CHARCOAL BURNING IN WYRE FOREST

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Many accounts of charcoal burning by the traditional method have been written. Writing as early as the third century B.C. the Greek Philosopher, Theophrastus, discusses the virtues of a number of species of trees for making charcoal for various purposes. He also concisely describes the basic method for making charcoal as follows. "They cut and require for the charcoal-heap straight smooth billets: for they must be laid as close as possible for the smouldering process. When they have covered (with sods) the kiln, they kindle the heap by degrees, stirring it with poles. Such is the wood required for the charcoal heap." Probably the first description to be written in the English language was by John Evelyn in his "Sylva" dated 1664. He recorded a detailed account which described the charcoal burning process more or less as it was operated in Britain until the time that metal kilns superseded earth clamps. However a comprehensive explanation of all the stages of the process and the technical reasons for each of them does not appear in any of the documents which have so far come to hand. The last demonstration burn in Wyre Forest took place in May 1956 and was supervised by a retired charcoal burner Mr. George Potter from Wyre Hill in Bewdley. Mr. James Booten from Far Forest, another retired charcoal burner was also present.

The following account is based on detailed observations made and discussions engaged in during a charcoal burning demonstration which was carried out in Wyre Forest during the rather rainy week prior to Sunday 14th October 1973. It took place on an old hearth which was rumoured to date back 200 years or more and which was last used in 1927 by Joseph Nevey, the 69 year old retired charcoal burner who supervised the demonstration. Several organisations co-operated in setting up and carrying out the demonstration. The Bewdley Museum and the Worcestershire County Museum at Hartlebury organised and provided the manpower, and the Forestry Commission provided the site, timber and assistance in clearing under-growth and pumping of water. During the period of the "burn" I was able to spend many hours with Joseph Nevey discussing the process and the life and times of a charcoal burner before metal kilns superseded the traditional method.

The Traditional Charcoal Burning Process (The October 1973 Demonstration Burn)

The process ably demonstrated by Joseph Nevey, who had retired from charcoal burning many years previous, followed closely the description given by John Evelyn in 1664. The principle difference was that the cooling stage in John Evelyn's description was achieved using waiting time alone. In Joseph Nevey's demonstration he used water as a quenching and cooling agent as well as waiting time.

For his comfort and well being a small caravan was provided on site in the forest to house Joseph Nevey for the duration of his demonstration. Joseph told me that he had been born in a cottage opposite the Green Dragon in Rock. His father who had been born in 1840 had started work at sixteen in Wyre forest as a woodcutter and had never been a charcoal burner. Joseph said he had gathered all his knowledge of charcoal burning from the "Cooks" a well known local family.

Preparing the Hearth and Laying out the Timber

The first stage of the charcoal burning demonstration was the preparation of the hearth or "pit". This consisted of the excavation of a flat level circular depression in the ground of a diameter sufficient to accommodate the quantity of timber being converted when the clamp was completed. For the 1973 demonstration it was only necessary to remove the accumulated ground vegetation to reveal the blackened soil from the previous burn in 1927.

Joseph Nevey said that charcoal burners chose dry, "warm", that is to say sandy and not clay, sites for their pits so that the moisture in the ground would soak away as little of the heat as possible. Newly created pits or pits which had not been used for some time were referred to as "green" and produced more charcoal when they were used subsequently after they had dried out.

The diameter of this old pit used for the 1973 burn was about 22 feet, rather larger than required for the quantity of wood involved in the demonstration. The pit was cleared of all surface

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vegetation down to soil level and examined to make sure that there were no animal burrows beneath it which could allow air to enter by an uncontrolled route. The material removed was placed to one side for use later. The hearth was always sited in a well sheltered spot as wind blowing on the clamp was one of the worst enemies of the charcoal burner. The Forestry Commission had provided about four tons of freshly sawn timber, roughly three cords, cut to lengths of approximately three and a half feet. Joseph Nevey said that this quantity was a relatively small amount compared with the fourteen ton stacks, nine cords, he had burned before his retirement. The timber varied in diameter from three to ten inches and was mainly oak mixed with some birch. This timber was sorted into sizes by diameter and stacked in a horseshoe shape around the circumference of the hearth with the smallest diameter wood at the outside and the largest inside. The timber was supported, largest end upwards, in an almost upright position by leaning it against the thinnest pieces which were systematically placed as props around the circumference. The horseshoe shape meant that an entrance space was left so that access to the centre was easy. Figure 1 shows the appearance at this stage.

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Figure 1Cordwood assembled prior to raising the stack

Under normal circumstances the charcoal burner would have collected his timber from the surrounding woodland on a barrow, and would have selected bent as well as straight pieces to enable him to shape the final stack. The barrow used by the burners was as shown in Figure 2. It had no sides and timber was laid across the frame. In some parts of Britain this barrow was called a "mare" but Joseph Nevey stated that to his knowledge it was never given this name in Wyre.

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Figure 2Charcoal burner's barrow, sometimes called a "mare"

Raising the Stack

Having completed this initial sorting and stacking, three sharpened stakes roughly four feet long were driven into the ground near the centre of the hearth in the form of a tripod with a base of about two feet six inches. The top of the tripod was the same height as the timber had been cut and was to form the base of the chimney space which would eventually enable the stack to be ignited. By walking round and round this central tripod, the charcoal burner was able to select timber from around him at arm's length and lean it against the stakes at an angle of about 70 degrees to the horizontal, largest end upwards, leaving the smallest end in contact with the ground to minimise eventual heat transfer into the ground. As all the timber was on view it was thus possible to select in turn, pieces which would form the tightest stack. The care and effort expended on the previous stage therefore paid off in reducing the physical labour required for actual building of the best stack, because all the necessary timber was accessible, easily reached and the right way up while the stack was being raised. At first the wood was stacked one timber length high but as soon as the radius of the growing stack exceeded the cut length of the timber, a second layer of wood was placed on top of this stack. At first this layer was laid horizontally with the largest ends of the logs tightly together at the centre. A circular gap about ten inches in diameter was left at the centre above the top of the tripod of stakes to form the beginning of the chimney space. The logs of the next layer were lined up in the gaps left between the logs of the previous layer which lay like spokes, close at the centre, but spaced at the circumference. Due to this fact these new logs could not sit fully down along their length and were thus tilted upwards at the centre where the chimney space was being maintained. This tilt formed the foundation for the sloping top of the stack. Timber was then progressively placed on this foundation so that the characteristic beehive shape was formed as shown in Figure 3.

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Figure 3The stack completed and ready for covering

If bent timber was present this was of great assistance as it helped to form the rounded shoulders of the stack would assist in making the next part of the process easier. The three cords of timber supplied were sufficient to make a roughly hemispherical stack between five and six feet high and eleven or twelve feet in diameter. The reason for the great care taken during the construction of the stack can be seen later during the burning process when a well constructed stack will collapse evenly in a controlled fashion as the wood carbonises and shrinks.

"Shingling" and Covering the Stack

In order to exclude a high percentage of the air, the completed stack was covered with a layer of turf then earth. Thin slices of humus-rich turf-like topsoil were skimmed from the forest floor with a shovel and were placed over the completed stack, root side outwards, starting from ground level then building up round and round the stack until the whole was covered except for the chimney opening which had been temporarily blocked by a piece of sacking. Access was gained to the top of the stack

by means of a short ladder which in times past would have been made by the charcoal burner. This first part of the covering process was known in Wyre as "shingling" because it was like applying shingles to a roof. The shingling was then covered with a layer of leaves and peaty substance raked up from the surrounding forest floor. Woodland soil was then placed over this layer to a depth of two or three inches and was firmed down well with the back of a shovel. The shingling and the peaty layer underneath prevented this loose soil from falling down between the logs. Once this top layer of soil had been completed the stack, or the "clamp" it had now become, was ready for "firing" and had the appearance shown in Figure 4.

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Figure 4 The stack covered and ready for firing

Firing Or "Dressing" the Clamp

A fire was already lit nearby and was used to provide quantities of burning wood with which to fire the clamp. The sacking used to block the chimney during covering was removed and some short lengths of unburnt wood were lowered through the chimney opening so that they rested horizontally on top of the lower timber pile which formed a circular shelf around the top of the tripod at this point. This, as Joseph Nevey explained, was to prevent the burning wood, which was then to be dropped into the chimney, from falling to the base of the clamp down the spaces between the logs. The stated aim was to ignite the clamp so that the "fire" started at this point and then burned down the centre and then out to the edges of the clamp. As soon as the chimney space was full of burning wood from the fire an iron lid, some three and a half feet in diameter and having a central handle - (a Bewdley museum exhibit loaned for the occasion), was placed over the chimney hole to restrict the air. Lids of this kind had been a feature of charcoal burning in Wyre forest during the final decades of the use of the clamp method.

After approximately two hours the iron lid was removed and the charcoal in the chimney which has been formed from the burning wood used to ignite the clamp, was pushed down the chimney. Billets of dry wood were then dropped into the chimney until it was again full and the iron lid was replaced. This stoking process, or "dressing" as it was known in Wyre, was repeated every two hours or so, and gradually the charcoal so formed filled the chimney space. The purpose of the lengthy dressing process was to create a column of hot charcoal in the chimney sufficient to heat a quantity of the adjacent timber to the point where it began to char. As Joseph Nevey commented, with freshly cut timber which was full of sap the dressing took longer than it did if the timber was well seasoned. When the chimney was full of charcoal and there was no longer room to drop in billets of dry wood after the lid had been removed, the clamp was regarded as fully fired or "fully dressed". Volumes of smoke were beginning to appear through the covering of the clamp around the iron lid. At this stage the insurge of air caused by removing the iron lid immediately caused the smouldering charcoal in the chimney to burst into life, and flames sprang from the chimney as the smoke caught fire. Once this stage had been reached the iron lid was removed altogether and the chimney hole was then covered with turf and soil. The clamp had now received sufficient heat to start the carbonizing process which was more or less self-maintaining depending on how tightly the wood was packed. Once the

moisture had been driven from the wood nearest the chimney and the temperature of this part of the clamp had risen sufficiently, the chemical breakdown reaction, which took place in the wood as it carbonised, generated more heat. This in turn heated and carbonised the timber adjacent to it and so by a slow chain reaction the whole tightly packed clamp became converted to charcoal. At first grey then white acrid smoke issued through the earth covering of the clamp and the position and extent of the fire smouldering inside could be determined from its presence.

The ideal condition was stated to be for the fire and hence the smoke to start from the centre and then to slowly burn in a complete circle to the outside of the clamp. When the carbonization of a part of the clamp was complete after the volatile constituents had been driven from the wood, the white smoke ceased and only a faint bluish haze, which gradually disappeared, was emitted. Joseph Nevey said that the ideal burning pattern was rarely met with and that the charcoal burner had to use his know how to steer the course of the fire as it moved through the clamp, and to carefully control the rate of burning. He steered the fire by making holes through the turf covering with a long, pointed pole which he called a "furgun" stick. This allowed air into the clamp and drew the fire in the direction he wished it to move. For example if the fire was burning too fiercely on one side he would add earth over the area from where the smoke was rising and would then make holes on the opposite side of the clamp with his furgun stick. It was the skill of the charcoal burner that determined the proportion of charcoal which a given quantity of wood could produce.

During most of the stages of the burn, the clamp needed constant attention because as the wood carbonised it shrank to about 40% of its former size causing the clamp to settle. Any gaps appearing in the earth covering which could admit air, were immediately covered with more soil to prevent the wood or charcoal at these points bursting into flames and burning to ashes. A stack which had been built badly could collapse suddenly at some point during the burn exposing a large amount of the hot charcoal which would catch fire and require great efforts to bring it under control.

As previously mentioned, wind blowing on the clamp is one of the worst enemies of the charcoal burner because it causes the fire to burn too fiercely over the whole of the windward side of the clamp. Wind nearly always becomes a problem during the extended period of a burn and the only satisfactory remedy is to shield the clamp with screens sometimes called "lews" or "lues". Working charcoal burners regarded these lews as part of their normal equipment and always had them ready to hand. They could be made of brushwood or bracken, supported between poles, driven into the ground. These screens became necessary during the demonstration burn and in that case were made up from hessian, as can be seen in Figure 5.

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Figure 5Tending the stack. Screens of hessian shield it from the wind

The carbonization process continues at a rate controlled by the charcoal burner and may take from five to ten days to complete depending on the amount of timber in the clamp. In this demonstration burn the four tons of wood were converted in four and a half days. When the carbonizing, or "coaling" process as it was sometimes called, was complete, white smoke was no longer emitted from any part of the clamp which was then less than half of its original height, and was then ready for the next stages which were sealing and quenching.

Sealing and Quenching the Clamp.

Buckets of water were kept handy in case the clamp flared up and the outer covering of the clamp, which was turned to dust by the heat of the fire, was carefully raked off using the back of a rake avoiding as far as possible any disturbance of the outer layer of charcoal. This process was sometimes referred to as "raking out the pit". In some areas a long handled rake-like tool called a "rauble", which had a solid half-moon shaped head, was used. The dust removed would normally have been riddled into piles around the edge of the hearth and any pieces of charcoal found would have been carefully collected. However, due to the bad weather conditions, the riddling was omitted or as Joseph Nevey put it we "fenaiged". The surface of the uncovered stack was then carefully wetted, without disturbing the remaining dust too much, using several buckets full of water. The dust which had been removed was then put back on as a covering on the stack and firmed down with the back of a shovel. This fine dust, together with the water which had been applied to the surface of the stack, formed a good seal. The importance of this part of the process was that as the clamp was about to be quenched this covering seal would retain the steam which would be generated in it long enough to extinguish the remaining embers and to cool down the hot charcoal sufficiently for the clamp to be opened safely without fear of spontaneous ignition. In order to quench the clamp several holes were made through the top of it down to ground level with the furgun stick and quantities of water were poured into each. (In the case of the demonstration burn, six holes were made around the top of the clamp and three two-gallon buckets of water were poured into each.) It was important not to use excessive amounts of water because the finished charcoal was required to be dry. The holes were closed up with dust and after a period of several hours (three hours in the case of the demonstration burn) when the amount of steam escaping from it was very small, the clamp was ready for opening or in the charcoal burner's language "the pit was ready for drawing".

Drawing the Pit.

Up to this point very few people had visited the demonstration because of the rain which had fallen almost every day. However a good number turned out to witness the drawing of the pit. Included in the crowd was ninety year old Mr. Jim Morris from Button Oak among other things a noted Besom and oak basket maker. He like many others had come to pass his expert opinion on the skill of the burn and to comment on the quality of the resulting charcoal. He greatly enjoyed swapping memories of life and times in Wyre forest long past with his old friend Joseph Nevey.

To "draw the pit" the principal tools used were a long-handled, heart-shaped shovel known as a "ship" and a long-tined rake. The fine dust was shovelled aside and by starting from the base and working round the clamp the uncovered charcoal was shovelled and raked to the outside of the hearth where it formed a horseshoe-shaped pile. The dust, ashes and debris which remained were raked into a pile in the centre of the hearth. Figure 6 shows the

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Figure 6. The “pit drawn” and left to cool. The iron lid used during “firing” is in the background

appearance of the pit when drawn. During the drawing process a bucket of water was kept nearby in case any pieces of charcoal were uncovered which were still very hot and which ignited spontaneously when exposed to the air. These were known as "gledes" and at worst could ignite the whole horseshoe of charcoal if they should go unnoticed. This was especially so if there was any wind blowing. The heat from a burning horseshoe of charcoal could be so great that a charcoal burner alone, armed only with a bucket, might well be unable to get near enough to extinguish the fire once it has taken a firm hold. Because of the danger of re-ignition of the highly reactive charcoal it was necessary to leave it for several hours or even a day or more to cool completely and to adsorb atmospheric moisture before bagging it for sale or transporting it. During the cooling period an eye had to be kept open for any signs of hot spots around the horseshoe which could indicate the presence of a hidden "glede".

The result of this successful demonstration charcoal burn was a horseshoe shaped mound of large pieces of fully carbonized wood, a fraction of the weight of the original logs and about half of their original size. The charcoal retained the cellular structure of the original wood and had a faintly blue metallic lustre when broken. When two pieces were knocked together they produced, as they should, a metallic ring. In addition to the large pieces around the edge of the hearth the pile at the centre of the hearth contained a quantity of small fragments perhaps ranging in size from half an inch to two inches. These were mixed with the dust from the covering of the stack and with the ashes of the small quantity of wood which had been completely burned to provide the heat to start and to maintain the carbonizing process. These fragments were much too valuable to waste and these "brays", as they were called, were riddled out with a quarter inch mesh sieve and then bagged. In other charcoal burning areas these fragments were often referred to as "breeze" or "smalls". As well as the charcoal produced there were inevitably a few unconverted ends of wood which had been in contact with the ground and hence had not reached a high enough temperature to carbonize. These included the ends of the three stakes driven into the ground to form the base of the chimney space. The unconverted ends were known in Wyre as "bruns". In other regions these unburnt ends were called "brands", and in some areas referred to even as "bones". They were known to occur more readily if the timber was sawn and thus could contact the ground over a large area of the sawn surface. In the days when wood was cut with an axe, the uneven ends of the timber which resulted reduced considerably the number of "bruns" produced. The charcoal burner would use the dust and ashes resulting from the riddling of the "brays" to cover the next stack of timber which he would have in preparation during the time he was attending the first hearth.

Seasoning of Timber

John Evelyn suggested that the timber should be seasoned for half a year before being turned into charcoal. Seasoning of timber before conversion produces a denser charcoal than that resulting from "green" timber. This is mainly due to the reduction in the amount of water which, as steam, is forced out of the wood just prior to the carbonizing process and which tends to force open the cellular structure as it escapes. Although wood was seasoned when the charcoal was to be used for iron working, this was not the case in the latter years of charcoal burning in Wyre Forest. Nearly all the timber converted during Joseph Nevey's working life was unseasoned and used straight from the tree.

The Life of the Charcoal Burner.

In order to maintain a close watch on the hearths it was necessary for the charcoal burner to live in the woods. Rough cabins, like wigwams, were constructed of poles covered with canvas or bracken and then turf. Figure 7 shows the cabin constructed at the demonstration burn showing just

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Figure 7A charcoal burner's cabin. An exhibit at the 1973 Wyre Forest burn

the first layer of canvas without its final turf covering. Joseph Nevey said that this exhibit was less than half the size of the cabins used by the Wyre Forest charcoal burners. The floor of the cabin was covered with a thick layer of fine birch twigs except for a circular space at the centre. A charcoal fire was lit in this space several days or even weeks before occupancy, and this fire was never allowed to go out while the cabin was in use. Fumes escaped through a hole left in the top of the cabin and the charcoal burner made sure that the fuel he used for his cabin fire was dry and that plenty of air was allowed to get to the fire to ensure complete combustion. Failure to observe these precautions could lead to the production of carbon monoxide with disastrous consequences to the cabin occupants. Joseph Nevey said that these cabins always felt damp but were a welcome refuge when the weather was very cold or when it rained heavily.

Earning a living by charcoal burning was a hard life and brought little financial reward. Charcoal was a relatively expensive commodity but most of the profits were made by the middlemen who sold it to the consumer. Many tales are told of the nefarious deeds and drunkenness of some of the old charcoal burners, but in common with so many local stories these were probably based on a few isolated incidents which grew with the years and with the telling. A popular myth regarding charcoal burners was that most kept an adder as a pet. In Wyre Forest, where the adder was common, Joseph Nevey said that, far from regarding them as pets, he and all of his charcoal burner colleagues considered adders a hazard and kept a careful eye out for them to avoid being bitten. He thought that it was perhaps a tale put about by charcoal burners in some other district, aimed at deterring unwanted visitors to their cabins when they were absent. Another story told in Wyre Forest related to the wife of a charcoal burner who was continually arguing with her husband. They lived together in the forest but one day the wife mysteriously disappeared without trace. Rumours spread that the husband had struck his wife during an argument and had accidentally killed her. Finding himself in this awful predicament he was rumoured to have cremated her in one of his hearths. Doubtless this tale was used by many charcoal burners as a salutary reminder to their wives to behave themselves.

Joseph Nevey said that during the summer when the weather was good, charcoal burning was quite enjoyable and any game that the forest could provide was always welcome. Rabbits, pheasants and the occasional deer were snared. Pheasants were often cooked in the hearth without preparation. The method consisted of wrapping the whole bird, feathers, feet and head intact, in a thick layer of clay. This was then baked in the hearth for three quarters of an hour or so, after which the feathers would come away easily with the clay, and the "innards" could be removed as a tight ball. Experience had shown that snares set for deer never caught any for the first three days. When deer were snared they had to be killed with a heavy stick, often a distressing procedure. When dead they were usually hung on the cabin for two or three days before being prepared for cooking.

Two practices which exploited the adsorptive and purifying properties of charcoal were in common use by the charcoal burner. Firstly a piece of charcoal dropped into the kettle which was on the fire took the smoky taste out of the water, and secondly meat cooked together with pieces of charcoal lost any tainted flavour it had. An indication of the intense heat which charcoal produces when burnt was related to me by Joseph Nevey. Having run short of coal for the cooking range, a woman had been given a bag of "brays" with the warning that she should mix them with coal or coke when burning them. Unfortunately she did not pay sufficient heed to this warning with the result that several of the iron bars of the grate melted.

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