES, CIDER AND GIN**

Brewing has almost ceased in Devon. In **Exeter**, for example, fifteen breweries are listed in White's *Directory* for 1890 but today none are still working, the last to close being Heavitree Brewery. But a number of brewery buildings have been converted to other uses. **St Anne's Well Brewery** in Lower North Street SX 917927, an impressive late-Victorian building, although brewing or malting was conducted on the site from at least 1819, is now owned by a printing firm. **Well Park Brewery**, Willeys Avenue SX 917916, was owned by Ross & Pidsley in 1890 and later by Devenish and is now occupied by DTH Structural Services. Malshouses remain in **Bartholomew Street East** SX 917926, now a restaurant, and **Haven Banks** SX 917919, in use until about 1952 and then used as a bonded warehouse for a period. Recently demolished is the **City Brewery** which had deeds going back to 1760 and was in use until 1966.

**80 Heavitree Brewery SX 937923**

This was incorporated in 1890 but brewing on the site went back long before this. Malting was carried out here in the last century and a three-storeyed rectangular malt house existed, supported by cast-iron pillars. Some of the machinery dated from the middle of the 19th century, including the malt-mill (1870) and the mash tuns (1880). The well supplying the brewery with all washing water was sunk in 1903 and lined with white tiles. It had its original pump with oaken cogwheels but was powered by electricity when the brewery, which is now a bottling depot, closed in 1970.

**The Coopery, Heavitree Brewery SX 939923**

Mr Ibbett, the cooper (see photograph), came from a long line of coopers and was the last member of his family to take up the craft. The building now has other uses.

**81 Starkey, Knight & Ford Brewery, Tiverton SS 955125**

This brewery was started in a fine Georgian house in Fore Street where Tesco now stands (built by Samuel Lewis, merchant) in 1852 by Thomas Ford. It became part of the present group in 1895. Some original buildings, malshouses and kilns survive.

**82 Henley's Cider Factory, Abbotskerswell SX 853691**

One of the first commercial cider works in the county, it started in the late 18th century and ceased production in the 1960s. It is now occupied by Watermota Ltd.

**83 Stoke Vale Cider Factory SX 939982**

The Horrell family made cider for generations on their farm before they began commercial production in 1930. The present building at Stoke Canon dates from 1949. Though the machinery is modern, some of the oaken vats are of the traditional type. The works closed in 1975.

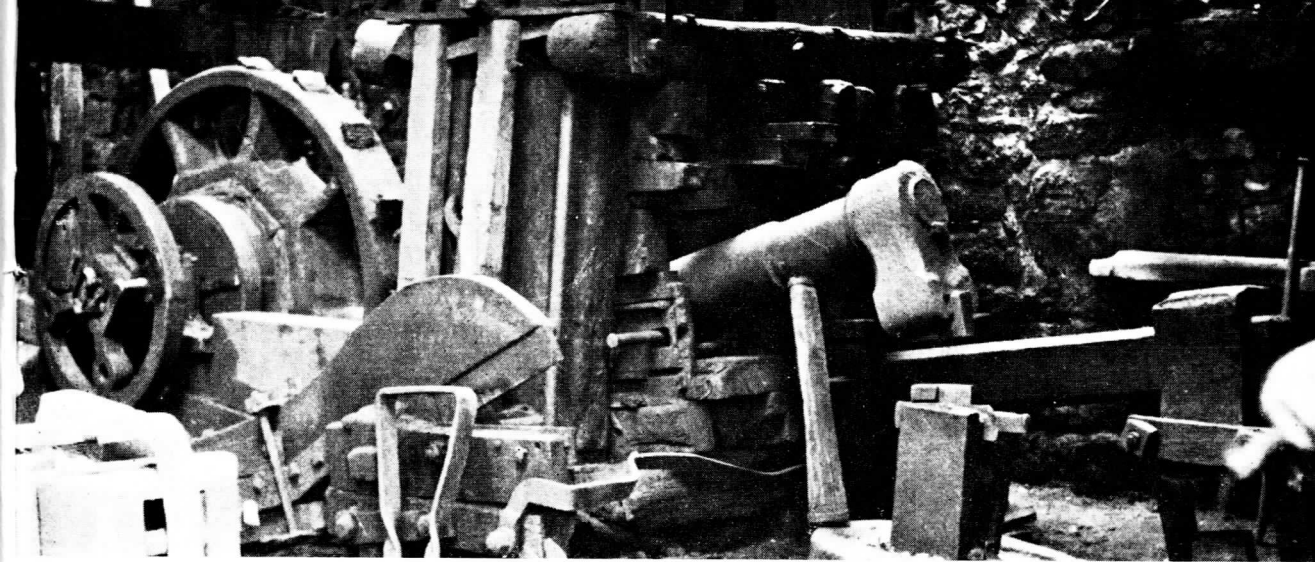
**84 Teign Cider Company, Netherton SX 892713**

This company began as merchants dealing in farmhouse cider in 1791. Later they moved into the production of cider and mineral waters. Most of the buildings, at Netherton near Newton Abbot, are new. One of the large oak fermenting vats came from the Guinness Works and is over 100 years old. Visitors are welcome during the cider-making season.

**85 Whiteways Cyder Company, Whimble SY 045975**

Whiteways established their Whimble Works in 1890 and later set up factories elsewhere. They have some early buildings and a farm cider press but cider is no longer made here.

Cider is also still made on farms. It is reported that four old cider presses are still at work in **Woodbury** SY 012873. **Bicton Museum** also has an old farm-type cider press.



87 Finch Brothers' Foundry, Sticklepath

**86 Coates' Gin Distillery, 60-2 Southside Street, Plymouth SX 483542**

The Black Friars Distillery is believed to contain the oldest surviving building in the city — the 14th-century Refectory of the Dominican Friary. Before becoming a distillery in 1783 it served various purposes — as the Town Marshalsea or Debtors' Prison, as the first meeting place of the Nonconformists and as a refuge for Huguenots. Within the distillery two old stills, an 1855 pot still and an 1856 rectifying still, are preserved and there is an 1855 steam pump in the still house — all made by Shears and Sons, London.

**OTHER TRADES**

**87 Finch Brothers' Foundry, Sticklepath SX 639940**

Originally known as Manor Mills, it consisted of a corn mill and a cloth mill. In 1814 the cloth mill was taken over by William Finch and converted into an edge-tool factory (although called a foundry, this was a misnomer). In 1835 the corn mill was also taken over and made into a grinding house. Agricultural tools such as scythes, bill-hooks and shovels were made and also special scoops for the Devon and Cornwall china clay industry. The machinery was powered by water from the River Taw. A pair of 'tilt' hammers was driven by one water-wheel. A second water-wheel powered a fan and a third drove the grinding mill. Production ceased in 1960 and in 1966 the Finch Foundry Trust was set up. It has restored much of the property to form a museum of rural industry open to the public.

Another edge-tool factory, still in production, near Steps Bridge, **Dunsford SX 806885**, has been modernised. The water-wheel was last used in 1937.

**88 Gill & Rundle's Foundry, Tavistock SX 482744**

In Parkham Road, this is a very good example of the building of an early 19th-century foundry. Now used as a store, it is a solidly built stone structure with arched windows and slate roof.

**89 The Old Match Factory, Exeter SX 925915**

Although called the Old Match Factory, evidence that matches were made here is inconclusive. It was a flax mill in the 1850s and has since been used for paper-bag making, as stables and as a warehouse.

Also to be noted are the mid-Victorian buildings of the **Luckie Horseshoe Leatherworks**, 86 Longbrook Street, Exeter SX 923930, and the tannery of J and F J Baker at Colyton ST 244943.

## HOUSES FOR MASTERS AND MEN

Industry demands not only a place to work but a place to live. In pre-industrial societies, these are often the same place. Domestic industry, as its name implies, was carried on in the home. But of the medieval domestic cloth industry little appears to have survived in Devon. What industrial housing still exists in Devon came with the industrial revolution. Then houses were built by landlords and industrialists in various parts of Devon to house workers in factories and mines. So industrial housing is to be found at Tavistock, Tiverton and Lee Moor.

Equally essential as a part of past industrial society are the houses business men built for themselves, often one of the most conspicuous ways in which the profits of business were expressed.

Lastly, there was the provision the state made in former times for the poor and unemployed — the workhouse — of which Devon has some surviving examples.

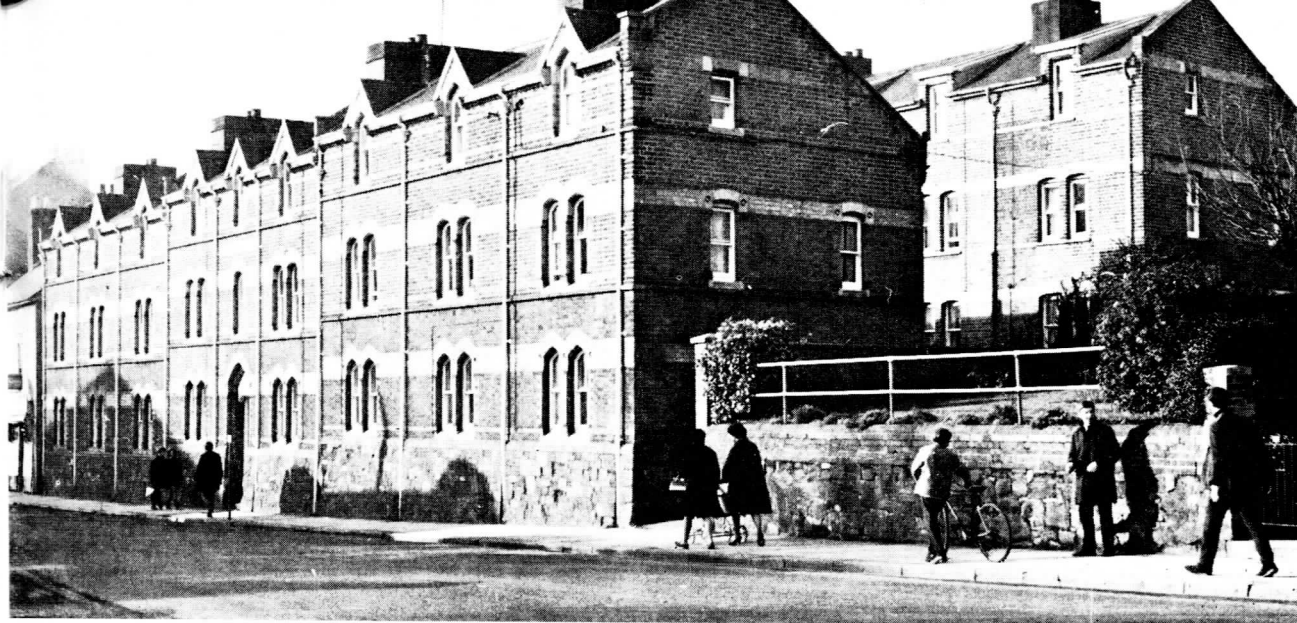
### WORKERS' HOUSES

- 90 Kendall's Improved Industrial Dwellings, Blackboy Road, Exeter SX 929934**  
Built in the mid-19th century of brick, this group of buildings is unusual in design. It consists of two terraces parallel to each other with a long narrow courtyard between and a central passage.
- 91 Haytor Vale Hostelry SX 772772**  
In 1825 a hostelry was built for the workers in the nearby Haytor Granite Quarries, which were opened at the same time. The hostelry is now the Rock Inn. **Merrivale** is a similar village entirely built for the workers of the quarries.
- 92 Horndon Cottages SX 521801**  
This small settlement, originally called 'Miner's Town', was built for the miners of Wheal Friendship, the copper mines at Mary Tavy. One of the early 19th-century stone cottages is now an inn.
- 93 Lee Moor Village SX 573621**  
This village was originally built for china clay workers in 1834. A row of two-storeyed grey-stone terraced cottages bears the date 1835.
- 94 Industrial Housing, Tavistock**  
During the copper mining boom in the mid-19th century, the Duke of Bedford constructed workers' houses for the miners and portworkers at **Westbridge SX 476735**, **Fitzford SX 475738** and **Morwellham SX 445698** (see picture opposite). The design of these houses was in advance of its day.
- 95 Tiverton Workers' Cottages**  
The terraces in **St Paul's Street SS 950126**, **Melbourne Street SS 949127**, **Elm Terrace in Leat Street SS 958120** and **Loughborough Street SS 947133** were built for Heathcoat's workers in 1816.

### LARGER HOUSES

- 96 Elizabethan Merchant's House, 32 New Street, Plymouth SX 483542**  
This fine example of an Elizabethan merchant's house, owned by Plymouth City Council, is open to the public. At **Totnes (70 Fore Street)** a merchant's house is now a museum.
- 97 Oldway, Paignton SX 887617**  
This opulent mansion, of 115 rooms, inspired by Versailles, was built in 1874 at a cost of over £100,000 for Paris Singer by the architect, GS Bridgman. It has a splendid circular stable and carriage house. The Singer family ceased to live there in 1914. It is now owned by Torbay Council.





90 Kendall's Improved Industrial Dwellings, Exeter

98 William Cookworthy's House, Notte Street, Plymouth SX 475543

William Cookworthy, 1705-80, famous for his discovery of china clay and the first manufacturer of Chinese porcelain in England, spent the latter part of his life in this Queen Anne house. It was altered and converted for the use of a Mission Hall in 1883 and is now the Elim Church. It was seriously damaged during the 1939-45 war but was later rebuilt with the original front apart from the pediment.

**WORKHOUSES**

99 Belmont Hospital, Belmont Road, Tiverton SS 956129

An interesting example of the early work of the architect Giles Gilbert Scott, it was built in 1837-8 in the classical style, with plain blocks, small windows and a central octagon with clock tower.

Other workhouses worth noting are at **Barnstaple** (Pre-union) SS 557834 and SS 563333, **Bideford** SS 449263, **St Thomas-Redhills** SX 908924 and **Tavistock** SX 479748.

94 Industrial Housing, Morwellham





## DARTMOOR

Considering its wild and inhospitable character, Dartmoor has been the centre of a surprising amount of industrial activity. Tin working occurred as early as 1156 and for centuries tin was obtained by streaming from surface deposits. Underground mining probably began about 1500. A general decline took place in the late 16th century and only a few tin mines survived into the 19th century. The tin ore was smelted in blowing houses, remains of which survive, notably at **Glaze Meet** SX 668603, **Lydford** SX 642719, **Merrivale** SX 552753, **Shillapark** SX 552762 and **Weekford** SX 654720. Other minerals — copper, silver, lead and zinc — were worked in the 19th and early 20th centuries.

In the 19th century the demand for stone grew and several large quarries were opened. Other industries, including the making of gunpowder, were also carried on in the 19th and early 20th centuries; but the exploitation of china clay is the only such activity to have grown in this century.

The quarrying of granite and china clay and the digging of peat for fuel and naphtha manufacturing posed formidable transport problems and made Dartmoor a site for early railway experiments. Railways or tramways were built to link a number of these enterprises with the main transport system or to supply works with needed materials.

### CHINA CLAY

#### 100 Lee Moor Clay Works SX 567625

These workings were opened in 1830 and have expanded over the years. They include pits at Wotter, Hemerdon, Shaugh, Heddon, Brisworthy and Smallhanger.

#### 101 Shaugh Prior Clay Works SX 534635

These works were abandoned in the 1960s. The process of working can be followed clearly from the remains. In the quarries, the clay was broken up and washed into large settling pits, usually through a pipe or in the early days an open leat, where the impurities (mostly mica) fell to the bottom. The clay and water was then pumped into the refining pits, where the clay was allowed to settle and the water was drawn off from the top. Finally the clay passed into the drying tanks built like a Roman hypocaust.

#### 102 South Brent Clay Works SX 681629

These works were a failure because the clay was not of high enough quality to make the pits remunerative. Opened in the mid-19th century, they were abandoned before 1900.

### MINES

#### 103 Eylesbarrow Mine SX 598682

Tin was produced here until the middle of the 19th century. Ruins of the smelting house and wheel pit can be seen; but more interesting are the remains of the axle-bearing granite standing stones which supported a flat-rod system of power transmission. About half a mile out of Sheepstor a good path leads to this mine. (See R M L Cook, T A P Greeves and C C Kilvington, 'Eylesbarrow (1814-1852): a study of a Dartmoor tin mine', TDA, CVI (1974) 161-214. 'A tinner's mill in Walkhampton parish' (SX 567695) is described by T A P Greeves in TDA, CIII (1971) 197-200.)

#### 104 Hexworthy Mine SX 654711

First worked opencast for tin in the 1820s and 1830s, it was reopened in the late 1880s when shafts were sunk. In 1905 a generating plant using a water-driven Pelton wheel was set up near Saddle Bridge. Production ceased in 1916. Among the remains are ruins of buildings, wheel pits, leats and dressing floors with circular buddles and the base of the stamps.



106 Engine House at Wheal Betsy

**105 Birch Tor and Vitifer Mines SX 685808**

In the late 18th and mid-19th centuries, these were the largest group of tin mines on the moor and extended right down the valley to link up with the Golden Dagger mine in Manaton Parish. The water for these mines was brought by a seven-mile leat from the East Dart. A footpath leads down to the head of the West Webburn river, where artificial ravines made by tin-miners before the days of shaft-mining can be seen. There are extensive earthworks and shafts in this area and care should be taken.

**106 Wheal Betsy SX 510813**

This old mine was reopened for a time in 1806 and again in 1863 when it was renamed The Prince Arthur Consols. It produced lead, silver and zinc. Between 1845 and 1875 the output was 540 tons of lead and over 2,000 ounces of silver. Five water-wheels were used to provide power for pumping, milling, etc. The mine was abandoned in the late 1870s. Its engine house is now owned by the National Trust.

**107 Wheal Friendship SX 505795**

Copper, arsenic, lead and iron were mined here for 130 years. It was a large mine extending under the village street at Mary Tavy east to the Tavy valley and stretching nearly a mile westwards from the valley. In 1798 John Taylor took over the management and opened up the mine further with a new shaft in 1826. During its prime the power for this mine was produced by 17 overshot water-wheels. In the 1880s the mine was reopened by the Devon Arsenic Co and extensive new plant was installed: working continued until 31 July 1925. A considerable amount of the arsenic plant remains, including ruins of the condensing plant and a large 300-ft long flue leading to the now demolished 'Brenton's stack'. The couthouse (which also served as the mine captain's house) has recently been reroofed.

Surface remains of many other mines can be seen on Dartmoor. In particular **Great Rock Mine** SX 827816 which operated from the 1840s to the late 1870s and again 1902-69: the remains of the dressing floors survive at this mine. **Kelly Mine** SX 795817 worked intermittently from 1797 to 1950: as well as open workings and the dressing floors, the remains of a water turbine and set of stamps can be seen. Remains at **Wray Mine** SX 771848 consist of two open adits and dressing floors including three buddle bases.

## OTHER INDUSTRIES

### 108 Gunpowder Mills, Two Bridges SX 628769

These mills were opened in 1844 by George Freaun to make gunpowder, a mixture of saltpetre, charcoal and sulphur. The fine grinding necessary was carried out in circular troughs by huge stone wheels powered by water. After the invention of dynamite by Alfred Nobel in 1867 the demand for gunpowder declined and the powder mills closed down in the 1890s. Some of the buildings have been subsequently converted for farm use; workers' housing can be seen alongside Powder Mills Farm; the walls of three wheel- and grinding-houses and two tall chimney stacks can be seen on the moor behind the farm. A small mortar used for testing stands at the entrance to the farm.

### 109 Iceworks, Sourton SX 546893

During the early 1880s these iceworks were set up on the moor above the village of Sourton. Spring water was fed into tanks and allowed to freeze. The blocks of ice were then stored in peat-insulated tanks. The works, however, had only a short life. All that remains are a few pits and some granite posts in the dip between Sourton Tor and Corn Ridge.

### 110 Naphtha Works, Shipley Bridge SX 681629

Naphtha is an inflammable oil derived from the distillation of peat and used for making gas and candles. In 1844 Peter Adams and Jacob Hall Drew of Plymouth started a naphtha works, first at Bachelors Hall near Princetown and then at the Princetown prison which was lit by gas and candles made at the plant. A railway was made to the peat beds at Holming Beam and Greena Ball: at the same time works were also started at Shipley Bridge to use the peat beds at Redlake. The ruins are intermixed with those of South Brent Clay works, see page 24.

### 111 Compressed Peat Works, Rattlebrook Head SX 561871

In 1901 a plant was set up to carbonize peat to make it into a commercial fuel. Similar to coal, this fuel had a combustion rate too rapid to make it economical to use. Only a few ruins remain of the works but the extensive peat beds can be seen at Kitty Tor.

### 112 Haytor Granite Quarries SX 759775

These quarries were worked by George Templer, son of the builder of Stover Canal, early in the 19th century. For a period several thousand tons of granite were exported each year and used in the construction of the British Museum, National Gallery and London Bridge etc. In 1850 100 men were employed; but by 1858 the trade had declined due to competition from coastal Cornish quarries and the quarries were closed in 1865. Other disused quarries are on **Walkhampton Common** at **King Tor** SX 554739, **Foggintor** or **Royal Oak** SX 567736 and **Swell Tor** SX 560733.

## TRAMWAYS AND RAILWAYS

### 113 Haytor Granite Tramway (length 10 miles)

Built by George Templer and opened in September 1820, this unusual 4 ft 3 in gauge tramway was used for transporting granite from the Haytor quarries to Ventiford Wharf on the Stover Canal at Teigngrace and thence by barge to Teignmouth for shipment to London. The rails made of granite blocks 12 in wide and 9 in deep vary in length from 4 ft to 8 ft. They were laid longitudinally and had flanges on the inside. The wagons, made of iron with flangeless wheels, ran in trains of twelve drawn by eighteen horses in single file, in front for the upward journey and at the rear for the downward. The tramway ceased operation when the quarries were closed in the late 1850s. The section from Holwell quarry SX 751778 to the Manaton road has much granite rail *in situ*.

### 114 Lee Moor Tramway (length 8 miles)

This 4 ft 6 in tramway was built to carry china clay from Lee Moor to Cattewater Quay, Plymouth. Opened in 1854, it closed down almost immediately because of an unfortunate accident. Then, having been almost entirely rebuilt, it reopened in 1858. From 1899 to 1947 it had three different forms of traction — steam, gravity and horse — working together. Steam operated between two cable-operated inclines, gravity on the inclines and horses at the bottom on the final stage to the quay. The line was dismantled in 1961. Much of the track can be traced.



107 Wheal Friendship Arsenic Plant

**115 Plymouth and Dartmoor Railway** (length 24 miles)

This horse-drawn railway, built for Sir Thomas Tyrwhitt by William Hughes and Roger Hopkins, ran between Sutton Harbour and Princetown. Opened in 1823, it was used for the transport of granite to Plymouth and coal, timber, sea-sand, lime and general supplies for Princetown. The line included a 620-yd tunnel at **Leigham** SX 512586. The tunnel portals are intact and parts of the track can be seen. The most accessible portion for viewing is situated on a by-road to Chub Tor north of the Yelverton-Plymouth road (A386) approximately one mile from Yelverton.

This by-road runs parallel not only to the railway but also to **Drakes Leat** and the **Devonport Leat**, which were built to carry fresh water to Plymouth and Devonport.

**116 Rattlebrook Peat Railway** (length approximately 4½ miles)

This standard gauge railway was built in 1879 to bring peat down from Rattlebrook Head 1,750 ft above sea level to Bridestowe station. Owned by the West of England Compressed Peat Company, it survived until 1931. The line was dismantled but the trackway, used until the 1950s by lorries to bring the peat down, can be followed.

**117 Redlake China Clay Railway** (length 7½ miles)

This 3-ft gauge railway with one inclined plane, was opened in 1911 to transport workers, supplies and coal from Bittaford to the china clay works at Redlake. The clay was then piped down to Bittaford on the main line. The company closed down in 1932. Parts of the track can be followed. The turntable site can be seen above the incline.

**118 Zeal Tor or Redlake Peat Tramway** (length 4 miles)

This unusual tramway which had wooden rails bolted to granite blocks, was built in 1847 to carry peat from the Redlake beds on the open moor to the Naphtha Works at Shipley Bridge. It closed in 1872 but was later used for a time by the Brent Moor Clay Company. The track can be followed over the moor and some of the blocks of granite containing the holes where the rails were attached can be seen.

108 Mortar at Powder Mills Farm



## THE TAMAR VALLEY

The area around the lower Tamar valley and the Bere Alston Peninsula between the Tamar and its tributary, the Tavy, was one of the richest mining territories in Britain a hundred years ago. It is rich in copper, tin, lead, silver, arsenic and other minerals. As a result a network of quays, canals and mineral railways was constructed in the steep and rugged terrain; and the whole area abounds in deserted mines, foundries, workshops, warehouses and limekilns. The isolated grandeur of the scenery today adds to the fascination of visiting this remarkable valley, which can best be seen by a boat trip on the river.

### MINES, QUARRIES AND SMELTING

#### 119 Bedford United Mine SX 435724

This important mine produced arsenic, copper, fluorspar, tin, uranium and wolfram. Situated on high ground north-east of Gunnislake bridge, it was opened in 1840. Its water power was brought by a leat from the Tavistock canal two miles away: this leat, which was in use until the 1930s, followed the contour of the hillside and passed through two tunnels cut through the rock and over a rock face on wooden launders hung by chains. This mine became the third largest copper producer in Devon and had its own tramway linking up with the Devon Great Consols railway. The mine worked intermittently until 1925. An adit may be seen along the river, above Gunnislake bridge, and there are other remains south of the bridge.

#### Bere Alston Silver and Lead Mines

These are some of the oldest worked mines in the country and are first recorded in the 13th century. In 1294 370 lb of silver were sent up to London from Martinstowe (Maristowe). As at Combe Martin mines in north Devon, men were brought from Derbyshire to work these mines. They were abandoned by the end of the 15th century and not successfully reworked until the 19th century. By 1809 they were among the leading lead and silver mines in the country. The lead and silver come from two lodes running north and south through the Bere Alston peninsula. Of eight mines, the two richest were the **South Hooe** and the **South Tamar Consols** (see 120 below).

#### 120 South Tamar Consols Mine SX 435645

The ruins of this mine, disastrously flooded in 1856, lie a quarter mile south of Weir Quay. At SX 426654, the engine house of **Ward Mine** is preserved as a farmhouse.

#### 121 Gawton Arsenic Works SX 448689

Many remains of arsenic plants can be found in the Tamar Valley. Arsenic was found in association with copper and when the copper lodes began to decline, arsenic plants were set up at most of the mines. Much of the arsenic was used as a colouring agent for dyes. It was also used in glass manufacture and for insecticides. The stack at Gawton is prominent and has a pronounced slant. It terminates the long and impressive arsenic flue.

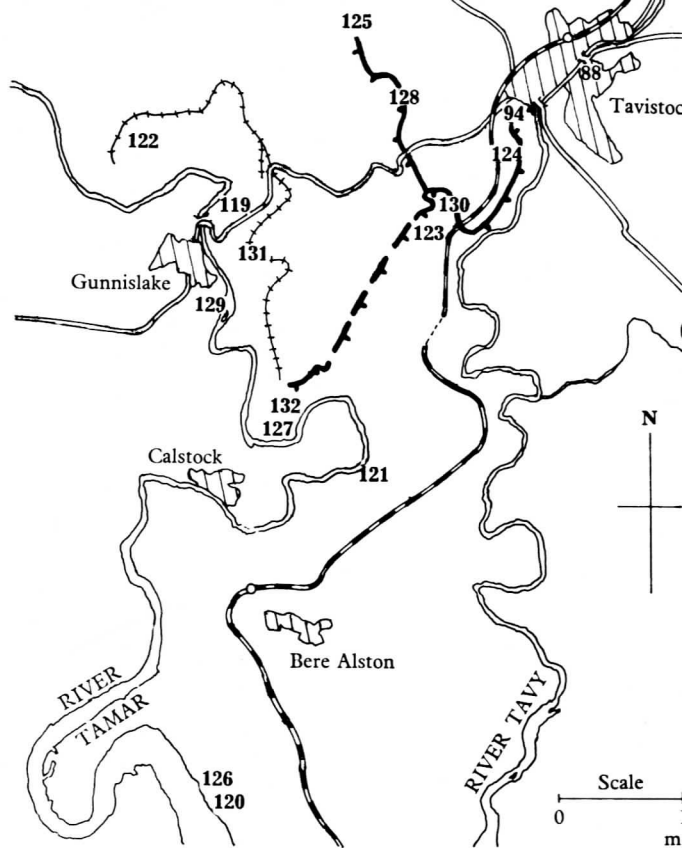
#### 122 Devon Great Consols Mine SX 426733

This rich mine was opened in 1844. By 1878 it had produced over 622,000 tons of copper and 76,000 tons of arsenic. In the 1880s production concentrated on arsenic. The mines extended over 160 acres and were among the largest and richest copper mines in the world. This mine was the only one in the district with its own railway system. It closed in 1901. Little of this vast enterprise survives. Heaps of waste and the ruins of the arsenic plant cover a wide area but little else remains. Leaching of copper dumps is being carried out on this site so it can only be viewed from the road.





121 Gawton Arsenic Works



The Tamar Valley

**123 Wheal Crebor SX 458719**

This mine produced copper and some arsenic, tin and iron. Less than a mile from Wheal Crowndale, the lodes were discovered during work on the Tavistock canal tunnel. Between 1811 and 1817 this was one of Devon's leading copper mines. It closed in 1902. Twenty feet from the north end of the canal tunnel can be seen the mouth of an incline shaft.

**124 Wheal Crowndale SX 473727**

Opened in 1799, it was one of the main reasons for building the Tavistock canal. It produced mainly copper, arsenic and some tin and iron. The Duke of Bedford was averse to the development of this mine and it was not worked on a large scale after 1858. It was prospected in 1924 for the working of arsenic. A timbered shaft from the 1924 workings can be seen from the Tavistock canal towpath.

**125 Mill Hill Slate Quarries SX 453748**

These quarries have been in continuous use for 400 years and produce an attractive blue-black slate much used in Tavistock and in local farm buildings for walling, chimneys and water tanks. In the 18th century much of this slate was exported to the Channel Islands.

**126 Smelting Works, Weir Quay SX 435650**

Most of the ore from the lead and silver mines of the Bere Alston peninsula was smelted at the two works at Weir Quay; the **Tamar Smelting Works** and the **Union Smelting Works**. The former, built in the 1820s and completely re-equipped in 1845, contained 18 furnaces which were able to smelt over 300 tons of ore a month. They closed in about 1860. The large entrance gates and paved yard and some of the ore storage sheds can be seen but those wishing to explore within the yard should ask permission from the house next to the gate. The **Union Smelting Works** lie 100 yards north of the Tamar works and are in a better state of preservation. The buildings on either side were formerly used as count and assay houses.

### 127 Morwellham Quay SX 445695

This decayed and abandoned river port, one of the most evocative places in Devon, was the hub of the communication network for the industries of the upper Tamar Valley. Although Morwellham had been the port of Tavistock since the middle ages, it reached world-wide importance in the 19th century, following the completion of the canal link with Tavistock in 1817; and in the 1840s Morwellham became the port of the Devon Great Consols mine. Goods from the canal and from Devon Great Consols were brought down to the quay by two inclined planes (see 131 and 132). Traffic boomed in the 1840s and in the following decade vessels up to 300 tons queued up to be accommodated. But the prosperity of this up-river port was brief. The first blow was struck by the construction in 1859 of the Plymouth-Tavistock railway, which took most of the canal's traffic; and the death-knell came with the closure of Devon Great Consols in 1901. Over the next seventy years, the harbours silted up and the quays became overgrown and almost forgotten.

In 1970 the harbour area was leased by the Dartington Hall Trust, who set up the Morwellham Quay Centre for Recreation and Education in order to encourage visitors to come and explore the historic features. The old dance hall behind the Ship Inn has become the Centre's museum; a warehouse is converted into an audio-visual centre; limekilns have been excavated and a water-wheel (previously operated at the china clay pits at Headon on Dartmoor) erected where a former wheel ground manganese; the tiled quays have been uncovered and a start made clearing the great 1859 dock. Cottages ('improved dwellings') built by the Duke of Bedford for the workers are still inhabited. The site is open all the year round.

## CANALS

### 128 Mill Hill Cut (length 2 miles)

Linking the Mill Hill quarries to the Tavistock Canal (see 130), it was opened in 1819 and replaced by a tramway in 1844. Parts of the canal and the tramway can be followed.

### 129 Tamar Manure Navigation (length 3 miles)

This section of a proposed canal from Morwellham to Tamerton bridge, constructed under an Act of 1796, finished at Weir Head. It had a long successful life, carrying manure, coal, bricks, lime and granite, until it was closed during the second world war. At Weir Head SX 436711 the lock basin, part of the lock and remains of the lock-keeper's cottage survive.

### 130 Tavistock Canal (length 4½ miles)

Built by John Taylor between 1803 and 1817 to connect Tavistock to the Tamar at Morwellham, this canal carried copper ore to Morwellham and coal, lime, manure and sand in the opposite direction. Its usefulness declined after the railway was built in 1859 and it was closed in the 1880s. The canal is now used as a source of water to power the Morwellham generator of the Central Electricity Board. At Tavistock SX 477742 the canal basin with good examples of Georgian warehouses and cottages can be seen. The towpath can be followed to the northern entrance of the tunnel cut through Morwell Down. The aqueduct crossing the Lumburn SX 463726 is intact. The canal ends with a basin at the top of the inclined plane above Morwellham (see 132).

## RAILWAYS AND TRAMWAYS

### 131 Devon Great Consols Mineral Railway

Opened in 1859, this standard gauge railway linked Devon Great Consols and Morwellham quay. The steep descent down to Morwellham quay was made by a half mile long incline. The railway closed when the mines shut down in 1901. Parts of the incline are visible.

### 132 Morwellham Inclined Plane SX 445698

Built by John Taylor in 1817, it connected the Tavistock Canal terminus with Morwellham quay 240 ft below. It had a double 4-ft 3-in track and was powered by a large water-wheel. Little remains of the incline but the wheel-pit and parts of the incline rails can be seen.



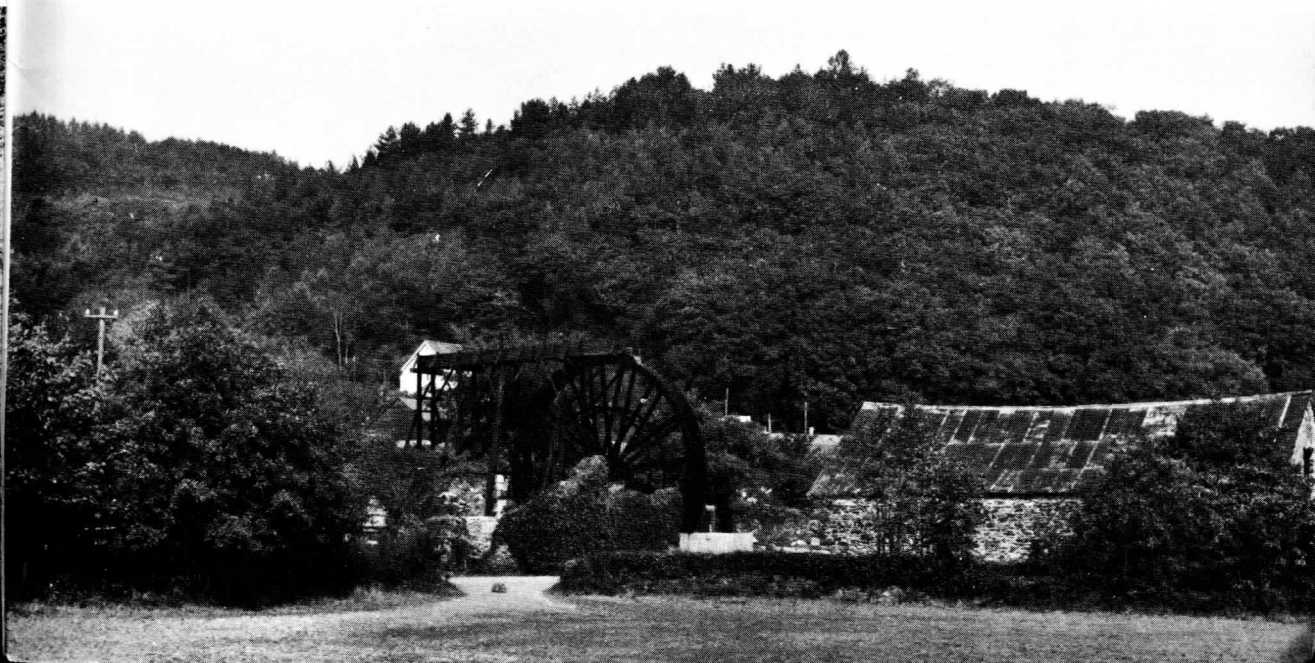
126 Union Smelting Works, Weir Quay

#### LIMEKILNS

The trade in lime for agricultural purposes was one of the oldest and largest of the Tamar Valley industries. In early days, lime was obtained from coral and shell in sea sand; but later it was extracted from limestone brought by barge from the Plymouth quarries by a burning process carried on in kilns. Most of the kilns were built between 1770 and 1830. They were usually constructed of slate, 20—30 ft high, and set in the river bank.

Of the kilns in the Tamar Valley, the following are in Devon: **Gawton SX 448688**, **Hole's Hole SX 431652**, **Mill Hill SX 454747**, **Morwellham SX 446698**, **Newquay SX 455696**, **Rumleigh SX 445684**, **South Hooe SX 422654** and **Weirquay SX 434646**.

127 Manganese warehouse and reconstructed water-wheel, Morwellham



## INDUSTRIAL ARCHAEOLOGY SURVEY IN DEVON

A number of bodies are concerned with industrial archaeology in Devon. The **Council for British Archaeology**, through its industrial archaeology representative Keith Falconer, has carried out a survey of sites in Devon and has made recommendations for official scheduling and listing of monuments and buildings. The **Exeter Industrial Archaeology Group** (Secretary: Roger Eckersley, 26 Sylvan Road, Exeter) is active in its own area and is publishing a series of pamphlets on the subject. In conjunction with the **Department of Economic History, University of Exeter**, it has in hand surveys of watermills, limekilns, tollhouses, poundhouses, blowing houses and milestones and other roadside monuments. Information about sites in any of these categories would be welcome.

### How you can help

Industrial archaeology has two main aspects — the preservation of important sites, monuments and buildings; and systematic recording, including photographs and measured drawings as well as verbal descriptions. Help is needed for both these purposes.

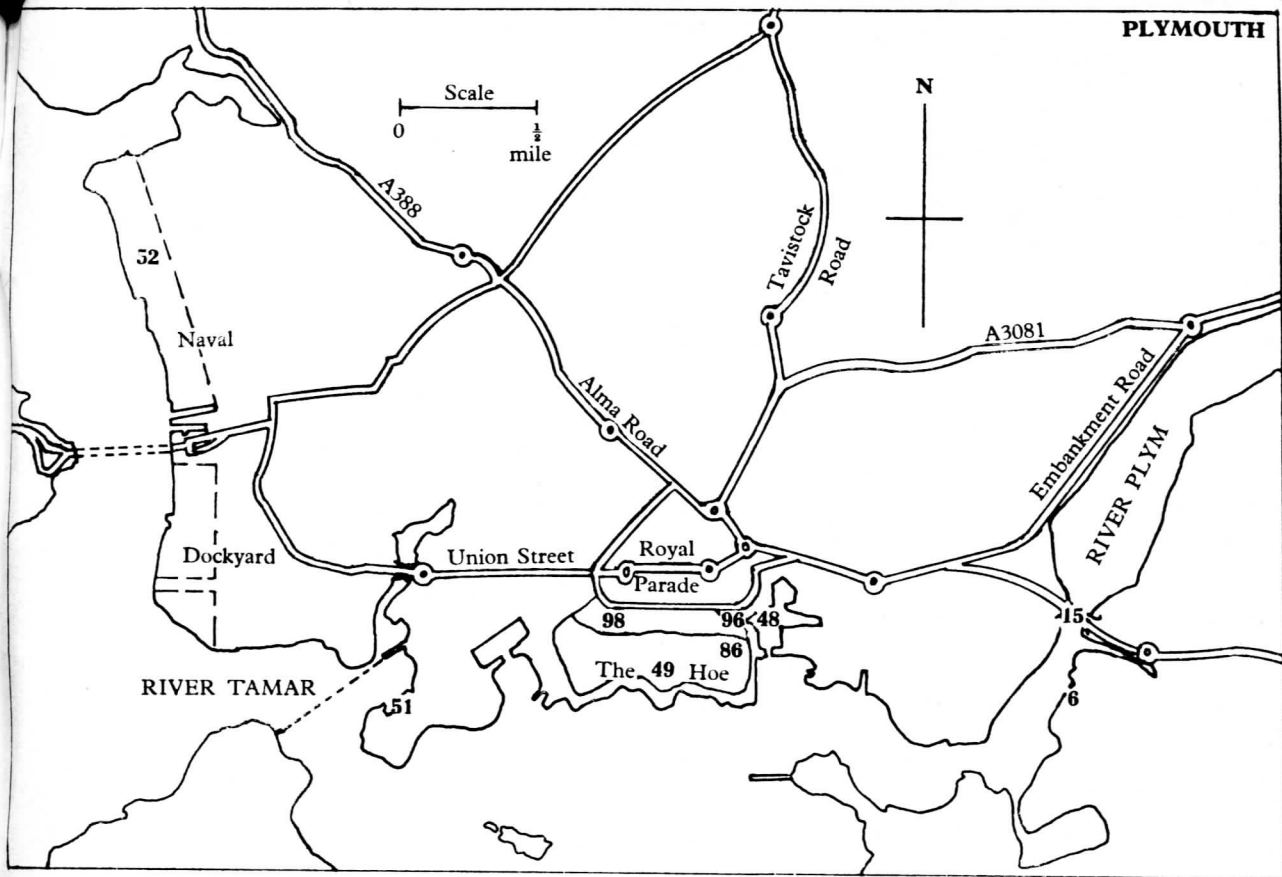
*Preservation.* Public bodies have powers to protect and preserve industrial relics. The Ancient Monuments Acts permit the 'scheduling' of ancient monuments; their purchase or guardianship by the Department of the Environment; the making of preservation orders; and various other forms of control or assistance. The Historic Buildings Acts and the Town and Country Planning Acts permit the 'listing' of buildings of architectural or historic interest; the payment of grants or loans towards their upkeep by the Historic Buildings Council or by local authorities; the making of preservation orders; and various other forms of control. These controls are strengthened by the Civic Amenities Act 1967.

The effective use of these powers by public bodies depends greatly upon public interest in the preservation of monuments and historic buildings. Moreover, the public powers must be supported by the active care of private and commercial people to maintain the historic building they own or occupy. The speed with which buildings can be destroyed and monuments removed means that quick action is imperative when significant structures are threatened.

*Recording.* Help in the systematic recording of the industrial archaeology of Devon would be welcome to the bodies shown earlier on this page.

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- |                                  |   |
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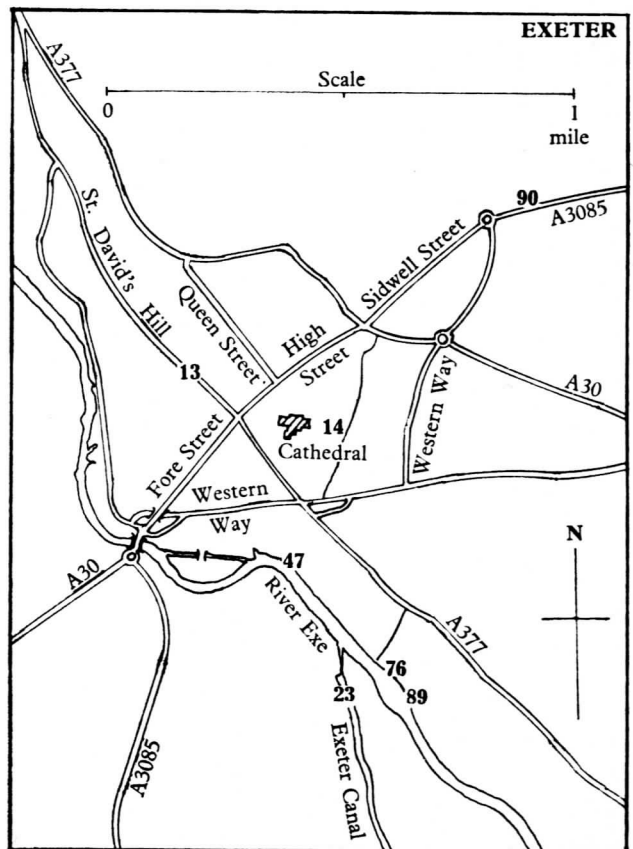


## PLYMOUTH

- 6 Pomphlett Mill
- 15 Laira Bridge
- 48 Sutton Harbour
- 49 Smeaton's Tower, Plymouth Hoe
- 51 Royal William Victualling Yard
- 52 Royal Naval Dockyard
- 86 Coates' Gin Distillery
- 96 Elizabethan Merchant's House
- 98 William Cookworthy's House

## EXETER

- 13 North Road Iron Bridge
- 14 Iron Footbridge, The Close
- 23 Exeter Canal
- 47 Exeter River Quay
- 76 Trews Weir Paper Mill
- 89 The Old Match Factory
- 90 Kendall's Improved Industrial Dwellings





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