Finch Brothers' Foundry
Sticklepath · Okehampton
Devon

The Foundry as it was before 1960.

PRICE 25p
Proceeds to Foundry Restoration Fund

Finch Brothers' Foundry

B. A. FYFIELD-SHAYLER AND C. P. NORTON

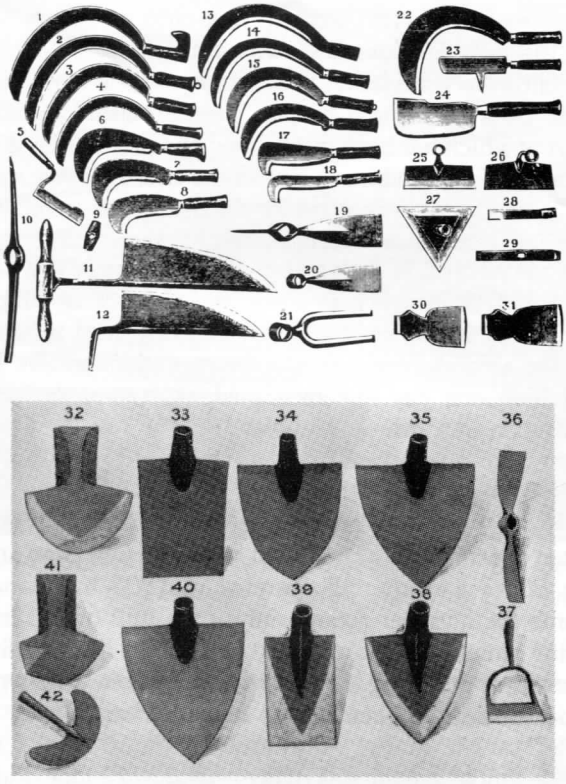
STUDENTS of nineteenth-century rural industry owe a debt to the Trustees of the Finch Foundry at Sticklepath, near Okehampton in Devon, for putting into working order this water-powered complex of edge-tool manufactury, forge, grinding house and sawmill which was in operation from 1814 to 1960, using techniques evolved in the 18th century. Surprisingly little has been written about the Finch Foundry, though it is equalled in importance perhaps only by the scythe-works at the better-known Abbeydale Industrial Hamlet near Sheffield, from which it differs in many unique ways.

Scholars have perhaps been inclined to overlook these works since Dartmoor is not one of Britain's best-known industrial areas. Secondly it is not strictly a foundry, for although early directories refer to William Finch who formed the firm in 1814 as an iron founder there is no evidence that any casting ever took place here.

Known as the Finch Foundry throughout the nineteenth century, it became the Finch Brothers' Foundry in 1919 when the three brothers, Albany, James and Thomas, formed a partnership. It was a limited company from 1945 to 1960, and is now maintained by the Finch Foundry Trust. The use of the word Foundry is therefore a long-established one.

Primarily, Finch Brothers were manufacturers of agricultural edge tools: scythes, billhooks, axes, hoes and shovels, as well as the hemispherical ladle-like scoops required by the china clay industry and other tools for the mines of Devon and Cornwall.

As it prospered the firm became importers and sole agents for a variety of American farm tools: Lake City axes and Batcheller hay forks. It traded in a range of agricultural equipment not of its own manufacture, traps, twine and grindstones. Here was the local blacksmith's and the wheelwright's shop, where carts and wheel



Some of the tools made at the Foundry.

1. Reap Hook; 2. Rib Trimming Hook; 3. Crank Grass Hook; 4. Straight Grass Hook; 5. Devon Potato Chopper; 6. Half Turn Hook (Knob handle); 7. Half Turn Hook (Plain handle); 8. Chop Hook; 9. Stonebreaker's Hammer; 10. Pick Axe; 11. Cross handle Hay Knife; 12. Side handle Hay Knife; 13. Staff Hook; 14. Bramble Hook; 15. Browse Hook; 16. Straight Browse Hook; 17. Bill Hook; 18. Spear Hook; 19. Twibill; 20. Mattock; 21. 2-Prong Digger; 22. Cornish Furze Hook; 23. Mason's Zex; 24. Devon Cleaver; 25. Straight Neck Hoe; 26. Swan Neck or Bury Hoe; 27. Triangle Hoe; 28. Weed Iron; 29. Bricklayer's Hammer; 30. Kent Axe; 31. Ordinary Axe; 32. Turf Iron; 33. Cornish Square Shovel; 34. West Cornwall Round Pattern Shovel; 35. Cornish Shovel; 36. Double Headed Hoe; 37. Dutch Hoe 5 in. to 9 in.; 38. Devon Shovel; 39. Devon Shovel, Square; 40. Clay Work Shovel; 41. Wing Turf Iron; 42. Edging Knife.

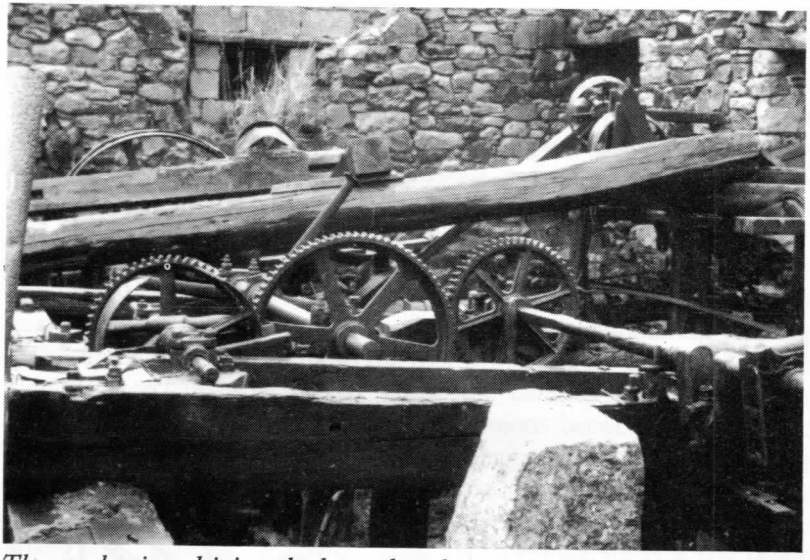
barrows were made and tyres were shrunk onto wheels; a mandrel at the foot of the outside stairs and two circular tyring plates formerly beside the fan wheel evidence this activity. Tool handles, wooden parts for the carts, gates and hurdles were produced in the adjacent sawmill (part of which has been demolished and part has been converted into a museum of rural industry) and in the nearby joiner's shop. The firm produced ready-cut boat knees for the boat yards, acted as builders and builders' merchants, and as coal merchants.

From the records still in the possession of the family it would appear that more could be researched about the number of employees at various periods (it is known that twenty men worked in the complex just before the second World War), about production (we know, for example, that in one day five men made 400 swan-neck hoes) and about distribution in south-west England.

The power that drove these works was derived from the waters of the river Taw which, since the middle ages has supplied Sticklepath with the power for a dozen or more wheels, of which eight are known to have operated concurrently. The Finch complex itself is an amalgam of two former mills: a cloth mill operated in 1805 by John Stanbury which became the hammer room, and a corn mill owned in 1805 by John Bowring which was incorporated in 1835 as the grinding house. Today, apart from powering the Finch works, these waters provide all the domestic lighting and heating for Albany House lower down the village owned by Mr Robert A. Barron, a descendant of the Finch family and a Finch Foundry Trustee, whose 12-foot water wheel operates an alternator producing 4 kilowatts.

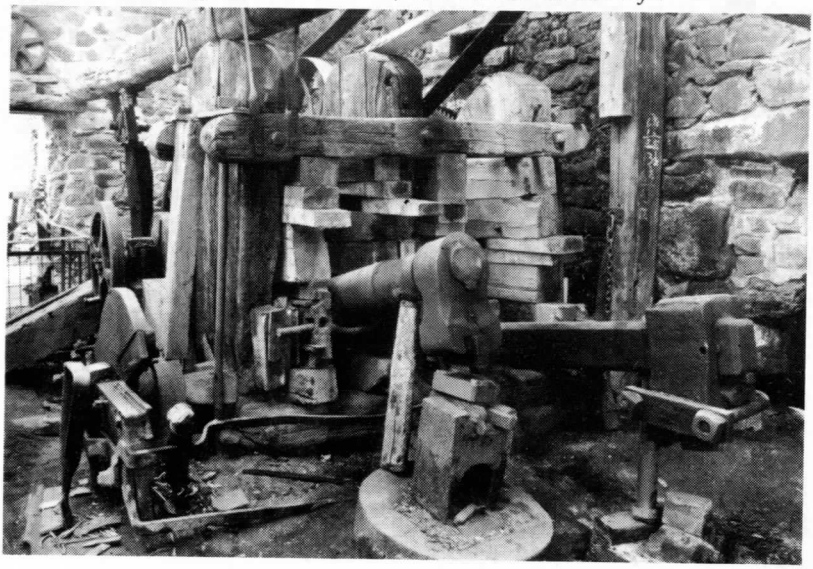
The existing wheels at the Finch Foundry and the wheel at Albany House, along with those of the mills which have now disappeared, are served by a leat running from a dam on the Taw beside a former serge mill above the village, behind the backs of the buildings along the main street, to join up with the river again further south-east. Behind the grinding house the water from the leat is channelled along a wooden aqueduct or "launder," an overhead construction about 10 feet wide and extending about 40 yards along the full length of the complex. It is made of heavy wooden boards supported on massive legs, and it is estimated that each cross-strut bears 1.5 tons of water. From this launder the water plunges through hatches controlled by levers to activate the wheels below. The woodwork of the launder and the wheels has been rebuilt since 1966, but the ironwork and machinery are original.

The main building, the forge or hammer room, measures about 100



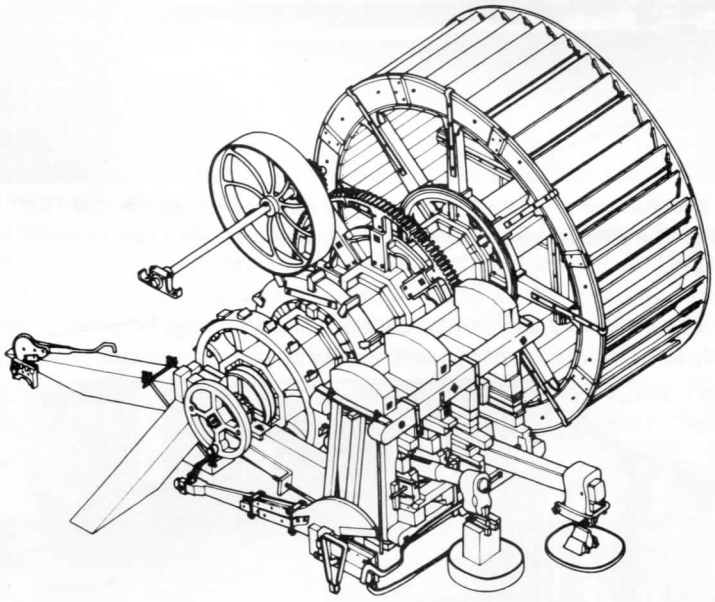
The mechanism driving the large drop hammer, with (in the rear) that driving the smaller drop hammer — before reroofing the hammer shop in 1966.

The trip hammers and power shears — the plating hammer is on the right, the steeling hammer centre, and shears on the left.



square yards and originally extended the three-storey height of the cloth mill, with two lower stone storeys and an upper storey of cob, probably roofed with slate. The upper storeys have since been removed and the building re-roofed.

The two biggest wheels were made by J. & H. Pearce of Tavistock, and it is believed that these as well as the power shears, trip and drop hammers were originally in use at the Tavistock Iron Works. The Pearce family seems to have had a branch, which generally spelled its name Pearse, owners of woollen mills at Horrabridge and Sticklepath.



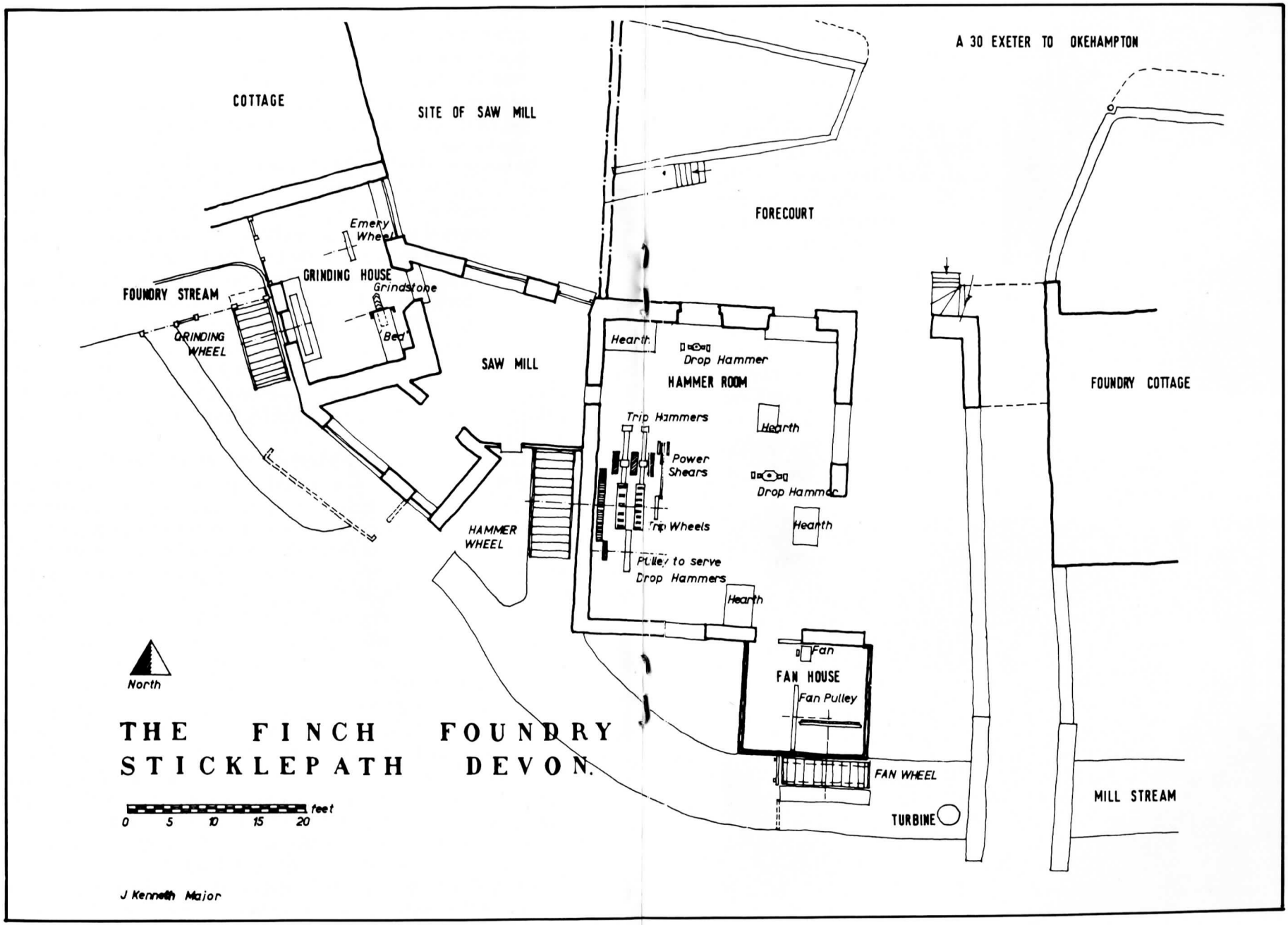
The 12ft water-wheel which powers the machinery in the hammer room and (formerly) in the sawmill; the 18ft hexagonal-sectioned timber main axle; primary gear wheel which supplies power through lay shafts to the drop hammers; two iron tappet wheels showing projecting cams which trip the plating hammer (front, far right) and steeling hammer (front, right of centre). Note the rod connected to the wheel at the end of the axle which produces the scissors action for the power-shears (front, centre). The drawing is by John Reynolds from his book Windmills and Watermills *1969 (Hugh Evelyn Ltd.) and is reproduced by permission of the author and publishers.*

The Iron Works manager, Saunders Hornbrook, married one of the Pearse daughters. In 1815 the Iron Works advertised for sale its water wheels and machinery, and since a copy of this advertisement was preserved by William Finch amongst his records it seems safe to assume these were indeed the wheels and machines he installed in his year-old forge. The smaller fan wheel was probably acquired in 1835 from the former corn mill.

The hammer wheel was once capable of producing about 12 horse-power. It is 12 feet in diameter, 5 feet wide, with iron rims and 48 elm-wood buckets. Trip wheels on the axle of this wheel drive two trip or tilt hammers of iron with slotted heads into which different striking parts can be fitted according to the tool being forged. The anvils have similar interchangeable heads. These tilt hammers, mounted in a massive timber frame and swung on trunnions between iron cheeks, are of the ''tail helve'' type, their butts depressed by cams projecting from iron tappet wheels. One wheel has 16 cams, the other 12, producing different rates of striking. The hammer nearest the water-wheel is a ''plating'' hammer, used for flattening shovels and other tools. The other is a ''steeling'' hammer for drawing out bars to make hooks and other shapes.

A cast-iron primary gear wheel on the timber main shaft drives a secondary shaft to which are connected pulleys and belts running to other lay shafts in the hammer shop and (formerly) in the sawmill. These shafts carry pulleys and snatch wheels which operate two drop hammers, falling between iron rails onto anvils below. The main shaft also powers a pair of heavy shears: a wheel at the end of the shaft is connected to the shears by a rod, producing the scissors action. Here were trimmed the shield-shaped shovels for the clay pits. A further set of power-operated shears worked off a rocker arm on one of the secondary shafts and was activated by a primitive clutch.

In the hammer room there are five hearths and two furnaces; four are operational though today only one is in regular use. They are fed with air, not by bellows, but by underground ducts of 3-4 inches diameter running from a fan of the paddle type, built by Langdon of London in 1853 and powered by the fan house water-wheel. Originally undershot, driven by the stream passing through it when the hatches were closed, this wheel is now overshot like the others. It is 10 feet in diameter, 2 feet 6 inches in width and produces about 2 horse-power. Sometime after its installation the pulley and gear between water-wheel and fan was increased in power by bolting a sheet iron rim with spacing pieces onto the wooden pulley to increase its diameter by 8 inches.


A 30 EXETER TO OKEHAMPTON
COTTAGE
SITE OF SAW MILL
FORECOURT
Emery Wheel
GRINDING HOUSE
Grindstone
FOUNDRY STREAM
GRINDING WHEEL
Bed
SAW MILL
Hearth
Drop Hammer
HAMMER ROOM
Trip Hammers
Hearth
Power Shears
Drop Hammer
Trip Wheels
Hearth
HAMMER WHEEL
Pulley to serve Drop Hammers
Hearth
Fan
FAN HOUSE
Fan Pulley
FAN WHEEL
TURBINE
FOUNDRY COTTAGE
MILL STREAM
North
THE FINCH FOUNDRY
STICKLEPATH DEVON.
0 5 10 15 20 feet
J Kenneth Major

The 12 ft. overshot water-wheel which powers the hammers, shears and drop stamps in the forge area (left). The flow of water from the reconstructed launder is controlled by a lever-operated hatch.

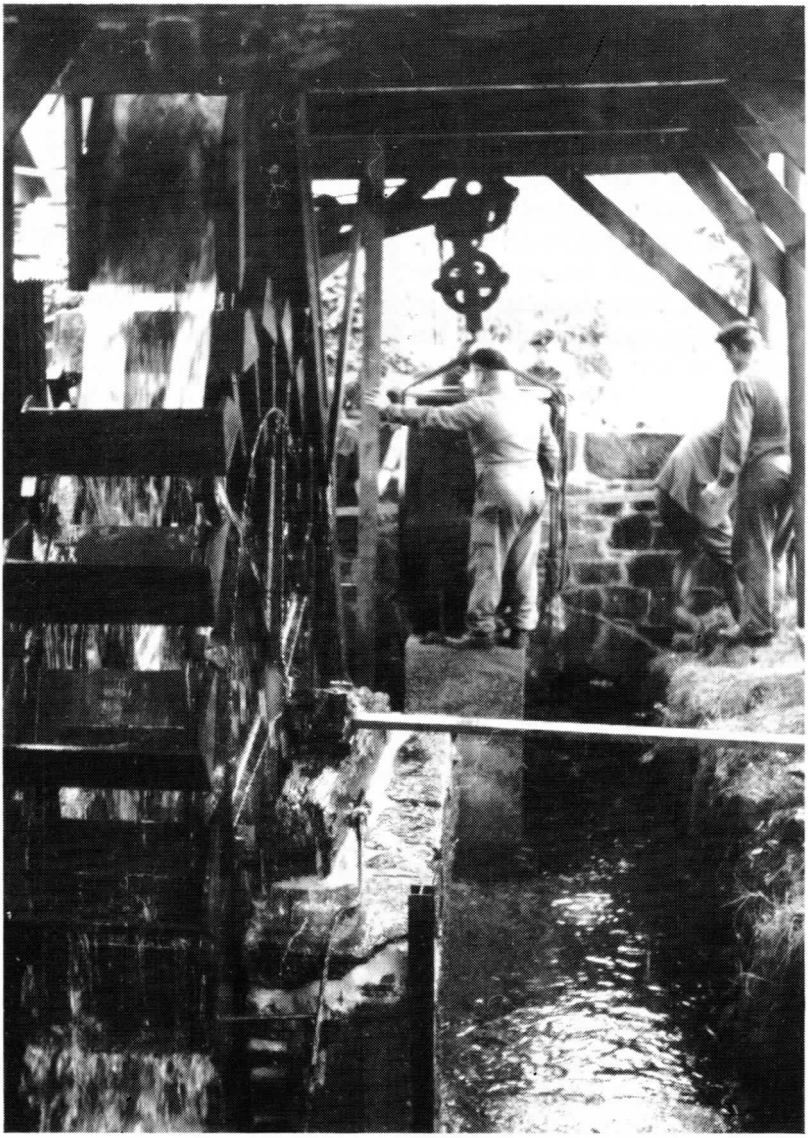
Below, Mr R. A. Barron at work on the power shears. The steeling hammer with inter-changeable bit inserted between chocks can be seen in close-up on the right.

Roughly shaped on the hammers, the tools were passed to smiths at the individual hearths and anvils for final shaping and tempering. After about 1908 laminated steel for the edge tools was fetched from Sheffield, but at one time the lamination was carried out on the premises, and the records contain several recipes for the steel suitable for different edge tools.

After forging, the tools were passed to the grinding shop, converted from the corn mill in 1835. The power source here is an overshot water-wheel, 11 feet in diameter and 3 feet 10 inches in width, containing thirty buckets and producing about 7 horse-power. The workman using the grindstone lies on a horizontal bed above, using his weight to bear down upon the tool to be ground against the stone below — a most unusual method of operation. A bevelled edge facilitated the grinding of shaped blades. The grindstone runs in a trough of water, automatically fed by two iron pipes from the leat, under the grindstone and escaping through a hole back to the leat. The grindstones were bought from the Sheriff Hill quarries at Gateshead-on-Tyne, and several worn down from their original diameter of 5 feet to about 2 feet 6 inches survive in this room. The tools were then polished at an emery wheel: a wooden pulley, fabric-rimmed, impregnated with glue and emery powder. Here, too, tools were returned for sharpening and domestic utensils such as flat-irons were brought in for polishing.

Between the main hammer room and the grinding house stood the sawmill. The part that ran out towards the road has been demolished and the back part now houses a museum of rural industry. The saws and equipment have now been lost and the Trustees would like to trace them. Originally there were a rack-bench and a push-bench, both with circular saws (the former mounted on a floor-rack enabling the work to be winched against the blade), a boring machine and a lathe. Today only a band-saw survives, in the grinding house where it always seems to have been. On the former saws, powered by the main hammer room wheel, the tool handles were roughly shaped before finishing with spoke-shaves and ingenious handle-planes or nugs which could be adjusted to each size of handle. The blades were then varnished or coated with Stockholm tar to preserve the bright edge.

The Finch family operated the works continuously from 1814 until the collapse in 1960 of the wall between the hammer wheel and the fan house. Earlier, in 1950, it had been felt worthwhile to replace the rotted oak shaft from the main wheel with a new piece of Ayan wood from West Africa, 18 feet long and 2 feet wide, cut to the same



Members of the 15th Infantry Workshop, R.E.M.E. Plymouth, relocating the turbine in 1969. The fan house wheel newly restored by Mr Barry Hughes and the pupils of Grenville College, Bideford. Above: the underside of the reconstructed launder.

hexagonal shape. By 1958 the water-wheels were in a bad state of repair, and rather than renovate them it was decided to purchase a turbine generator. Unfortunately one of the wrong capacity was installed. This error, the increasing deterioration of the launder and wheels, coupled with competition from mass-produced tools and the fact that hand tools were less in demand on the farms, led to the decision when the wall collapsed to abandon the business.

From 1960 to 1966 the buildings and machinery lay derelict. The last person to own the firm as a going concern was Richard K. Barron, a grandson of Albany Finch, and it was he who formulated the idea of restoring the complex as a working example of 19th century rural industry. Richard Barron died in 1964 but his brother and sister, Mr Robert K. Barron and Mrs M. F. Pyne, decided to continue the work both as a memorial to him and because they had been assured of the foundry's irreplaceable value by visiting industrial archaeologists.

In 1966 a charitable trust was formed to restore the buildings, replace the woodwork of the launder and wheels and get the machines operational. Rebuilding started in 1967 with a £1,000 grant from the Pilgrim Trust.

Today, Richard Barron's dream is a reality: the fabric is sound, most of the machinery is in place and working daily. Last year a roundhouse was built on the green behind the foundry to accommodate a working horse wheel, presented by Lord Lambert, that had formerly been used to operate a cider press at Coffins, Spreyton. This year extensive car-parking and other facilities for visitors have been added between the foundry and the Quaker cemetery. Since 1966 between £15,000 and £20,000 has been spent on the complex, which attracts 10,000-12,000 visitors annually, including parties from universities and technical colleges.

The Finch Brothers' Foundry has featured in publications as diverse as *The Field*, *The New Scientist* and *The Schoolboy's Annual*. In 1973 it was one of the winners of a BBC2 *Chronicle* competition for the best projects in industrial archaeology. In January 1976 and again in 1977 it featured in the Granada TV schools' programmes on the geography of Dartmoor and on water power.

Apart from the southern section of the former sawmill which has been converted into a museum of rural industry, and the attractively laid-out museum of water power in the upper portion of the eastern wing, this is not a static exhibition. It is a working example of an 18th-19th century water-powered factory, in daily operation throughout the summer and occasionally in the winter. Next year, if

Mrs Pyne and the Trustees succeed in their plans, the wheels and furnace, the hammers and shears will not operate merely for the education and pleasure of visitors and enthusiasts, but will actually be in production. The plan is to employ a blacksmith to work in the foundry, producing wrought iron articles for sale.

The days are past when the Finch Foundry was called upon to produce 400 swan-neck hoes, Cornish furze hooks or clay scoops by the gross. Farmers and pit managers are unlikely to call with orders for edge tools and shovels. Times have changed, the market has altered and it seems the foundry is capable of adapting to it, as it has done before. During the poliomyelitis epidemic of the late 1940's and early 50's the foundry answered the call and produced several thousands of leg irons and fittings for victims of the disease. Today the need for these has fortunately virtually disappeared. The ''customers'' of the future may perhaps be found amongst the visitors and tourists who come to the area in increasing numbers, and these combined with the modern taste for decorative wrought iron would suggest that the potential for a 19th century water-powered factory profitably surviving into the 20th and 21st centuries is bright indeed.

SOURCES

The Foundry itself, the machinery and records.

Information given by Mrs M. F. Pyne, Mr Robert K. Barron, Mr J. Kenneth Major of the Society for the Protection of Ancient Buildings, Mr John Reynolds.

Douglas Gordon, ''Industry in a Devon Village'', *Country Life*, 14th January, 1944.

The Devon Farmer, April 1966.

Western Times & Gazette, 1st April 1966, 31st October 1969, etc.

J. D. U. Ward, an article in *Austin Magazine*, March 1967.

John Reynolds, *Windmills & Watermills*, Hugh Evelyn Ltd., 1969.

Western Morning News, 24th July 1970, 21st January 1972, etc.

The Sunday Times Magazine, 28th January 1974.

J. Kenneth Major, *Finch Brothers' Foundry, Sticklepath*, David & Charles, reprinted 1974.

Brian J. Ford, ''Preserving an Industrial Centre on Dartmoor's edge'', *New Scientist & Science Journal*, pp. 332-333, 6th May 1971.

The Finch brothers, standing left to right, James, Thomas and Albany, with their mother, Rebecca Finch (seated centre), and their families — c. 1890.

Albany J. Finch (1863-1945) standing (centre, with legs crossed) outside the Foundry with a group of workmen at the turn of the century.

ADDENDUM

Page 4. Lines 9 to 14: The few records which remain do not indicate the number of employees at various times. However, it is understood to have been up to 20. According to an old employee, 400 swan-neck hoes were made in one day, but there is no documentary evidence of this.

Page 4. Line 17: As far as is known the River Taw supplied the power for six or possibly seven water-wheels at Sticklepath, not "a dozen or more".

Page 4. Line 28: There were three water-mills at Sticklepath, none of which have "disappeared". The buildings remain, although the serge mill is now derelict.

Page 6. Lines 8 and 9: There was no family connection between J. & H. Pearce of Tavistock and the Pearse family, serge-makers, of Horrabridge, Sticklepath and Hatherleigh.

Page 7. Lines 3 to 7: The advertisement by Tavistock Ironworks was found in the County Archives. No record of William Finch's activities remain. However, as he established the business at Sticklepath in 1814 and there was a link between Saunders Hornbrook of Tavistock Ironworks and Sticklepath, it is possible that the Foundry machinery came from the Tavistock Ironworks in 1815.

Page 7. Lines 19 and 20: The steeling hammer was originally used for welding together two types of steel used in the manufacture of edge tools.

Page 7. Lines 26 to 29: The heavy shears were used for cutting bar steel. The smaller shears were used for trimming shovels.

Page 13. Line 13 and Page 14 'Sources'

For "Robert K." read Robert A. Barron.

Page 15 Lower caption. Should read Albany G. Finch, (not J.)

Sid Mallett sharpening a hook on the grindstone.

The Foundry from the south, showing the old launder, before 1960.

TEXT REPRODUCED FROM *INDUSTRIAL ARCHAEOLOGY*
VOL. 12 NO. 2

PUBLISHED BY GRAPHMITRE LTD., 1 WEST STREET, TAVISTOCK, DEVON. TELEPHONE (0822) 3577/2785.