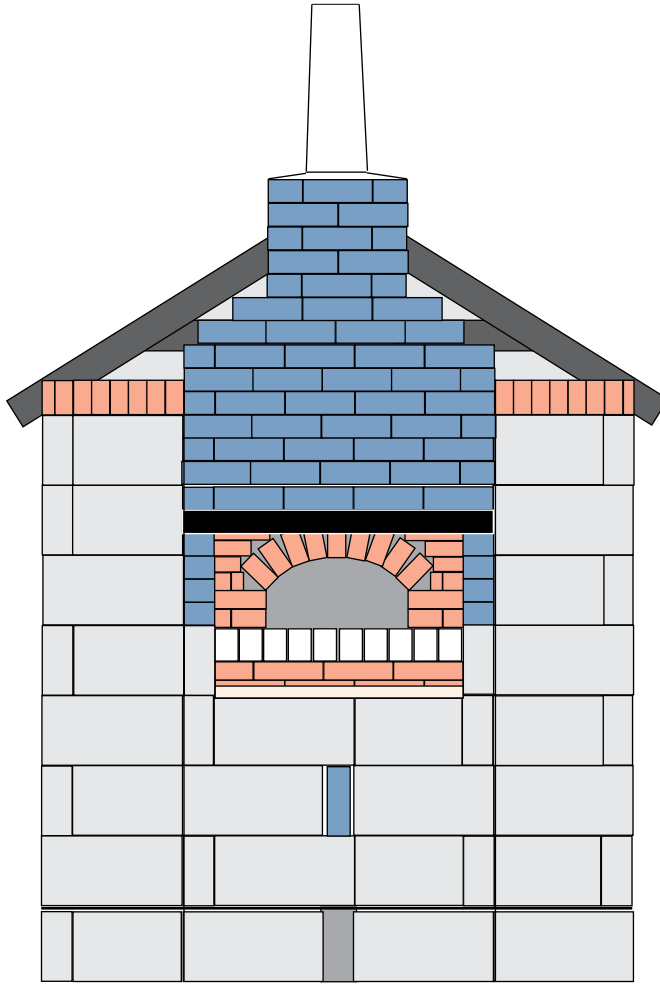
BUILDING A WOOD-FIRED OVEN FOR BREAD AND PIZZA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THE ENGLISH KITCHEN

BUILDING A WOOD-FIRED OVEN FOR BREAD AND PIZZA

TOM JAINE

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Illustration of Bulgarian oven on page 11, © Maria Kaneva Johnson

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Figure 1: a beehive oven, here depicted on a wooden stand, housed in a barnlike structure to give shelter. In the foreground, a trough where the dough is kneaded and left to rise.

ACKNOWLEDGEMENTS

I would like to record my debt to many people who have offered advice, help and encouragement to baking at Allaleigh. Ann and the late Don Barnes, Ed Behr, Roger Berrett, Peter Brears, the late Alan Davidson, the late Gwenda Hill, Andras Kaldor, Nigel Marriage, Janet Mills, Jim Moore, Polly Morrow, Adam Nicholson, the late Alan Scott, Brian Stoddart, Rolf Peter Weichold, and Andrew Whitley.

This new edition is not so much a reworking or revision as a reformatting to fit the series 'The English Kitchen'. In the twenty or more years since its first construction, the oven has continued to give good service. I should stress that the design here described is but one alternative among a multitude. The best recourse for readers anxious to explore other models of ovens (and loaves to cook in them) is the book by Daniel Wing and the late Alan Scott, *The Bread Builders* (Chelsea Green, 1999). I am also grateful to the oven builders Freddie Dudbridge, Gideon Hollis and David Parker who have allowed me to print photographs of their versions of the oven described in the following pages. Their sterling work may give encouragement to those unsure of the wisdom of proceeding.

My family suffered many evenings, and days, of intense tedium. Their patience was impressive.

Allaleigh,
Christmas 2010

A photograph of the author's oven at Allaleigh shortly after its completion in 1988. No external render has yet been applied, and the roof is exiguous.I now have a lean-to canopy springing off the gothic screen on the left-hand side to protect both the oven and the work space. (Photograph, Clare Pawley.)

INTRODUCTORY

COOKING

The list maker can happily tick off ways in which food may be cooked: roasted, grilled, boiled, fried, baked, and .... They all, for that is cooking, require the introduction of heat. And they might, with the addition of smoking – an attenuated form of roasting – be reduced to three: direct exposure to flames or smoke; the use of a heated medium (water or liquid, oil or fat) that transfers that warmth to the food immersed in, or lubricated by it; and finally, cooking in a dry heat at one remove from the flame itself, be it on a griddle or hot stone set atop the fire, or an entire structure (or excavation) that has itself been heated in order to cook the food in the residual heat stored in its walls, floor and ceiling.

Cooking techniques may be viewed as successive steps away from the primitive. At first, direct application of the flame; then the construction of pots to enable heat transference; then the development, over millenniums, of structures to retain heat and return it in measured and useful fashion.

This reflects the broad pattern of development in the food of early man. Roasting is best suited to flesh of all sorts; boiling, or the interposition of a medium, is most apposite for vegetables or fruit, if they are not eaten raw; and baking, on a bakestone or in an oven, is the preferred – though by no means the first – way of coping with grains. Cereals and the settled agriculture they imply came relatively late in man's history – just like ovens.

While a close link between methods of cooking and basic ingredients would be difficult to sustain in every instance – boiling could be applied as well to meat as to vegetables, gruels or fruit – it does become relevant in thinking about wood-fired

ovens. We usually refer to them, and they invariably seem to have a primary use, as bread ovens. What was there about bread, therefore, that urged mankind towards ovens?

Bread, and ovens, are essentials of a Mediterranean, near-eastern, and southern European culture. The two are indissoluble, and have colonized the world as supercargoes on the packet-boat of European migration. Where a technique of baking food existed beyond European confines, it was in the form of a pit of heated stones, such as the North American clambake, or the Polynesian paupau: nothing to do with bread, but cooking out of the circulating air, by means of borrowed, indirect, or residual heat.

BAKESTONES AND POT OVENS

There are many strategies available for dealing with grain. The technical steps that ended with grinding into flour do not inevitably lead to the beehive oven. At first the seeds may be cracked and made into porridge or gruel. Or the milled flour can be made into a paste and boiled, as with central Asian pasta, or dumplings. Or the paste can be wrapped round sticks and roasted for the Boy Scout favourite, twist. The use of controlled dry heat by means of a flat bakestone or metal griddle, or the surface of the hearthstone itself, once swept of ash and embers, was a further primitive method that appealed to cultures across the world whether in Ethiopia, Pakistan, the Middle East, Latin America, or Brittany and other Celtic upland zones of northern Europe.

The two essential techniques, bakestone and ashes of the hearth, might co-exist. When two Anglo-Saxon historians described Alfred's bloomer with the cakes (which were flatbreads) one described them as burning in the fire, the other has him with a pan and the fire underneath.

Flatbreads, like pancakes, have little or no leavening. They are satisfactorily cooked on a griddle, not requiring the all-round heat of the oven. Griddle baking is not wholly restricted

to unleavened breads, even if the 'loaves' are always flat. The Ethiopian *injera*, made from the indigenous grass seed *tef*, was given a sour, natural leavening which makes the giant flatbread much lighter, softer and more spongy than it would otherwise have been. The yeast-raised crumpet or pikelet is also full of holes and spongy in texture. But cooking these on a griddle has inevitable consequences on their form. If a dough is leavened and worked into a shape that requires more complex and gradual application of heat than a griddle can supply, then practical modification is essential.

A bakestone is not the most adaptable of instruments. Its heat is delivered from one side only; whatever is cooked on it will usually have to be turned. But a stone with a cover was a radical improvement, for embers heaped around the lid could provide top heat. In short, an oven, albeit with inadequate temperature control (though Seneca refers to holes in the lids of Roman pot ovens to control the temperature more sensitively). Such a device served to bake soda bread on the peat fires of Ireland, barley bread in Cornwall, or spelt and wheaten breads in south-eastern Europe and the Mediterranean.

These pot ovens have a long recorded history, in classical cultures as well as the barbarian fringes. There were two terms in Latin: *testum* and *clibanus* (from the Greek *klibanos* and ultimately perhaps from the Indo-European root **kleibh-* which may mean 'to bake'), both describing the same vessel designed for cooking between two heats. These figure in later periods as *testo*, *tegamo*, *tiella* and *tian* in various Mediterranean languages, or as the 'trap' in northern France and England. Latin literary references like the instruction by Cato to knead, mould and bake your bread under the *testu*, or pseudo-Virgil's description in *Moretum* of cleaning the hearthstone for the bread, then covering it with tiles before heaping on embers, or Seneca's account of the development of ovens subsequent to the more primitive system of baking in a hot earthenware vessel, confirm the linguistic and archaeological evidence. In the Middle Ages,

the technique was often associated with making pies topped with a pastry crust, though the thirteenth-century Bolognese writer Pietro di Crescenzi said that 'bread baked in an oven is better, because it cooks evenly; that cooked in *testi* is not as good', so even in medieval Italy the oven did not reign entirely supreme.

The pot oven lives on in the Balkans, where Maria Kaneva-Johnson describes the *vrshnik* (Macedonian), or portable lidded oven; or on the Dalmatian island of Iz, where the pot goes by the name of *cripnja* (from *clibanus*), while in Romania the word is *test* – a straight-line derivation from the Latin, before the intrusion of the Greek loan-word.

Nor had the tradition entirely disappeared in Cornwall when the Women's Institute compiled their first local cookery book in 1929. A correspondent described arrangements current in the household of her youth where the clay oven was only used once weekly, and the flat iron griddle for every day. The griddle was placed on a trivet over the fire of brambles, furze and sticks which was allowed to burn hot then, as it died to embers, the trivet would be removed and the bakestone placed directly on the hot ashes. Once wiped clean, the bread would be placed on the griddle, a heavy 'baker' – 'like a huge iron frying pan without the handle' – would go over the top, embers would be piled right over and the loaf would take about an hour to cook.

The eighteenth-century writer William Ellis eloquently described this process in an account of baking barley bread in Devonshire,

> under a large iron kettle, that is chiefly made use of for washing dishes in. As soon as the dough is ready, they make it into a loaf of about three parts the size of the kettle; a large kettle will cover a loaf of near half a bushel of flower [approximately 28 lb (12.6 kg), yielding a loaf of approximately 35 lb (15.75 kg)], which being clean and dry, they sweep the hearth, and on the hottest part of it

> they lay down the loaf, and immediately cover it with the kettle, then put over it a good quantity of damp straw or horse litter, and upon this a few ashes: This done, they set fire to the straw, which will burn leisurely away, and cause the upper part of the loaf to be baked equal to the under part; and to this end they commonly allow four or five hours for baking it, if it is a loaf of moderate size; but if very large, they frequently bake it thus all night.

FROM POT OVENS TO BRICK OVENS

To speculate on the century by century progress of leavened bread and its means of cooking would be too much for this place, but the short answer has to be that the covered griddle buried in embers may answer requirements to a degree, but soon becomes practically inadequate for large-scale use, and in a culture where sun-dried bricks and clay are readily available, some larger version of the *clibanus* must have presented itself as a viable alternative. The presumption must surely be that the bakestone and pot oven antedate the beehive oven, even if latterly their courses have run parallel.

The consensus that leavened bread was a discovery of the ancient Egyptians may or may not be confirmed by the fact that the earliest ovens are found in the eastern half of the Mediterranean basin. Excavations in distinct culture zones have produced variant forms, all with us today. An ancient Egyptian oven from the 2nd millennium BC, 'was a squat, beehive-shaped clay mound about three feet tall with internal shelving and with a hole at the base designed to allow the removal of ash. It was principally used to bake bread, although food could also be cooked in a saucepan placed on the flat oven-top, and the cook sat or squatted in front of the mouth of the oven while preparing her food.' From the Jordanian site of Deir' Alla comes a version of the modern tandoor, the *tannur*, dating from around 1000 BC, with a fireplace in the bottom of the oven, and a large opening at the top. Pots could also be placed over the aperture,

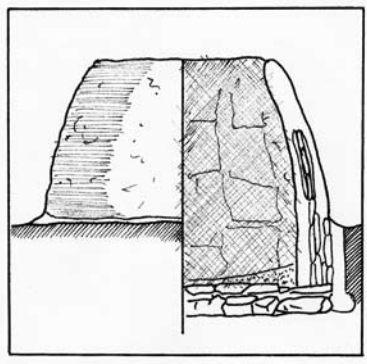

Figure 2: a section and reconstruction of an Iron Age tannur *from Tell Keisan near Deir'Alla in Jordan. The drawing is based on that published by Eveline J. van der Steen.*

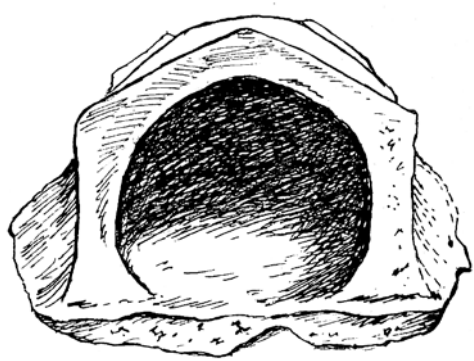

Figure 3: a clay model, dated approximately 4,300 BC, of a bread oven, found in Stara Zagora, Bulgaria; and another of a loaf, carbon-dated to approximately 5,100 BC.

as in Egypt, for cooking as if on an open fire (Figure 2). At Deir' Alla, there was also the *wagdiah*, a closed domed oven or beehive, with two levels. In this case, the fire was built at the bottom, and the bread cooked on the heated floor. This form is sometimes termed, by writers at the beginning of this century for instance, the 'Jewish' oven. Both the *tannur* and *wagdiah* are found in Middle Eastern villages today.

Older than these, however, are the clay models of beehive ovens found in tombs around Stara Zagora in Bulgaria, dating from approximately 4,300 BC, together with models of the loaves baked in them (Figure 3). The pricks in the surface, and the entire shape and appearance of the loaf illustrated must indicate leavening, which would antedate the risen loaves illustrated in Egyptian wall paintings, or those excavated in Egyptian sites. On Minoan Crete, a community that shared the same Mesopotamian-Egyptian cultural nexus as the Nile valley, such ovens do not occur in the archaeological record for another thousand years, so these Bulgarian remains seem to imply a development of bread and baking that was without and beyond the accepted 'cradle of civilization'.

The Bulgarian finds are the clearest sign of the symbiosis of risen bread and ovens. A paste of flour and water was given a leavening, be it a lactic fermentation from the souring and working together of the two ingredients, or alcoholic fermentation caused by the introduction of yeasts, or a combination of the two, which meant that bubbles of air or expanding gas were created at the very heart of the dough. If the flour was of the right sort, this gas could be trapped within the dough by the cells expanding elastically – the magic of gluten – and it was the operation of the gas which the oven captured and sealed within a crust of sugary starch formed by exposure to heat. No instrument could do this more effectively than an oven.

The Bulgarian oven may be compared to a modern beehive oven from Peru (Figure 4) – the consequence of Spanish invasion

Figure 4: a beehive oven made of clay in the courtyard of a house in Peru. Drawing based on a photograph in The Cook's Room. *The ledge on the left is a working platform, the stone door is propped up in the front.*

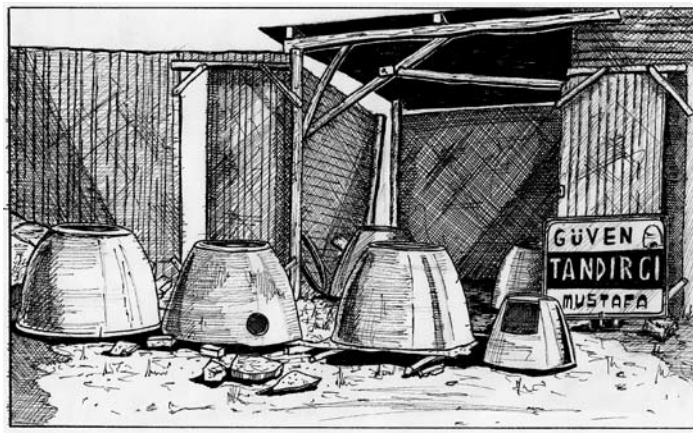

Figure 5: a drawing based on a photograph of a modern tannur oven maker's shop in Turkey.

and colonization, not native Inca ingenuity. That there is little to tell them apart speaks volumes for the enduring simplicity and satisfaction of the original concept.

How then does an oven of this nature work? A space is enclosed by floor, walls and roof, with a single aperture at the front. On the floor, or the sole, a fire is kindled. Air enters through the opening to feed the flames, smoke leaves through the same hole, an invisible line separating the incoming and outgoing, bottom and top respectively. The fire heats the entire structure, more or less efficiently depending on its size and shape, and the competence of the fire-builder and the fuel used. At a certain moment, the structure is deemed sufficiently hot for the purpose of baking and the fire and ashes are withdrawn. In their place is thrust the risen dough. The aperture is closed and the loaf cooks in the residual heat which will, if the architecture is sound, radiate in equal amount from all angles thus browning the loaf evenly and allowing the action of leavening to take effect in all parts of the dough. On the elapse of time gauged by experience, the door is opened, the loaf removed and left to cool.

There may be an infinity of variables, caused by design, weather, materials, skill, location and mere happenstance, but that is how all bread ovens worked until modern times. The fuel can be anything, provided it burns; the heat may be delivered by a variety of routes; the oven can be made of many different materials, in a whole range of shapes and sizes, but the principle of residual, radiant heat is enduring. The bread oven differs from the normal run of domestic appliances because the heat combines radiation from the structure itself, and the convection heat of the air contained within the cooking space. Many domestic ovens rely on convection alone, which gives a different character to the bread cooked in them, particularly to the crust.

While the oven was developed to cook bread, its utility was more general. It was bread first and last because loaves are not amenable to other forms of cookery in quite the same way as

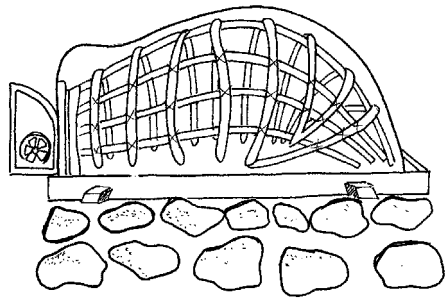

Figure 6: a view of a Quebec oven, showing the boulder foundation, the withy or lath framwork on which the clay envelope is formed, and the iron doors in place.

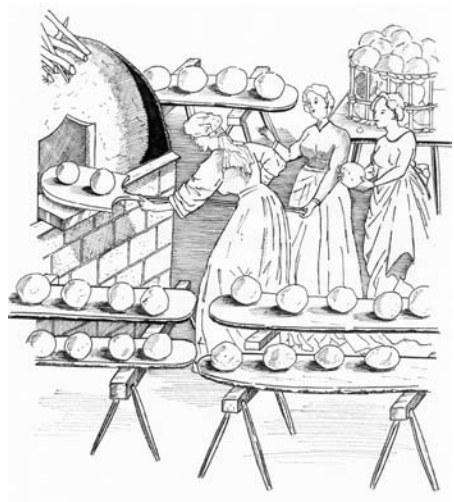

Figure 7: an outdoor oven, from a fifteenth-century French manuscript. The loaves are characteristically round – at least when represented in pictures. There are trestles of loaves proving and the lady is charging the oven with the aid of a peel.

a gigot of lamb that could as easily be roasted or broiled. And it was bread first because it occupies a rather more important place in the hierarchy of foodstuffs than fruit cake, sponges or meringues. But they too need an oven, were always cooked in the bread oven, and still can be. Similarly, stews and casseroles may take their place on the sole, and joints of meat or pies that are to be baked. Samuel Pepys's venison pasties were never cooked at home, but at the baker or the cookshop; so too were countless Sunday joints, whose consumers boasted too meagre a fire to undertake a full-scale roast.

In Cornwall, again, a news story of 1948 recounts how the housewives of the fishing port of Mousehole lacked the necessary to bake their Christmas cakes: they themselves did not have adequate ranges or stoves, and the last public baker of the town had retired. 'Many women were to be seen carrying large baskets along the cliff path or to the bus on the way to Newlyn, where ovens had to serve scores of extra patrons.' Such practices might be observed anywhere in Europe.

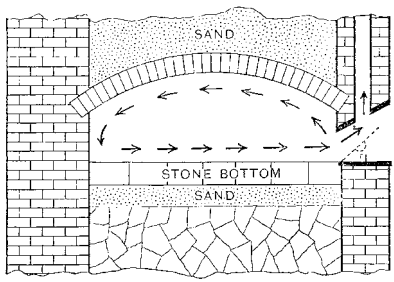

Figure 8: airflow in a traditional oven.

THE THIRD COURSE OF THE OVEN CHAMBER AND THE ARCH FOR THE DOORWAY

There are two strategies available for forming the oven doorway. Either a brick arch may be turned, or the superstructure of the chimney and flue can be supported on concrete lintels. This plan adopts the first, but concrete lintels will do the job and pose few problems of building technique.

Make two templates of the arch out of heavy plywood such as is used for concrete shuttering. Nail them each side of a piece of 100 x 50mm timber so that the form is free-standing. See figure 28 for approximate dimensions. The vertical measurement is 10mm shorter than the actual height of the arch, so that the former can be placed on wedges of 10mm wood. It will otherwise be difficult to remove once the arch is built, but this way the wedges have only to be extracted and the form can be pulled free.

Place this form in the doorway. The brick arch is one brick thick, laid lengthwise on edge. The elevation in figure 30 shows how it will look.

Before actually beginning the arch, complete laying the third course of engineering bricks for the oven walls. Once more, stagger the joints. The only differences between second and third courses are the bricks that abut the springing of the door arch. These are labelled (a) in figure 30. Cut them cleanly to size, and bed the first brick of the arch generously in mortar.

Turn the arch over the form work, bedding each brick in mortar. There is no need to shape the bricks into wedges, but the mortar should be well packed.

TURNING THE OVEN ARCH, AND LAYING THE FOURTH COURSE OF THE OVEN WALLS

It will have been appreciated by now that this oven is not a domed beehive oven of traditional form. This is because a barrel arch as specified here is easier to construct, especially with materials readily available from local builders' merchants, than

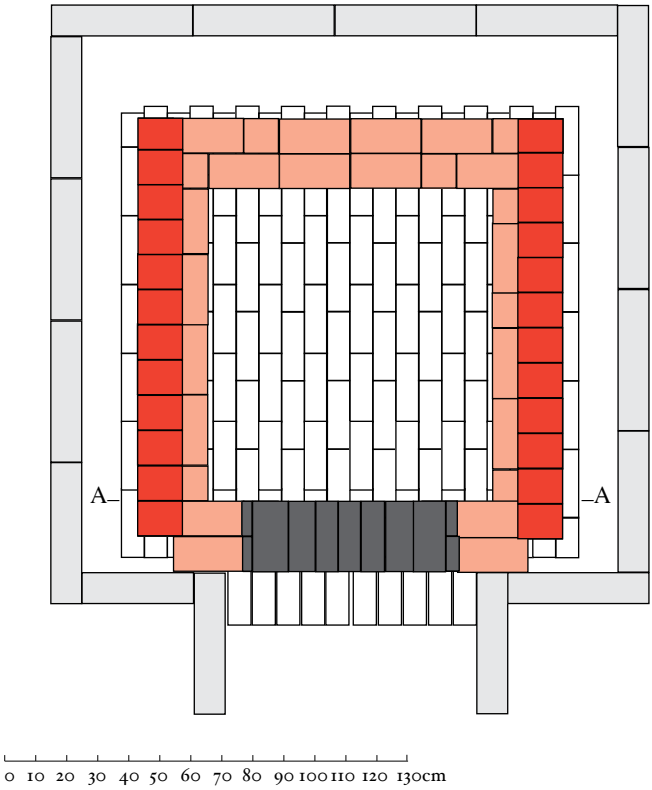

Figure 31: plan illustrating the laying of the fourth course of the oven chamber, and showing the arch to the oven door in place (scale 1:20).

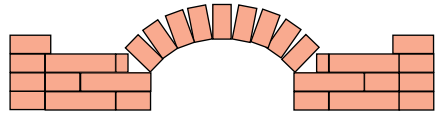

Figure 32: elevation of the front of the oven, showing the fourth course of bricks in place, ready to receive the arch of the oven roof (scale 1:20)

a dome. There may be objections that the rectangular shape of the oven is less rapid to heat, and that the heat radiation is less even, but I have not found this matters in practice, particularly if the firing is fairly long and slow.

Begin by laying the fourth course of bricks along each side of the oven. These are part bricks, approximately 140mm long. They are shown in figure 31, as is the way they should be laid.

The roof arch laps over that of the doorway, and runs through to the back of the oven. The elevation in figure 36 shows how it is suggested the arch finish at the inner row of bricks in the double brick back wall. To determine its form, it is possible to construct a timber former as was done for the doorway. This would be left in place until the end of construction, when it would be burned out. An easier method is to form the shape with sand. Fill the oven chamber with a pile of damp sand, well tamped, and shape a curve from side to side. The crown of the vault will rest on the topside of the doorway arch. The elevation in figure 33 shows the form it will take.

To be certain of the shape of the arch, figure 34 shows a way of establishing the curve. On a vertical wall or board insert drawing pins at aa. Their distance is the span of the arch. Ensure they are level. Mark a point b below them, the distance shown (230mm). That is the height of the arch. Suspend a string from the two drawing pins with its lowest point at the mark b. It will follow the curve indicated. Transfer this curve onto pieces of

stiff cardboard, or thin ply or hardboard. Cut them to shape. These may be inserted vertically into the pile of sand, resting their ends on the third course of bricks, and will give an exact guide to the shape the sand should take. They may be left in the sand while building is underway.

The bricks for the vault are laid lengthwise on edge, as they were for the doorway arch. When installing them, stagger the joints between courses, as if it were a brick wall.

Once all the bricks are in place, with sufficient mortar between them to maintain their respective angles – remember too that the bricks should not actually touch each other, there should be mortar between each one – an external coating of mortar can be applied to the arch as a whole. Let the initial installation go off over half a day or a night, then pack the joints well with fresh mortar and skim a thin layer of mortar over the entire outside. Add a further layer of mortar of approximately 10mm and leave to dry and set.

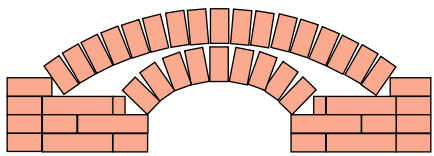

Figure 33: section through the oven (A—A in figure 31), showing the shape of the main vault and its relationship to the oven doorway arch (scale 1:20).

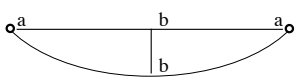

Figure 34: drawing the curve of the oven vault, using a string and two drawing pins. aa *measures 990mm;* bb *measures 230mm.*

There will be a gaping hole at the far end between the top of the third course of bricks and the curve of the arch. However, as the arch finishes with the first brick of the double brick wall at the end, there is every chance to tidy up the outward appearance and secure the join. Fill the aperture as tidily as possible with bricks laid at right angles to the wall, trying not to let too much mortar spill on to the inside. It is easiest if this end is constructed in tandem with the making of the arch. Once the arch is completed, the outer skin of bricks can be finished off plumb and true. This is shown in figure 36.

Similarly, the interstice at the front of the oven, between the door arch and the main vault of the oven should be filled with cut bricks and mortar.

When the arch has been finally plastered, the oven chamber itself is complete. It is also filled with sand. Leave it several days before emptying the sand with a small shovel.

Figure 35 is a side elevation of the oven chamber before the superstructure is begun.

The Scottish baker, John White of Dunbar, wrote in 1828 of the cement required for turning the arch over the oven, commenting that often too limy a mortar caused lime to fall upon the bread in the baking. His specific was a mortar of blood and lime: 'procure as much well burnt lime-shell (the whiter the better) as will be sufficient for the purpose; reduce that shell into a powder, and put it through a fine sieve. In the next place, procure some bullocks blood, newly drawn, mix as much of the lime powder in the blood as will bring it to the consistence of a thin paste, then dip the dressed stones or bricks, one by one, in this paste and lay them in their regular course, till the whole is finished. A very little of this cement must be made at a time, as it soon gets too stiff for working.'

BUILDING THE UPPER OUTER WALLS AND THE CHIMNEY

This is the last phase of the main structure, it includes both brick and block work. The outer walls (which are in block-work) are

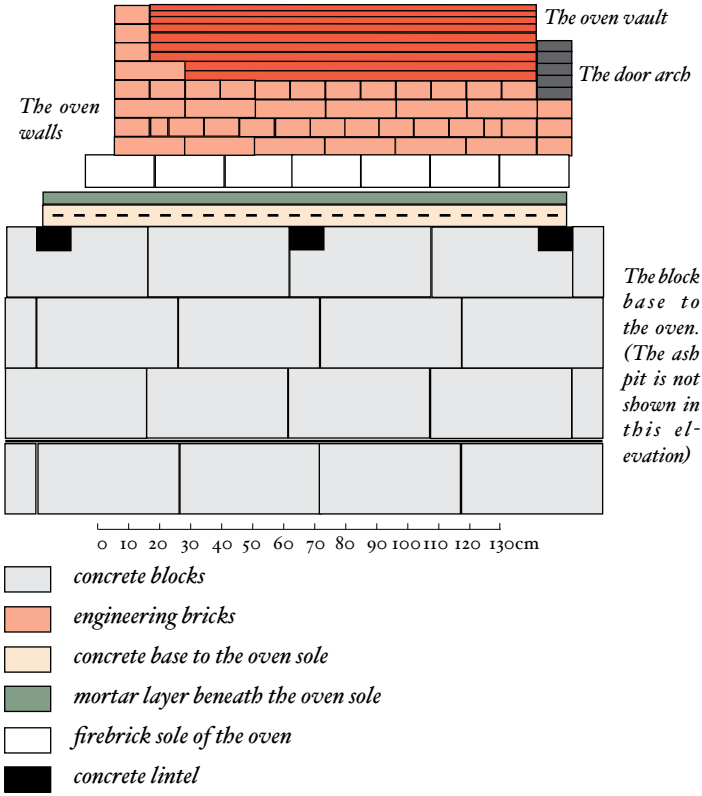

Figure 35: a side view of the oven, including the base, the concrete, mortar and firebrick sole, the oven itself and its vaulted roof (scale 1:20).

put up at the same time as the chimney, into which they are tied.

The sixth course of blocks (counting up from the foundation) is shown in figure 37. The bricks marked (a) in the plan are engineering bricks that act as the connecting pad between the chimney stack and the oven chamber itself.

Succeeding illustrations (figures 38 to 41) show the progress of the work, with each brick and block detailed in its correct position. The front of the chimney stack is supported on a

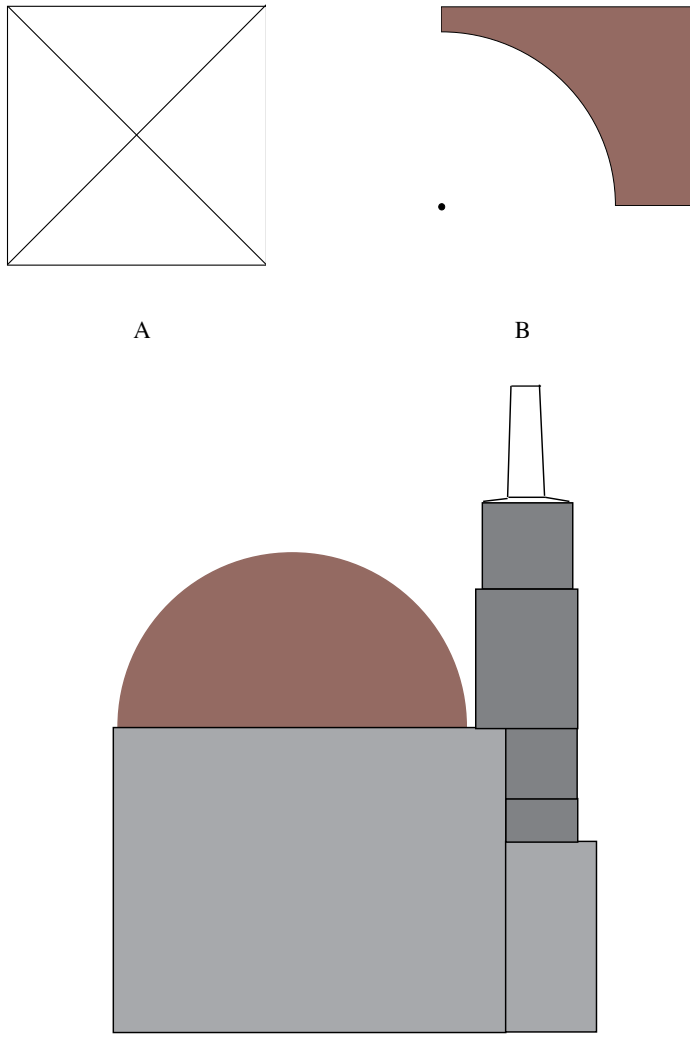

Figure 44: an oriental look. A is a reminder that the centre may be determined by stretching diagonal lines across the rectangle. B shows the plywood sheet cut to the radius of the circle, with a dot marking the centre.

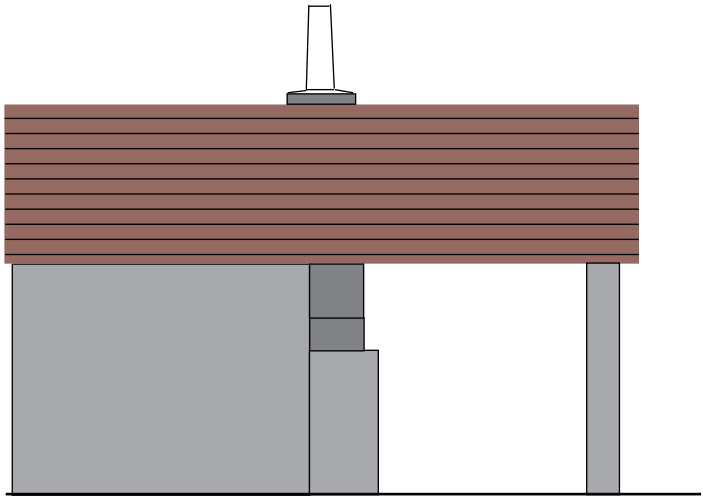

Figure 45: side elevation of an oven with roof extended over the working area, supported by pillars (scale 1:40).

Another scheme might be as shown in figure 18 where the oven is overarched by a canopy. This oven, part of a Mediterranean 'summer kitchen', has been contained within a complete box, giving a useful flat surface for storage on its top. The chimney and flue are contained within the structure, with ventilation being closed off by a damper above the oven door. This arrangement has much to recommend it. The oven door can be very small, thus reducing heat loss, as its only function, other than admitting the food, is to provide draught for the fire. The doorway of the oven under discussion in this book, however, has to make room for exhaust as well as inhalation.

A roof is not the only form of weatherproofing. A Mohammedan look to the oven might be given by finishing the top with a dome of cement. Once the oven is built, and the sand has been poured round to give insulation, it can be moulded into the form of a dome. Take a sheet of plywood approximately

firing, so the amount of wood reduces. If there is a dead time, when the oven is not needed nor a fire required, he counsels that wood for the next blaze be put in place. Subjected to all that residual heat, it soon gets to the point where ignition will be immediate and fierce, thus shortening the time needed for one of these supplementary firings.

Our own routine is less elaborate; the oven is but a fraction the size, and we do not have to cope with the press of successive bakings, nor impatient customers waiting for their breakfast loaf.

A typical day's baking, fine and dry in the summer when the oven has been used regularly two days a week, starts after lunch at two in the afternoon when the first flames are kindled. The fuel is builders' discards: mostly softwood, well seasoned. A vigorous fire is started, using small-sectioned choppings, at the front of the oven. It is fed after 30 or 40 minutes with 8 or 10 more substantial pieces. When these have burned, they will leave a bed of embers that act as motor to the ensuing refuellings. The fire is left to its own devices for two hours, until 5 pm, when it is fed again with a substantial armful of baulks up to 150 x 75mm in section, and perhaps 1 metre in length. At this juncture, the dough is made – a simple yeasted dough, enough to make 8 loaves each weighing 600g.

The fire burns unattended for the next 3 hours, when it is given a final present of four or five slight timbers at 8 o'clock in the evening. The main period of burning has seen the flames pass from the front to the back of the oven. The last refuelling bolsters the embers that are heating the furthest corners. At this stage, it is possible that the front of the sole has been devoid of hot ash and ember for several hours, so the burning coals may be spread evenly over the whole floor to ensure that everything has had equal attention.

The dough is knocked back at 9 o'clock and an hour later, at 10, the oven is raked out and the door closed to give a chance for the heat to soak into the structure: rather as you leave a piece of meat to rest after roasting so that it becomes suffused

with pink rather than dark red in parts and brown in others. A temperature gauge is left inside to check on progress. The oven heat is just below 600°F.

At 10.30 pm the loaves are moulded and put in tins or baskets for their final proof. The oven heat is 550°F. An hour later it is 500°F, and at midnight it is 450°F. The loaves are ready for the oven. This is swept out, but not scuffled (see below), and the bread inserted.

The heat drops immediately, to about 350°F, but recovers by the end of baking (20 minutes), to 425°F. At 10 o'clock the next morning, 12 hours after the fire was raked out, the internal temperature is still 225°F.

This is a relaxed way of doing it. It is always wisest to have the oven wait for the bread, not the reverse. The times I give here are those of a particular day and night of working. The oven was heated for a sufficient time to get the whole fabric warmed, the heat was therefore gradually released. Had the burning time been shorter, a fair temperature might have been obtained, but for less time. The slow fall of heat may be accelerated by repeated opening of the oven door and loading further items to be cooked. Nothing absorbs heat like cold food. This makes planning for two or more batches of bread or other items more complicated than the straight-line temperature graph leads us to suppose. If serial cooking is required from a single heating, choose things that track the oven's cooling. Start with breads, follow with cakes, finish with stews. Although the oven will pass comparatively rapidly through the upper temperature registers – the sort of heat needed to give a fine crackle to the crust – it will sit on the middle band for several hours.

Given the flames pass from back to front (seeking the fresh air), it would make sense to follow Parmentier's advice on building the fire as in the illustration. However, this is more complicated when dealing with scrappy wood than it is with faggots. What may be more important is that the fire is allowed to burn most of the time, rather than smokily smoulder. This

means building it with small stuff until it has a real heat at its heart. Once various critical points are reached, combustion becomes quicker and quicker. Potters who have wood-fired kilns, working to far greater temperatures than bakers, tell of nights spent thrusting great logs into the flames, only to see them spontaneously dissolve in a puff of smoke and flame, so fierce is the heat.

The invariable desire of flames for the open air and oxygen imposes certain limitations on how a front-vented oven is stoked. Imagine that the first half of the firing is over, that there is a fair bed of embers at the front of the oven, but several logs towards the rear that have not yet burned. If fresh fuel is inserted, it will inevitably burn first nearest the door, leaving the nethermost parts still barely warmed. It is more effective therefore, if each substantial refuelling is allowed to burn itself to charcoal, contributing towards the stock of hot coals that will eventually cover the floor in its entirety.

If the firing is long, and use of fuel profligate, there will certainly be time enough to move the glowing coals from one part of the oven to the next in order to ensure even heating. If insufficient attention is paid to the minutiae of firing, it is almost certain that a simple and small batch of loaves will cook satisfactorily, but less sure that ambitious procedures will be successful. Perhaps a full load is wanted: the front of the oven will often be less hot than the back. Perhaps two batches are needed, in quick succession. This is possible on the heat curve that I have described above, but timing is critical. The doughs have to come together at exactly the right time, especially the second batch. The oven will probably not be hot enough to 'rescue' an overproved loaf. This works better with practice.

The operation of the original wood-fired oven built and used by Andrew Whitley at the Village Bakery at Melmerby in Cumbria shows how relatively trouble-free such an instrument can be. The fire is on the side, as in figure 15, and is stoked at the end of the working day. Refreshed halfway through the evening,

it burns for the rest of the night until baking commences early the next morning. By way of contrast, Andrew Whitley has also installed a *gueulard* oven, of French design (see figure 17). This has a separate fire that can be kept alive through baking and kindled at a moment's notice to reheat the oven between loads.

An oven such as the one under discussion here is less easily refreshed than a gueulard. Once a bake is finished, then a fire can be rekindled but without forced draught the process is never short. This will generally mean that it needs reloading with bread too soon, when the heat is called 'flash', and has not really soaked into the structure, but merely caressed the reflective surfaces.

These strictures serve to underline that wood-fired ovens perform differently from a modern electric or oil-fired machine. Each baker knew the hot and cool spots, but many were the miscalculations. Perhaps the dough was ready too soon, thus charged when the oven was too hot: all burned today. Or the fire was not spread properly over the sole: all doughy. Or the apprentice put the loaves too near the side walls: burned again. (They used to put spacers down the sides of large ovens so that tins were not pressed tight against the walls.) Finally, as heat was ineluctably falling all the day through, early bakes might be crusty, and later ones light. Those were the days when your father would send you to the baker with a very specific set of demands as to hardness and appearance: no longer.

Stoking the fire, and cleaning the oven afterwards, needs equipment. A bow saw and an axe for the timber, an ash box for the embers, a poker, bellows, a rake, perhaps a shovel, and a scuffle or mop. The ash box is already built into our design, but if a variation is constructed, its necessity should be borne in mind. The French called it an *étouffoir*, smotherer or extinguisher, and it was a copper box with tight fitting lid which took all the ash and embers as they were removed from the oven. By virtue of its lid, the flames would be soon damped and the baker could extract the charcoal for the fire next day.

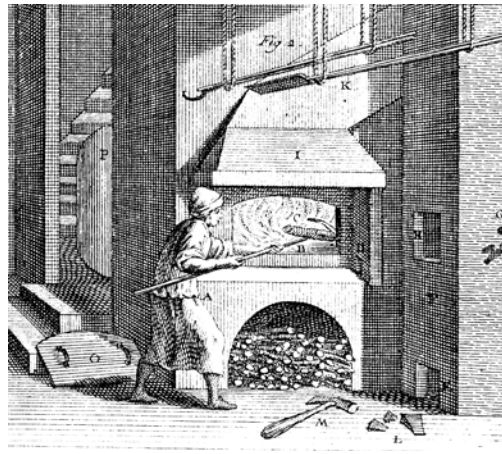

Figure 53: an oven in an eighteenth-century French bakery, from the Encyclopédie. *The baker is using a rooker to adjust the fire. A peel is stored above his head. The oven door is on the floor at the left. The flue is outside the oven mouth which vents into the cowl.*

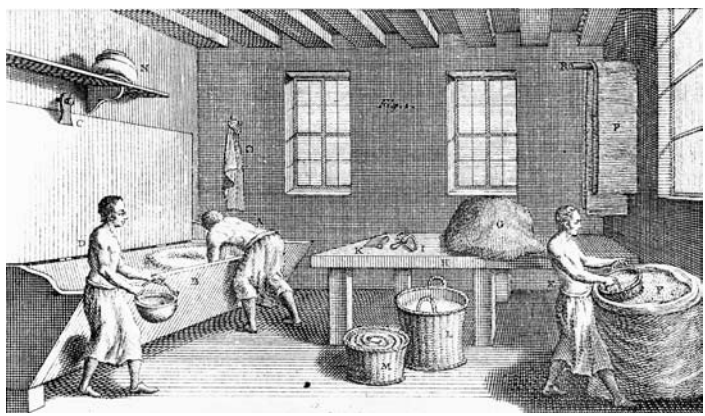

Figure 54: bread preparation in the same bakery. Next to the mountain of dough on the table is a scraper for cleaning work surfaces, and a flat scraper for the dough. The trough lid can be seen pinned back to the wall by the clip labelled C. Long cloths for keeping the loaves apart during final proof are hanging from the hook by the window on the right.

bread recipes of any final proof. Lady Clark of Tillypronie recommends that ovens for all breadmaking should be 'of moderate heat'. Although the recipe for French bread given by the *Instructor* proves in wooden bowls before baking, his household bread is simply moulded then baked. If the oven were cool enough, there would be a fair oven 'spring' to give lightness to the dough, for the working of the yeast would not be killed by too great a temperature. That this lack of final proof was often intended may be inferred from a succeeding recipe in the *Instructor*, for 'Brentford Rolls' (also from Mrs Rundell).

> Mix with two pounds of flour, a little salt, two ounces of sifted sugar, four ounces of butter, and two eggs beaten with two spoonfuls of yeast, and about a pint of milk. Knead the dough well, and set it to rise before the fire. Make twelve rolls, butter tin plates, and set them before the fire to rise, till they become of a proper size; then bake half an hour.

If writers can mention proving in one place, their lack of reference to it in others must be intentional. This may be confirmed by study of Eliza Acton, perhaps the most detailed early English bread book, where some doughs are given a second rise in the trough or crock, others a final proof in the tin or bowl, and some just a single bulk fermentation. Note, however, that William Ellis, in the quotation above, does envisage a final proof.

The recipe book of Lady Clark of Tillypronie is interesting. Several of her entries advise a final proof, indeed rather an overproof such as her Birk Hall bread that should have 'eaves' hanging over the sides of the tin when ready for the oven, but her oven-bottom bread is put straight in the oven after knocking back from the first rise. Her brown bread recipe ends with a note that when the dough is sufficiently spongy, it be divided into loaves and baked immediately, unless a light porous loaf is required, when the dough should prove in the tins for half an hour.

When placing the loaves in the oven, the crust will be crisper if they are not too close together, and their rising will not be affected by their neighbour. If the loaves are in tins, baking will be slower. The black sheet steel tins give the best crust. If tins are lined in serried ranks, the side crusts will be very pale, and cooking delayed.

It is wise to check on progress (for which a torch is useful) four or five minutes after the bake has begun. If you have miscalculated the temperature or conditions inside the oven, you can plan remedial action. For instance, once the loaves have set, you can move them away from a hot spot to some cooler zone so that they do not burn too much.

Loaves that are baked on the oven floor usually have thick adamantine crusts when they are taken out. The usual test of tapping the bottom to see if they ring hollow still works, but the sound and vibration of the loaf in the hand are not the same as they are with a thin-skinned object removed from the sterile conditions of a gas cooker. One check is by weight – they feel light. They will have lost about 8–10 per cent of their weight by evaporation of moisture. This will increase to 12 per cent during cooling.

BAKING PIZZAS

There are many excellent recipe books for pizzas and other hearthbreads such as focaccia which will be more instructive than I on fillings, flavours, and other imponderables. Sufficient here to say that the important fact, argued persuasively by Elizabeth David, is they should be simple and pungent, not dustbin vehicles for anything vaguely Italian in the refrigerator. I would stress the importance of fresh herbs to the real success of a pizza.

Most British pizzas are composed and cooked on a pan. Nothing is better than directly on the oven bottom. It needs a degree of facility with the peel, and an encumbrance-free

working area, but time in trial and error is well spent. Pizzas cooked like this, and consumed on the spot, will be much more tender and toothsome than those cooked for longer on metal in an electric oven.

If the oven has been heated for any time, cooking is tremendously rapid. If it were heated to cook but one pizza for personal consumption, it would be a terrible (apparent) waste of fuel, so a pizza-party is the obvious answer; or the pizza is cooked as a prelude to a bread baking session.

The embers are left in the oven during cooking, and the door left open, for different reasons. The embers are commonly left in the pizza oven because the baker is using it for production all day, or at least all the meal, long. The oven, therefore will need refreshing, so the embers are stoked and revived to make a small fire to give more flash heat. The door is left open because pizzas and other hearthbreads were cooked at the beginning of a session, when the oven was at its hottest. A closed door was simply not necessary. It is of course not imperative that the embers are left in, or the door left open, to cook a matchless pizza in your own oven.

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