THE PERRAN FOUNDRY PERRANWORTHAL CORNWALL

AN HISTORICAL REPORT AND ASSESSMENT OF A LATE EIGHTEENTH-CENTURY IRON FOUNDRY AND STEAM ENGINE MANUFACTORY

by
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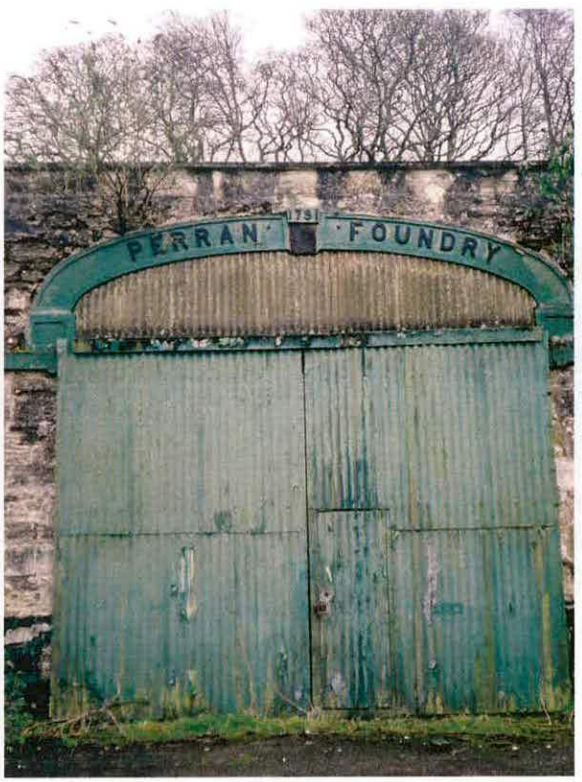

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Nature of Request

The Perran Foundry at Perranwarworthal, between Truro and Falmouth, was one of three substantial mining engineering concerns in Cornwall which flourished in the late eighteenth and early nineteenth centuries, the others being Harvey's and the Copperhouse foundries both at Hayle on the north Cornish coast. These foundries supplied steam engine pumps and heavy iron machine parts to mines, waterworks and ironworks in many parts of the world. The Perran foundry, the most intact of the three, was established in 1791 by the Fox family of Falmouth, who were also lessees of the Neath Abbey blast furnaces in South Wales (which supplied top quality pig iron to the Cornish foundry). In 1858 the foundry fell under the control of the Williams family of nearby Gwennap who, between 1860 and 1865, rebuilt some of the older buildings and constructed new ones. The foundry closed in 1879 and from 1890 became part of a milling enterprise, which continued until 1985. Proposals to redevelop the site in the 1990s came to nothing and it is at present unoccupied (summer 2002). It comprises a group of industrial sheds (certainly not 'Architecture' by Sir Nikolaus Pevsner's famous definition) dating from the late eighteenth century to the mid-nineteenth century, some roofless and in a bad state of repair. The site includes the remains of a leat system that provided water power to the forge. The site was thoroughly investigated by the Cornwall Archaeological Unit who produced a report in 1990. This present report must be seen as an historical appendix to the CAU report, the Conservation Plan prepared by John Lyall Architects and Alan Baxter Associates for Perran Foundry Ltd in 1998, as well as to the Conservation Statement prepared by Carrick District Council in April 2002.

The site comprises a mixture of grade II and II* listed buildings and the whole is listed on the English Heritage *Buildings at Risk* register. The Historical Analysis and Research Team, based at Savile Row, have been asked to provide historical information to inform the conservation of the site. Copies of the report have been deposited at the National Monuments Record Centre in Swindon, and in the English Heritage Library at Savile Row.

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THE PERRAN FOUNDRY

1. Introduction

'It is generally well known' wrote the Cornish industrial historian W. Tregoning Hooper in his paper, 'Summary of the History of the Perran Foundry' published in 1929, and one of his two key historical accounts of Perran, 'that from 1750 to 1850, Cornwall was one of the principal world centres of mining and engineering activity; the steam engine being cradled and brought to a high degree of efficiency in the mining area between Truro and Camborne. In this work, which made modern civilization possible, the Perran Foundry played an important part'.[1]

The Perran foundry at Perranworthal, between Truro and Falmouth, is one of three major iron foundries in the county of Cornwall. They were founded in the late eighteenth and early nineteenth centuries with the purpose of making steam pumping engines for draining tin and copper producing mines. Harvey's at Hayle on the north coast of Cornwall was the earliest, founded in 1779; the Perran foundry in 1791; and the Copperhouse Foundry and Engine Works at Copperhouse, Hayle was established in 1819. Of these, Harvey's was long reckoned to be the largest and best known, 'the most considerable in the west of England'.[2] It was an ideal place to site a foundry because coal was easily brought from Wales. However, little remains intact of the early buildings associated with the Hayle foundries following a period of dereliction and demolition in the 1970s and 1980s,[3] and although Perran was, at 4 acres (1.6 ha), the smallest site of the three, more survives there than at the other comparable sites in Cornwall.[4] (see section 11, page 16 below, *Significance of the Perran Site*). Some of the buildings constructed in 1790s, such as the Pattern Shed at the west end of the site, survive today, albeit with mid-nineteenth-century alterations and additions when the ironworks expanded. Perran can claim to be the only surviving major late eighteenth-century engine-making foundry in Cornwall and the South-West, and an integral and vital part of the story of the Industrial Revolution in this part of Britain.

2. Background History on the Use of Steam Engines in Cornish Mines

Thomas Newcomen (1663–1729), an engineer from Dartmouth, invented the first practical steam engine in 1712. The engine, with its wooden beam, cylinder and plug-rod with tappets for working the injection and steam valves, made twelve strokes per minute, and raised 50 gallons (227 litres) of water with each stroke from a depth of 156 feet (48m). It was the earliest known example of the beam engine, and provided the impetus to develop mining in Cornwall and elsewhere. James Watt improved on the design with a separate condenser (patented in 1769), which led to a great saving in coal. In 1777, the new Watt engines were installed at Wheal Busy and Ting Tang

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1 Tregoning Hooper 1928, 273

2 Barham 1843,1

3 See *Harvey's Foundry Hayle* report by the Cornwall Archaeological Unit, August 2001. The pattern store, ruined foundry barn, engine and boiler house and the remains of the boring mill are significant survivals and are grade II listed buildings.

4 See section 11, page 16 below, *Significance of the Perran Site.*

mines which had hitherto been drained by manual labour and horse-powered pumps. In 1800 Watt's patent expired and Cornish engineers such as Richard Trevithick (1771–1833), rushed to improve on the existing designs for beam pumping engine. In 1801 Trevithick built the first high-pressure steam pumping engine capable of lifting 92 gallons (418lt) of water at a rate of thirteen strokes per minute. The castings for Trevithick's steam engine were made at the Hayle foundry. The first mining engine was erected by Trevithick at Wheal Prosper mine in 1811. It was a single-acting condensing engine on which the steam piston, on its downstroke, raised through the beam a heavy weight on the pump ram which, on its subsequent downstroke, pumped the water. The established iron foundries at Hayle, Perran and Neath Abbey Ironworks in South Wales went on to make themselves renowned for building such steam engines for mine pumping. The cylinder of Trevithick's 76-inch (1.9m) Dolcoath engine, erected in 1816, was cast at the Neath Abbey Ironworks, and the beam was cast at the Perran Foundry. These engines led not only to a great improvement of the local mining industry by draining mines at greater depths, but also had a marked influence on the industrial supremacy of England. Tregoning Hooper wrote: 'In this work of national importance, Perran Foundry played a part equally important and meritorious as that of its more famous contemporary, Hayle foundry'.[5]

The principal copper mining area in Cornwall from the late eighteenth until the end of the nineteenth century, was in the Gwenapp parish, located between north and south coasts of Cornwall and a few miles north-west of Perran. Here, mines were being developed by the Williams family of Scorrier, and the Foxes of Falmouth. Winding or raising the ore from the mines was equally important as pumping water. Throughout the nineteenth century the bulk of the ore was raised by what were known as 'fire whims', rotary Cornish beam engines driving large winding drums. There were several hundred engines of this type at work in the county, varying in size from 18 inches (0.46m) to 36 inches (0.9m) cylinder. Many were made at the Perran foundry, and nearly all the engines in the Gwennap mines were built there.[6] A few of the engine houses – rectangular in plan with a round chimney at one corner and a bob wall at the opposite end on which the beam rocked – can still be seen at the United Mines site at Gwennap (Fig.14).

3. The Founding of the Perran Foundry, and the Interests of the Fox Family

George Croker Fox, (1728–1781) was a Quaker and founder, in 1762, of G.C. Fox and Co. 'Consuls, Merchants and Shipping Agents' in Falmouth. In 1769, Fox acquired, under lease from Lord Mount Edgcumbe, the wastelands in the bottom of the Kennall Valley on the Mylor (south) side of the river. These lands were part of Lord Mount Edgcumbe's holding of the Manor of Cosawes.[7] This was the beginning of the great industrial development which was to transform the Kennall Valley, and formed part of the expansion, by the Fox family, of one of the principal industrial empires in the early nineteenth century. George Fox did not live to see the fruits of his endeavours; the Perran Foundry Company was eventually founded in 1791 by his two sons George Croker Fox II (1752–1807), and Robert Were Fox I (1754–1818).

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5 Tregoning Hooper 1939, 62

6 Tregoning Hooper 1939, 81

7 Bradley 1980, 28

The purpose of establishing the foundry was to supply all the machinery and engine castings required for the Gwennap mines, and a variety of cast-iron products for world markets. At the same time, a trading company was founded by the Foxes dealing in imports of timber, coal, iron, and guano; and the outwards transportation of copper ore from Perran Wharf by lighters. Because of the quantities of fuel required for smelting, most copper ores were shipped to South Wales, from which coal was brought back in return for the engines on the mines. The Fox family businesses were beautifully integrated. Besides the foundry and wharf at Perran, the Fox family had interests in Welsh coal and iron mines, at the Neath Abbey Ironworks and copper-smelting works, as well as shipping on the Bristol Channel routes and, later, a gunpowder works in Kennall Vale. They were also responsible for the development of the harbour at Portreath, and for turning it into one of the largest copper exporting ports in Cornwall. In the 1790s the Foxes had a close working relationship with Boulton and Watt in Birmingham, and the Quaker Darby family of Coalbrookdale, from whom they purchased pig iron until they produced their own at the Neath Abbey Ironworks. They were one of the key families of Quaker entrepreneurs in Britain's unfolding Industrial Revolution, ploughing their profits back into their businesses.

The setting up of Perran was, for the most part, supervised George's second son, Robert Were Fox, mine-owner, merchant, ship agent, consul and tin smelter. The other founding partners of the Perran Foundry Company were Samuel Tregelles, Peter Price, George Fox of Tredrea (the first manager) and John Williams of Scorrier, an able mineralogist. The latter was a partner in the Perran Foundry Company from 1791 until his death in 1841. In collaboration with the Williams family, Robert Were Fox conceived and constructed the first railway in the county from the Gwennap Mines to Porthreath in 1824, which later became part of the Mineral Tramways Project. Were Fox's son, Robert Were Fox II (1789–1877), took an interest in the running of Perran. He became a prominent and respected scientist, was one of the founders of the Royal Cornwall Polytechnic Society in 1833, and a Fellow of the Royal Society. He carried out research into high pressure steam, hoping to improve the Watt engines employed in pumping the Cornish Mines. He published papers on the subject of temperature in mines in relation to depth, and the role of electro-magnetism in the formation of mineral veins.[8]

Following the founding of the company in 1791, a group was formed to develop the foundry and works which included three acknowledged experts in practical engineering: Thomas Wilson, a copper smelter and former agent for Boulton and Watt; William Wood, an ironmaster of Swansea; and Peter Price (1739–1821), merchant of Penryn. According to Cornish industrial historian and engineer Thomas H. Bradley, Peter Price was the lynch pin on which the project depended in its early days and much involved in the technical aspects of the Perran foundry. Price had been trained by Abraham Darby II of Coalbrookdale, had been a manager of the boring mill of the great iron foundry of Carron in Scotland and, later, land agent to the Coalbrookdale Company. He spent five years, between 1769 and 1774, developing blast furnaces in the eastern states of America. He had moved to Cornwall in 1780 and married Anne Tregelles, sister of Samuel Tregelles, a merchant, friend of the Foxes, and another founder partner in the Perran works.[9]

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8 DNB, Vol.VII 1968, 573

9 Bradley 1980, 38

In 1792, Peter Price secured a lease of Neath Abbey Ironworks at Cwm Velin in South Wales, which then comprised only a foundry and copper rolling mill. In that year Price designed and built there two huge blast furnaces which were to be used in conjunction with Boulton and Watt blowing engines. This was part of a large-scale development of the South Wales Iron industry.[10] There followed a close co-operation between the two foundries, with heavy forgings and castings made at the Neath Abbey works, and lighter castings at Perran. Tregoning Hooper cited a letter from James Watt to John Southern from Truro, dated 1792, which stated that: 'Messrs R.W. Fox and Co. of Falmouth have ordered an engine for blowing iron furnaces at Neath Abbey. The castings and the cylinders are to be done at the (Coalbrook)Dale, and pipes and small castings at their new foundry here. The hammered ironwork is all to be done here or in Wales'.[11] The members of both companies were the same people. The first manager of the Perran works was George Fox, who had overall control from 1792 until his retirement in 1821. He was first cousin to George Croker Fox of Falmouth.

4. Early Years of the Site, 1791-1830

The site chosen was the vale of Perranarworthal, on the boundary between the fresh water of the River Kennall and the head of what was then the navigable tidal inlet of the Fal estuary at Perran Wharf (Fig.1). The site was close to the main coach road and within four miles (6.4 km) of the Gwenapp mines to the north-west. Water power was abundant and raw materials could be brought right in to the works by means of barges; heavy machinery could be taken back down to deeper water at Restronguet to be transhipped to sea-going ships.

According to Tregoning Hooper, the valley of Perranarworthal at the end of the eighteenth century was pretty and picturesque. The foundry was located on the right bank at the head of a creek, the mouth of which joins the Carnon valley, near the former small trading port of Devoran. Davies Gilbert, writing in 1838 in *The Parochial History of Cornwall*, commented:

> The valley above and below these works is perhaps the most beautiful in the west of Cornwall, and it has recently been adorned, just opposite the fine woods of Carclew, by the elegant and tasteful residence of Benjamin Sampson Esq.,[12] who conducts an extensive manufactory for supplying the mines with gunpowder made in their immediate neighbourhood.[13]

But industry had been present in the area earlier: tin smelting. In Cornwall, as early as 1705, a Mr Lyddell obtained a patent for smelting tin in iron furnaces, and set up works in Angarrack in Phillack. At the end of the eighteenth century, and closer to the Perran site, were the Carnon 'streamworks', the name given to the extraction of tin

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10 For a fascinating account of the Neath Abbey Ironworks, see Ince 1984

11 Tregoning Hooper 1939, 63-64

12 Benjamin Sampson (1770-1840) was one of the shareholders at Perran. He built his home, Tullimaar House, on the slope above the Truro-Falmouth road, in 1828, and later established the Kennall Vale Powder Mills. He left his shares in Perran to his sister's son, Benjamin Cloak, who assumed the name Sampson in 1840 and was manager of the works until his death in 1864.

13 Gilbert 1838, 305.

ore washed down from the higher ground and deposited along gravel beds in the valleys from where the metal could be easily retrieved. Located near Restronguet Creek, Carnon was 'the most rich and extensive of any streamworks in the county'.[14] The Carnon stream was one mile (1.6 km) long and 300 yards (274m) wide, with a water-driven wheel. The tin was taken to one of the small water-powered smelting or 'blowing' houses in the area and cast into blocks. Davies Gilbert noted: 'Not far below the village stood one of the tin-smelting houses constructed after the Germans introduced reverbatory furnaces; it has been used for the last thirty years for refining arsenic.'[15]

Thomas Bradley set out clearly why the site was ideal for development:

> Perranworthal was well suited to Fox's philosophy; less than four miles from the heart of Cornish mining expansion at Gwenapp, uncluttered by other commercial activity, he had a free hand. Forthwith, he and his Quaker associates applied themselves to the task of converting the wastelands to a port by developing a series of jetties and quays for the offloading of coal and mining stores; timber ponds in which could be stored under ideal conditions the great timber baulks from Norway, which were destined to carcass and prop the deep workings, and provide the massive pumprods for the great new Cornish pumping engines; storage sheds and compounds for the outgoing ores and ingots, and for the multiplicity of engineering materials on which the mining industry was becoming increasingly dependent. The success of the venture was assured – Perranwharf was born.[16]

The first task in establishing the foundry works at Perran would have been the harnessing of a water supply from the Kennall river to provide power. This was done by the creation of a series of watercourses (leats), and installing mill wheels at strategic points (Fig. 13). The headworks for the leat system is at Ponsanooth, immediately downstream of the Ponsanooth Rail Viaduct. The Perran Foundry leat was 8 feet (2.4m) wide and 2 feet 9 inches (0.84m) deep, with a potential throughput of 1.4 million gallons (6.36 million litres) per hour. Thomas Bradley's article on the site, published by the Fal History Group in 1980, identified structures of water engineering that had survived from the 1790s. Bradley noted, for example, that:

> The foundry overflow is still largely intact, and the frames of the weiring penstock (6 feet wide by 2 feet 6 inches high in the portal) together with the stilling pond, some of the cascade steps, and the discharge channel can still be seen from the public right of way which passes through the western side of the foundry site. This is the overflow and cascade which still operates as a storm water relief drain after exceptionally heavy local rainfall.[17]

Sufficient water power was available for about eight months of the year, but during dry periods steam power was used. Bradley identified, in same article, the locations of the various power-generating wheels and engines at the site. These included: the main hammer wheel located in the centre of the main forge (18 feet or 5.5m in diameter); the subsidiary forge wheel (22 feet or 6.7m in diameter) installed in a wheel chamber south of the forge; the steam engine for the steam hammer installed in the Smiths' Shop *c.*1842; a vertical high pressure condensing engine, 16-inch (0.4m) cylinder, and boiler installed close to the subsidiary forge wheel; the fitting shop wheels; the machine shop wheels (one 24 feet or 7.3m in diameter and one 20 feet or 6.1m in diameter); the ancillary machine shop steam engine (*c.*1865), and the

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14 Polwhele 1803, 10-11
15 Gilbert 1838, 305
16 Bradley 1980, pp 28-9
17 Bradley op.cit, 34

Blacking Mill water wheel for driving the grinder to clean the castings, (12 feet or 3.6m in diameter). Sadly, none of these wheels or engines survive.

What did the Perran foundry produce in the early days? The main product was the Cornish beam engines used for pumping water out of deep mines. Thanks to Cornish engineer Richard Trevithick and others, the depth to which mines could be drained by these great pumping engines was considerable, over 3,000 feet or around 1,000 metres. In 1819, the works and its products were described as follows:

> A large iron and brass foundry for manufacturing all sorts of steam engines and other castings, not infrequently making from twenty to twenty-eight tons a day. Also a large hammer mill, rolling mill, turning lathe etc under the management of Benjamin Sampson, also acting partner.[18]

The works originally occupied an area of about 4 acres (1.6ha). Unfortunately, according to Tregoning Hooper writing in 1938, 'there are no records to show the nature or extent of the buildings in the early days of its existence, but there is good reason to believe that they were just as they are today'.[19] The earliest helpful map is the Tithe Map (Fig. 3) and its apportionment of 1839, which lists the land as being owned by Sir Charles Lemon, who lived in an early eighteenth-century house, Carclew, nearby, and who also owned the manor of Restronguet. The Perran Foundry Company is listed as co-lessees and occupiers, with the 'foundry tenement'. The foundry area is marked plot number 721 on the map: 'Foundry, sawing mills, houses, docks and yards, amounting to an area of 4 acres, 2 roods and 5 perches.[20]

A description of the works given in Penaluna's *Historical Survey of Cornwall* at around this date, 1838-39, helpfully expands on the minimal tithe apportionment listing, and gives more information about ship repairs and trading activity:

> On the north-west of the parish is Perran Cove, now generally known by the name of the Perran Wharf...On the Milor side is Perran Foundry. In this foundry are made all kinds of brass and iron castings, for steam engines and other purposes; the machinery for the government steam packets is also occasionally repaired. At this place is also a large hammer mill, a turning mill, and a boring mill. The village has been very much improved by these works, and the newly built dwellings for the agents, labourers and others make it a delightful and pleasing spot. A considerable trade is carried on in coals, limes and slates and in timber from Canada and Norway. [21]

Two main blocks of buildings are shown on the Tithe Map and must have comprised the foundry, sawing mills, hammer mill, turning mill and boring mill, but it is not certain which was which. The main block comprises a long section with two additions on the east side, and a square section attached to the south side, with small blocks forming nibs (stove chambers?) on the west side. Water is channelled into the centre of this main block from the pond, so this probably contained the hammer mill. There are several detached blocks around the main one, but with no hint of their function. Immediately south of the pond is a terrace of four equally-sized houses. From the Penaluna description we can assume a date of about 1835 for these. The relative size, proximity and configuration of the buildings can be seen in an engraving of about

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18 Penaluna *The Circle* 1819, 212-30

19 Tregoning Hooper 1939, 68

20 Tithe map and apportionment 1839, Cornwall Record Office.

21 Penaluna 1839

1840 which shows a view of the foundry from the road looking west, (Fig.11). The smoking chimneys of the centrally placed foundry can be clearly seen, and in front of them the pitched roofs of the workshops and pattern sheds. The terraced houses are visible on the slope to the left of the engraving.

Each building had a specific function related to the casting and forging of iron. The Pattern Shops produced wooden patterns, templates, mould boxes and core boxes from which moulds were made for all the foundry castings. The production of a metal casting requires the skills of a pattern maker, moulder and core maker. The pattern maker makes a wooden model of the casting and from this the moulder and core maker produce a negatively shaped mould into which liquid metal is poured to form a positive casting. The wooden pattern is made so that it can easily be withdrawn from the sand mould. A wooden core box allows sand shapes to be made separately, which are then placed securely in a mould to form the internal shape of the casting. Molten metal is poured into the mould and, on solidification and cooling, the sand is broken away to reveal the casting, ready for cleaning and finishing.

At Perran, the iron foundry consisted of three main areas, each with its associated furnaces, cupolas and stoves, to correspond with the three basic moulding practices that were used. These were the greensand, drysand and loam processes, depending on the type of casting being made. The Green Sand Shop produced simple castings from slightly moist moulds, and the Dry Sand Shop produced more complex castings from moulds which were baked before use. The Loam Shop was used for the founding of very large castings in the floor of the shop itself, using moulds made of wet, mud-like sand and shaped by the use of a revolving template, rather than a pattern, before being dried and finally cast. The Brass Foundry and Bolt Shop was used to produce the brass and bronze parts required for the engines, using similar moulding and casting techniques to those for ironwork cast in the Green Sand Shop. The Smiths' Shop was where wrought iron was forged, and around the walls of the building were a series of hearths for small-scale forging and welding. Traces of these hearths can still be seen in the ruined Smiths' Shop walls.

What tools and machinery was used inside these core foundry buildings shown on the Tithe Map? Tregoning Hooper's article of 1939 stated that he had not been able to uncover details of the machinery installed in the early years but he knew that in the Hammer Mill or Smiths' Shop, 'tilt' hammers were used. Tilt hammers were worked by water wheels and were used for heavy forging and 'faggotting'. Faggotting consisted of piling selected pieces of scrap wrought iron onto a flat bar, forming a square pile, which was then bound together by wire rods of iron, heated in a furnace, then placed under the tilt hammer and welded into a single mass. Faggotted iron was superior to rolled iron because it was denser and more uniform and equal in strength laterally and longitudinally.[22]

The Engineers' Shop and Boring Mill was where the castings and forgings were finished. In engine manufacture prior to 1790 the most intractable problem had been the smooth finishing of the bores of the cylinders. In 1774, John Wilkinson (1728–1808) had produced a boring mill for the accurate finishing of gun barrels, which had obvious potential for steam engines. Thomas Bradley wrote: 'Peter Price, intimately

[22] Tregoning Hooper 1939, 69

associated with the foundry, with his experience as one of the pioneer boring mill managers at Carron Ironfoundry, would have been among the first to realise the possibilities for Perran, and we know that as early as 1797 it was possible to cast and to bore out an eighteen-inch diameter air pump barrel at the works'.[23] Tregoning Hooper had earlier surmised: 'In the early days the machine tool equipment would have comprised boring mills for boring cylinders, air pumps and working barrels: these would have been the biggest machines installed'.[24] The Engineers' Shop would have also contained lathes, drilling machines, shaping and planing machines, grindstones and workbenches with hand tools. The big piston rods, 8 to 10 inches or 0.2m to 0.25m in diameter, were turned by hand tools, like wood turning, and finished very precisely with a file, and finishing with the nuts cast in brass on the tread.

Davies Gilbert wrote in praise of the burgeoning production of large cylinders and general achievement of the Perran ironworks in his short description of the parish of Perran in 1838, placing it higher than Hayle in significance:

> Partly in this parish, but principally in Milor, on the next creek towards Falmouth, are situated the great iron works, conducted by Messsrs Fox, a family distinguished for ability, exertion, and liberality, from generation to generation. *These works were the first constructed of any magnitude in Cornwall.* (My italics). Previously, all the cast-iron materials for steam engines were brought from Glamorganshire, and the working of an important mine very frequently depended on the uncertain direction of the wind. Now everything that can be required, even cylinders of the largest dimensions, seven feet and a half (90-inch) in diameter, and ten or twelve feet long, are cast and bored with the utmost accuracy here and at Hayle, where similar works have arisen, to the incalculable benefit of the mining concerns.'[25]

5. Perran's Heyday of Steam Engine Manufacture: 1830–58

Because the foundry worked in association with the Neath Abbey Ironworks, no complete engines were produced at Perran until 1830, thereafter increasingly larger engines were made, including steam engines with cylinders 90 inches (2.3m) in diameter.[26] Under the control of the Fox family, and using high quality pig iron, the foundry gained a world-wide reputation. In 1838 there was a competition between steam engines made by Boulton, Watt and Company in Birmingham and Cornish engines, and the Cornish engine was found to be superior. Between 1840 and 1842, Perran's greatest product was manufactured at the foundry. This was the beam for Taylor's celebrated 85-inch (2.1m) engine for the United Mines at Gwennap, and one for an engine the same size for Tresavean, including 'the largest piece of wrought iron work ever forged in Cornwall for this engine.'[27] This engine, designed and erected by Cornish engineers Hocking and Loam, performed the highest continuous duty of any Cornish engine (Fig.15). Other engines made at the Perran foundry included the 112-inch (2.8m) cylinder, and Harvey's supplied 90-inch (2.3m) and 100-inch (2.5m) engines: it was big business in the 1840s for the Cornish foundries. The engineers designed new engines for which the foundries tendered and supervised the erection of the machines. Despite the rivalry between them, the Perran foundry joined up with Harvey's of Hayle to build two 144-inch (3.6m) cylinder engines for the Dutch

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23 Bradley 1980, 45
24 Tregoning Hooper 1939, 69
25 Gilbert, 1838, 305
26 *Lakes Falmouth Packet*, 10 February 1939
27 Tregoning Hooper 1939, 78

Government for draining the lake at Haarlem.[28] A 30-inch (0.76m) engine by Perran was exhibited at the Great Exhibition of 1851, and in that year, a blowing engine was cast and fitted at Perran, the large 144-inch (3.6m) cylinder being in two rings, for the Dowlais Iron Works in South Wales. Double cylinder horizontal winding machines were also manufactured. Orders came in from London, Holland, Spain, Chile, Argentina, Mexico and Australia.

A sense of the activities of the workmen and their use of the buildings in the heyday of the 1840s emerges in an article on the health of the men and families employed at the foundry, published in the *Cornwall Royal Gazette*, Truro in 1843, by medical officer Charles Barham.[29] This article was based on his *Report to Her Majesty's Commission on the Employment of Children in the Iron Foundries in West of England,* 1841. Barham noted that the Sandys and Company foundry at Copperhouse employed 282 people; at Harvey's, 344 adults. At Perran there were 89 adults, 19 youths and 2 children, bringing the total to 110 people. Of these, only 22 could read, and 16 could write their own names. The main business of the foundry was listed as 'casting iron, moulding and shaping iron ('wrought iron'), and 'fitting up' where the brass work was carried out'. There was also mould-making for casting large cylinders between 50 inches (1.3m) and 90 inches (2.3m) in diameter. Steam or water power was used to work the great hammers that worked the iron, and lathes were used for finishing, in the boring mill.

From Barham's article, it is clear that steam power was being used alongside water power. The traditional tilt hammer, worked a spur wheel turning the drive shaft to raise and lower the hammers, began to be superseded by steam hammers which were developed by James Nasmyth in 1842, and were capable of delivering precisely controlled blows of great power. Perran's ironworkers were evidently quick to take advantage of this technical advance, with two boilers in the Smiths' Shop providing steam for the hammer used for forging heavy items.

There are, in the article, one or two points relevant to the buildings on the site. These include a reference to powerful cranes for lifting iron attached to 'high, spacious buildings,' and to the fact that the most dangerous area on the site were the furnaces, which were extremely hot and contained in confined spaces where accidents were most likely to happen. Elsewhere on the site, Barham approvingly noted that the work areas were well ventilated, with enough space between equipment for workers to move around. In general, he spoke highly of the efficiency of the operations at Perran and the other foundries of Cornwall, which 'had gained for these foundries a high reputation and extensive orders form different parts of the United Kingdom, Europe, and even the United States.'[30]

At this time the Perran foundry was being managed by Charles Fox, the seventh son of Robert Were Fox senior. He had succeeded George Fox as manager in 1821. According to Tregoning Hooper, Charles Fox not only increased output at the foundry but also improved the conditions of the work force by providing technical classes for the mechanics and schooling for the children. The Perran Wharf Mechanics Institute was built in 1847, with almshouses and a teetotal Sunday school, in addition to two

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28 Tregoning Hooper 1939, 72

29 *Royal Cornwall Gazette* 5 May 1843,1 cols 1-3

30 Barham 1843, 1

schools, under the management of Charles Fox.[31] Fox himself lectured on scientific subjects and was one of the founders of the Royal Cornwall Polytechnic Society in 1833. He died in 1878.[32]

6. Rise, Peak and Demise of the Perran Foundry, 1858-1879

In 1858, the Fox family sold their interest and control of the Perran foundry to members of the Williams family, to Michael Williams M.P. of Trevince and Mr William Williams of Tregullow. The firm was retitled Williams Perran Foundry Company and continued to trade under that name until the works closed in March, 1879. James Carnell, who was still manager in 1858, left Perran to run the Redruth Hammer Mill Foundry until his death in 1866. He was succeeded at Perran by John Burgess, draughtsman, engineer and works manager.[33] Burgess would have been in charge following the sale in 1858, and supervised the expansion of the works and the increase in workforce that took place soon afterwards. Unfortunately, no documentary evidence directly related to the refurbishment of older buildings, or the building of new ones, has so far come to light. However, a plan of the newly extended site, dated 1865 and deposited in the County Record Office at Truro, makes clear the extent of the works, and, most usefully, the use of each area (Fig. 4). The western block, shown on the tithe map, is here clearly identified as the Engineers' Shop, with a boiler house to the west of the water leat, and a Boring Mill and Pattern Shed to the west of that. Another pattern shed has been built just north of this, straddling the River Kennall. To the north, by the entrance to the site, is a new office and committee room building, with a drawing office on the upper floor, and stables behind. Alongside the river, a new time office, warehouse, coal yards, and yards for storing and despatching machines have been built. South of this is the main foundry complex, viz, Moulding Shop and Smiths' Shop with the hammer mill, furnaces and coke stoves, a blacking mill, a boiler house attached on the south side of the engine house, Brass Shop and Bolt Shop. To the east, a New Pattern Shop, and to the north, the Old Pattern Shop, which corresponds closely to the block on the Tithe Map; this may be the oldest building on the site. A coal shed and gas works were developed at the west end of the site.

The works now covered an area of six acres (2.4ha) and employed 140 people. Power for the machinery was provided by five waterwheels fed by the leat system, as already described, as well as steam power, probably combined with the use of hot-blast furnaces. Coking ovens provided fuel for the furnaces, with coal gas stored for use on the site and at Perran Wharf, from where raw materials and products were still being shipped out in barges via the Fal. According to Tregoning Hooper, there were two large gantries for loading heavy machinery on to wagons in the yard close to the main road, and at Restronguet Quay, where the heavy machinery was loaded on to sea-going vessels, there was a powerful iron jib crane, capable of lifting thirty tons.

Around this time, local historian E.S. Tregoning wrote:

> Opposite Devoran, the creek bends in a direction south west and extends nearly a mile through a beautifully wooded glen. Here it is navigable only for barges, and that only at high water. At

31 The location and survival of these buildings (at Perran Wharf?) has not yet been established.
32 DNB Vol VII 1968, 534
33 For details of foundry workers' employment see Tregoning Hooper 1939, pp 74-6

> its head, completely embosomed in rich woodland is the Perran Iron Foundry of Messrs Williams and Company, the most considerable, with one exception, in the county, chiefly for the manufacture of steam engines and machinery for the local mines, but having also a large foreign connection.[34]

What machinery would have been in use in the foundry in this period? Tregoning Hooper asserts that in the Engineers' Shop there would have been two large boring machines, one for boring cylinders up to 36 inches (0.9m) in diameter; the other for cylinders 100 inches (2.5m) in diameter, as well as machines, benches and accommodation for eighty to one hundred men. In the Hammer Mill and Smiths' Shop there was a 30-cwt Nasmyth steam hammer, a water wheel, three tilt hammers and anvils. The Moulding Shop had three air furnaces and one cupola.

Some Perran Foundry Company ledger books survive from the 1870s in the Cornwall County Record Office at Truro. In 1878 there were thirty-eight men in the Engineers' Shop, ten in the Hammer Mill, sixteen in the Smiths' Shop and twenty-seven in the Moulding Shop. Apart from these, there were twenty men in the boiler yard, and an extra fourteen labourers as well as the stableman, night watchman, pensioner, office cleaner, delivery chief, engineer, storekeeper, time keeper, draughtsman and apprentice mason. That comes to a total workforce of 135 men, which is more than in 1843 when Barham noted 110 men, but probably less than in 1865. It appears from these ledgers that repairs of the buildings and houses took place regularly, but no details were given.

The ledgers for 1878 are also useful in listing Perran Foundry clients which included the Cornwall Railway Company, Harris's Navigation Company, the Stiebel Brothers, the Leinster Colliery Company, invoices for 'the erection of Lord Paget's engines at Bideford', and engines destined for Spain and Portugal, via Brentford and Millwall docks. According to Todd and Laws, there is a disused Perran Foundry beam engine of 1878 at the Hodbarrow Iron Mine near Millom, Cumberland, 'probably the only one in the world.'[35] Towards the end of its days the firm manufactured engines for five steamers, and for a launch for the Thames River Police.

Despite both the activity of the workforce to meet the orders from this variety of sources and the award-winning improvements that had been made to the steam engines by engineers Richard and William Hosking, the Williams family were unable to withstand the slump of the late 1870s when most of the Gwennap copper mines closed. Perran was largely dependent for its raw materials on the Gwennap mines, and indeed, despite substantial orders from abroad, for custom; it was principally for those at Gwennap, the Consolidated Mines and Tresavean Mines, that the engines and machinery of Perran were destined. From 1860 copper production declined rapidly, due partly to the exhaustion of the mines, and partly to the fall in price owing to the rapidly increasing output in America, Chile and Africa. Cornishmen were travelling overseas to South America to develop the mines, and Cornwall which, in the 1830s, had produced over half the world's output of copper, was being overtaken by Chile. The mines in the Gwennap district closed one by one, including the great Wheal Clifford Amalgamated Mines in 1870, with engines and machinery that had been maintained by Perran. With the death of one of the Williams family, Sir Frederick

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[34] Tregoning 1865, 32

[35] Todd and Laws 1972, 48

Martin Williams, in 1878, and the closing of the banking firm of Tweedy Williams and Company, who had managed the Perran Foundry accounts, Perran was forced to close in March, 1879. Tregoning Hooper wrote: 'This closed the active life of these famous works which played such an important part in the perfecting of the steam engine. It is impossible to gauge the influence this foundry had on the engineering and industrial development of the nineteenth century'.[36] Many of the skilled men went to work at the Falmouth docks, the Royal dockyards and Woolwich Arsenal in London.[37]

The Tuckingmill Foundry Company tried to make a go of the former Perran works but failed after a few years. The Cornish foundries were facing competition from firms in the Midlands and the North, and from Germany and the United States.[38] The foundry machinery was sold off in two sales, in September 1880 and in March 1881, and the works lay empty for nearly ten years. Mr R. Symons, writing in *The Gazeteer of Cornwall* published in 1884, referred to the situation at the Perran works as follows:

> Perran wharf, a small village in Perranarworthal and Mylor, well known from its having an iron foundry on the Mylor side, and a timber, coal, and lime depot and trade on the Perran side, both belonging to Messrs Williams and Co., from which they have lately retired.

As a point of interest, the Williams's lived at Goonvrea House, Perranarworthal.

A plan of the site from this date, *c.*1880, (Fig 7), deposited in the Cornwall County Record office at Truro, corresponds almost exactly with the 1865 plan in layout and function. It shows the main components of the site: the Smiths' Shop with furnaces and hammer mill, Fitting Shop, Engineers' Shop and Boring Mill, link building to foundry, main foundry building, Green Sand Shop, the Loam Moulding Shop with cupola, boiler house, Brass Foundry and Bolt Shop, old Pattern Shop and new Pattern Shop. It shows the small gas works with three coke ovens.

Thomas Cragoe wrote in 1889:

> An arm of the river runs from Devoran through the beautiful valley of Perranarworthal, with the Falmouth Road on one side and the woods of Carclew on the other, but navigable only for small boats. At its head is a large and celebrated iron foundry, where some of the most beautiful steam engines in the world have been made and until lately, giving employment to a large number of hands. [39]

7. Alterations after 1890

In 1890, the foundry site was leased by the Edwards brothers, millers who operated the Manor Mill on the opposite side of the turnpike road. The existing foundry buildings were adapted to the milling of grain for animal feedstuffs; waterwheels again provided power. In 1894 a canal and quay were cut into the eastern end of the site alongside the new Pattern Shop of 1865, which was modified to house three pairs of millstones. An extra storey was probably added at this time. Barges were again used for the bulk inwards transport of grain until the 1930's. The use of waterpower

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36 Tregoning Hooper 1939, 86
37 *Lake's Falmouth Packet* 10 February 1939
38 Michael 1932, 195
39 Cragoe 1889, 97

was gradually supplanted by oil engines and later mains electricity. In 1958 the Kennall river was diverted through the site in a new cutting, and the iron footbridge was relocated.[40] In 1968 the mill was completely modernised and re-equipped and acquired in 1969 by J. Bibby & Sons. During their residence, between 1969 and 1988, milling and processing operations were gradually run down and the site was ultimately became a storage and distribution point. After nearly two hundred years of business activity at Perran Foundry and mill, it finally closed in 1988 and slowly fell into disrepair.

8. Survival of Structures

Writing in 1972, Todd and Laws wrote:

> The buildings are still in extremely good condition, impressive in size with their enormous beams and roof timbers and colourful with their red tiles. The smiths' shop and the loam shop, now only marked by their walls, are vast and spacious, as is the grass-covered cylinder casting-pit. The scale of the double furnace chimneys with their brick bases is immense. Two cast-iron pumps are used as beam supports, while over the former gateways two cast-iron arches proclaim the legend 'Perran foundry 1791'. Near the expansive courtyard and spanning the stream is a bridge cast in one solid piece reputed to be the every last piece of work turned out by the foundry in 1879.'[41]

Tregoning Hooper referred to the Smiths' Shop as 'unroofed', this is as far back as 1939. Today there is no machinery left on site, and the Loam Moulding Shop and Smiths' Shop have mostly gone except for the walls, which bear the cast-iron Perran arches. The Pattern Shed that once straddled the River Kennall at the west end of the site has entirely disappeared. However, by using the three maps of 1839, 1865 and 1880, it is possible to analyse and identify on site the structural work from the first phase (1791–1860), and that of the rebuilding of 1860–65, with the minor changes made subsequently when the works went out of heavy iron forging and machine assembly use into milling.

This is precisely what the Cornwall Archaeological Unit has done, and the results of their conclusions are set out in an excellent and thorough report of 1990, which includes a brief description of each standing structure, possible date, and condition.[42] It is clear from this work that, apart from the structures listed above, much of the 1790s fabric survives, either in its entirety or embedded in work of the 1860s, as the existing buildings were converted to new uses and no brand new structures were added after 1865. There is also the cast-iron footbridge, which is a scheduled ancient monument and notable, as Todd and Laws pointed out, for each side having been cast in one piece.[43]

9. CAU Report 1990: Summary of the Principal Findings

The Cornwall Archaeological Unit report includes a brief description of all the structures left standing on the site, a likely date of construction, and condition in 1990. The earliest surviving buildings appear to be the Engineers' Shop and the

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40 Bradley 1982, 18
41 Todd and Laws 1972, 48
42 Cornwall Archaeological Unit 1990
43 Perran Foundry Limited 1999, 4

Boring Mill, parts of the main foundry building walls and roof timbers, walls of the Green Sand Shop and Loam Moulding Shop with the Perran arches, the frontage of the Smiths' Shop and Hammer Mill, boiler house, the walls of Brass Fitting and Bolt shop, parts of the ruinous Old Pattern Shop, and the leat system. The New Pattern Shop of 1865 was heavily altered in the 1890s, but the tailrace is still there. The tailrace is the channel along which water flows having passed over or under a waterwheel, then returned to the water course. The gas works was destroyed by the 1930s canal cut. The report recommended some excavation in this eastern area and to carry out photographic recording. If restoration were to take place, the CAU recommended a general date of 1878 to restore to, and provided a specific recommendation for each structure.

10. Condition of the Buildings in 2002

The foundry buildings are built of local rubble stone, Killas, with granite, and with granite- and brick-dressing. The earliest roof coverings were of scantle slate, later ones are of red tiles. The walls were originally limewashed. All the structures, apart from the buildings near the road, are rapidly deteriorating. The roofed Dry Sand Shop and Green Sand Shop, with vast timber king post trusses, and arched openings in the walls, are still in a reasonable condition. These spaces are linked to the Engineers' Shop and Boring Mill, with the 1790s Pattern Shed incorporated at the west end. Much original roof structure survives here, along with some steel truss reinforcement, but in a bad state with breaks in the trusses (Fig. 22). Here too are the two cast-iron columns (not pumps but rather part of the main structural frame of a beam engine) mentioned by Todd and Laws in 1972 (Fig. 26). The Old Pattern Shop, the Loam Shop, Moulding Shop and Smiths' Shop, are unroofed or have corrugated asbestos sheets or felt and batten-type roof coverings which afford only minimal protection over the elevations, many of which are falling. The cast-iron Perran arches are still intact.

Important surviving windows include the mullion type with vertical glazing bars and overlapping panes of glass, as seen in the New Pattern Shop; the glazed cast-iron frames in the roof of the Dry Sand Shop; and the two cast-iron windows, but no glass, still in the walls of the roofless former brass and bolt shop (Fig. 49). It is important to save these features for both their intrinsic value and interest, and their suitability to provide models for reinstatement.

11. Significance of the Perran Site

The historical significance of Perran is pre-eminent amongst comparable industrial sites in Cornwall. Its listing status reflects this. The whole site, including foundry buildings and wharf, is a conservation area, with six buildings listed at grade II* (see Appendix One). The site comprises the best surviving of the principal engineering works founded in the late eighteenth century in Cornwall, serving both the local mining industry and other industries world wide, particularly in South Africa, Mexico and Chile where deep mining was carried out. The works not only manufactured components from pig iron but also assembled steam engines for mine pumping and other machinery for a wide range of clients. The story of its founding, rise and decline is a testament in built form to the boom and bust of the copper mining industry in Cornwall. In 1758 the copper mines had produced £160,000 per annum; by 1801 the

figure had risen to £471,872, with 57,198 tons of ore being mined.[44] On the subsequent collapse of the copper mining industry in the 1870s which forced Perran Foundry to close Peter Stanier wrote:

> The history of mining is one of faith and perseverance, with occasional compensating riches on the one side, and disastrous financial losses and hardship on the other. Mining has always been a risky business, subject to the fluctuations in metal prices. The nineteenth century saw prices tumble with the discovery and development of foreign ore bodies, and the result was a disaster for home metal mining.[45]

At Perran, the visitor can see evidence of the story: the remains of the fabric that was built with the spur of the confidence and optimism of the eighteenth-century entrepreneurs and engineers, the rebuilt structures of the mid-nineteenth century at the height of operations, and the alterations and additions to the site in the last phases of its life as a milling and animal feed processing centre. Professionals who have been involved with the site over the past twelve years, such as the conservation officer, Eric Berry (Carrick District Council), archaeologists (CAU), engineers (Alan Baxter Associates), and architects (John Lyall and Partners) agree that 'What remains is a sequence of buildings whose function in the engineering and foundry process can, with interpretation, be clearly understood. Although the historical significance of the site has been eroded through adaption and neglect, *sufficient fabric survives to enable its significance to be retrieved.*[46] In fact, the historical significance of the site, with its association with Price/Fox partnership, remains as strong as ever, as this report has tried to demonstrate.

Despite their condition, the buildings at Perran survive more completely than other comparable sites in South-West Britain. According to Laurence Inces's book on the Neath Abbey Ironworks published in 1984, and, more recently, to Peter Wakelin, Inspector of Ancient Monuments and Historic Buildings at CADW, the bases of Price's blast furnaces, a rolling mill, ironmaster's house, a dam, a shell of the engine works, and a section of ship building dock is all that survives of the Neath Abbey Ironworks (1792–1886).[47] It can be seen from Ferguson's list of Cornish iron foundries, published in the *Journal of the Trevithick Society* in 1998, that much has been demolished. Of the Hayle Foundry (1779–1903), a hammer mill, mill pond, boring mill, foundry barn and drawing office is all that survives around the Foundry Square area of Hayle. Of the Copperhouse Foundry in the same town (1819–1867), no original buildings survive apart from some office accommodation. The foundry at St Blazey (1848–1900), has a large part still in use as a builders' merchants; some offices and warehouses, but no foundry buildings, survive at the Wadebridge Foundry site. There is nothing left of the Truro Foundry (founded 1818), or the Truro New Foundry (founded 1852).[48]

What about the national picture? Industrial archaeologist and historian Dr Barrie Trinder, writing on the Perran Foundry archaeological investigations in 1991, declared:

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44 Polwhele 1808, 137

45 Stanier 1998, 11-12

46 Baxter,Lyall 1998, 2.2

47 Ince describes these survivals as 'Important monuments to the early iron and engineering industries', p.97

48 Ferguson 1998, 49

> There is no national survey of nineteenth century foundries or mechanical engineering concerns...Perhaps the nearest parallel to Perran which has been studied in some detail is the Coalbrookdale Ironworks in Shropshire, where investigations have indicated that, some decades after the celebrated old furnace was blown out in 1818, several substantial foundry buildings, including offices and an engineering shop were constructed in the 1850s and 60s, when the Coalbrrokdale Company prided itself, perhaps wrongly, on being the largest foundry in the world. The large foundry buildings which remain are for the most part either like those in Ipswich, much altered or like those in Gainsborough, of much later date than the example at Perran.[49]

This dramatic rate of attrition significantly increases the importance of the extant foundry buildings and leat system at Perran.

In November 2000 the Blaenavon coalfield in South Wales, with ironworks dating from 1788, was declared a World Heritage Site by UNESCO. Saltaire, the Derwent Valley and New Lanark have also joined the list; a group of Cornish mining sites, including Perran, await consideration (see Section 13 'Options' below). In an article charting the story Blaenavon and its passage to World Heritage status. Peter Wakelin of CADW wrote:

> Our industrial landscapes help us celebrate this ingenuity, dynamism and bravery of industrial cultures as well as to understand the cruelty and labour which came with them. While we can and sometimes should reclaim and clear the land, reconciling ourselves with our past is more sustainable and profound, because it regenerates our minds.[50]

The Brymbo Ironworks in North Wales is a site where two hundred years of technical innovation in iron and steel making only came to an end in 1990. The great Staffordshire ironmaster John Wilkinson (1728–1808) developed Brymbo in the late 1770s, at the same time as his crucial innovation for producing cast-iron cylinders for cannon and steam engines. As part of its plans to regenerate the massive steelworks, Wrexham County Borough Council have asked Donald Insall Associates to advise on how the ironworks, with its eighteenth-century blast furnace, might find a useful new life. The Welsh Development Agency and CADW are supporting the study to help Wrexham move forward. The Perran Foundry site is surely worthy of the effort, recognition, conservation and regeneration demonstrated by the Welsh examples of historic industrial sites.

12. Recent Development Plans

A specialist local residential developer acquired the site with a view to major residential development with commercial offices supporting a Heritage Centre, following repairs to the listed structures. The 1991 collapse in the property market proved disastrous and hence their proposals could not move forward as planned. During this period, no serious repairs were undertaken to the building and the company began to seek a purchaser for the site. However their discussions with new potential owners, Perran Foundry Limited in 1995, led to successful planning application in 1996 with full Listed Buildings Consent. The Perran Foundry Limited (established 1994) finally acquired the site from Devington on 3 June 1999, to implement their plans to create a 'heritage, leisure and retail centre' in association

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49 Trinder 1991, 3

50 Wakelin 2002, 38

with the Trevithick Trust.[51] The Listed Building Consents and planning consents have now lapsed (October 2001), and Carrick District Council is preparing to serve an Urgent Works Notice on the Perran Foundry Ltd.

13. Options

The conservation officer and county archaeologist have produced a Conservation Statement (March 2002) on behalf of Cornwall County Council and Carrick District Council.[52] The authors are keen to see the site benefit from related regeneration initiatives such as 'Objective One' status which could bring European funding, and from the World Heritage Site bid for Cornish Mining, which would encourage proper management of this historic site.[53] The statement also lists the Regional Development Agency, the Heritage Lottery Fund and English Heritage as possible sources for funding. Options for the site range from stabilizing the buildings as ruins to wholesale repair, conversion, re-roofing of shells and possibly some appropriate and sensitive new build. Possible uses include a heritage and educational centre, arts/media facilities, or office, industrial, retail, even some residential use, or a mixture of these. A mixed use would make sense in terms of bringing in income to help maintain the buildings, and providing employment. The Statement suggests that the site remain in a single ownership managed by a Trust. This has been successfully done in Cornwall by the Hayle Town Trust with Millpond Gardens, incorporating the site of Harvey's hammer mill, rope walk and mill ponds, and at Geevor mines managed by the Trevithick Trust, and in other parts of the country such as Cromford Mill in Derbyshire. The Statement concludes that any future development should take into account the setting of the site and the potential role of water. The provision of a public park amenity would be likely to be more attractive to the Heritage Lottery Fund than if there were no such clear public gain. An application to the HLF would also need to be supported by a full conservation plan, and it is hoped that this report would be of assistance in that undertaking.

But the first priority must be the stabilization of the buildings, particularly the roof timbers in the Engineers' Shop, and the upper floor of the New Pattern Shop, and steps taken to prevent further decay. Carrick District Council have applied to English Heritage for a grant to help fund urgent works if the work is not carried out immediately by the owners, as set out in section 7.5 'Urgent Works', of PPG 15. A 'last resort' option available to Carrick District Council, which would follow the serving of a Repairs notice and if neither urgent works nor repairs are carried out by the owners, is compulsory purchase of the site. English Heritage will support Carrick District Council in preparing a brief for full recording of the grade II* listed buildings, which are also 'Buildings at Risk', and may advise, when the time comes, on the specification of works to the buildings.

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51 Perran Foundry Limited 1999, 3

52 Berry and Thorpe, 2002

53 The Cornish Mining World Heritage Site bid is being prepared by the Cornwall Archaeological Unit for submission in July 2002. Sites include engine houses, tramways, foundries (including Perran), mining towns and villages, chapels, mineowners' houses, and the miners' housing, schools and institutes. See the website, www.cornwall.gov.uk.

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A Note on the Listed Buildings with Associations with Perran Wharf and Foundry

'Tulimaar': Listed II*. Built in 1828 by Benjamin Sampson (1770-1840). Sampson worked in the office of the Perran Foundry, and had shares in Perran and in the Kennall Vale Gunpowder Mills. He has a monument in St Piran's church Perranarworthal. Cornish born novelist Sir William Golding lived at Tulimaar from 1985 until his death in 1993. His son currently resides in the house.

'Carclew': Listed II*. Begun in 1720 by Samuel Kempe for himself but unfinished at the time of his death in 1728. It was lived in for a while by his widow Jane Kempe, and bought by a Mr Lemon in 1749. His son William Lemon (1748-1824), became an MP and one of the principal land and mineral rights owners in the area; much of the foreshore in Restronquet Creek belonged to him. The house was completed with a portico and wings added to Kempe's central block in 1750 by Thomas Edwards of Greenwich (d.1775). Edwards was described by Colvin in his *Biographical Dictionary of British Architects 1600-1840* (1995), as a 'competent Georgian architect'. Sir William Lemon was succeeded by Sir Charles Lemon, who owned the land on which the Perran Foundry had been built, and who lived at Carclew until his death in 1868. The house was gutted by fire in 1934 and remains a shell.

'Riverside': A short terrace of late eighteenth-century houses on the main road and once occupied by foundry employees, listed grade II.

Perran Foundry and Wharf: 13 structures on the foundry site were listed grade II on 30 May 1967 (descriptions appended), and 6 of these were upgraded to II* on 31 January 1990. These were: the warehouse, footbridge, Engineers' Shop, offices, Dry Sand Shop and the New Pattern Shop. The foundry terrace built c.1835, now called 'Woodview', is not listed but will be submitted to the DCMS for consideration in due course.

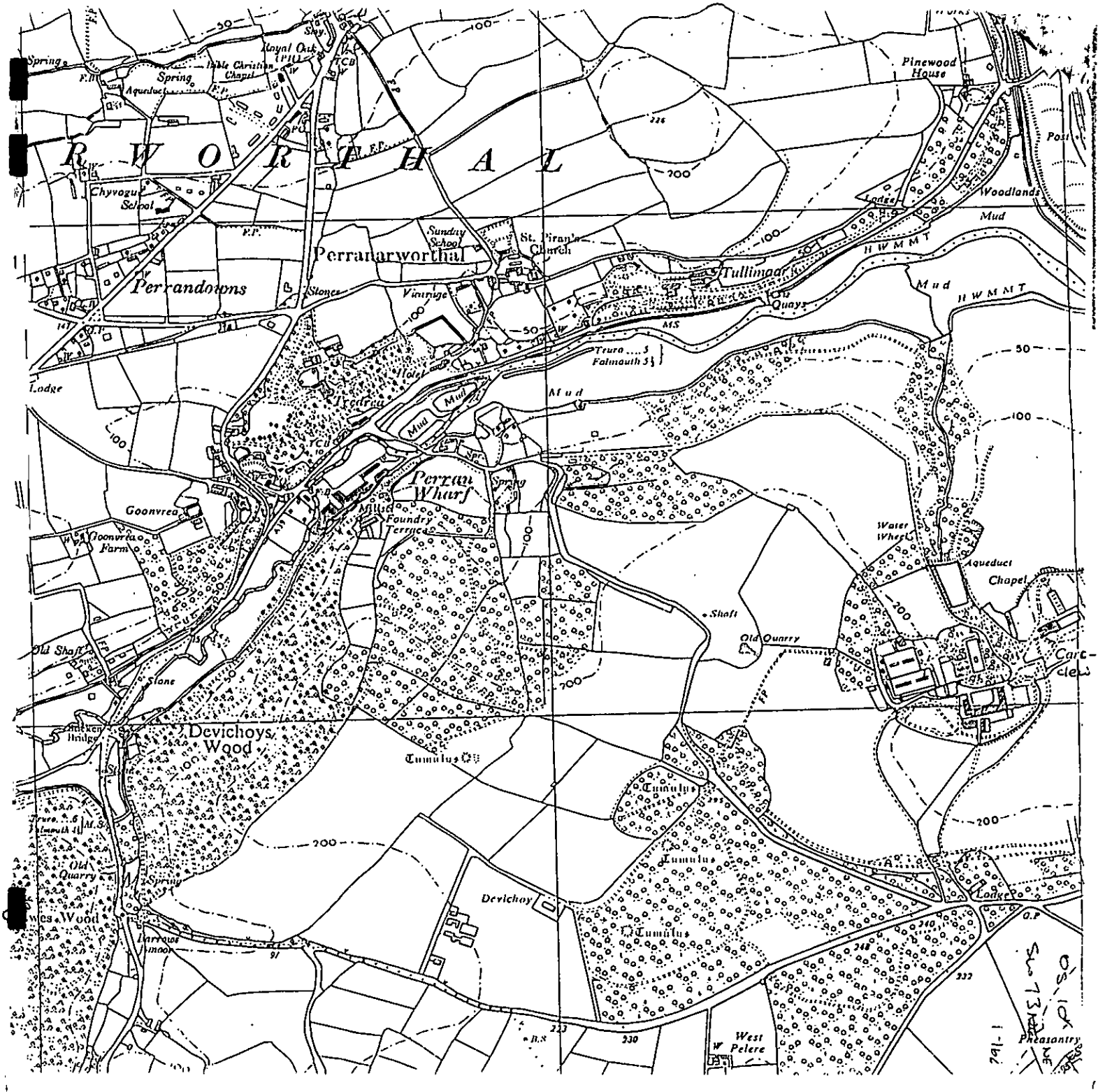


Fig. 1 Site map showing location of the Perran foundry (labelled 'mills') and Wharf, O.S. 1962

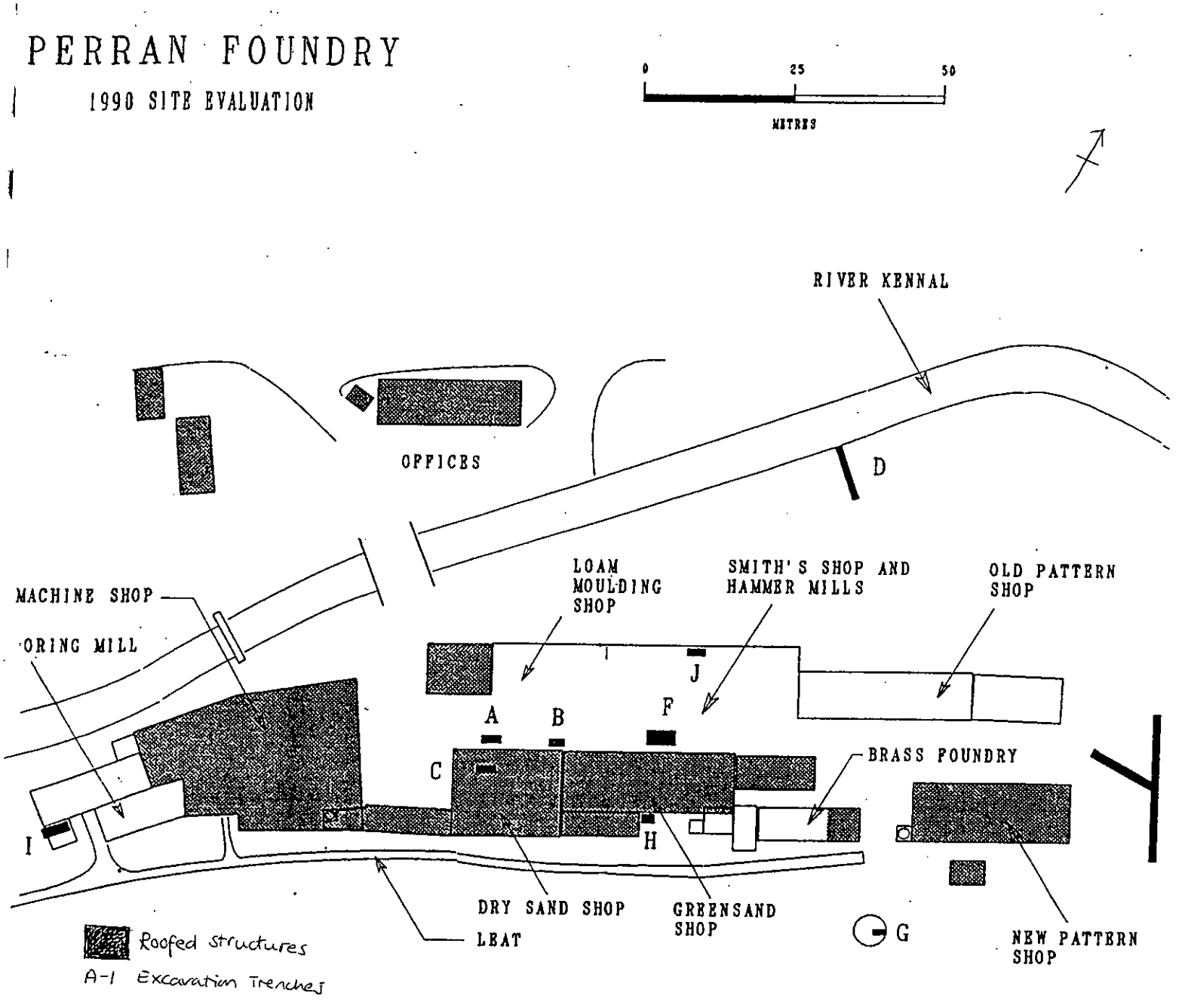


Fig. 2 Perran Foundry 1990, showing principal buildings C.A.U. 1990

Fig. 3 Tithe Map, 1839, TM 161, showing foundry buildings and tenements.

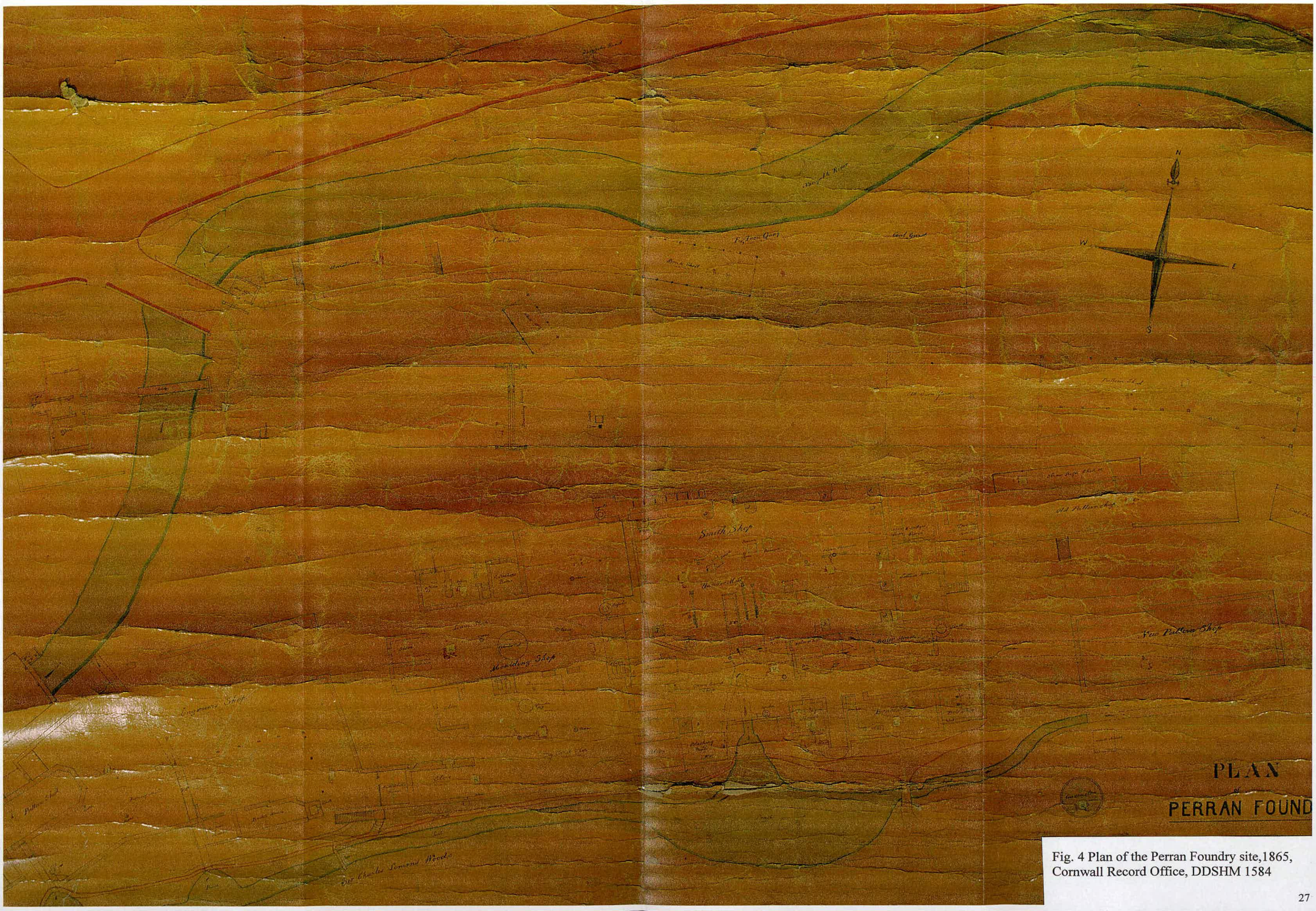


Fig. 4 Plan of the Perran Foundry site,1865, Cornwall Record Office, DDSHM 1584

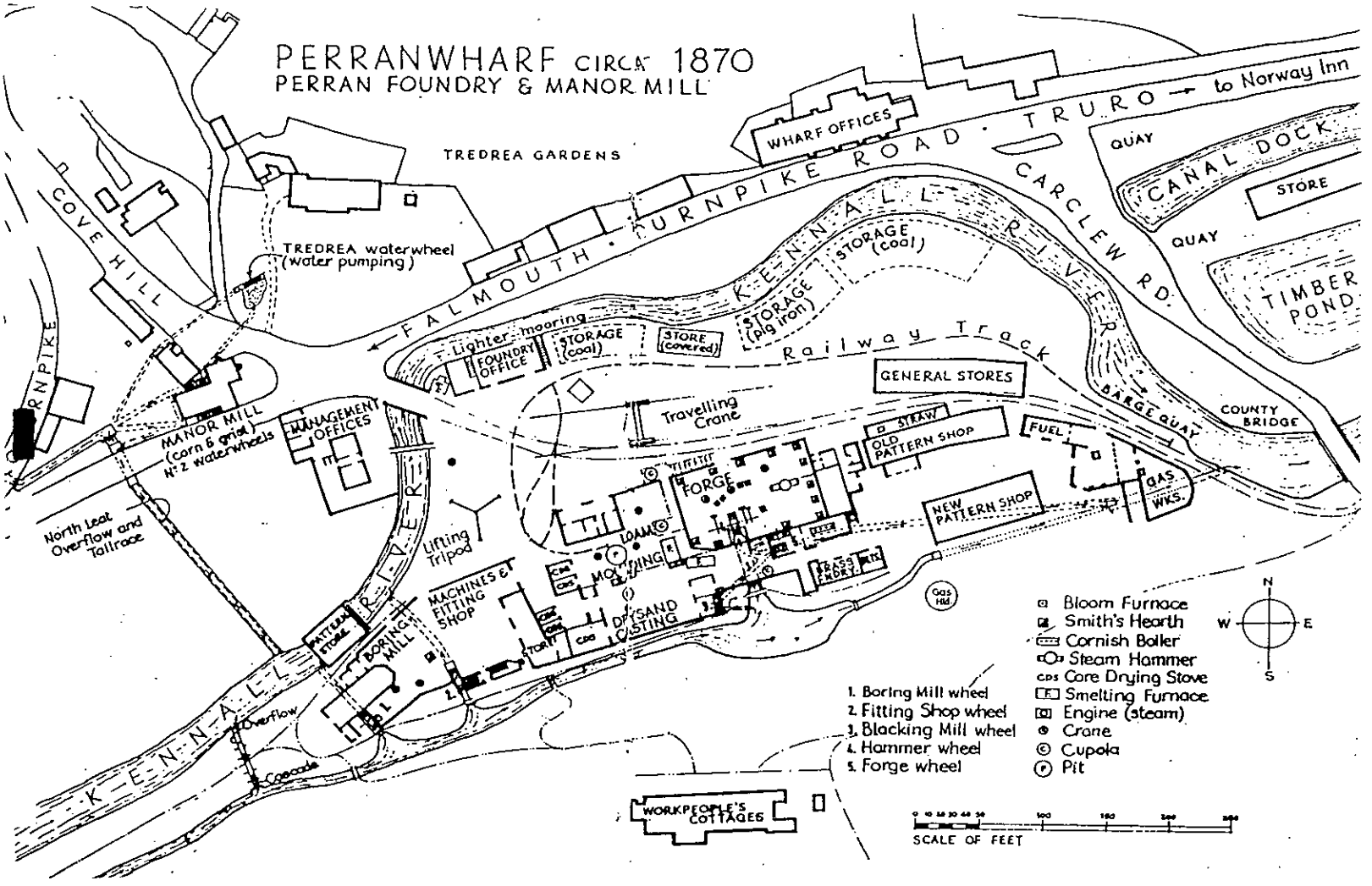


Fig. 5 Plan of the site, 1865, re-drawn by T. Bradley for the Fal History Group, 1980

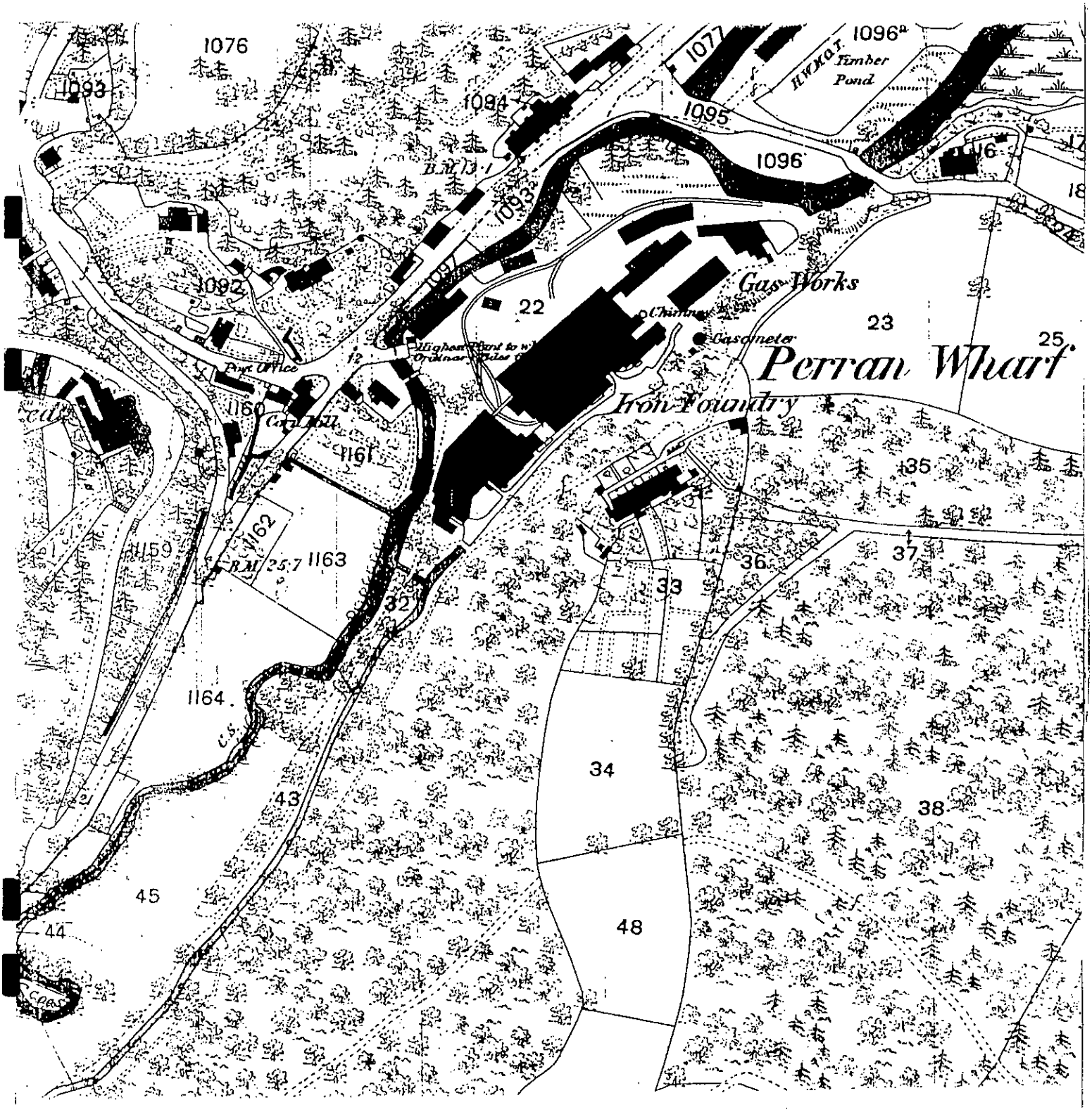


Fig. 6 Map showing the site, O.S. 1878, 25 inch = 1 mile

PLAN OF PERRAN FOUNDRY.

Fig. 7 Plan, Perran Foundry site *c.*1880, Cornwall Record Office Acc. 808 DDX.197

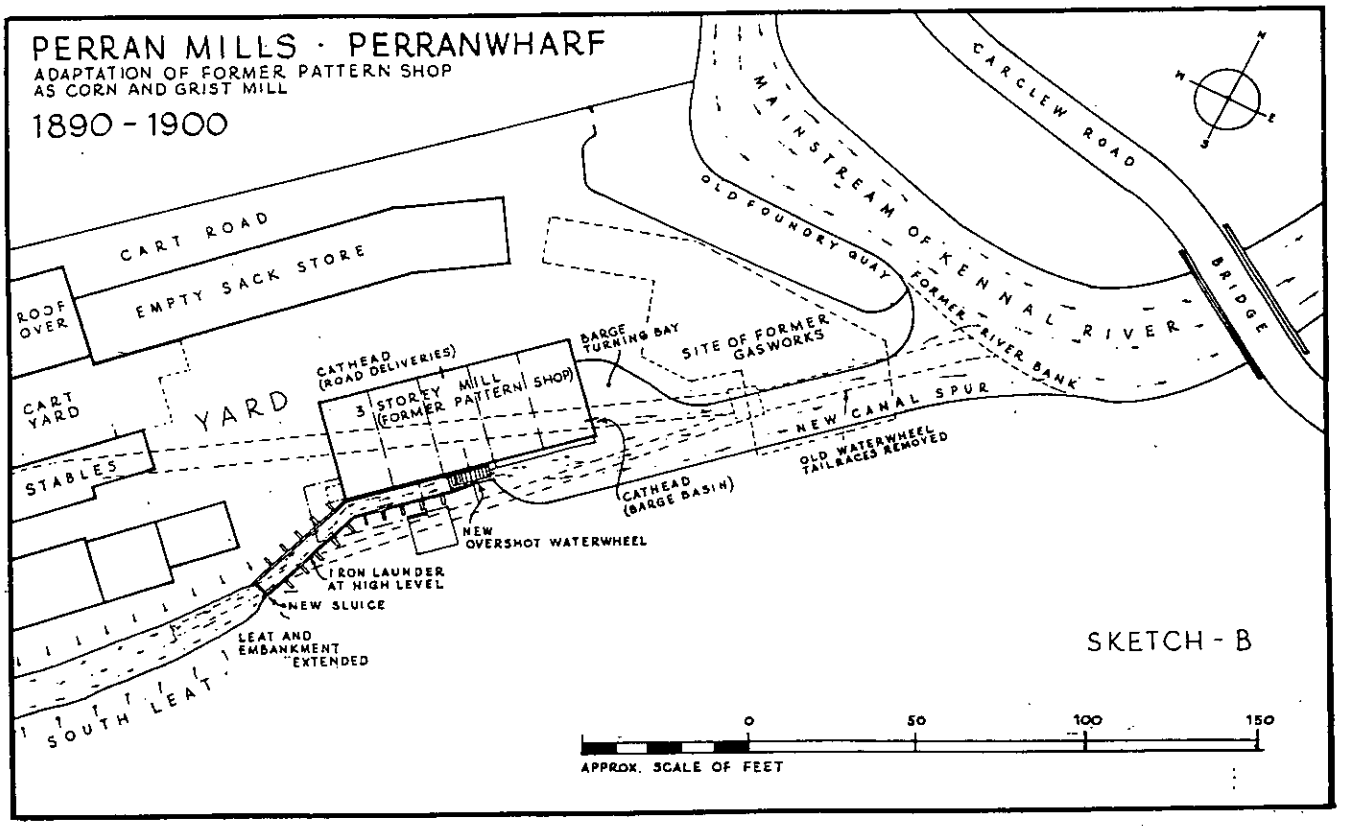


Fig. 8 Plan of the site 1890-1900, drawn by T. Bradley, 1980

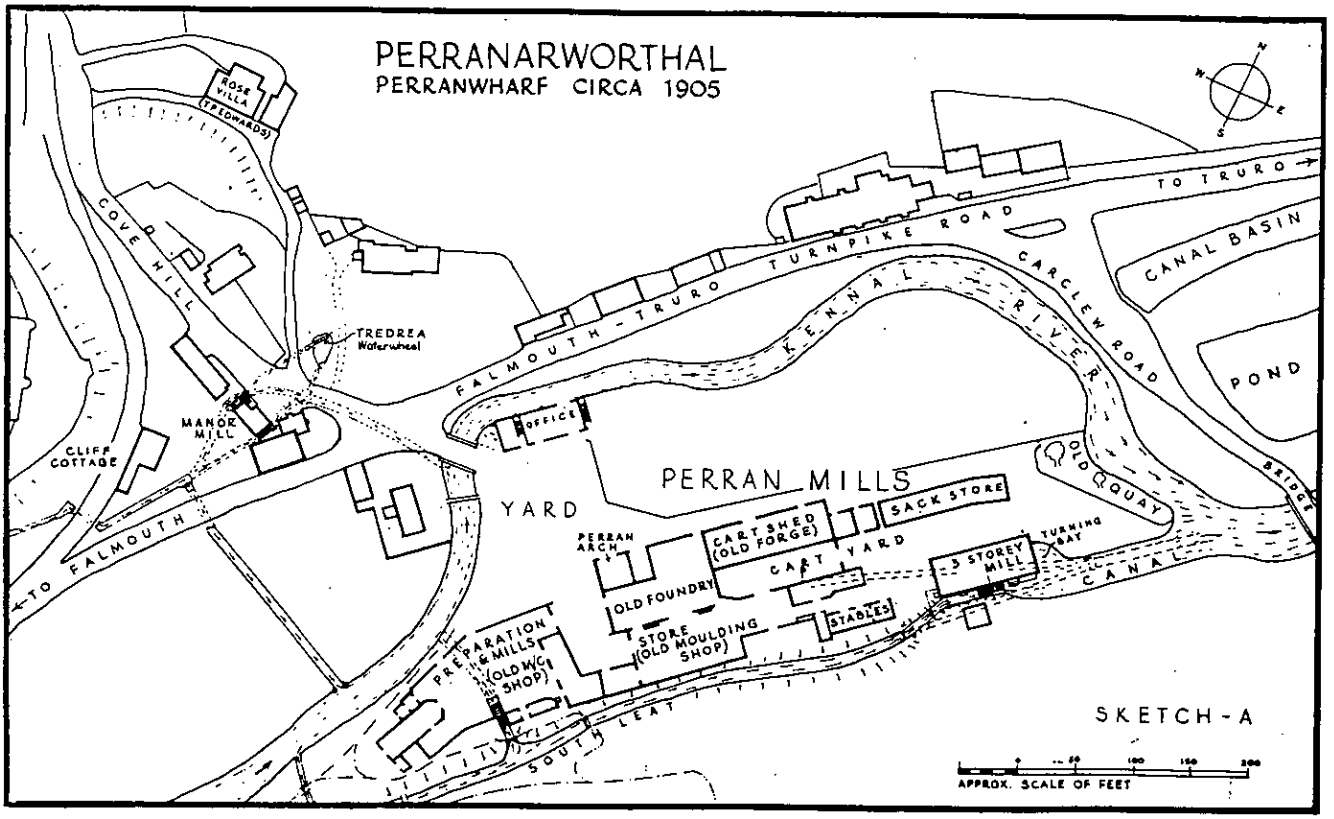


Fig. 9 Plan of the site 1905, drawn by T. Bradley, 1982

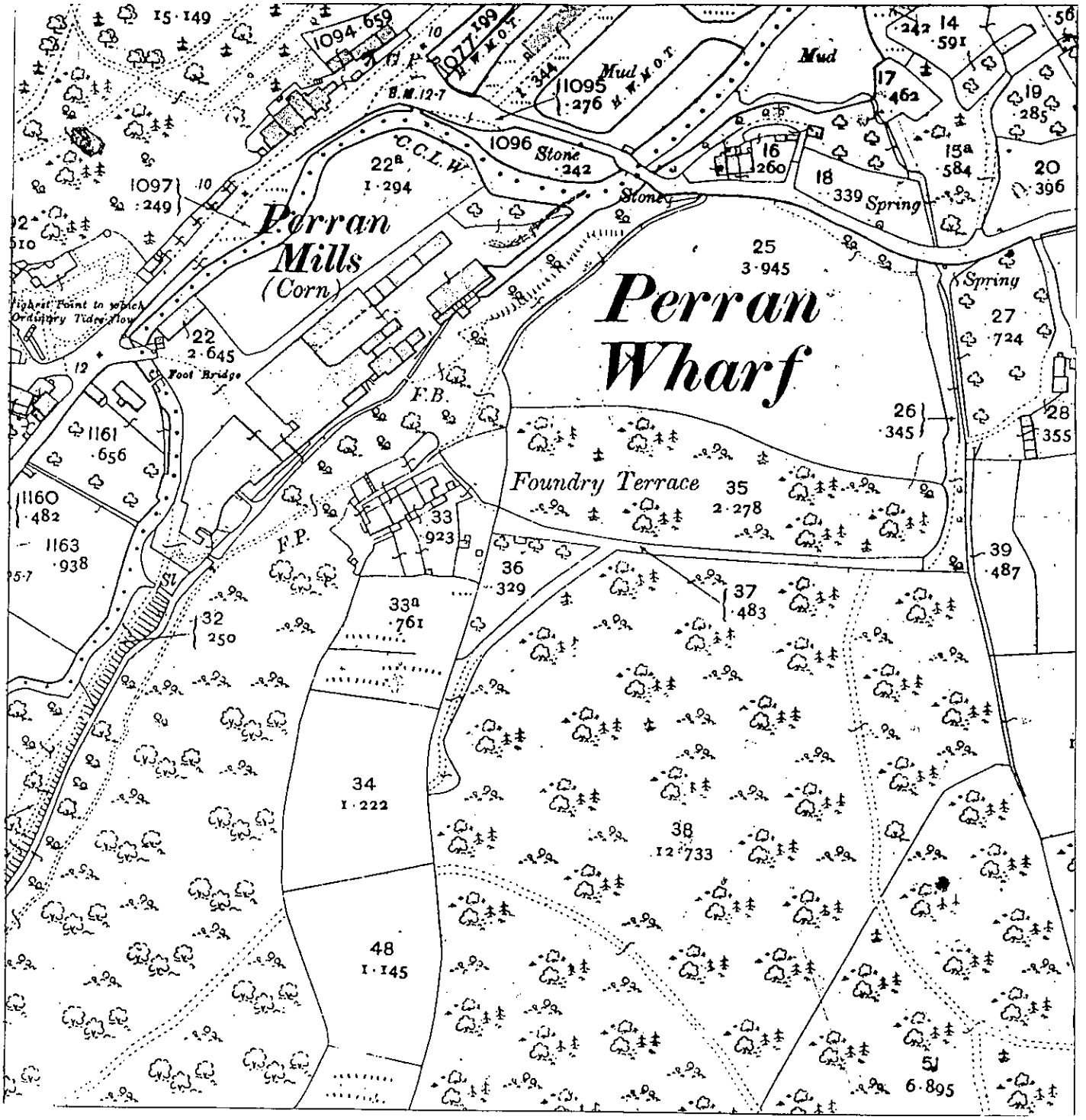


Fig. 10 Map showing the site, O.S. 1907 25 inch =1 mile

Perran Foundry, Cornwall.

Fig. 11 Perran wharf and foundry, engraving c.1840 Cornwall Record Office, showing the Norway Inn, the pitched roofs of the foundry buildings with four tall chimneys, and to the left, on the rise, the foundry tenements

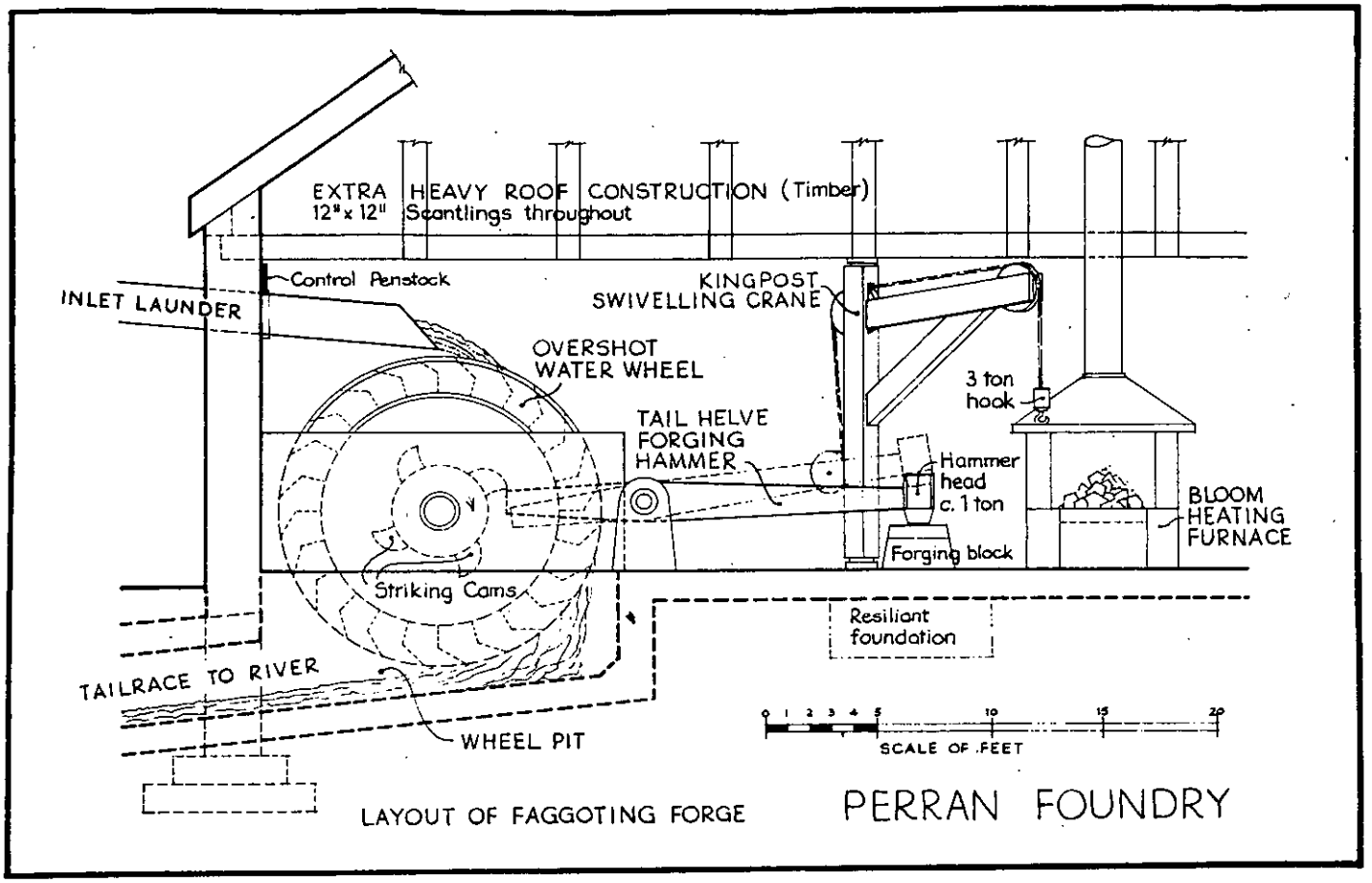


Fig. 12 Perran foundry: layout of faggoting forge, drawn by T. Bradley, 1980

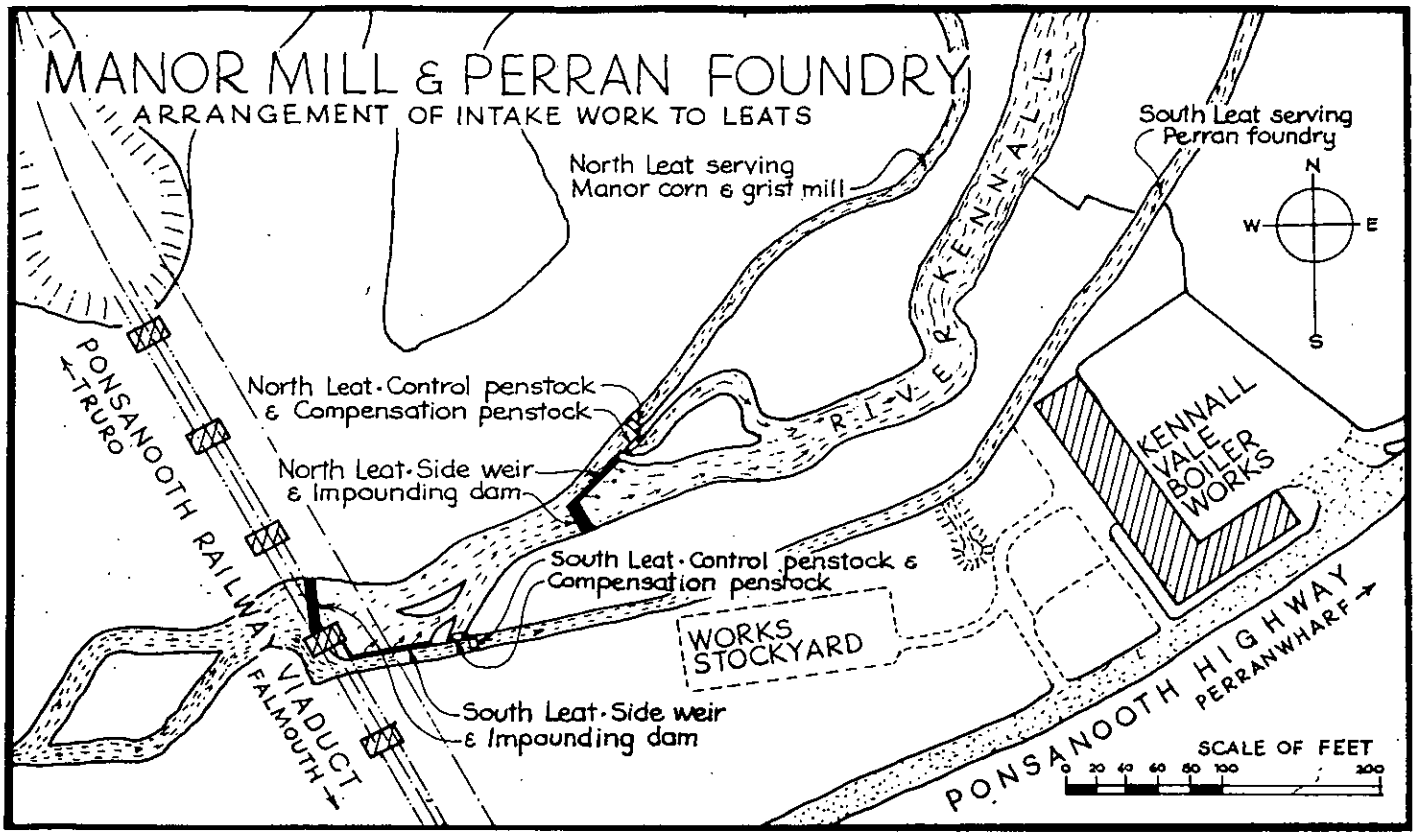
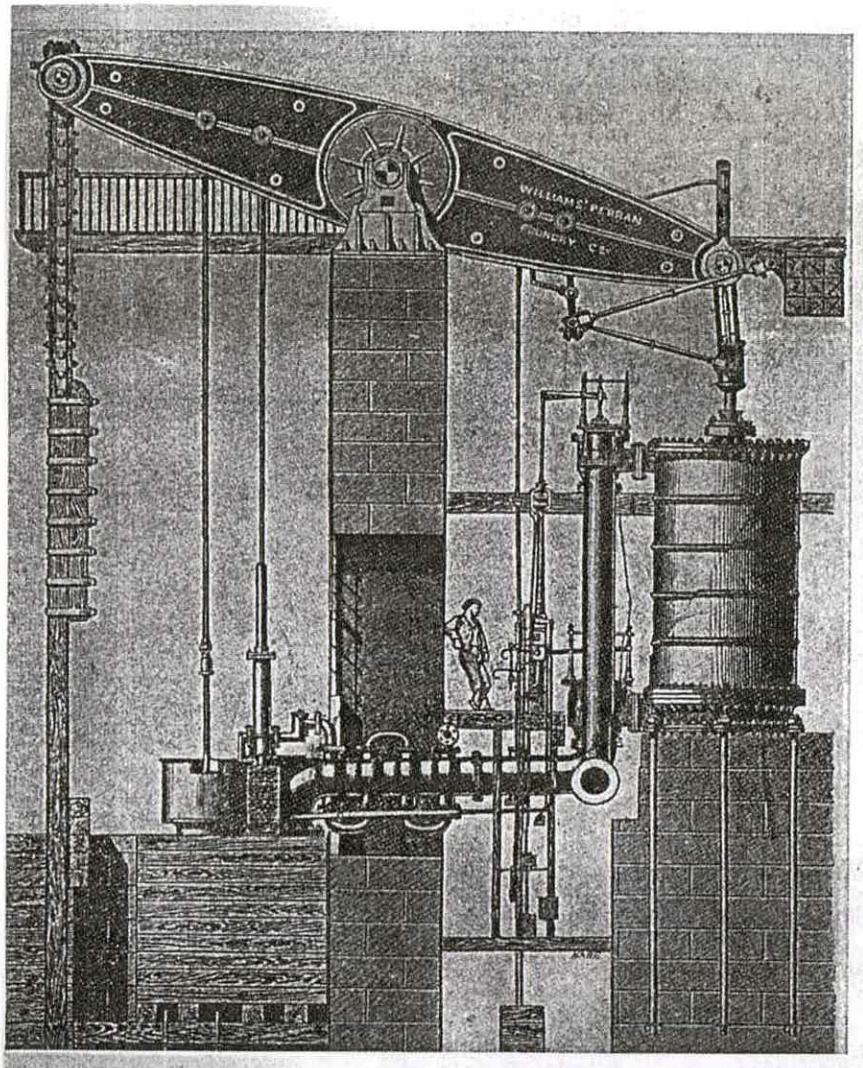


Fig. 13 Leat system drawn by T. Bradley, 1980

Fig. 14 Gwennap: United Mines engine houses



[From a Perran Foundry Cat.

Taylor's Cornish Pumping Engine for the United Mines, 1840.

Largely due to Trevithick the steam-pumping engine was developed in Cornwall to use high-pressure steam. In the example represented the steam pressure was 50-lb., the steam cyclinder was 85 inches diameter, and the stroke 11 feet. The five main pumps had bores of 14 inches with strokes of 10 feet. Its greatest power of 220 horse-power at 7·5 double-strokes per minute was obtained in 1851, with a pump displacement of about 500 gallons per minute.

Fig. 15 Taylor's Cornish pumping engine for the United Mines, 1840 from a Perran Foundry catalogue c.1870

Fig. 16 Perran foundry: view of the entrance to the site c.1890

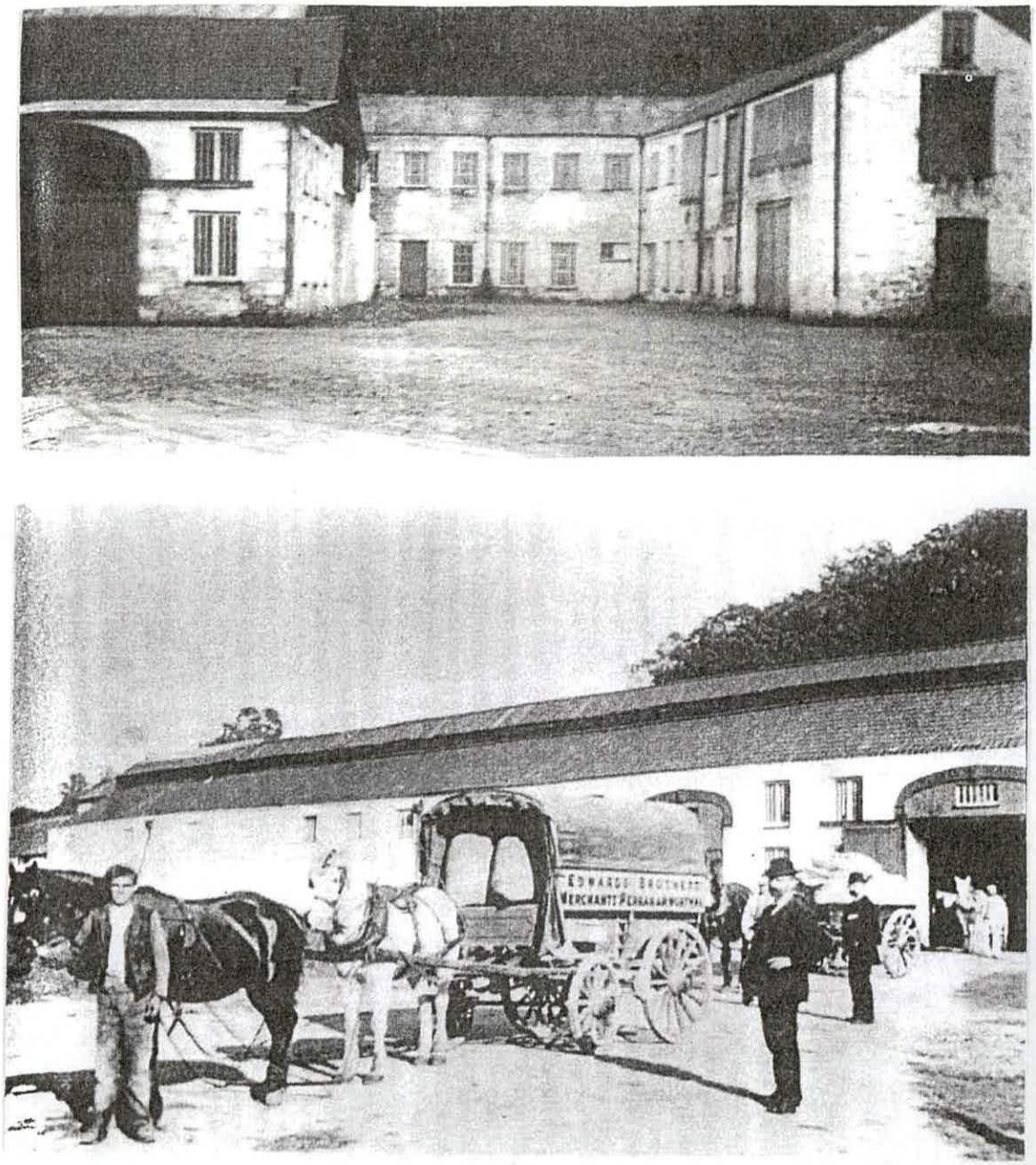


Fig. 17 View of the Smiths' Shop range, 1893, with Perran arches, and engineers' shop behind

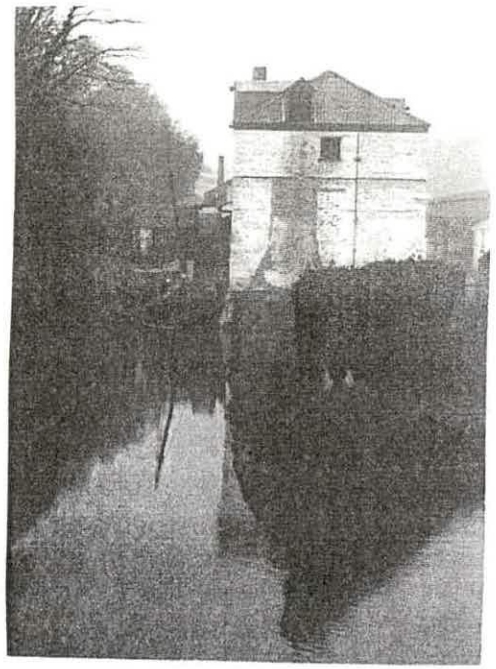


Fig. 18 New Pattern Shop, c1930, showing new canal spur cut in 1894

Fig. 19 New Pattern shop in 2002

Fig. 20 Cast-iron bridge, c.1870, in 2002

Fig. 21 Views of the Green Sand and Dry Sand Shops for moulding and casting, showing original limewash on walls, 2002

Fig. 22 Engineers' Shop: collapsing roof, 2002

Fig. 23 Cast-iron window frame in the Brass and Bolt Shop, 2002

Fig. 24 Timber window in Dry Sand Shop, 2002

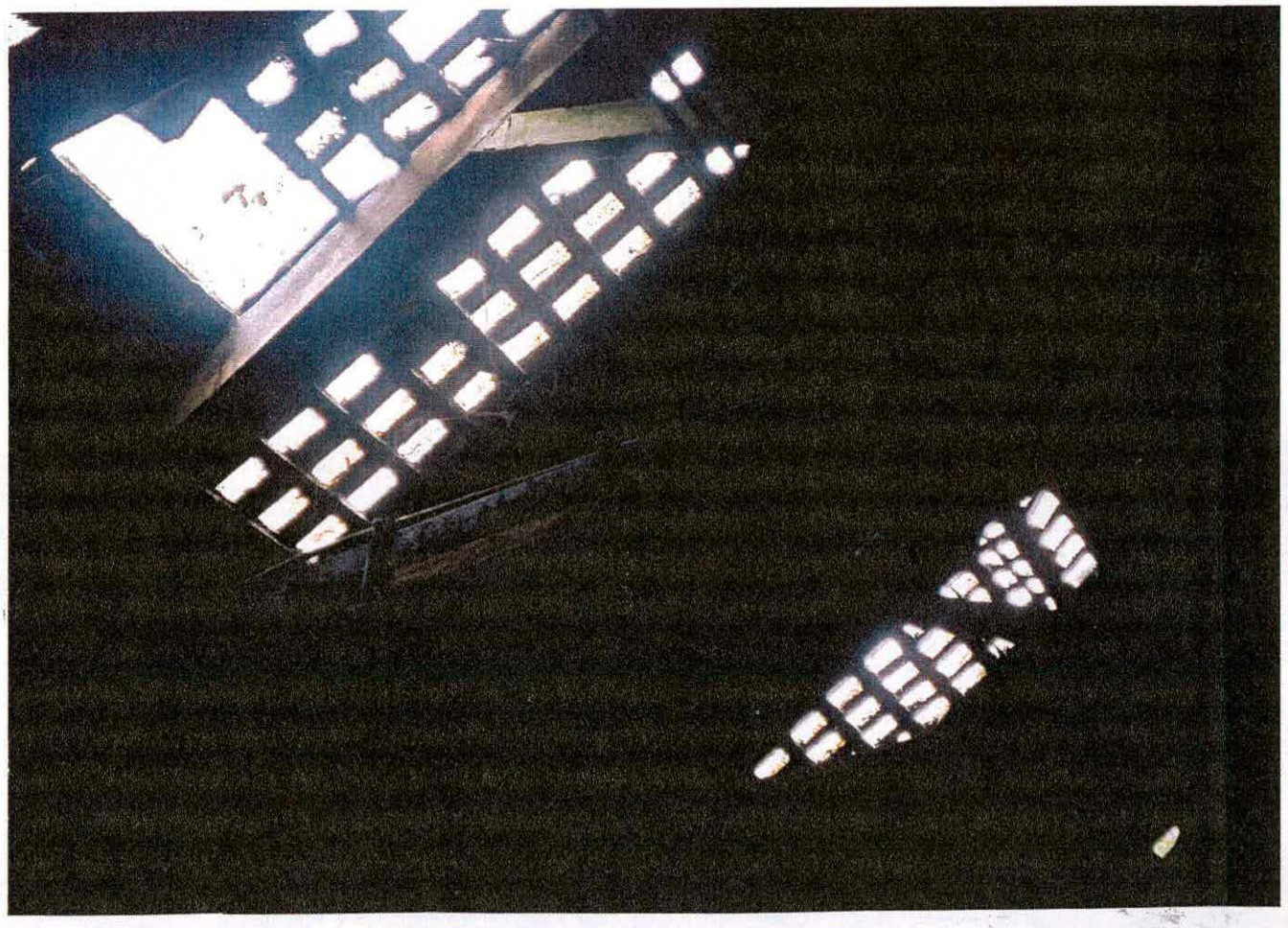


Fig. 25 Glazed iron frames in roof of Engineers' Shop

Fig. 26 Two cast-iron columns, probably from the frame of a beam engine, used as supports in the Engineer's Shop

Fig. 27 Foundry tenement cottages c.1835, in 2002(not listed), with Eric Berry conservation officer

Fig. 28 Warehouse *c.*1865, (top) and Dry Sand Shop, in 2002.

APPENDIX ONE:

List Descriptions for the Perran Foundry and Perran Wharf, and Associated Buildings (Ref. Carrick 1045).

SCHEDULE

The following buildings shall be upgraded to II*

SW 73 NE 3/249 30.5.67 GV	MYLOR	PERRAN WHARF Warehouse (formerly listed as office at Perran Foundry) II
SW 83 NW 3/250 30.5.67 GV	MYLOR	PERRAN WHARF Footbridge (formerly part of group listed as Perran Foundry) II
SW 73 NE 3/251 30.5.67 GV	MYLOR	PERRAN WHARF Engineers shop (formerly part of group listed as Perran) II
SW 73 NE 3/252 30.5.67 GV	MYLOR	PERRAN WHARF Offices (formerly part of group listed as Perran Foundry) II

SW 73 NE	MYLOR	PERRAN WHARF
3/253		Dry Sand shop and Sand shop (formerly part of of group listed as Foundry)
30.5.67		
GV		II

SW 73 NE	MYLOR	PERRAN WHARF
3/257		New Pattern Shop (formerly part of group listed as Perran Foundry
30.5.67		
GV		II

Dated: 31st January 1990

Signed by authority of the Secretary of State

Paul Heron

P. J. HERON
A Senior Executive Officer in the Department of the Environment

SW 73 NE

3/249
30.5.67

GV

MYLOR

PERRAN WHARF

Warehouse,(formerly listed as Office at Perran Foundry)

II

Warehouse, serving iron foundry, now used as office. Circa mid C19. Painted shale rubble walls, slate sills, shallow brick arches and mostly grouted scantle slate roof with brick chimney over gable end, left, and over ridge of cross wall, left of middle.
Long rectangular plan of offices, left (south), double depth 2-rooms wide with entrance passage between narrow front rooms, and larger rectangular single cell warehouse on right (north).
2 storeys. Regular 4-window east front of nearly symmetrical office front, left, with central doorway and original 4-panel door with overlight; and original windows with 3-light bay with hipped slate roof and original hornless sashes to first floor left (presumably room used by foundry overseer) and otherwise 16-pane hornless sashes. Warehouse front has wide doorway with ledged sliding door, right, and original 20-pane 2-light casements. Rear also has complete original fenestration of 4 first floor sashes and 3 ground floor sashes to office and original casements to warehouse which is mirror image of front. Rear used to be on river bank, now diverted.
Interior partly inspected has original C19 carpentry and joinery.
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry circa 1860 (CRO).
This particular industrial building is notable for its completeness, including the complete survival of its C19 fenestration; sashes for the office and casements for the warehouse.

SW 83 NW

2/250
30.5.67

GV

MYLOR

PERRAN WHARF

Footbridge,(formerly part of group listed as Perran Foundry)

II

Footbridge over River Kennal. Circa early-mid C19. Cast iron. 5-bay construction with walkway cast in sections with diamond pattern for grip and slots for drainage, and 2 identical balustraded parapets, each cast in one section. Gothic style. Resited C20 when river diverted. Balustrades have: bottom rail, narrow lancets up to next rail and intersecting pointed arches between top rails.
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry, circa 1860 (CRO).
This footbridge, almost certainly cast here, is testament to the quality and scale of castings.

SW 73 NE | MYLOR | PERRAN WHARF

3/251
30.5.67

Engineers shop, (formerly part of group listed as Perran)

GV

II

Engineers shop, boring mill and pattern shop, now store. Circa early-mid C18 and partly enclosing earlier structure possibly late C18. Painted rubble walls with brick arches and wooden lintels. Corrugated asbestos and scantle slate roofs with gable ends and large stack at south side paragraph.
Overall plan survives since the C19, of large tapered single-storey working area covered by parallel roofs running east west; rectangular 2-storey building with roof running north south adjoins at east end and further rectangular extension (originally pattern shop adjoins middle of west end).
This building's machinery was driven by 2 waterwheels turned by water from leat passing parallel to south and discharged into river parallel to north side. Wheels and machinery since removed. Many original openings survive, wide and narrow doorways, including openings at north gable end to ground floor, first floor and to gable. Many first floor window openings with some window frames covered in P.V.C. sheeting.
Interior has original roof structures of both king post and queen post type.
Part of the Perran Iron Foundry founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry circa 1860 (CRO).
Despite superficial C20 alterations, this is a very complete C19 industrial building.

SW 73 NE | MYLOR | PERRAN WHARF

3/252
30.5.67

Offices, (formerly part of group listed as Perran Foundry)

GV

II

Offices, now used as store. Circa early-mid C19. Painted shale rubble with dressed granite quoins, sills and lintels. C20 low pitched roof (hidden).
Rectangular-on-plan. Originally divided into small rooms for offices with full width narrow reception room at front (north) and 3 equal rooms to rear with passage between rear left and middle rooms.
2 storeys originally. Symmetrical north and west fronts. North front has wide central doorway (widened circa mid-late C19) with elliptical arched cast iron beam inserted. Beam has inscription in relief of PERRAN FOUNDRY with the Cornish shield as keystone, between, with date 1791 over. Flanking ground and first floor windows are blocked. West, 3-window front has C20 windows to ground floor opening and blocked window over.
Part of the Perran Iron Foundry, founded in1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry circa 1860 (CRO).
This building near the middle of the complex was presumably the administrative hub of the system and although re-roofed in the C20 retains many original openings, and the splendid iron beam which still advertises the quality and scale of work formerly carried out here.

SW 73 NE | MYLOR | PERRAN WHARF

3/253
30.5.67
GV

Dry Sand shop and Green Sand shop (formerly part of group listed as Perran Poundry)
II

Mould and casting buildings, now store. Circa early-mid C19. Painted shale rubble walls, brick arches. 3 roofs with gable ends or adjoining; grouted scantle slate over main block (Dry Sand shop) with upper half of west gable weather boarded; clay pantiles over Green Sand shop, adjoining at east; and corrugated asbestos over stove extension at west.
Plan of 3 roughly rectangular adjoining buildings. Main building (Dry Sand Shop) with spaces for furnaces (stoves) at east and west plus 2 later stacks each with 2 flues to north side. Single storey Sand Shop at east is narrower, and 2 storey stove extension at west, much narrower, and adjoins south side of gable of main building. There was originally a water wheel at south side of Dry Sand Shop.
2 storeys. Dry Sand Shop has large round-headed arches to north and west walls, originally furnace entrances, except for central west doorway. Other arches are partly or wholly blocked or hidden by later building. West gable end has 2 first floor openings probably originally with windows. First floor of Stove has 4 of the original 7 openings spanned by granite lintels. Original ground floor openings blocked.
Interior has original king post roof structures and much evidence of former use.
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry, circa 1860 (CRO).
This is the main furnace building which in the C19 must have been both hot and dangerous. Now, with some of the 'stove' projections removed and with its brick arches standing alone, it is still quite impressive and surprisingly intact.

SW 73 NE | MYLOR | PERRAN WHARF

3/254
30.5.67
GV

Smiths shop,(formerly part of group listed as Perran Foundry)
II

Smiths shop, ruin. Circa early C19. Shale rubble walling with granite quoins, jambstones and lintels.
Plan was originally of a large rectangular building adjoining Loam shop and Moulding Shop, at west (since removed and Green Sand Shop, qv.), to south. Outer walling only still standing with complete section along north side. Originally containing a water powered hammer mill and further water wheel beside south wall. (Much evidence of former use can still be seen in surviving walling).
2 storeys. North wall has 2 original doorways and original vertical glazed window over right-hand doorway. On the inside of the wall are stone piers at each bay.
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry, circa 1860 (CRO).

SW 73 NE | MYLOR | PERRAN WHARF

3/255
30.5.67

Brass Shop, Bolt Shop and Boiler House,(formerly part of group listed as Perran Foundry)

GV

II

Brass shop, bolt shop and boiler house, now used as stores. Circa early C19. Lime-washed rubble with granite sills, quoins and timber lintels. Mostly clay pantile roofs with gable ends.
Irregular U-shaped plan of Brass Shop and Bolt Shop in wing projecting east on south side and boiler house projecting at north, adjoining Green Sand Shop qv at west and Smiths shop at north. Former waterwheel serving Smiths shop was in north west corner.
Single storey. North wall of Bolt Shop and Brass Shop retain 3 original 30-paned cast iron windows with spikes behind glass.
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry, circa 1860 (CRO).
Notable for the pantile roofs and the cast iron windows of which very few survive in Cornwall.

SW 73 NE | MYLOR | PERRAN WHARF

3/256
30.5.67

Old Pattern Shop, formerly part of group listed as Perran Foundry

GV

II

Pattern shop, now derelict. Circa late C18/early C19. Lime-washed shale rubble walls and some brick with slate sills and timber lintels. Grouted scantle slate roof with gable ends (some roofing fallen).
Plan of long rectangular range, undivided originally. There was in the C19 a lean-to straw rope shed along north side.
2 storeys. South side has slightly irregularly disposed range of openings, with 9 openings to each floor. First floor loading doorway with pair of ledged doors is approached by earth ramp. Windows with vertical glazing bars mostly survive but there are many broken panes. North side has similar range of openings and windows.
Interior not inspected but said to be unaltered since the C19.
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry, circa 1860 (CRO).
Much original fabric and features surviving but derelict at the time of the survey (1985).

SW 73 NE | MYLOR | PERRAN WHARF

3/257
30.5.67

New Pattern Shop,(formerly part of group listed as Perran Foundry)

GV | II

Pattern shop. Circa early C19. Lime-washed shale rubble with weather boarding to second floor north front. Timber lintels. Hipped clay pantile roof with gabled roof dormer for hoist over each side wall and over the middle of front wall. Large rectangular unpartitioned building.
3 storeys. Originally symmetrical north front with doorways to middle of each floor and 2 windows to either side. String dividing ground and first floors. Left-hand bay is rebuilt C20 above ground floor level. Ground floor opening mostly blocked but 3 original windows survive to first floor and to second floor. Those to first floor have vertical glazing bars and second floor windows are fixed 12-pane lights.
Interior has original floors with cross beams and original roof structure (not inspected).
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Plan of Perran Foundry, circa 1860 (CRO).

SW 73 NE | MYLOR | PERRAN WHARF

3/258
30.5.67

Wood shed,(formerly part of group listed as Perran Foundry)

GV | II

Wood shed, now unused. Circa early-mid C19. Brick walls with gable ends and clay pantile roof. Small square single-cell building. Doorway at west end.
Interior not inspected.
Part of the Perran Iron Foundry, founded in 1791, and in its heyday the most important foundry in Cornwall, manufacturing some of the largest beam engines ever constructed.
Included for group value.

SW 73 NE | MYLOR | PERRAN WHARF

3/259

Bridge at SW 777 385 NE

GV | II

Road bridge over river Kennal. Circa early-mid C19. Shale rubble with dressed granite plinth, quoins, arch stones and parapet copings. Single span with unequal segmental arch springing from vertical abutments over tall plinth. Rock-faced parapet, possibly later replacement.

SW 73 NE

3/333
30.5.67

GV

PERRANARWORTHAL

PERRAN WHARF

Committee Room,(formerly listed as part of Perran Foundry in Mylor)
Parish
II

House, formerly used for committe meetings for Perran Foundry. Circa early-mid C19. Shale rubble over rendered plinth dressed granite steps quoins, sills and lintels. Hipped scantle slate roof with very wide eaves.
Plan of 2 reception rooms flanking central cross passage leading to central stair.
2 storeys. Symmetrical 3-window north east front. Central doorway with 4-panel door and 4-pane horned sashes.
Interior not inspected.

SW 73 NE

3/334
30.5.67

GV

PERRANARWORTHAL

PERRAN WHARF

Stables at approx 4m to west of Committee Room,(formerly listed as part of Perran Foundry in Mylor)
Parish
II

Stables and cart shed. Circa early-mid C19. Shale rubble with dressed granite quoins, sills, jambstones and lintels, some brick walling to stables. Scantle slate roofs, hipped over cart shed and with gable end to cart shed roof.
L-shaped plan of stables in lower left-hand (south east) range and cart shed and adjoining tack room in right-hand (north east) arm of L.
North east front has stables, left, and projecting hipped end of cartshed right.
Stables have doorways with ledge doors.
Cartshed has hornless sash, left, with high meeting rail, 6 panes over 2 panes. Wide doorway on right with ledged doors.
Interior not inspected.
This building has group value with the other buildings included at Perran Foundry.

SW 73 NE

3/335
30.5.67

GV

PERRANARWORTHAL

PERRAN WHARF

Lodge and gate-piers,(formerly listed in Mylor Parish)

II

Lodge and gate-piers. Circa mid C19. Painted rubble walls, slate sills and scantle slate roof with wide eaves, wide verge to gable end left and adjoining Warehouse qv, right, listed in Mylor parish.
Single-cell plan.
Single storey. Symmetrical 3-bay 3-window south front. Central canted bay window with 12-pane central light and 2-pane sidelights, flanked by 16-pane hornless sashes.
Interior not inspected.
Slender cast iron gate-piers with moulded cornices to capitals and urn finial to most westerly pier.

SW 73 NE

3/336
-

GV

PERRANARWORTHAL

PERRANARWORTHAL

Cliff House, formerly Cliff Cottage

II

House. Circa early C19. Designed by Richard Budge, draughtsman of Perran Foundry and built by John Williams. Coursed faced slatestone to front, otherwise painted rubble, granite quoins, shallow keyed elvan arches and slate sills. Hipped asbestos slate roof with wide eaves, sweeping lower to rear and rebuilt brick chimneys over side walls.
Double depth plan of 2 equal reception rooms flanking cross passage (now incorporated into 1 room) leading to central stair between 2 shallow rear service rooms and with later single storey service wing adjoining to rear left. Built partly into bank at right for pantry.
2 storeys. Symmetrical 3-window east front with central doorway with C20 top-glazed door. Original hornless 16-pane sashes except for copy replacement with horns to first floor left. Back door was to left-hand rear room but now enclosing by extension. Rear has unequal 2-light casement to left-hand (west) room with 9:3 panes.
Interior retains most of its original carpentry and joinery: dog leg stair with stick balusters and turned newels; 6-panel doors; window shutters; glazed cupboards to niches in left-hand front room; moulded beams and underside of floorboards; basket arch between former passage and stair and a cast iron hob grate to each first floor front room within surrounds with roundels in corner blocks.
The names of draughtsman and builder were found written on wood in one of the window seats.
This house was the home of the Edwards Brothers who used to own Perran Foundry qv.
Information from occupier. An early C19 house little altered since built.

SW 73 NE

3/339
-

GV

PERRANARWORTHAL

PERRANARWORTHAL

House at approx 25m east of Oak Tree Cottage

II

Small house. C18. Shale rubble, rendered to ground floor, slate sills and timber lintels. Asbestos slate roof with brick chimneys over gable ends.
Plan of 2 equal rooms flanking central passage leading to central stair between shallow rear service rooms.
2 storeys. Symmetrical 2-window south east front with central doorway with 2 vertical panelled door. C19 hornless sashes with marginal panes. Single-storey extension with front projecting forward slightly on left.
Interior not inspected.

SW 73 NE

3/340
-

GV

PERRANARWORTHAL

PERRANARWORTHAL

No 1 Riverside

II

House in terrace. Circa late C18, extended to left circa early C19. Painted rubble with weatherboard cladding to first floor of original part. Steep scantle slate roof with hipped dormer to front, brick chimney over, gable end, left, and adjoining No 2 on right. Later part has slate roof at lower pitch and lower level. Cast iron ogee gutters.
Plan of large parlour to front with cross passage on right and service room behind plus C19 extension, left, providing further reception room to front and service room behind.
2 storeys plus attic to right-hand original part. South east front. Original front on right with doorway to far right. 6-panel door with top 4 panels later glazed set back behind original wooden pedimented doorcase with moulded cornices. Canted bay, left of middle, with old ground and first floor 3-light casement, 12 panes to middle lights and 6 panes to sidelights. 1-window C19 extension on left with ground and first floor sashes.
Interior not inspected but may have original C18 features like No 2 (qv).
Part of an unusual group of C18 houses.

SW 73 NE

3/341

-

GV

PERRANARWORTHAL

PERRANARWORTHAL

No 2 Riverside

II

House, in middle of terrace of 3. Circa late C18. Painted rubble and some slatehanging to ground floor and C20 P.V.C. weatherboarding to first floor. Steep scantle slate rof with brick axial stacks, left of middle and over party wall, right. Hipped 2-light roof dormer right of middle. Cast iron ogee gutter.
Plan of 2 nearly equal reception rooms flanking cross pasage leading to central stair hall between rear service rooms.
2 storeys plus attic. Nearly symmetrical 3-window south east road front. Central doorway with 6-panel door set back behind original wooden pedimented doorcase with moulded cornices. Canted bays right and left with old hornless 12-pane sashes with 8-pane sidelights except for first floor left with same numbers of panes but fixed lights or casements and 16-pane 2-light casement over doorway. Old slatehanging to ground floor right indicates that the whole front of Riverside, Nos 1, 2 and 3 was probably slate-hung.
Interior partly inspected: original open-well closed string stair with ramped pine handrail, rectangular balusters and turned pendants; original 6-panel and 2-panel doors, and moulded plaster ceiling cornices in front rooms.
Part of an unusual group of C18 houses, and this one surprisingly complete.

SW 73 NE

3/342

-

GV

PERRANARWORTHAL

PERRANARWORTHAL

No 3 Riverside

II

House in terrace. Circa late C18. Painted rubble wall with vestige of slatehanging left of doorway. Concrete tiles over main steep roof with brick chimney over external stack rights, party wall, left. Hipped roof dormer, left, with original 12-pane 2-light casement. Scantle slate roof at lower level, set back and adjoining gable end, right.
Plan of large parlour to front with cross passage leading to stair and rear service room, plus 2-storey slightly later wing set back and adjoining gable end at right and single-storey later lean-to at gable end of wing.
2 storeys plus attic. South east road front. Original 1-window front on left and 1-window front of wing set back on right. Original front has doorway, left, 6-panel door with top 2 panels later glazed, set back behind original pedimented wooden doorcase with moulded cornices. Canted bay windows to ground and first floor right with original 20-pane fixed centre light and 10-pane casement sidelights. Old hornless sashes with glazing bars, over. Wing has probably original 2-light casements with glazing bars.
Interior not inspected but may have original features like No 2 (qv).
Part of an unusual group of C18 houses.

SW 73 NE MYLOR

3/183 Remains of Carclew House

30.5.67

GV II*

Ruin of country house. Begun by Samuel Kemp circa 1720s but extended and completed circa 1750's for William Lemon, probably by Thomas Edwards, and extended in the later C18 and early C19. Gutted by fire in 1934. Granite ashlar, except stuccoed rubble to later C18 and early C19 parts.

Plan of large originally central block of 3-rooms wide of central hall with flanking reception rooms, stair hall behind hall and service rooms to either side to rear. Flanking single storey over basement link buildings to originally identical pavilions. Later extended to left (west) by double depth range with front reception rooms and rear service rooms and long axial passage between. C18 parts terminating to left (west) with square clock tower but extended further to left (west) and to rear in the C19. Palladian style with original central 1750's part in the Ionic order. The building has extensive remains, in many parts to full wall height of 2 storeys over basement, and complete with cornice. The part to the east suffered most damage and to the right of the Ionic portico is reduced to basement level for the greater part. South front was originally symmetrical with recessed 3-window front behind tetrastyle Ionic portico with engaged terminal columns between identical rusticated ashlar 2-window bays with moulded strings below flat arch level and moulded cornice to parapet. To the left and right were single storey 5-window fronts of wings with Tuscan colonnades surmounted by entablatures and cornices. In front of the whole of this central section was a granite balustrade, in front of the portico, with flanking stairs; to left and right of the stairs, and between the column bases of the colonnades. To the far left and right were pedimented single storey over basement pavilions each with a central Venetian window. The central portico and much to the left survives, but to the right the walling has mostly fallen. Both the colonnades have gone and the balustrades are removed. However, much of the original stone is lying around the site including moulded cornices to front and to rear. The later C18 part to the left has a fairly intact single storey over basement 3-window front and 4-stage clock tower to left. The stucco is crumbling but the granite dressings of string, sill consoles, moulded sills, jambstones arch stones and cornices are complete. The front has plain openings to the basement but Venetian windows to first floor, left and right, and central single-light opening with moulded architrave.

The clocktower, with splayed corners, has round-arched opening to basement, tall narrow opening to first floor, continuation of parapet cornice as string, round clock face openings to front and left (west) with moulded string as hood, over, and bellcote with round-arched openings and moulded impost string and cornice.

Interior is very overgrown and access is dangerous but much internal walling survives and even window shutters and panelled reveals in places. There is a granite stair with iron balustraded columns to one side of the axial passage.

This house at Carclew replaced an earlier one surviving until the C18. Called Cargelew-Dangarus in Henry II's reign, and, was owned by descendants of the Daungers as heiresses who married the Renaudins and Bonythons at the beginning of the C15. The Renaudins soon died out, but the Bonythons continued until 1697, when Richard, the last male heir of the elder branch, died, leaving an only daughter, Jane, who married Samuel Kemp.

Extracted from part of Lawrence Weaver's description in The Country Life of May 13th, 1916, and repeated in a Country Life article of April 14th, 1934.

Information about Thomas Edwards the assumed architect of the main phase of Carclew House can be referred to in an article by H. Dalton Clifford and Howard Colvin also in The Country Life (Vols 113 and 132, 1962).

Carclew is now a magnificent romantic ruin, overgrown and neglected. Built in a commanding position overlooking Restronguet Creek and Carrick Roads beyond, and formerly one of Cornwalls very best C18 country houses. Photographs survive of the house before the fire, both in the Country Life articles and with the NMR.

SW 73 NE

3/350
30.5.67

GV

PERRANARWORTHAL

PERRANARWORTHAL

Tullimaar

II*

Country house. Circa 1828. Built for Benjamin Sampson, manager of a local powder factory. Stuccoed rubble walls. Hipped dry Delabole slate roofs around central leaded valley. Wide eaves, cast iron ogee and stuccoed chimneys with cornices over cross and axial walls.
Plan: central entrance leading to large stair hall with 3 principal rooms to right facing the garden and a larger room to the left of the entrance. The kitchen behind the hall has service room in a wing to its left and to rear. Circa early C20 conservatory projecting from left-hand corner of entrance front. Neo classical style.
2 storeys. All fronts with plinth, string and square cornice and with corner pilasters. Symmetrical 3-bay 3-window south garden front with pilasters dividing bays and window within basket arched recesses. Symmetrical 3-window east garden front with windows set in rectangular recesses. Regular west 2:1:1 bay 4-window entrance front with windows in recesses like south front. Round-headed doorway to third bay from left has original fanlight with flower petal panes. Fine Doric porch with unfluted columns and plain frieze. All windows, except for round-headed stair sash, are 12-pane original hornless sashes with thin glazing bars or later horned copies.
Interior is virtually complete with its C19 carpentry, joinery, some chimney pieces and plasterwork: mahogany 6-panel doors, open-well open-string stair and moulded plaster cornices to principal reception rooms, stair hall and chambers. Cornices and bands to reception rooms and stair hall with carved classical enrichments including egg and dart, acanthus, and trailing or plaited detail. Central roses to left and right reception rooms and stair hall. In the kitchen is a fine classical dresser. In the central east room there is a commemorative plaque with 'A shot was fired through this window by a sentry Running Amok 1944'.
This incident occurred whilst General Eisenhower was using the house as his personal headquarters before D-Day.
Tullimaar has been the home of many distinguished residents or guests including Sarah Parkin, mistress to George III, who spent her last years here; the Reverend Francis Kilvert who stayed here in 1870 and more recently, from 1957-1974 was owned by Princess Marthe Bibesco and her married daughter Princess Valentine Ghika (direct descendants of the Emperor Napoleon) and Prince Ghika. It is stated in the estate agents sale particulars of 1974 that the interior of the house was completely transformed in the French style during this period, but the present interior seems to be typical of what early C19 houses in England should be. Perhaps the description refers to the furnishings.
Other historical information from present owner and the N.M.R. A fine and virtually complete early C19 house in well planted grounds overlooking the beautiful Kennal Valley.

APPENDIX TWO:

List of Royal Commission on the Historical Monuments of England photographs of the site, taken in 1990 by Peter Williams and deposited at the National Monuments Record Centre, Swindon.

Photographers Negative List - Order 90/01438

26 September 2001

Photographer PETER WILLIAMS
Date Taken 04 OCT 1990
Address PERRAN FOUNDRY

MYLOR
CORNWALL

BB93/34016	ENTRANCE, VIEW FROM NORTH WEST.	BLACK AND WHITE
BB93/34017	OFFICE, PETROL PUMP.	BLACK AND WHITE
BB93/34018	OFFICE, VIEW FROM SOUTH.	BLACK AND WHITE
BB93/34019	WEST END OF OFFICE, VIEW FROM SOUTH EAST.	BLACK AND WHITE
BB93/34020	OFFICE, VIEW FROM NORTH WEST.	BLACK AND WHITE
BB93/34021	OFFICE, GND FLOOR, EAST ROOM, VIEW FROM EAST	BLACK AND WHITE
BB93/34022	OFFICE, STAIRS.	BLACK AND WHITE
BB93/34023	AVERY WEIGHBRIDGE, VIEW FROM SOUTH.	BLACK AND WHITE
BB93/34024	WEIGHBRIDGE OFFICE, VIEW FROM WEST.	BLACK AND WHITE
BB93/34025	WEIGHBRIDGE OFFICE, INTERIOR, VIEW FROM NORTH EAST.	BLACK AND WHITE
BB93/34026	THREE STOREY MILL, VIEW FROM SOUTH EAST.	BLACK AND WHITE
BB93/34027	THREE STOREY MILL, VIEW FROM NORTH EAST.	BLACK AND WHITE
BB93/34028	THREE STOREY MILL, VIEW FROM WEST.	BLACK AND WHITE
BB93/34029	THREE STOREY MILL, VIEW FROM SOUTH WEST	BLACK AND WHITE
BB93/34030	THREE STOREY MILL, FROM SOUTH LEAT	BLACK AND WHITE
BB93/34031	THREE STOREY MILL, WEST SIDE, CAST LINTEL & DOORWAY.	BLACK AND WHITE
BB93/34032	THREE STOREY MILL, INTERIOR, TOP FLOOR, VIEW FROM SOUTH EAST.	BLACK AND WHITE
BB93/34033	THREE STOREY MILL, INTERIOR, TOP FLOOR, VIEW FROM EAST	BLACK AND WHITE
BB93/34034	THREE STOREY MILL, INTERIOR, 2ND FLOOR, VIEW FROM NORTH EAST	BLACK AND WHITE
BB93/34035	THREE STOREY MILL, INTERIOR, 1ST FLOOR, VIEW FROM NORTH EAST	BLACK AND WHITE
BB93/34036	THREE STOREY MILL, INTERIOR, GND FLOOR, VIEW FROM WEST.	BLACK AND WHITE
BB93/34037	BUILDING TO SOUTH OF THREE STOREY MILL, STONE MAKER'S NAME PLATE	BLACK AND WHITE
BB93/34038	BUILDING TO SOUTH OF THREE STOREY MILL, MILL STONE	BLACK AND WHITE
BB93/34039	CAST IRON FOOTBRIDGE, VIEW FROM NORTH.	BLACK AND WHITE
BB93/34040	CAST IRON FOOTBRIDGE, VIEW FROM NORTH EAST	BLACK AND WHITE
BB93/34041	CAST IRON FOOTBRIDGE, DETAIL	BLACK AND WHITE
BB93/34042	SOUTH LEAT, GENERAL VIEW FROM SOUTH WEST	BLACK AND WHITE
BB93/34043	SOUTH LEAT, VIEW FROM WEST	BLACK AND WHITE
BB93/34044	SOUTH LEAT, VIEW FROM SOUTH WEST	BLACK AND WHITE
BB93/34045	SOUTH LEAT, EAST END	BLACK AND WHITE
BB93/34046	OLD MOULDING SHOP, VIEW FROM WEST.	BLACK AND WHITE
BB93/34047	OLD MOULDING SHOP, WINDOW ON SOUTH SIDE.	BLACK AND WHITE
BB93/34048	OLD MOULDING SHOP, INTERIOR, VIEW FROM SOUTH WEST.	BLACK AND WHITE
BB93/34049	OLD MOULDING SHOP, INTERIOR, VIEW FROM WEST.	BLACK AND WHITE
BB93/34050	OLD MOULDING SHOP, INTERIOR, VIEW FROM EAST.	BLACK AND WHITE
BB93/34051	OLD MOULDING SHOP, INTERIOR, VIEW FROM NORTH	BLACK AND WHITE
BB93/34052	OLD MOULDING SHOP, INTERIOR, ROOF, FROM WEST	BLACK AND WHITE
BB93/34053	OLD MOULDING SHOP, INTERIOR, EAST FURNACE, VIEW FROM SOUTH WEST	BLACK AND WHITE
BB93/34054	OLD MOULDING SHOP, INTERIOR, WEST FURNACE	BLACK AND WHITE
BB93/34055	OLD MOULDING SHOP/SOUTH LEAT - OF FORMER WHEEL POSITION VIEW FROM WEST	BLACK AND WHITE
BB93/34056	OLD MOULDING SHOP/SOUTH LEAT - FORMER WHEEL POSITION, VIEW FROM EAST.	BLACK AND WHITE
BB93/34057	OLD M/C SHOP, CHIMNEY ON SOUTH WALL	BLACK AND WHITE
BB93/34058	BUILDING BETWEEN OLD M/C SHOP & OLD MOULDING SHOP, VIEW FROM NORTH.	BLACK AND WHITE
BB93/34059	BUILDING BETWEEN OLD M/C SHOP & OLD MOULDING SHOP, VIEW FROM EAST	BLACK AND WHITE
BB93/34060	BUILDING BETWEEN OLD M/C SHOP & OLD MOULDING SHOP, INTERIOR, VIEW FROM NORTH	BLACK AND WHITE
BB93/34061	BUILDING TO EAST OF OLD M/C SHOP & OLD MOULDING SHOP, INTERIOR, VIEW FROM	BLACK AND WHITE

BB93/34062	EAST BUILDING TO EAST OF OLD M/C SHOP & OLD MOULDING SHOP, INTERIOR, VIEW FROM NORTH	BLACK AND WHITE
BB93/34063	BUILDING TO EAST OF OLD M/C SHOP & OLD MOULDING SHOP, INTERIOR, FURNACE, VIEW FROM SOUTH EAST.	BLACK AND WHITE
BB93/34064	OLD FORGE, VIEW FROM SOUTH WEST	BLACK AND WHITE
BB93/34065	OLD FORGE, NORTH FRONT, BLOCKED OPENINGS.	BLACK AND WHITE
BB93/34066	OLD FORGE, NORTH WALL, VIEW FROM SOUTH.	BLACK AND WHITE
BB93/34067	OLD FOUNDRY, WEST ELEVATION	BLACK AND WHITE
BB93/34068	OLD FOUNDRY, NORTH WALL, VIEW FROM SOUTH.	BLACK AND WHITE
BB93/34069	SACK STORE, VIEW FROM SOUTH EAST	BLACK AND WHITE
BB93/34070	SACK STORE, VIEW FROM NORTH WEST	BLACK AND WHITE
BB93/34071	SACK STORE, GROUND FLOOR, NORTH EAST ROOM, VIEW FROM EAST.	BLACK AND WHITE
BB93/34072	OLD FOUNDRY/CART SHED/SACK STORE, VIEW FROM WEST	BLACK AND WHITE
BB93/34073	PREPARATION MILLS, VIEW FROM NORTH EAST	BLACK AND WHITE
BB93/34074	PREPARATION MILLS, INTERIOR, NORTH WALL, VIEW FROM SOUTH	BLACK AND WHITE
BB93/34075	PREPARATION MILLS, INTERIOR, WEST END, ROOF	BLACK AND WHITE
BB93/34076	PREPARATION MILLS, INTERIOR, WEST END, ROOF, DETAIL	BLACK AND WHITE
BB93/34077	DERELICT BUILDINGS TO WEST OF PREPARATION MILLS, SITE OF FORMER WHEEL.	BLACK AND WHITE
BB93/34078	DERELICT BUILDINGS TO WEST OF PREPARATION MILLS, FROM EAST	BLACK AND WHITE
BB93/34079	STABLES, VIEW FROM NORTH EAST	BLACK AND WHITE
BB93/34080	STABLES, WINDOW, DETAIL, NO:1.	BLACK AND WHITE
BB93/34082	STABLES, WINDOW, DETAIL, NO:2.	BLACK AND WHITE
BB93/34083	BUILDING TO NORTH OF STABLES, VIEW FROM EAST	BLACK AND WHITE
BB93/34084	BUILDING TO NORTH OF STABLES, INTERIOR, VIEW FROM EAST	BLACK AND WHITE
BB93/34085	PERRAN COTTAGE, VIEW FROM SOUTH	BLACK AND WHITE
BB93/34086	"PERRAN ARCHES", VIEW FROM NORTH EAST	BLACK AND WHITE
BB93/34087	SOUTH GATEPOST, DETAIL	BLACK AND WHITE
BB93/34088	SITE OF GASHOLDER, VIEW FROM EAST.	BLACK AND WHITE
BB93/34089	CAST LINTEL.	BLACK AND WHITE

Total Records: 73