

MERSTHAM LIMeworks

BY

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The first part of this paper outlines the history of the very important quarries and limeworks at Merstham, Surrey. The second part describes the investigation of a nineteenth-century industrial installation in the works. The paper concludes with a note on some of the records of the limeworks, by Marguerite Gollancz, M.A.

HISTORY OF QUARRIES AND LIMeworks

THE parish of Merstham straddles the scarp-slope of the North Downs. The village street is some 280 feet above sea level, but in the north of the parish the crest of the downs, just east of Alderstead Farm, reaches 624 feet. These downs are cut, along a north-south line, by a wind-gap in the centre of the parish which is utilized by the present-day Brighton Road (A23) and which was chosen for the course of the Croydon, Merstham and Godstone Railway.

The geology of the district is complicated,¹ the main strata coming to the surface in east-west bands. The village itself lies in the Gault Clay, which is some half-mile wide. To the south, near Albury Moat, the Folkestone Beds are reached, and near Battle Bridge Farm is a large area of brown Brickearth. Overlying the Gault Clay, north of the village, is a narrow band of Upper Greensand, upon which the church is built and which reaches almost to Quarry Dean. Above and to the north of this lies the Chalk, which is finally capped by clay-with-flints on Alderstead Heath.

The good communications north-south, because of the wind-gap, and east-west by the 'Pilgrims' Way' which originally crossed the parish, caused two of the strata, described above, to assume economic importance. These were the Upper Greensand, which yielded the famous Merstham Stone, and the overlying Lower Chalk, which was burnt into lime.

THE STONE QUARRIES

The Upper Greensand yields a building stone, particularly valuable for its free-working properties and its relative immunity to fire damage. It is generally known as the Merstham Stone or the Reigate Stone, both of which names cover the products of many quarries in several parishes along the North Downs.

¹ Geological Survey Sheet 286 refers.

This stone has been used in many famous public buildings² (including Westminster Abbey in the thirteenth century, the Guildhall in 1400-20, and Nonsuch Palace in 1531-3), although in many cases no attempt has apparently been made to identify the particular quarry concerned. Several buildings in Merstham Parish testify to its later use, including 26 High Street (1791), Weighbridge Cottage, Lime Cottage and Quarry Dean itself. Certainly, when Hall and Co. occupied the area (see below) they continued stone working, as one of the buildings at their Croydon Wharf was in this material. It is not known exactly when quarrying ceased in the late nineteenth century. It probably continued spasmodically for years, but, since it could not compete in price with bricks, the demand fell off, latterly being restricted to the linings of furnaces; the Merstham Lime-Kilns being made if it.

The upper layers of the stone are softer and found a use as hearth-stone for scouring hearths and front door-steps. Small quantities are believed to be still mined in the Reigate area.

The stone was won by 'pillar and hall' mining, the hills being honeycombed with galleries of several periods. The entrance was directly to the south of the Limesworks, being blocked, early this century, by blasting, it being considered unsafe. Near this entrance a large assortment of gears and pulleys remains of some machinery believed to have been used in connection with haulage of stone. The granite base of a single-cylinder vertical steam engine, used for stone haulage, was found built into a wall near Lime Cottage.³ This base was formed out of one block of granite measuring 6 feet 2 inches by 3 feet by 16 inches. It is illustrated in Plate I(a). Another entrance lay to the south-east of Quarry Dean and further entrances lay to the east.

In recent years there have been several subsidences and these have been investigated by the Cave Research Group of Great Britain since 1960.⁴ These explorations have been made difficult by the high level of water in the galleries. It is suspected that flooding has long been a problem in the operation of the quarries. Manning and Bray⁵ mention drainage works carried out in 1807-9 and their interference with the water supply to the mill near the church.

Quarry Dean itself is mentioned in 1522 as Quarrepitden in a rental of the Manor of Merstham,⁶ which unfortunately fails to mention the stone quarries. The present house appears to have

² *M. & B.*, II, 253; *V.C.H.*, Surrey, II, 277; III, 214; Dines, H. G., and Edwards, F. H., *The Geology of the Country around Reigate and Dorking* (1933), 173; Hooper, W., *Reigate* (Surrey A.S. 1945), 105; Dent, J., *Quest for Nonsuch* (1962), 264.

³ Information from Mr. John Sanders, ex-manager of Merstham Limesworks.

⁴ Information from Mr. M. W. Harrison, the farmer at Quarry Dean, and from his lecture to the Reigate Society reported in *Surrey Mirror and County Post* (19.2.1960).

⁵ *M. & B.*, II, 807.

⁶ *Surrey A.C.*, XX (1907), 90-114.

been largely reconstructed in the first half of the nineteenth century, probably when it was owned by George Valentine Hall.

ROADS AND RAILWAYS

The 'Pilgrims' Way' passes south of the Limeworks in an east-west direction. This section of the road was closed in 1878⁷ and also the other roads of Merstham have undergone considerable alteration. Hart⁸ gives a map of these changes. Briefly, the present Quality Street was continued northwards to form the road to London. This was diverted in 1807 by the formation of a turnpike road by-passing the village to the east, and this was again diverted (westwards) to form the modern road in 1839 when the South-Eastern Railway came. Also Shepperd's Hill was diverted in 1868 due to undermining by the Lime Quarry.⁹

The story of the iron railways in the area is well documented.¹⁰ The Surrey Iron Railway was opened in 1803 from Wandsworth to Croydon. The Croydon, Merstham and Godstone Railway (C.M.G.R.) was incorporated by an Act of Parliament of May 17 1803 (43 Geo. III., cap 35), and was intended to reach Reigate with a branch to Godstone Green.¹¹ A war-time venture, this was originally intended to be part of a main trunk railway to Portsmouth. Victory at Trafalgar removed the urgency for such an overland connection, and as constructed and opened in 1805 the C.M.G.R. only reaches the Merstham Quarries. The line enters Merstham Parish in a cutting,¹² much of which still exists, some 20 feet deep and approximately parallel to the main road. An overbridge remains, buried to its parapets, and a second and third may be seen just to the north in Coulsdon parish. The Weighbridge Cottage still exists beside the main road, and is shown on the Merstham Tithe Map of 1838.¹³ The railway then diverges eastwards from the main road and passes the site of the old Hylton Arms—the present inn was rebuilt on the main road, as the Jolliffe Arms.

To the south-west of the line are the remnants of some cottages, which were originally stables for horses and a repair depot for the trucks, and which were demolished at the beginning of the recent war. The track continued south-east, past Lime Cottage, and finished at the quarry entrance near Quarry Dean Farm. The line of the track

⁷ Surrey R.O., Highway Proceedings, Q.S. 5/8/412.

⁸ Hart, E., *Surrey A.C.*, XLI (1933), 22.

⁹ Surrey R.O., Highway Proceedings, Q.S. 5/8/316.

¹⁰ Dobson, G. G., *A Century and a Quarter* (privately published for Hall & Co., 1949); Townsend, C. E. C., *Transactions of the Newcomen Society*, XXVII (1956), 51–68; Lee, C. E., 'Early Railways in Surrey,' *Railway Gazette*, 1944; Bing, F. C., *The Grand Surrey Iron Railway* (Croydon Public Libraries, 1931).

¹¹ The copies of the Parliamentary plans deposited with the Clerk of the Peace for Surrey are in the Surrey R.O., Q.S. 6/8/14 and Q.S. 6/8/16.

¹² A scheduled ancient monument.

¹³ Copy in Surrey R.O.

is shown in a series of maps drawn by Lee and illustrating Townsend's paper.¹⁴

Between Lime Cottage and Quarry Dean the line is shown as curving and twice crossing the existing pathway, and the reasons (and evidence) for these diversions are not obvious to the author. Beyond the south-west corner of Lime Cottage the ground has been made up above its natural level, some six feet by spoil from the Limeworks. It has long been suspected that this was laid on top of the track of the railway¹⁵ and the author has located with a mine-detector two parallel metal objects going some ten yards and spaced approximately 5 feet apart. However, these may be the gas and water pipes to the cottage and unfortunately it was not possible to excavate.

The track consisted of flanged plates, supported on square, stone sleepers, each with a central hole in which a wooden peg was inserted, and to this the plates were spiked. It was strictly a plateway, the flanges being on the inner side of the rails and not on the wheels of the trucks, which were horse-drawn and could be used on ordinary roads. The sleepers were rough-hewn in a variety of different stones, mainly millstone grit. A section of track has been erected near the Jolliffe Arms and specimens of rail and sleeper exist in the Guildford Museum. It is surprising that the actual gauge of the line appears to be obscure.¹⁶ Some of the doubts are obviously due to difficulties of definitions of gauge in a plateway. However, the discovery in 1961 of a straight set of sleepers, *in situ*, in the lane between the Jolliffe Arms and the quarry, have made it clear that these were placed in two lines so that the peg-holes were 5 feet apart, and 3 feet 1 inch apart in the direction of the rails. Unfortunately, the road has been resurfaced since observations were taken and the sleepers are no longer visible.

The C.M.G.R., never financially very successful although it provided a ready outlet for Merstham lime, was bought out by the London and Brighton Railway in September 1838, since it wished to use the line as part of its track at Coulsdon. The Brighton line was commenced on 12 July 1838,¹⁷ just north of Merstham Tunnel (1,831 yards), which was completed by 1841. As noted above, this involved a diversion of the 1807 turnpike road.¹⁸ The Tithe Map of 1838 shows the London and Brighton Railway land, but also shows the C.M.G.R. track finishing just short of the limeworks, presumably the section to the stone-quarrying having been abandoned. The limeworks were originally served by the C.M.G.R., and this was

¹⁴ Townsend, C. E. C., *op. cit.* Also *Railway Magazine*, 1947, p. 255. This is shown in greater detail in a plan drawn by Major Taylerson (in Dobson, C. G., *ibid.*, Plate 50).

¹⁵ Information from Mr. Sanders.

¹⁶ Lee, C. E., *op. cit.*, 31.

¹⁷ White, H. P., *Regional History of Railways in Great Britain* (1961), II, 75-80.

¹⁸ Built by Jolliffe & Banks for the Croydon and Reigate Turnpike Trust.

replaced by a single track spur from the L.B.S.C.R.-S.E.R. joint line.¹⁹ When the Quarry line was built, this spur was carried by a bridge immediately south of the tunnel mouth. This bridge was removed when the limeworks closed. Although built by the Brighton Company,²⁰ due to Parliamentary insistence that only one southern route for a railway from London was required, the Merstham section actually passed to the South-Eastern Railway in 1842, and was used by trains of both companies. This caused considerable friction, and the London, Brighton and South Coast Railway built a new line (the Quarry Line), by-passing Redhill, largely parallel to the earlier line and involving a further Merstham Quarry Line Tunnel of 2,113 yards, which was opened in April, 1900. The chalk spoil for this tunnel was dumped on land directly to the south of Lime Cottage, considerably altering the contours there.

When it was realized that the Croydon, Merstham and Godstone Railway was unlikely to be extended beyond Merstham, plans were made to connect it to the Arun by canal. In 1811 the plan²¹ of the proposed Merstham and Newbridge Canal shows that connection between the canal basin at the foot of the downs and the iron railway was to be by inclined plane. This map is interesting in that it marks Jolliffe & Bank's Works (see below) and also an obviously artificial pond to the south of Rockshaw Road, called New Pond. This was intended as a feeder reservoir for the canal and it is interesting to speculate whether this pond existed before 1811 or if it represents the commencement of works on this canal. It is not shown on Rocque's map, but is shown on the Tithe Map. Portsmouth was reached (1823) by canal from the Thames by way of the Wey Navigation, the Wey and Arun Junction Canal, the Arun Navigation and the Portsmouth and Arundel Canal.²²

THE LIMEWORKS

Chalk has been dug from the hills around Merstham for burning into lime since 'time out of mind.' Certainly the small pit south of Alderstead farm is shown on the Tithe Map and is identified by Hart²³ with that of Pit Field mentioned in the Merstham Manor Rent Roll of 1522. Also in a wood to the north-west of the church is an extensive series of marling pits. These were mainly to supply agricultural lime, the use of which increased during the agricultural improvements of the eighteenth century. The effect of this on clay soils and the lime-burning industry has recently been studied by Robinson and Cooke,²⁴ who show that, for economy in transport,

¹⁹ The locomotives used in the Limeworks are listed in *Industrial Locomotives of South-East England* (Birmingham Locomotive Club 1958), 13.

²⁰ The contractors were the Hoof Brothers, one of whom was killed in the tunnel and buried in Merstham Churchyard.

²¹ In Surrey R.O., Q.S., 6/8/68, and *M. & B.*, III, appendix, ix.

²² Vine, P. A. L., *London's Lost Route to the Sea* (1965).

²³ Hart, E., *Surrey A.C.*, XLI (1933), 21.

²⁴ Robinson, D. J., and Cooke, R. U., *Surrey A.C.*, LIX (1962), 19-26.

the lime-burning took place at the farms near the source of fuel. This may explain the absence of earlier kilns at Merstham.

Lime was also used for building purposes. Manning and Bray state:—

The Chalk from this part of the Surrey Hills burns into excellent lime and is in much esteem with builders for any work which requires more than ordinary strength of mortar. In future, it may form a considerable and lucrative article of trade in this particular spot, if the traffic shall be sufficient to support an iron railway, which was completed in 1805, opening a direct communication between this place and the Thames, at Wandsworth. Great quantities of chalk have been conveyed by this means to the vicinity of the metropolis, and the business of lime-burning is now carrying on with great alacrity.²⁵

Thus it appears that it was the improvement in communications resulting from the iron railway that caused the large size of the Merstham Limeworks. Mr. Harrison²⁶ states that the Limeworks opened in 1762, but it is not shown on Rocque's map, nor the Merstham Estate Map of c. 1768 in the possession of Lord Hylton.²⁷ This and several other maps, including Cary's of 1801 and the first edition of Ordnance Survey, show the stone-quarries but not the limeworks. Some of these maps may not have attempted to show limeworks, but the author believes that this indicates that any works here were small in size before the iron railway came.

Tharby²⁸ states that Sir Edward Banks, the contractor, joined Colonel Hylton Jolliffe, M.P., of Merstham House, in developing Merstham Limeworks in 1805, after Banks had completed the C.M.G.R. In 1807 Banks entered into partnership with Hylton Jolliffe's younger brother, the Rev. William John Jolliffe, to form the firm of Jolliffe & Banks, Public Works Contractors. This Company had many famous contracts, including Dartmoor Prison (1809–10), Waterloo Bridge (1812–7), Sheerness Dockyard (1813–23), the new London Bridge (1824–31) and that over the Serpentine (commenced in 1824). In their public works they were the first to introduce Aberdeen granite to the South of England, and the millstones of this material found at the Merstham site are undoubtedly connected with them. The Company's offices were at the Merstham Limeworks and are shown in the map of the proposed Merstham and Newbridge canal (1811), and are included in the Land Tax returns for 1809 and later.²⁹

It appears that Jolliffe and Banks worked the lime here until 1824, when the lease of the Limeworks, Quarry Dean, and surrounding fields were taken by George Valentine Hall, who was previously employed there. He became the founder of the firm of Hall & Company Ltd., whose history has been excellently covered by Dobson,³⁰ and was described as a lime-burner. The firm of Jolliffe &

²⁵ *M. & B.*, II, 253.

²⁶ Lecture to the Reigate Society, *see* note 4.

²⁷ Photocopy at Castle Arch, Guildford.

²⁸ Tharby, W. G. *The Life of Sir Edward Banks* (1955).

²⁹ Plan and Land Tax returns in Surrey R.O.

³⁰ Dobson, C. G., *op. cit.*

Banks continued to have their offices on the site until they wound up in 1834, and continued to use Merstham lime and stone in happy business relationship with George Valentine Hall. The Hall family lived at Quarry Dean, and the Company were connected with the site until 1864, when the conditions imposed for a renewal of lease being too heavy due to the landlord's annoyance that the firm had recently acquired a second site at Coulsdon, they gave up the Merstham Works and concentrated their resources at Stroat's Nest Quarry, Coulsdon, which closed in 1962.

About 1872, the workings were taken over by Mr. J. S. Peters, whose family had been connected with lime in the Lower Medway Valley. He appears at first to have only taken over the works area to the north of the bridle road to Quarry Dean, which he does not appear to have leased until 1890,³¹ when he also acquired rights on the land behind the bridle road and the site of the Pilgrims' Way. The limeworks were run by the Peters, uncle and nephew, until 1934, when the Merstham Grey-stone Lime Company was formed. This Company continued until 1956, when the works lay derelict for several years. Finally in 1961, Croydon Corporation bought the land for the dumping of household rubbish and eventual restoration of the original contours.

An illustration exists of the Limeworks in 1824 in a hunting print by D. Wolstenholme, *Full Cry—crossing the Brighton Road at Merstham*.³² This shows on the left the old Hylton Arms and Jolliffe Row and, on the right, Lime Cottage. This building is constructed of the Merstham Stone and appears to date from the early part of the nineteenth century. It may be the cottage first mentioned at Jolliffe & Banks' Works in the Land Tax in 1815. It is, however, reputed to have been a mill building,³³ and this was confirmed by the discovery within the wall of timber supports, presumably for a bearing, during alterations carried out in 1962.³⁴ The exterior before alteration is shown in Plate I(b). This house is marked on the Tithe Map of 1838³⁵ with the form of hatching used for industrial buildings rather than dwellings. The eastern end was the office of the Company at least since 1870, and may have been so earlier. Remains of an archway are faintly visible in the stone work of the south face, and this was reputed to be connected with its industrial origins.³⁶ The cottage has been retained, but renamed 'Old Quarry Cottage'.

Remains existed until recently of two rows of old conical flare kilns, the upper one of eight kilns and the lower of three. The upper row is known to have been built by George Valentine Hall in 1830.³⁷

³¹ Lease from Lord Hylton to J. S. Peters, 1890 and 1899 in Surrey R.O., Acc. 641.

³² Reproduced in *Surrey A.C.*, XLIII (1935), Plate V.

³³ Information from Mr. Sanders.

³⁴ Information from Mr. R. Teesdale, Croydon Corporation, Engineer-in-Charge.

³⁵ In Surrey R.O.

³⁶ Information from Mr. Sanders.

³⁷ Dobson, G. C., *op. cit.*, illustrated in Plate 49.

These are illustrated in operation in an engraving by Elliott Seabrooke³⁸ and photograph A.4636 of the Geological Survey taken in 1929, reproduced by kind permission as Plate II. In 1934 continuous running kilns were installed and these were in use until the works closed. All the kilns used coal as fuel and this was a back-carriage in return for lime. All the occupiers of the site seem to have carried on a subsidiary coal-merchants' business due to this.

Several mill-stones were discovered during operations by Croydon Corporation. They were all apparently of Aberdeen granite, and included two halves, forming a platform 9 feet 5 inches diameter, with an 8 inch diameter hole. There were also two 5 feet 10 inch diameter, with an 11 inch square hole, fitted with a metal bearing for a 4½ inch shaft. It is suspected that these two were rotated edgewise on the platform, but it is not clear whether they came from Lime Cottage or perhaps elsewhere on the site. Two other mill-stones, approximately 3 feet 6 inches, were found, but had to be covered over.³⁹

K.W.E.G.

INVESTIGATION OF A NINETEENTH-CENTURY INDUSTRIAL INSTALLATION

During the many visits paid to Greystone Limeworks by Mr. K. W. E. Gravett in the course of his researches into their history (as described in the first part of this paper), the former quarry manager, Mr. John Sanders, who then lived at Old Quarry Cottage (formerly Lime Cottage), kindly drew his attention to a circular earth bank just inside the thicket, across the lane which runs south of the cottage.⁴⁰

As the purpose of this was not apparent, and as it was unlike any of the other known remains of the working days of the quarry or limeworks, investigation seemed desirable. Further inspection showed that there were, in fact, two contiguous circles (Fig. 1). There was no record of disturbance for many years, and indeed the thicket was dense and unbroken. In view of this prospect of uncovering a probably complete industrial installation (the circles had nothing ancient about their appearance), and of the imminent filling in by Croydon Corporation of the quarries, and the possible threat to the circles thereby, it was decided to excavate. Permission was kindly given by the ground landlord, Lord Hylton, and the Croydon Corporation; both showed continuous interest in the work, and much gratitude is due to them.

The excavation took place in June 1962 under the writer's direction, assisted by Mrs. M. C. Wood, Mr. Gravett, Mr. N. P.

³⁸ Reproduced in Green, F. F., *The Surrey Hills* (1915), 58.

³⁹ Information from Mr. R. Teesdale.

⁴⁰ This lane follows the line of the extension of the Surrey Iron Railway, which ended at Quarry Dean, a quarter mile beyond Lime Cottage. It was not possible to excavate beneath the lane for traces or actual remains of the track, but some of this has since come to light at Quarry Dean (1967).

Thompson and Mr. David Herbert. The work was visited by Mr. W. G. Tharby, of the Bourne Society.

The site is on a narrow spur of Lower Chalk, left standing on the southern edge of the quarries. Just to the south-east of it are the Merstham stone layers which were mined here for many centuries (see page 125).⁴¹ The rock (which is a very hard greyish clunch) falls away in a scarp a few yards south of the circles, but the formation is here obscured by the high piles of outcast from the railway tunnels and cuttings, which were built up against it. The cutting of the railway into the quarry runs under the lane some 50 yards north-west of the site.

But these features (except the chalk) are unrelated to the choice of site for the circles. These seem in fact to be sited in close relation

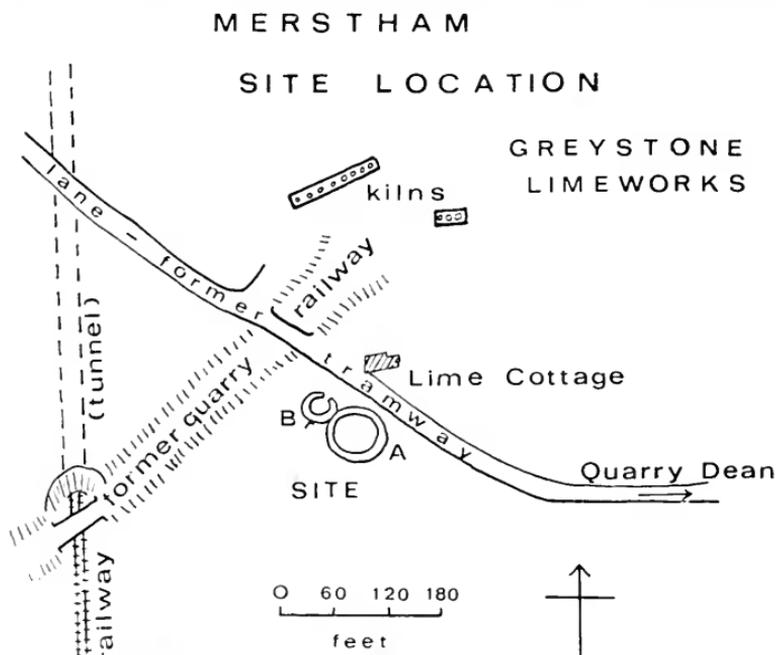


FIG. 1.—MERSTHAM LIMEWORKS: SITE LOCATION MAP.

to the lane to Quarry Dean, or rather, no doubt, to the iron railway which preceded it. This lane or railway could provide access, and a means of transporting the raw materials for, and the products of, the site. In fact, the entrance to the smaller circle (see below) faced the lane.

The circles consist of banks of chalk (covered with a thin topsoil) some 3 feet 6 inches high. They are some 60 feet and 24 feet in diameter. The smaller has a gap on the north side, the larger is unbroken (Fig. 1).

⁴¹ The lime quarries are in the Lower and Middle Chalk; the building-, road- and hearthstone beds (Merstham stone), to the south of them, form part of the Upper Greensand. Dines, H. G., and Edmunds, F. H., *The Geology of the Country around Reigate and Dorking* (1933), 100.

EXCAVATION METHOD

Although it was presumed that the circles represented the emplacements of rotary machines connected with processes of the lime industry, their precise contents could not be guessed from external inspection. They showed merely as gently-dished circular platforms, the level inside being higher than that of the soil surface outside the banks. Excavation, therefore, took the form of trenching (down to the natural undisturbed rock) across the larger circle from one of the few accessible points on the bank on the lane side, in towards the centre; examining a wider area at the centre, to see if there were any central feature; then continuing the trench towards the part of the bank where it touched, or rather appeared actually to form for a certain length, the bank of the smaller circle. From this point the trench was continued across the smaller circle, through its centre, to the bank on the far side. From the centre trenches were then taken, one to the gap on the lane side, the other in the opposite direction as far as the bank, and across it to test the flat platform which was observed in the angle where the banks of the two circles met.

Excavation was at all times hampered, and to some extent conditioned, by the dense cover of hawthorn bushes, with their roots, which entangled the entire site. Clearance of this vegetation was in fact so laborious that the minimum passages were cut consistent with adequate trenches, plans and sections being obtained. But in the result a clear picture was, in fact, achieved.

THE LARGE CIRCLE (A)

This was 60 feet in diameter, measured from the centre (highest point) of the bank. The bank was 3 ft. 2 in. high (above the present ground level outside the circle), and had a spread of 10 feet from the top in each direction. The top was rounded, and only slightly flattened. The soil level inside the circle was 1 ft. 9 in. below the top of the bank, i.e. 1 ft. 5 in. above the soil level outside. The top soil, which covered the whole area, including the inside of the circle, was 4 inches thick.

The *bank* was made of chalky material, and rested on the natural rock. Indeed, the whole circle was evidently cleared down to the rock before the bank and the interior layers were laid down.

The *interior* consisted of carefully laid and levelled thicknesses of clay (Fig. 2). The bank had evidently been allowed to settle before the interior was dealt with, as it showed a 'foot' or spread of some five feet from where the bank proper would have ended. Inside this some five inches of reddish brown clay (which outcrops at South Merstham) had been spread on the natural rock. Over this lay eight inches of clay, grey over the spread of the bank, merging into light brown over the red layer. It is possible that this is an effect of leaching or soil-water.

Some four inches of recent topsoil covered both the bank and the clay layers inside it. At the base of this, roughly coterminous with the brown part of the upper clay layer, was a thin (up to two inch)

layer of small pieces of apparently unburnt chalk and chalky soil, resting on the brown clay. On the assumption that Circle A was an artificial pond, this chalky matter might be seen as the remains of whatever the pond was meant to contain (*see below*), or might have been added to prevent damage by animals, perhaps oxen from the nearby grinding mill.⁴²

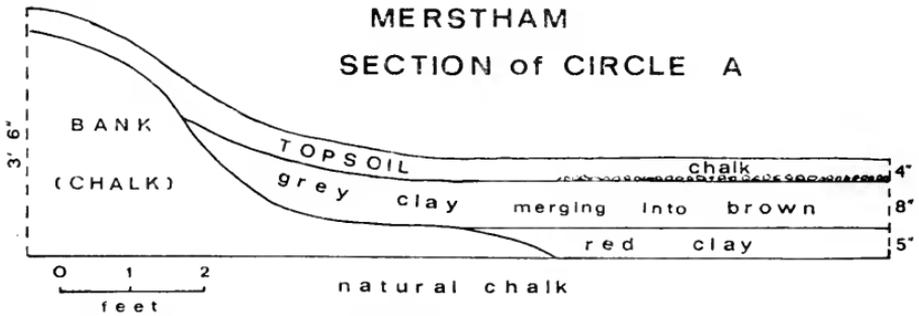


FIG. 2.—SECTION OF CIRCLE A (part—the circle is 60 ft. in diameter).

THE SMALL CIRCLE (B)

This was about 24 feet in diameter, between the tops of the bank. But the bank on the side of Circle A merged into the latter's bank, and for several feet was indistinguishable from it, forming one stretch of bank common to both circles.

The angles between the two circles were blocked with heaps of chalky rubble, perhaps spreads from the banks.

Midway along the common bank was a *platform* of brickwork laid transversely across the bank. This consisted of an oblong platform four bricks wide (two feet), and 3 ft. 8 in. long. On the outside rows of brick another course of bricks had been laid, forming low retaining walls. These did not extend across the ends of the platform (which therefore had the form of a tray with no lip at the shorter sides). The structure was laid on an inch layer of mortar on the top of the bank.

Below this, covering the slope of the bank inside Circle B, had been a *facing* of slates, of which many fragments were found. This must have been fastened to a wooden framework. If the purpose of the brick platform was (say) to rest buckets of water or some other liquid on, in transit between the two circles, then the slate facing would have prevented erosion of the bank by spilt liquid.

Inside the circle (*see plan*, Fig. 3), the bank had been prolonged by a flat shelf or berm some five feet wide, and 1 ft. 6 in. thick. On this (resting on a layer of sand) was laid a brick *floor* 3 ft. 6 in. wide, one brick thick, which ran continuously right round the circle. The outside edge of this floor, on the bank side, had been built up by a low retaining wall two bricks high and two (one foot) thick. There

⁴² Such a layer was commonly added to dewponds for this purpose. *See* Martin, E. A., *Dewponds* (1915), 104, and also Clutterbuck, J. C., 'Prize Essay on Water Supply,' *Journal of the Royal Agricultural Society*, 2nd Ser. I (1865), 271.

was a gap of about a foot between the retaining wall and the base of the bank, lined with sand (which may be merely part of the spread on which the floor was laid). The bank had spread over the wall, except under the brick platform on the Circle A side, where the slate facing had protected it for a time. When the slates collapsed the bank spread, but only up to the wall and not over it.

MERSTHAM
PLAN OF CIRCLE B

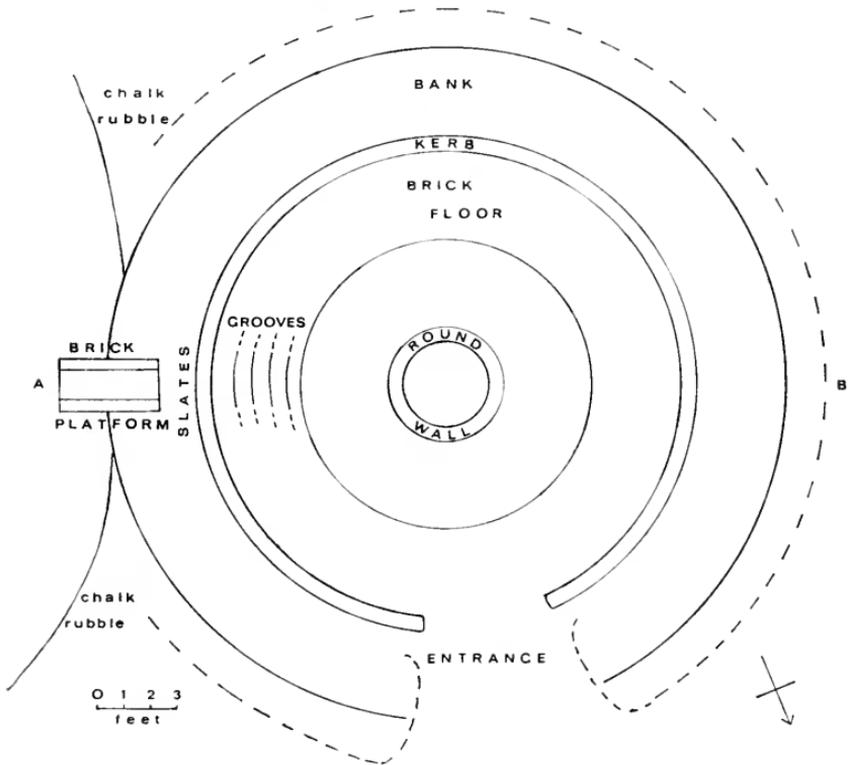


FIG. 3.—PLAN OF CIRCLE B.

The bricks which formed the floor were laid in diagonal rows of four bricks each, lengthwise (*see* Plate IV(b)). Four somewhat irregular grooves, one inch wide and up to three-quarter inch deep, had been worn into the brickwork by the passage of some heavy object(s) dragged across it. The amount of irregularity of these grooves may be gauged by measurements taken at two places:—

	Wall to 1st groove	1st groove to 2nd groove	2nd groove to 3rd groove	3rd groove to 4th groove	4th groove to inner edge of floor
a	3 in.	11 in.	6 in.	9 in.	9 in.
b	3 in.	9 in.	8 in.	9 in.	12 in.

The circular space, 11 ft. 6 in. in diameter, contained by the floor, was, of course, two feet deep from the surface of the floor to the natural rock, inside the inner slopes of the berm. In the centre of this space (and thus in the centre of the entire circle) was a low *circular wall*, one brick (lengthwise) thick, and two bricks deep, resting on the natural rock. This was 3 ft. 3 in. from the brick floor, and its inner diameter was 3 ft. 6 in. (*see* Plate IV(a)).

On the side of the circle nearest the lane (or railway) was a gap in the bank and retaining wall (but not the floor), 4 ft. 6 in. wide. This was evidently the *entrance* to the structure, but no trace of an actual doorway was found. Indeed, the absence of roofing material in the filling of the circle suggests that the structure was open to the sky. The flooring in the entrance was much broken up, no doubt partly by intensive wear. The bank had spread from both its ends over the entrance.

The topsoil layer, which ran, as stated above, over the bank, dipped into the centre of the circle (*see* section, Fig. 4). It was about

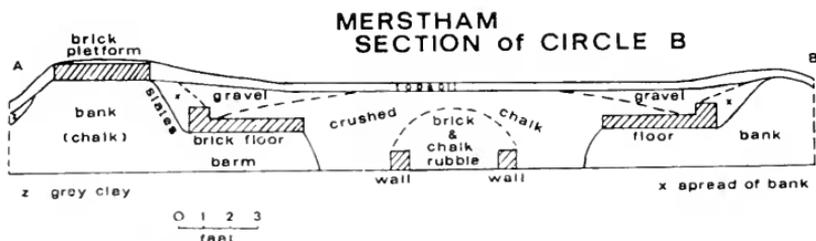


FIG. 4.—SECTION OF CIRCLE B (from A to B in Fig. 3).

a foot above the brick floor, and then ran level across the circle until it rose to the top of the bank on the far side. Above the floor the soil was brown and gravelly. The central circular feature was filled with rubble consisting of broken brick and chalk; this not only filled the central feature, but rose above it for about 1 ft. 3 in. The rest of the space inside the brick floor was filled with crushed and broken chalk.

The *bricks* measure 8½ in. by 4 in. by 2½ in. They are red, close-textured and hand-made, and have no frogs or makers' marks. Mr. Norman Cook, F.S.A., Keeper of the Guildhall Museum, who kindly examined one, places it earlier than the middle of the nineteenth century, but not much earlier than the end of the eighteenth.⁴³

The *small finds* are consistent with this dating. Nothing of importance was found in the areas excavated, but this was not unexpected in a site of this kind. The finds consisted of:—

Short piece (1.75 in. long) of an iron strap 1.25 in. wide. From the floor on the south side of Circle B.

⁴³ Lloyd, N., *A History of English Brickwork* (1925), gives the date of the introduction of this size of brick in England as 1776; the present size came in after 1850.

- Square iron nail (tip missing), with flattened conical head—length of fragment 2·6 in.; width of sides 0·3 in.; head 0·7 in. across.
- Large iron nail or staple, of flattened section, with broad flat head—this may be complete—it thins off at the end to an edge. Length 5·1 in.; width halfway along 0·6 in.; thickness 0·4 in.; head 1·25 in. by 0·9 in. From the floor on the south side of circle B.
- Part of bottle, of dark green glass (0·2 in. thick), heavily iridized. The fragment stops short as it turns inwards toward the base, which is kicked.
- Mouth, probably of the same bottle—thickened, with incised line round it. Diameter of mouth 0·8 in.; overall diameter 1·3 in. These two pieces came from the central feature of Circle B.
- Fragment of thin dark green bottle-glass.
- Fragments of thin flat pale green glass.
- Fragment of thin clear glass, from bottle of the 'medicine-bottle' type—two raised letters BL. From the brick platform.
- Nondescript piece of glazed earthenware. From the entrance.
- Piece of bone (part of sheep's clavicle). From the central feature of Circle B.
- Piece of a bituminous or tarry substance.

The *slates* from the slope of the bank below the brick platform are grey. They are of two thicknesses, 0·3 in. and 0·2 in. They are bevelled off along one edge. The size of the slates could not be determined.

DISCUSSION: THE PURPOSE OF THE CIRCLES

A satisfactory interpretation of this seemingly simple, but in fact puzzling, site has not been at all easy to arrive at. There seem to be no surviving or even recorded parallels, and the site is not mentioned in the published history of the Merstham quarries.⁴⁴ Indeed, the lime and allied industries are far from copiously documented from the historical point of view. Most of the literature deals with the modern industrial processes and plant, and (as for glass and some other industries) the references to the pre-industrial phases are not informative as regards the details of the plant and equipment used. Indeed, except for kilns, the equipment is scarcely referred to at all, let alone described or illustrated.

The Merstham site, as it clearly predated fully modern industrial practice, had therefore to be interpreted by inference from what little was known of the processes and products of the industry before, say, Johnson's breakthrough in the manufacture of cement in 1845 (see page 138). Even then, the results are not wholly conclusive; it is difficult to suggest a process and product which demands the use of all the evidence which the site provides.

⁴⁴ Dobson, C. G., *op. cit.*

Besides searching the literature, the problem was discussed with two people who had intimate knowledge of the industry and its history—Mr. Sanders, the former manager of Greystone Limeworks, and Mr. A. J. Rook, B.Sc., formerly of the Chalk, Lime and Allied Industries Research Association. I am greatly indebted to these authorities for their kindness in giving thought to this, and in making suggestions and elucidating obscurities. They are not committed by what follows.

It will make the discussion clearer if the evidence is related, in turn, to the various main processes of the industry:—

One of the three main primary products of a limeworks was of course *lime*.⁴⁵ This is made by burning chalk (or limestone), at about 900° C., in a kiln to convert it into *quicklime*. The chalk is mainly calcium carbonate, with various impurities; heating resolves it into carbon dioxide gas and calcium oxide (the quicklime). The stone is burnt in kilns (as at Merstham) usually close to the quarry; if not sold away at this point as lump lime, it is then ground and hydrated in plants adjacent to the quarry. Ground lime is also sold away.

For both agricultural and building purposes ground quicklime is *slaked*—that is, covered with water; it combines with the water, generating heat, to form *slaked lime*, which is mainly calcium hydroxide. Under specially controlled conditions a purified powder can be made called *hydrated lime*; hydration (or slaking) is usually done on site, but hydrated lime can be sold away and used after mixing with water. Sand is mixed with slaked or hydrated lime to produce *mortar*.

When excess water is used, the slaked lime in suspension in the water is *milk of lime*; when this is allowed to stand it thickens into *lime putty*, used for mortar and plastering.

The grey chalk of Merstham produces a semi-hydraulic lime, that is, one which will, with water, produce a relatively hard and impervious mortar or cement.

Another main product, using chalk as a raw material, is *cement*, which depends for its properties on the types and proportions of clays, earths or gravels with which the chalk is mixed. They are crushed together in a wet mill and calcined into a mass which is ground into a fine powder. Quality improved throughout the early nineteenth century, under the influence of men like Vicat and Frost, and in 1824 Joseph Aspdin patented a cement of modern type ('Portland cement'). But the first fully reliable cement was not produced until 1845, by I. C. Johnson at Swanscombe. *Reinforced concrete*, patented by W. B. Wilkinson in 1854, was the final stage in this long development, but is outside our concern here.

Various mixtures were experimented with in the making of cements and concretes. G. R. Burnell,⁴⁶ for example, describes in 1850 a process (no doubt not then new) in which hydrated lime was made into a thick paste, and made into a mortar before being mixed with gravel. It was 'wheeled in on a level, and beaten with a rammer.' Burnell gives details of mixtures of lime, earths, sand, gravel and broken limestone; burnt clay or pounded bricks could be substituted for the earth.

The third product of chalk is *whiting*. This is finely divided calcium carbonate, used in gesso, paints, putty, etc. No chemical process is involved; the chalk is merely ground in water; the fine material is separated by sedimentation, and the settled sediment dried and powdered. Normally, in this process, the chalk was broken up and crushed in a wash mill (a circular floor) by rollers drawn round a central upright. The resulting 'slurry' was transferred, or flowed, into an artificial pond, where the coarser material sank to the

⁴⁵ For a good general account of the various lime products see Davey, N., *A History of Building Materials* (1961), 97 ff.

⁴⁶ Burnell, G. R., *Rudimentary Treatise on Limes, etc.* (1850), 73. Burnell draws partly on Pasley, C. W., *Observations . . . on Cement, etc.* (1830).

bottom. At intervals, say once a year in the summer, the pond was allowed to dry; the fine material was dug out, dried, and broken to powder, perhaps in the same mill. The coarser pieces were usually left in the pond.

We are now in a position to review the evidence from Merstham, and suggest solutions.

Circle A is obviously a pond, constructed of layers of clay like a dew-pond.⁴⁷ Circle B is more difficult. At this point it should be noted that analysis of the chalky remains in either circle cannot be conclusive. Slaked lime (calcium hydroxide) under conditions of exposure is carbonated by the atmosphere, and reverts to calcium carbonate, which is chemically indistinguishable from chalk. In fact, Mr. A. J. Rook kindly examined the chalky substance from Circle B, and confirmed it as simply chalk, which appeared to have gone through no other process than the one which produced the small lumps recovered from the circle and sent for analysis; these could have been fractured by natural means. Mr. Rook⁴⁸ points out, however, that whiting would have the same chemical composition, but its consistency would be like whitewash that has dried out—much softer than the samples, and without their rather rectangular fracture. We can therefore eliminate whiting from the enquiry, and the site must be considered in the context of lime, mortar or cement.

Mr. Sanders pointed out that Circle A (the pond) was larger than normally used for slaking lime, for which quite small pans were usual. It was at first reasonable to assume that Circle B was the site of a rotary crusher or grinder, for which it was about the right size.⁴⁹ But against this, no trace of a central post or pivot was found (unless a pivot had been mounted on the central brick feature and since removed);⁵⁰ there was no sign of the compression on the ground inside the floor which would be the result of the passage of a heavy roller; and the brick floor showed no signs of the crushing or damage which would be caused by horses' hooves (and in any case brick would make the coefficient of friction completely wrong for horseshoes—a brick floor would speedily break up under shod hooves).

Thus the floor must have been intended for human use, either to watch or control a process taking place in the centre (although as the centre is 8 feet from the edge of the floor this idea also has practical difficulties).

One possibility is that this process could have been that of running down lime into lime putty. This is made⁵¹ by putting quicklime on a sieve and pouring water over it. Only the pure lime goes through—

⁴⁷ Pugsley, A. J., *Dewponds in Fable and Fact* (1939), 30 ff., and references in note 42.

⁴⁸ In correspondence.

⁴⁹ Information from Mr. F. Atkinson (Bowes Museum).

⁵⁰ This enigmatic feature may have been to stand a container of some sort on or in, but its real purpose remains obscure. Perhaps it was merely to guide something round the centre.

⁵¹ Information from Mr. Sanders.

the ashes and unbaked chalk stay on the sieve. It is then allowed to ripen and can be used either with sand to make mortar or, when allowed to dry a little into a stiff paste, for plastering walls and ceilings.

A similar process is described in 1819:—

A pit is dug in the ground, which is bricked at the bottom and sides, into which the operator puts the lime. He has command of a small stream of water, which is conveyed at pleasure into the pit, and in a few days the lime is sufficiently slaked; he then puts the lime and sand or gravel into the mill. . . .⁵²

The size of the pit is given as making six bushels at a time. The pit at Merstham is somewhat larger than this.

The grooves or scratches on the brick floor suggest that something heavy had been dragged round. This may have been some kind of stirrer, but more likely a large sieve on a wooden frame, which would have been agitated and used to remove the unburnt lumps from the quicklime.⁵³

That the circle was used for mixing and not crushing is also strengthened by indications, found by Mr. Gravett, that an animal mill for crushing probably existed in part of Lime Cottage across the lane. The signs of wear in the floor in the entrance of Circle B could suggest that the crushed material was brought across from the cottage and unloaded at the entrance to the circle, for distribution and use inside. The grooves on the floor could, in this event, represent the dragging of receptacles full of crushed material round the floor to the places where it was required.

Cement, rather than putty or mortar is, however, suggested by the gravel and broken brick and stone found together with chalk (lime) in the filling of Circle B. And the problem of accepting the circle as a slaking-pit is that lime was, until recently, only slaked for use as lime-mortar and was used as soon as possible after slaking. Hence it was always slaked at the place where it was to be used, and never sold in the slaked condition, but only as quicklime. Also slaked lime has considerably greater volume and weight than quicklime and transport costs are greater.

The use of the platform for conveying water (or liquid) from Circle A to Circle B is reasonably clear.

All this points to the plant having been constructed for a large local building work. It was at first thought that the products were sent off along the Surrey Iron Railway to works in London, such as the building of Rennie's new London Bridge (completed in 1831), for which the Merstham Limeworks had the contract.⁵⁴ But the

⁵² Rees, Abraham, *Cyclopaedia* (1819), XXIV under 'Mortar.'

⁵³ These lumps might explain the pile of chalk rubble between the circles at the back.

⁵⁴ And for which lime mortar was used; see Dobson, C. G., *op. cit.*, 191. A list of works, for which the firm of Jolliffe & Banks had the contract, is given in Dickenson, H. W., 'Jolliffe & Banks, Contractors,' *Transactions of the New-comen Society*, XII (1931-2), 1, but this paper does not deal with Merstham Limeworks or its contributions.

above arguments point, however inconclusively, to a work much closer at hand.

This is conveniently provided (as Mr. Gravett very ingeniously suggests) by the first Merstham Railway Tunnel. Certainly contractors' rails were laid from the limeworks to the railway works, and fragments remained of the trucks used until after 1950.⁵⁵ The plant could thus have been built to supply mortar or cement for the tunnel lining, and perhaps the size of the contract would account for the oversize of the slaking-pit itself. The tunnel was built between mid-1838 and mid-1841,⁵⁶ and thus the site would date from c. 1840. This is entirely consistent with the construction, bricks, slates, small finds, and many of the considerations above.

An approximate estimate of the quantity of slaked lime required for the tunnel is 950 cubic yards. This could be provided by the pit investigated, assuming it was used six days a week for nearly the three years.⁵⁷ The lime must have been mixed with sand somewhere, but no doubt this was done on the spot, by the tunnel. A short life would account for the absence of modifications, the relatively light wear (and good condition), and the abandonment of the plant thereafter.

This may indeed well be the true explanation, although much still remains obscure. One may hope that parallels to this interesting site will be found elsewhere, and more precise knowledge gained on their purpose. Other limeworks were visited by Mr. Gravett, but nothing like this site was seen. Perhaps one should look rather in the neighbourhood of major construction works, such as bridges, or canal and railway tunnels. It was no doubt merely a coincidence that the Merstham tunnel was close to a limeworks, and, after all, this site may indeed, for this reason, be unique.

SUMMARY

Two conjoined earth circles were investigated at Merstham Limeworks. One was an artificial pond, the other a structure with a circular brick floor round a space containing a central brick feature. This is a plant of the lime industry, and may have been built for the production of mortar or cement for the nearby railway tunnel, about 1840. The small finds are in Guildford Museum.

Acknowledgements

I am most grateful to the owner and lessees for permission to investigate this site. Several experts have given thought to the problems it raises, and have answered questions. These are mentioned in the text, but I should like to repeat my gratitude to them here. The paper, and the enquiry itself, also owes a great deal to Mr. Gravett, who kindly read the draft and contributed much.

E.S.W.

⁵⁵ Information from Mr. Tharby and Mr. Sanders.

⁵⁶ Marshall, C. F. D., *History of the Southern Railway* (1936), 267-8. This is not the tunnel shown in Fig. 1, but a little to the west.

⁵⁷ This estimate is based on a straight tunnel of length 1 mile 71 yards and horseshoe profile of span 22 ft. 6 in. and height 23 ft., lined throughout with four rings of brickwork (Mr. Gravett's calculations).

THE RECORDS OF MERSTHAM LIMeworks⁵⁸

A PRELIMINARY NOTE

BY

MARGUERITE GOLLAN CZ, M.A., COUNTY ARCHIVIST

The records formerly preserved at the Merstham limeworks and since 1961 deposited in the Surrey Record Office at County Hall, Kingston upon Thames, extend back in broken series to 1872. Although these records have suffered considerably through damp and only a few are at present available for study, these few are important as illustration of the value of business archives to the historian and to those interested in industrial archæology.

By 1870 the Peters family had established an interest in the operation of the limeworks which formed part of Lord Hylton's estates in Merstham, for in that year Edwin Peters was qualified to vote at parliamentary elections in respect of joint occupation of limeworks and farm. Though he changed his abode in 1875, moving first to Rochester and later to Maidstone, his name was retained on the Merstham register. From 1885, however, the qualification for Peters' vote was in respect of Quarry Dean. The name of Henry Peters of Wouldham Hall, Rochester, Kent, replaced that of Edwin Peters in 1888 and was followed in 1891 by Joseph (S.) Peters whose abode was in Merstham, from 1896 to 1899 at the limeworks, then at Quarry Dean.⁵⁹

It is assumed at present that the bulk of the records relate to the works of Peters Brothers, later Joseph S. Peters,⁶⁰ lime-burners, at Merstham, but a closer study may show that some of them include business of the Peters family elsewhere. The considerable business with Peters of Wouldham, Kent, Peters of 199 Old Kent Road and Peters of Paddington requires investigation. It should be noted in this connection that Henry Peters of Wouldham Hall was party to the lease of 1890,⁶¹ and that he qualified for inclusion in the occupiers' section of the electoral roll for Merstham in respect of Quarry Dean, as already shown. A small book, of later date, containing transport rates for lime from Merstham and cement from Snodland, in the Medway valley some miles south-west of Wouldham, may also be significant.

The main series of pre-1934 records includes journals (or day books), of which unfortunately only that for the years 1872-6 survives, trade ledgers, ledgers, purchases and sales accounts and wages books. There are also subsidiary cash books and a few less formal records, including a small note book containing accounts

⁵⁸ Surrey R.O., Acc. 566 (ledgers, etc.), and Acc. 641 (deeds). All records subsequent to 1933 are closed to searchers.

⁵⁹ Surrey R.O., Voters Lists for Surrey, Middle, later Reigate Division, 1870-1905.

⁶⁰ Cf. *Kelly's Directory of Surrey*, 1882, 1,246; 1891, 1,368.

⁶¹ See below, p. 145.

for harness repair between 1890 and 1896, this notebook having escaped the damp which has penetrated so many of the formal records.

One of the earliest surviving records is the journal, a large leather-bound volume of which only the first 270 of the 706 pages are used. It opens with entries for 1 January 1872, and breaks off on 25 May 1876. The pages have been ruled and the printed headings include name and residence; place of delivery; carman; yards lime, with separate columns for grey, ground, chalk; cement; sand; coals; and amounts paid. It provides a daily analysis of outward business, mostly the sale of grey lime, though there are also some sales of ground lime and chalk. Considerable use was made of the various branches of the South-Eastern Railway. Indeed the rails and sidings at the limeworks were extended between 1890 and 1899 as the plans annexed to the deeds of these dates show.⁶²

Among other volumes available for study are the ledger, 1876–84, and the Merstham trade ledger, 1885–9. The main part of the former is useful as giving the names and addresses of customers and the extent of their accounts. At the end of the volume, however, there are special accounts, including those for rents; rates, taxes and tithes; horses; horse keep; plant; loose tools, etc.; and the South-Eastern Railway. Debit and credit references to Peters Brothers occur on most pages of this section of the ledger. For the types of materials invoiced to the different customers and the destinations to which materials were despatched it is necessary to turn to the trade ledger. At the end of this volume, too, there is a section of special interest, in this case a daily analysis of sales of different materials, together with weekly, monthly and annual totals for the five years 1885–9.

The journal and trade ledger show that grey and ground lime and other materials were distributed throughout Kent; destinations in Surrey included Nutfield, Redhill, Dorking, Kingston and Virginia Water; in Berkshire, Wokingham and Reading. Except for nearby deliveries much of the transport was by rail, over the various lines of the South-Eastern net-work. The terminus at Bricklayers Arms was used frequently, for the abbreviations 'B. Arms' and 'B.A.' recur throughout the records in association with entries relating to Peters of Old Kent Road and others. Among the few carmen then employed was P. Wood who, in the years 1872–6, made trips to Nutfield, Redhill and Reigat, Caterham and Chipstead.

Supplies were sent to gas companies, including the Wokingham Gas Co., the Crystal Palace Co. at Sydenham, the Phoenix and the South Metropolitan. Among customers at Caterham was the asylum which received various types of materials and goods. Godson and Co., who received supplies at Croydon, may probably be identified with Richard Joseph Godson and Co., coal merchants

⁶² See pp. 126–8, Fig. 5; also plan of proposed connection between present siding and London, Brighton and South Coast new line received by the Engineer from Mr. Peters on 16 June 1899, and returned to him on 21 July 1899, Surrey R.O., Acc. 566.

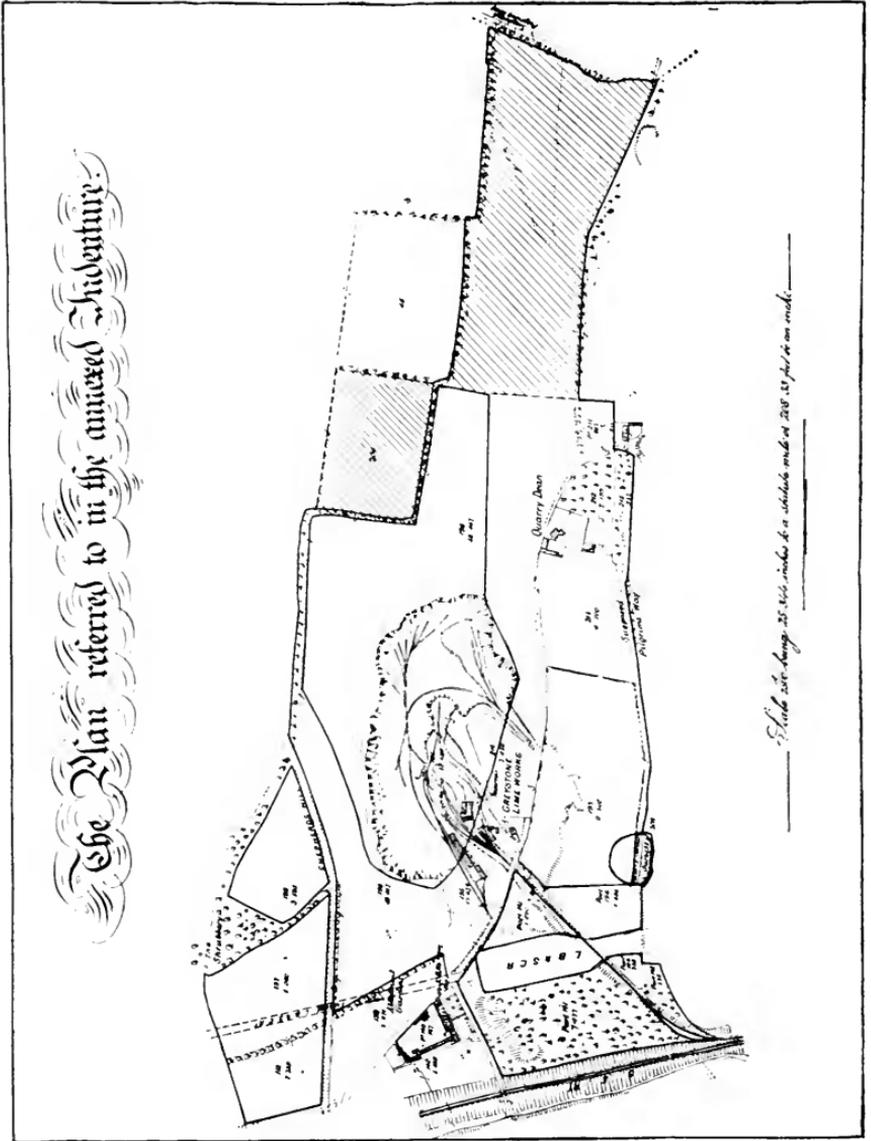


FIG. 5.—PLAN ANNEXED TO DEEDS OF MERSTHAM LIMEWORKS.

and building material merchants of 55 George Street,⁶³ and A. Brooks, Kingston, with Mrs. Adelaide Brooks, lime and cement merchant, of Clarence Street.⁶⁴ In 1885, for example, she received fortnightly 10 yards of grey lime at 7s.6d. and once, on 26 February, 1½ of ground lime at 8s.6d. In 1889 F. Higgs (probably Frederick Higgs, contractors, of Station Works, Camberwell)⁶⁵ had materials sent, for example, to Eltham and Norbiton, as well as to Marden Park. These are a few random examples of business connections that can be found in the records.

The wages book 1884-94 is made up of weekly accounts giving the names of those employed at daily rates, followed by companies paid for piece work. Wheelwrights and blacksmiths, paid 5s.2d. or 4s.8d. daily rate, and bricklayers, 4s.10d. or 4s.6d., were distinguished from the rest. Usually only one in each of these two classes was on the pay roll. With one exception they were paid more than the other workers whose duties were unspecified and who received between 4s.6d. and 1s.3d. or occasionally 10d. A rate of 3s.8d. was usual. One of those receiving this pay over a considerable period was W. Chillman who sometimes received 6s. or 7s. a week extra, on a piece-work rate, for clipping horses. The highest paid worker was R. Atkins who headed the lists until January 1893, with a daily wage of 7s.1d. He was not replaced. A six-day week was general. The weekly wage bill varied considerably. For example, for the week ending 10 October 1884, the total was £61 14s.0d., of which £42 2s.8d. was divided between 14 companies for piece work, and 17 day-rate workers. In the week ending 12 October 1888 the number was 15. Between them they received £16 19s.0d. and £31 3s.1½d. was paid for piece work.

Among the records which are the subject of this note there is no deed earlier in date than that of 31 March 1890, by which Lord Hylton leased to Joseph Stilwell Peters of the Welches, Bentley, near Farnham, Hants, Esq., and Henry Peters of Wouldham Hall, Esq., a workshop, 18 kilns, buildings, railways, spoil banks, works and pieces or parcels of land known as the limeworks and containing 19 acres 1 rod and 36 perches included within the red verge on the plan annexed to the lease, together with the messuage or farm house, cottages and buildings thereon and all quarries and beds of chalk and stone open or under the limeworks, with all yards, bridges, walls, fences, water courses, etc., with authority to work and extend the existing quarries of chalk and stone in an additional area, with the proviso that chalk and stone within 50 yards of the hedge on the south-east side of the new public road, up Shepherds Hill, was to be left unworked. In this deed Joseph Peters was described as the tenant. His lease was for two years from 25 March 1890, and was then to continue from year to year until determined by either party

⁶³ *Kelly's Directory of Surrey*, 1882, 1, 128.

⁶⁴ *Ibid.*, 1, 227.

⁶⁵ *Ibid.*, 1, 051.

giving the other two years' notice in writing to terminate on any 25 March.

Among other conditions the tenant was to pay the lessor £300 yearly on quarter days, 3 per cent royalty on each cubic yard of small chalk sold or carried away before being converted into lime, 5¼d. on each ton of dry or other chalk (except small chalk) sold or carried away before being converted into lime, one shilling for each ton of soft stone so sold, and 6d. for each ton of rough burrs. There was also a special rent of £20 for any new kiln erected, unless to replace one that had been pulled down. The tenant was also to pay any land tax, all taxes, tithes and rent charges in lieu thereof. He was to be responsible for the repair of all buildings, kilns, railways, railway bridges, roads, walls, fences, drains, ditches and, without the consent of the landlord, was not to convert into tillage or otherwise break-up meadow or pasture. The landlord was to be provided with lime of suitable quality at the lowest current selling price for the repair of his buildings. In addition to the care of a weighing machine or machines the tenant was to keep in some convenient part of the premises regular books of accounts and to enter accounts by weight or measure of chalk or stone liable to royalty that was sold or carried away and the times and dates and also particulars of waggons, carts and horses used. Copies of the books of account were to be delivered to the landlord each quarter. The schedule to the deed shows, in addition to over 16 acres of lime-works and quarries, and a cottage, stable and other buildings, over an acre of orchard and house and garden, these being part of Quarry Dean.

In contrast to that of 1890 the lease of 13 December 1899 was for 21 years, Joseph Stilwell Peters of Quarry Dean being described as the lessee. He was still the lessee in 1904 when the lease was modified, part of the main plot (195) being exempted from the conditions of the lease under a 99-year agreement referred to in the endorsement on the lease now described. The area as shown on the annexed plan (Fig. 5) now covered 109 acres 1 rod and 12½ perches and included quarry farm with the lime-works, the farm house known as Quarry Dean, 18 kilns, spoil banks, workshops, the upper part of the cottage (No. 86) included in the earlier deed and all railways belonging to Lord Hylton, the lessor. As in the earlier lease there were provisions for extending the workings, to cover repairs, payment of taxes, the keeping and submitting of accounts, and good farming and husbandry. The lease was also subject to the rights of the National Telephone Company to fix, inspect and repair poles and wires, of the London, Brighton and South Coast Railway to enter certain fields to deposit spoil, and of the lessor, tenants and others so authorised by him, with or without carts or waggons, to drive cattle, sheep and other animals over the road from Joliffe Row past Quarry Dean to Noddyshall cottages.

The yearly rent was increased to £430. The lessor was to be paid 2d. on each ton of lime manufactured in excess of 25,000 tons, 3d.

a cubic yard on small chalk sold or carried away and 5½d., 1s. and 6d. respectively on dry chalk, soft stone and burrs, as in the earlier lease. The schedule shows that 61·911 acres of the land was arable, 15·740 was pasture and the rest, 31·677 acres, included woodland and buildings.

It is tempting to suggest that we owe the detailed records of the business transactions of the Merstham limeworks that have survived from 1872 to the provisions in these leases that accounts should be prepared, and to similar provisions which may have been included in an earlier agreement or agreements with members of the Peters' family or their predecessors as lime-burners, and which have not survived among the archives of the Merstham limeworks.



(a) MERSTHAM LIMeworks. BASE OF STEAM ENGINE BUILT INTO WALL NEAR LIME COTTAGE.



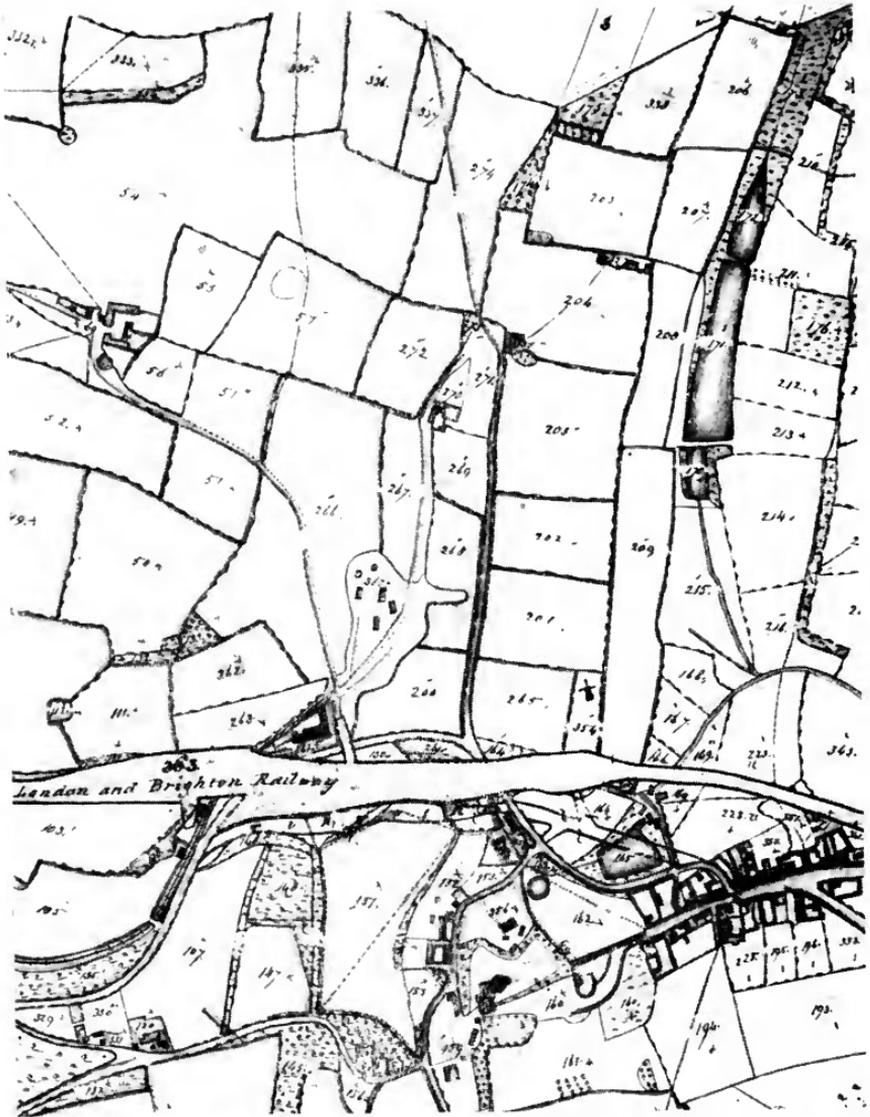
(b) MERSTHAM LIMeworks. LIME COTTAGE FROM WEST.

PLATE II



Courtesy of British Geological Survey

MERSTHAM LIMEWORCS IN OPERATION IN 1929. VIEW LOOKING WESTWARDS.



[By kind permission of the County Archivist.]

SECTION OF THE MERSTHAM TITHE MAP (1838).

(Note.—North is to the left of the diagram.)

KEY TO PLACES MENTIONED:—

- 57 Pit field showing small lime-pit.
 - 69 Alderstead Farm.
 - near 108 Weighbridge Cottage.
 - near 109 Croydon, Merstham and Godstone Railway.
 - 217 Ponds, perhaps connected with the Canal project.
 - 270 Quarry Dean, in occupation of George Hall in Tithe Award 1841.
 - 361 Jolliffe Row.
 - 362 Chalkpit Limeworks, in occupation of George Hall in Tithe Award 1841.
 - 363 Land required for London and Brighton Railway.
- The turnpike and turnpike diversion are also shown.
 Lime Cottage is the southernmost building in the Limeworks site. The two circles were identified by Mr. Sanders as wells.



(b) MERSHAM LIMEWORKS : DETAIL OF FLOOR IN
CIRCLE B, SHOWING WORN GROOVES.



(a) MERSHAM LIMEWORKS : VIEW ACROSS CIRCLE B
TOWARDS CIRCLE A, SHOWING CENTRAL FEATURE,
CIRCULAR FLOOR AND BRICK PLATFORM ON BANK.