

A large, dark, perforated metal bellows hangs from chains in a steamy industrial setting. The bellows is the central focus, with a grid of small holes on its surface. In the background, a man in a cap and work clothes stands amidst a thick cloud of white steam. The scene is lit with dramatic, low-key lighting, highlighting the textures of the metal and the steam. Large windows with multiple panes are visible in the background, letting in some light. The overall atmosphere is one of a traditional, working industrial environment.

CRAFTED IN BRITAIN

The Survival of Britain's Traditional Industries

ANTHONY BURTON AND ROB SCOTT

BLOOMSBURY

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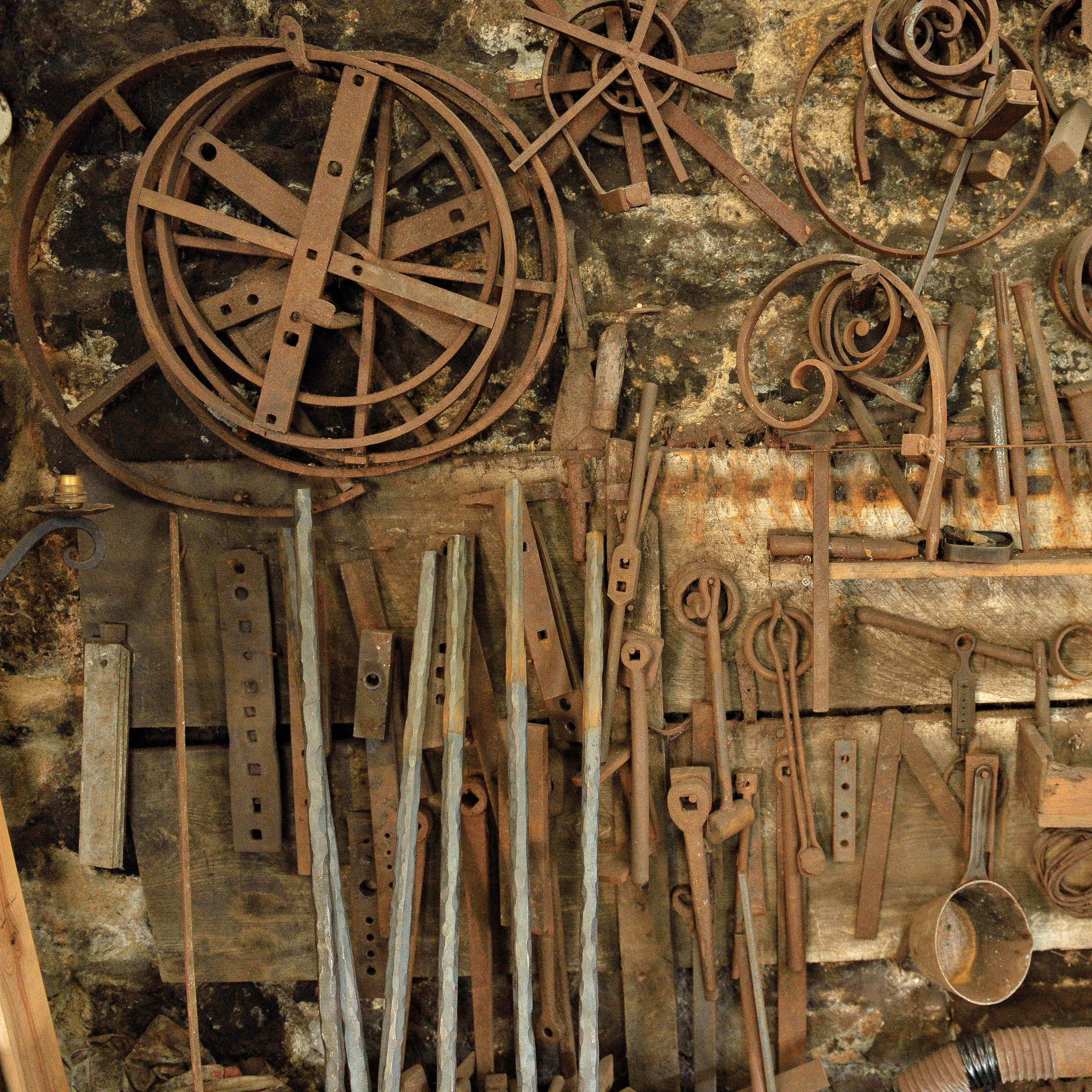
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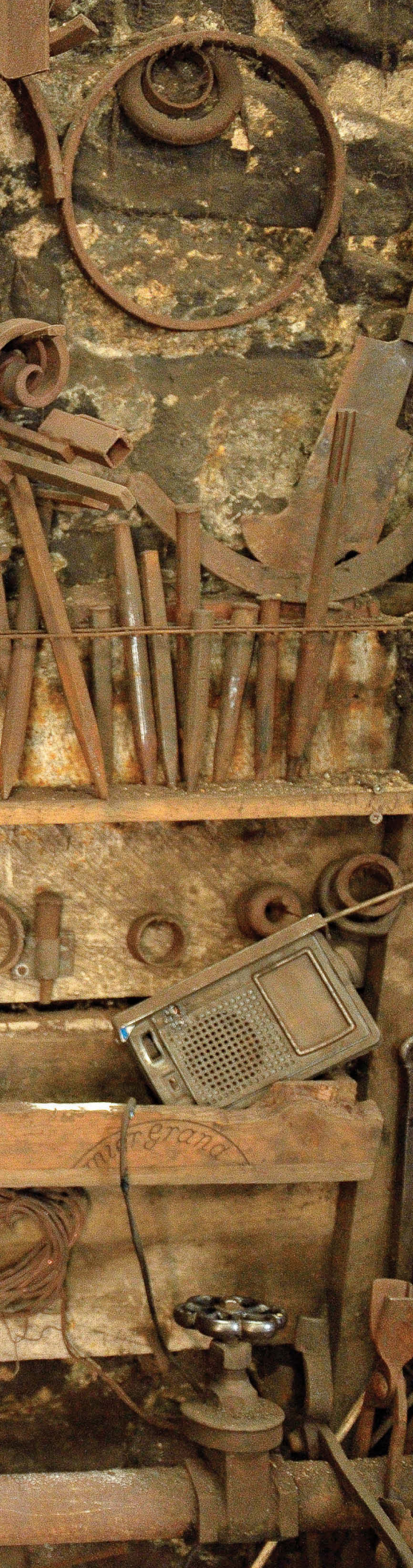




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Introduction

In the 19th century Britain was often described as the workshop of the world. But even as early as 1837 a former Prime Minister, Benjamin Disraeli, was prophesying that the rest of the world would not accept that situation for ever, though it is doubtful if anyone in Victorian Britain could have foreseen that in the 20th century another Prime Minister, Margaret Thatcher, would publicly turn her back on the whole concept in favour of ‘service industries’. When industries decline, it is not just material things that are lost, but a whole world of expertise and craftsmanship. Yet in spite of the drastic decline in Britain’s traditional crafts and industries, some survive, preserving skills and technologies developed in some cases over many centuries. It is these survivors that this book celebrates.

It could be argued that the world has moved on in recent decades and to look back on former triumphs is no more than an enjoyable but ultimately futile exercise in nostalgia. The crafts, trades and industries that we shall be looking at, however, are not museum pieces: they have survived because they offer something valuable, something for which there is a continuing demand. In many cases this may be because people still appreciate the extra craftsmanship that produces artefacts which stand out from the general run of mass-produced objects. In a few cases, conservation work absolutely requires that older technologies be used so that the end product will fit comfortably next to the original work. In other instances, technology simply cannot replace human skills.

There is a good case to be made for celebrating these survivors, but why bother to describe the processes by which they are made? Much of our modern world is incomprehensible in its detail. A modern mobile phone is a wondrous thing – but you can’t take it to pieces and see exactly how it works. One of the great fascinations of older technologies is that they are basically comprehensible. If you visit a watermill, for example, the machinery may look complex, but it doesn’t take long to work out what does what. Water makes the wheel turn – that cog meshes with that cog, which in turn meshes with another, until eventually the grindstone itself is moved, and grain can be poured in and turned into flour. The processes are often as attractive and appealing as the end result. That is what we hope this book shows – not only a range of things that are in themselves intrinsically interesting but also the great fascination to be had from seeing just how they are made and how they function.

For both me and the photographer Rob there were surprises and delights along the way: it was extraordinary, for example, to see craftsmen turn a strip of silver into a beautifully shaped spoon and neither of us will ever forget the extraordinary atmosphere of the bell foundry and the feeling that it must have been much the same a century ago. Our hope is that in words and pictures we can share these and other wonderful experiences with the reader.

Food for the Table

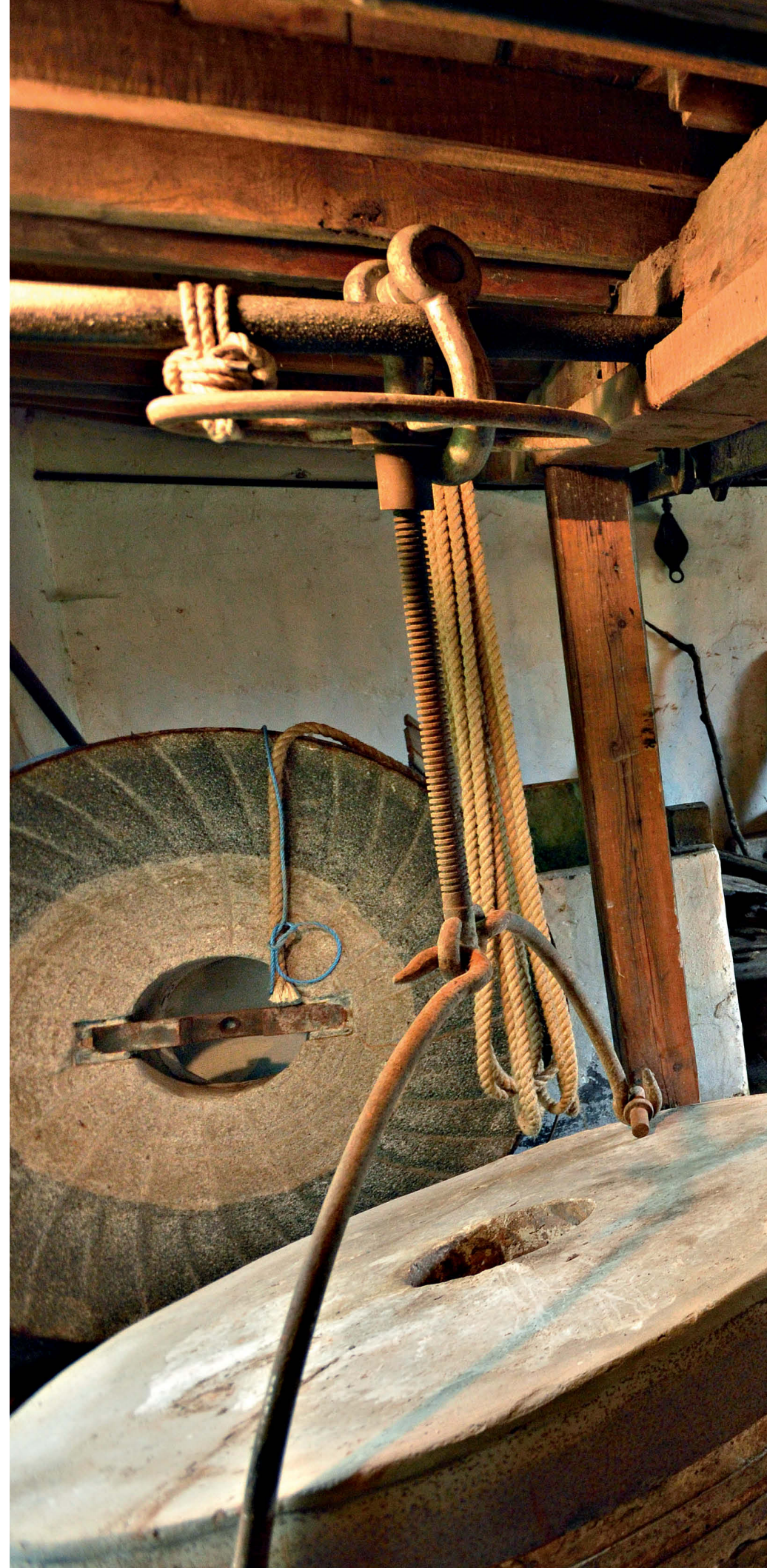
The Grain Mill and the Millwright

Food is the most basic of all human requirements; without it we die. And no form of food is more basic than bread; there is evidence that cereals were being grown for food back in the Stone Age. Originally, the grain would have been crushed by hand by rubbing between two stones, but this was also one of the first processes ever to be mechanised. For many, many centuries the only way to produce flour was to use stones in some sort of mill. Inevitably, changes came and new types of mill appeared, producing white flour that was considered more refined, in every sense of the word, and more sophisticated. But the old mills producing wholegrain flour have survived – and the end product is now generally seen as offering a healthier option, not to mention a far better flavour. But there are very few mills that are still powered by water or wind that are actually working as fully commercial concerns, rather than relying on paying visitors to keep them going. Claybrooke Mill is one of them.

Claybrooke Mill in Leicestershire can be found very close to High Cross, a spot at the very heart of Roman Britain, the point where the two great roads, the Fosse Way and Watling Street, intersect. This is rather appropriate, as it was the Romans who first introduced the water mill to Britain. The earliest mills were very simple: paddle wheels on a vertical shaft were set directly in a stream, and turned the stones above them by direct drive. The Romans improved on this system, with a vertical wheel on a horizontal shaft – the type of wheel we all recognise today. It was first described in the 1st century BC by Vitruvius, and it sometimes known, perhaps rather pedantically, as the Vitruvian wheel. It was an immediate success, and by the time the Normans had conquered England and recorded their assets in the Domesday Book, they were able to list literally thousands of water mills producing grain. Claybrooke was one of those mills. It will have been rebuilt, modified and enlarged many times over the years, but it remains a remarkable story of continuity – millers have been working here doing much the same job for more than a thousand years.

The present mill may not have been here in medieval times, but it still has a long history that you can see in the building itself. At one end, the walls are built of typical multi-shaded 18th-century bricks, and this part probably dates from the 1780s. The other end has more uniform, machine-made 19th-century

Spencer Craven inspecting the grain as it pours down to the pair of millstones at Claybrooke Mill.







Claybrooke Mill stands on a site where milling has continued for a thousand years. The internal waterwheel is to the right of the building.

bricks from an extension in the 1840s. But the story really starts over a mile away, where the leat, the channel that supplies the mill, leaves a tributary of the river Soar. It arrives at a small pond at the back of the mill, and from here sluice gates can be opened to allow the water to turn the wheel. An important part of the miller's job is controlling the water supply: it is not something that can just be left alone. Without proper controls you run the risk of either letting the leat dry up by running too much off, or flooding.

This mill has an overshot wheel, one in which, instead of water pushing paddles at the rim, it drops into buckets set round the edge. It is the weight of water on one side that provides the power, and experiments in the 18th century showed this to be the most efficient type of water wheel. The wheel itself is enclosed at the end of the mill, and it's here that things start to get really interesting. The problem (that millwrights solved centuries ago) was how to convert the movement of the water wheel round its horizontal axle into the movement of the stones round their vertical axle. At the same time, it was very helpful if something could be done to make the stones move faster than the slowly turning wheel. The answer was to introduce complex gears, and you could argue that the water mill was probably the most complex piece of machinery that existed until the Industrial Revolution.

The first gear is the pit wheel, a large, toothed wheel that turns with the water wheel at the same speed. This engages with a bevelled wheel, the wallower, mounted on a vertical shaft. So that's the first part of the job done. Higher up the vertical shaft is a much bigger spur wheel. At each side of this are two small cogs, the stone nuts. It is the gear ratios that make the difference in speed: the steady rate of the water wheel is 9 rpm but the



Above: A worn stencil used for marking sacks suggests that the mill might once have had a connection with the infamous Guy Fawkes.

Opposite: Checking the quality of the flour produced by the millstones on the floor above.

stone nuts turn their shafts at a nippy 100 rpm.

The action now moves up to the next floor and the grindstones themselves. There are two pairs, but only one is in use at any one time. These are not simply round stones. The lower bed stone is fixed, and only the runner above it turns. Each stone is cut with a complex of grooves. As the grain drops through the eye in the centre, it is sliced ever more finely as it gradually moves out to the edge of the circle to emerge as flour. These stones are French burrs, generally regarded as the finest millstones available. They are incredibly hard. The grooves have to be dressed – given clean edges – at roughly 12-monthly intervals. Modern tools are simply not up to the job: even a powered diamond cutter packs up before long. So the miller has to do as his forebears have done – work by hand with a mill bill, rather like a chisel mounted on a wooden handle like a hammer. Even this is not straightforward. The miller uses a staff, a wooden baton that is kept in the mill at all times to ensure it is kept at the same temperature and humidity as the stones. The top stone has to be lifted, using a simple rope and chain – not the easiest job, as it weighs around a ton. Then the staff is run over the surface to reveal any high spots that need to be smoothed away. The stones are also slightly dished so that the grain moves outwards, and this is a critical factor that depends entirely on the keen eye of the miller.

Spencer Craven took over the mill some 15 years ago, and the previous owner gave him a rudimentary lesson: how to start the whole thing working and how to stop it. The rest he had to find out for himself by trial and error. He soon discovered that making flour was not simply a matter of starting the wheels turning and pouring in grain. The grain itself is kept in bins on the top



floor and comes down a chute to a point above the stones. It is then directed into the eye of the stones by a second, smaller chute. This is agitated to shake in the grain by means of the damsel. This is a bulbous metal rod that spins round, clattering against the side of the chute. The very non-PC explanation of the name is that it is forever chattering like a young lady. The angle of the chute can be adjusted to increase the speed at which the grain flows down.

The miller has to perform a balancing act: the faster the grain hits the stones, the more power is needed to complete the job. The only way to tell when things are going just as they should is to pop down to the ground floor and test the flour. The testing device has never changed: it is known as the miller's golden thumb. Only by rubbing the flour between forefinger and thumb can he assess how well things are going. This is not a job for the idle,

constantly going up and down the steep stairs to make the small adjustments that make for the perfect flour.

No amount of adjustment, however, will produce the perfect wholemeal flour unless the grain is right for the job. The wheat can be ordered using two different systems. There is a highly regulated system, where you specify your needs and order a specific reference number. There is, however, no means of knowing where the wheat has originated: it is as likely to come from Russia or Canada as from a field in Britain. And many of these wheats are hard. Spencer Craven discovered quite early on that if he wanted the right wheat for his mill, he should be looking for names, not numbers. Then he got a much softer wheat, perfect for stone milling: during our visit he was using a grain called "Paragon" that came from neighbouring Warwickshire. This



Above: The finished product: flour bagged and ready for sale.

Opposite: The power house of the mill: the large vertical pit wheel engages with the horizontal wallower to turn the shaft that leads to the floor above and the millstones. The mechanism is being greased to ensure smooth running.

was the wheat that had finished its journey through the mill and was pouring down from the stones into a sack on the ground floor. This really is wholemeal: everything goes in, so that you get not just the soft kernel but also the fibrous bran as well as the essential oils. It is always difficult to escape the general feeling that 'natural' is necessarily synonymous with 'healthy', but there seems to be a growing body of genuine scientific evidence that flour such as this really does have genuine health benefits. And if you have ever wondered what the difference is between wholemeal and white flour, the mill has the answer to that as well. The flour can be run through a bolter, a cylinder of cloth that can be rotated, acting rather like a centrifuge. The finer matter goes through the cloth; the rest is left behind. For every 25kg of wholemeal that goes in, just 10kg of white flour comes out; or, to put it another way, most of the grain is discarded. Not everyone is concerned about health issues. There is, however, another argument in favour of wholemeal, stone-ground flour: the bread you make from it tastes far better.







Left: Willesbrough windmill, a wooden smock mill with a rotating cap.

Opposite: Vincent Pargeter at work at the top of the mill, standing next to the shaft that is attached directly to the sails.

the whole structure had to be swung round. Later, a more sophisticated version was developed, in which the sails were mounted on a rotating cap at the top of the mill. It was no longer even necessary to haul the whole thing round manually. A fantail, a device rather like a child's oversized whirligig, was mounted on the opposite side of the cap to the sails. When the sails were correctly positioned, the blades were shielded from the wind, but if the wind direction shifted, the blades began to turn, driving the cap round automatically. When you 'get it', there is something deeply satisfying about the fantail: an entirely self-adjusting feedback system. It was patented in 1745 by Edmund Lee, a Lancashire blacksmith. Imagine him inviting a group of millers to witness the first demonstration.

There is one more factor that has to be brought into play. Just as the sails of a sailing ship have to be adjusted to allow for different strengths of wind, so too do the sails of a windmill. The earliest versions had cloth-covered sails that could be reefed in, but later mills had sails made of adjustable shutters, rather like a Venetian blind.

Both types of mill were complex to build and maintain. This was the work of the millwright, arguably the original mechanical engineer; it still is. Vincent Pargeter started off in a very different occupation, working in the planning department of Essex County Council. Working on windmills was a hobby, which began with the restoration of the White windmill at Sandwich on the Isle of Wight. In 1969, after eight years of working as a volunteer, he felt he had acquired sufficient expertise to set up as a full-time millwright. He was to stay in the job for the rest of his life.

We met up with Vincent when he was working at restoring Willesborough windmill at Ashford in Kent. This is one of the mills with a rotating cap, known as a smock mill, because the main body of the mill is made of wood; mills built of stone or brick are tower mills. Vincent had to master a wide range of skills. He was an expert carpenter and had his own forge for making iron parts. He was prepared to do anything that needed doing, from painting the outside to resetting the gears. He even had to design a whole new set of machinery for a derelict mill, originally built by Holman Brothers of Canterbury. It was a long way from their home base – it stands in the old city of Jerusalem.

Just as this book was nearing completion, we heard the sad news that Vincent had passed away. It seemed appropriate, however, to still give him his place in this book, though he has a more lasting memorial: the many, many mills that turn again thanks to his efforts. CB

The alternative to the water mill was the windmill, developed in Britain rather later than the water mill: the earliest reference is to a mill at Weedley in Yorkshire in 1185. The machinery of the mill is similar in many ways to that of the water mill, except that it is the other way up, with the power source at the top instead of at the bottom. The windmill, however, has a problem that is not shared with the water mill: in order for it to work, the sails have to be faced into the changing wind. The earliest solution was the post mill. In this, the buck, the structure containing the whole of the machinery, was mounted on a central post. In order to bring it into the wind,



The Cheese Maker

What better traditional accompaniment to a fine wholemeal loaf could you have than a tasty British cheese? Cheese might well be the earliest processed food. No one can be quite sure, simply because no one really knows just when it was first made, but it has certainly been around for a few thousand years. One of the earliest written mentions comes in a biblical story: David was out delivering cheeses to the army when he first encountered Goliath. But it was to be a long time before cheese arrived in Britain, where it first appeared as part of the basic rations of the Roman legions. The British took to this new foodstuff with enthusiasm, and over the centuries different regions developed their own methods of making cheese. There were two main varieties: cheese made from cow's milk, which was enjoyed by the aristocracy, and ewe's milk cheese, which was what the rest of the population ate. There were also small quantities of goat's milk cheese made. Bread and cheese became major ingredients in the diet of a large part of the population – and they were very nutritious too. Cheese is rich in protein and essential minerals, particularly calcium. Today, if you visit any supermarket you will find British cheeses sitting alongside others from Europe, especially France, Italy and Holland. For a time it was thought to be quite the thing to put a foreign cheese on your table, far more exotic than the humble home-grown, and therefore almost by definition inferior, varieties. Yet in the Middle Ages, continental Europe was buying large quantities of cheese from Britain, and there are records of Cotswold cheeses being exported from Southampton. The story of Gloucestershire cheeses is typical of the history of many other varieties.

Robert Smith in his excellent book *The Great Cheeses of Britain and Ireland* gives a useful potted history of the county's cheese making. The first Gloucestershire cheeses were made from ewe's milk and apparently there were 1,700 sheep grazing on Minchinhampton Common, Stroud, at the beginning of the 14th century: in just one summer over 3000 lb of cheese was recorded as being made from the milk of these flocks. By 1498, cheese making was considered so important that Gloucester opened a specialist cheese market, and the export market for the produce was soon rivalling the other major industry of the region, woollen cloth. One reason for the success was the local breed of Gloucester cattle, whose milk had a

Mrs Diana Smart cutting up the junket, the clotted milk, as it starts to form. There is a row of cheese presses behind her.







Above: The full cream milk ready for cheese making.

Opposite: Rod Smart breaking up the curd using a wooden hay rake.

very high fat content, perfect for making strongly flavoured, rich cheese. A disastrous cattle plague in the 18th century almost wiped out the old breed, and it was mainly replaced by different stock, whose milk was fine for drinking but less satisfactory for cheese. But the real decline began in the following century. Cheap imports and the high prices being paid by customers for milk persuaded many farmers to abandon cheese making altogether. By the middle of the 20th century, virtually all Gloucestershire cheese making had come to an end. But recent years have seen a revival, and one of the pioneers was Mrs Diana Smart, who began making true Double Gloucester and Single Gloucester, and still does, now working in partnership with her son Rod.

The Smart farm can be found just to the west of Gloucester at Birdwood. The village lies on the busy A40, but to reach the farm you have to turn down a very narrow single-track road and then bump your way up the long drive to reach the farm itself. This is a working farm, not a show farm, a higgledy-piggledy array of barns and outbuildings, made out of whatever material happened to be handy at the time, from timber and brick to breeze block and corrugated iron. Hens scratch among the straw, dogs bark a welcome rather than a warning, and the lowing of cows is mingled with the more distant grunt of pigs. It is one of those farms that appear ramshackle, but where the owners know exactly where everything is and what to do with it. The actual cheese making takes place in one of the outbuildings, and here the apparent chaos gives way to order. All visitors have to dunk their shoes in disinfectant baths before entering, an imperative for modern

hygiene, but everywhere else tradition is the order of the day.

The first stage is to heat the milk and stir it constantly to prevent the cream settling out – once it has floated to the top you can't put it back in; no amount of later mixing will make a homogeneous cream milk. A starter is added. This is a bacterium or mixture of bacteria, which starts the work of turning the natural lactose in the milk into lactic acid. The next ingredient to be added is rennet. This is one of those mysterious substances that leave one wondering how on earth anyone ever discovered it could be used in cheese making in the first place. It is a clotting agent, and traditionally it comes from the fourth stomach of a calf. There is something reassuringly precise about the nomination of the stomach – obviously all other stomachs are quite inferior. Eventually it was discovered that other sources could be used, and the rennet can be made from vegetable, not animal, sources. Once the rennet has been added, the milk starts to clot to form a junket. After about three-quarters of an hour the junket is cut by knives, which aren't really knives at all, but fine-meshed screens. One other even more exotic ingredient is added, annatto, made from the seed coat of a South American tree. It is a natural colouring agent that gives Double Gloucester its attractive reddish-orange tinge.

Now the mixture in the hot vat has to be kept constantly on the move, as the curd begins to break down into ever-smaller pieces. It is a very hypnotic process. Rod Smart uses a wooden hay rake, which is constantly passed to and fro through the vat, sending creamy yellow waves rolling backwards and forwards. This goes on for at least 45 minutes for the Double, but half an



hour does for the thinner Single mixture. Deciding just when to stop this process is a question of judgement, and it is something a good cheese maker will learn until it is almost second nature. All he or she has to do is crumble the curd between the fingers and assess the texture. When the moment is right, the whey is run off. It is not wasted. It is pumped into a tank and a lot of it finds an excellent use. It goes to the Gloucester Old Spot pigs, which are as traditional a part of the local scene as the cheese. They love it. As soon as it's poured into the trough, they are in there, shoving and pushing, and if necessary giving a little nip on the ear of a neighbour, as each pig fights for its share of the tasty liquid. This is good, natural food for the pigs, which in summer

root around in the orchard. It all gives flavour to the end product, and helps explain just why Old Spot bacon is about as good as it gets.

For a Double Gloucester, full cream milk is used. Single Gloucester is rather different, and has its origins in the comparatively distant past. Cows naturally produce more milk in spring than in the rest of the year, and it became something of a glut on the market. So the milk was left out for the cream to separate. It was skimmed off and the skimmed milk added to full cream milk to make a lighter cheese. It was generally not considered suitable for sale to the better-class customers, but was just the thing for workers at harvest time. Both varieties are made, each batch of 150 gallons of