No. 006

# The Royal Arsenal Co-operative Society's Chalk Mine and the Building of the Bostall Estate

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## Introduction

In 1899 the Royal Arsenal Co-operative Society embarked on a massive building project, a venture very different from its retail activities. A small town or settlement was to be built suitable for 'the industrial classes'. The Bostall Estate in south-east London was constructed by the R.A.C.S. works department, which moved in its entirety from the Society's headquarters in Woolwich to the site, which was to the south-west of Abbey Wood station and north of Bostall Heath. A feature of the building works was the centralisation of the various workshops where much of the work could be prefabricated. Items such as doors, window frames, etc., as well as bricks and other material, were transported on 50 tip-wagons running on a total of four miles of light tram lines from the workshops to all parts of the construction site.

This temporary location of the works department was wisely chosen for the natural resources available on site: sand, ballast, chalk and water also, as the setting was uphill from the construction areas, gravity could be utilised when transporting materials on the tramways.

The mine was dug to provide chalk for the building operations: most was burnt in a kiln to give lime, which was suitable for internal plasterwork. Un-burnt chalk was used as a foundation for the estate roads.

## The Building of the Bostall Estate

The story of the Bostall Estate began in 1886 when, at a quarterly general meeting, the committee of the Royal Arsenal Co-operative Society was given the go ahead to purchase Bostall Farm, a small holding to the east of the town of Plumstead. The following year the 52 acres of agricultural land was obtained by public auction for £6,200, an average of £129 per acre. The land was unfortunately in poor condition and a great deal of money was invested in bringing it into a good state of cultivation.

Three old cottages were pulled down and a single new one erected and the existing cowsheds were converted into piggeries. In 1889 new piggeries were constructed and the farmyard was paved and properly drained. Other improvements made at this time included a field irrigation scheme and the erection of two greenhouses for the production of cucumbers and tomatoes.

For many years the farm provided vegetables for the Co-op shops and food for the Society's horses and pigs.

By 1899 Plumstead was expanding and development progressed eastward towards Bostall Heath. Land values rose sharply and the R.A.C.S. decided to expand their land holding in the area and change from market gardening to property development.

On April 13th 1899 a provisional agreement was made to purchase the neighbouring Suffolk Place Farm (122 ½ acres) from the New England Company for

£30,000. In the 16th century Suffolk Place had been a hunting lodge for the Duke of Suffolk up until 1535. Charles Brandon, Duke of Suffolk, then sold it to Sir Martin Bowes of Woolwich. By 1720 it had passed into the possession of the New England Company, which, being an old philanthropic society dating from the reign of James 1st, had its transactions overseen by the Charities Commission. This created some inconvenience for the R.A.C.S. as the Commission insisting on advertising the sale of Suffolk Place. This had the effect of bringing a competitor, a Mr Turner, against the Society.

A private auction was held on November 1st 1899 in the offices of the Charities Commission, with Mr Mcleod bidding for the Society and Mr Taylor, a solicitor, bidding for Mr Turner. The R.A.C.S. finally outbid their rival by £100 and secured Suffolk Place for £40,000. This gave a purchase price of £318 per acre, almost three times that of Bostall Farm when acquired some eleven years before.

The Society planned to use the land to build an estate of about 3,500 houses, "suitable for the industrial classes", (1) with prices ranging from £255 to £405 for a 99 year lease. Tenancy agreements with options of purchase would also be available as well as a few on a weekly tenancy.

A pamphlet put out by the Society to promote the new estate describes the location and method of building,

> '…The Society's Bostall Estate is pleasantly situated, adjoining the well known Bostall Heath and Woods, which cover an area of $232^{3}/_{4}$ acres and form one of the most attractive of the open spaces of London.
> It is close to the Abbey Wood Railway Station, and the main road (along which it is expected the tram service will shortly be continued) runs through the estate. It covers an area of about 120 acres, which it is intended shall be laid out in houses suitable to the requirements of the locality. These houses will be of various frontages from 15ft to between 17 and 18ft, the smaller houses being intended for occupation by one family, whilst in the larger full provision is made for their occupation by two families. The work, including the surveying and plotting of the estate, the designing of the houses, the road making and the sewer construction (2) in connection with the erection of the houses, has been done through the Society's Works Department, and the houses are in consequence, constructed in a thoroughly substantial manor by labour directly employed by the Society. Trade Union hours have been observed, and the wages paid are in no case less than a halfpenny per hour above the recognised trade union rate prevailing in the district.
>
> For the purpose of the development of the estate, extensive workshops have been erected, fitted with the latest machinery and most modern labour saving appliances, no pains having been spared to ensure that the houses, when finished, shall be thoroughly well constructed, at as cheap a rate as it is consistent with good work.
>
> A shaft has been sunk from which chalk is being obtained for use as a foundation of the roads. From the shaft also a plentiful supply of water is obtained, which is used for the mixing of mortar and other manufacturing

purposes. The window and door-sills, steps, coping, paving flags etc., are composed of granolithic artificial stone, manufactured on the estate, the durability of which can be guaranteed, and which also possesses other advantages over the natural stone commonly used in similar positions…'

The workshops were erected at the south-eastern portion of the estate in February of 1900, although the shaft for the chalk mine had been sunk the previous month. A description of a visit to the works area appeared in the R.A.C.S magazine in May 1901,(3)

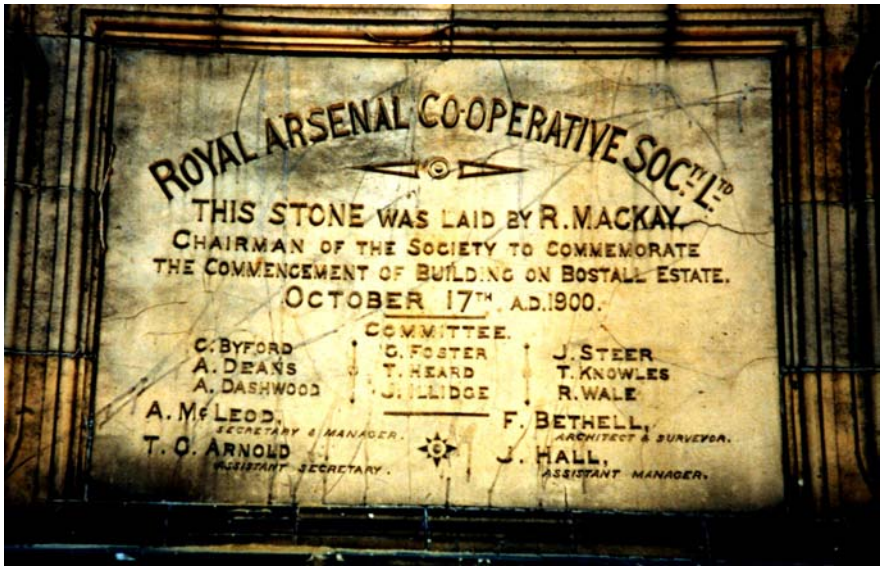
'…Visited in working hours, the first place to be seen is the great carpenter's shed, lofty, lit by electric light, about a hundred feet square. In one corner the van making is still being carried on, but this will have a building to itself, the great shed being all required for the woodwork of the houses. On the opposite, the south of the shed, is the engine, one of 16 horsepower, built by Marshal and Son of Gainsborough. By means of 90ft of shafting this little engine works a whole series of planing, sawing and other wood-cutting machines, a drilling machine and a lathe, the hoist of the chalk pit and the water pump attached to the same. It also works the dynamo, which supplies the electric light. The different woodcutting machines are arranged in a long row, and each is connected with a suction air pump, so that the sawdust and shavings are sucked through a series of wooden channels into a central receptacle.

Immediately adjacent to the carpenter's shed, again on the south side of it, is the Smith's shop, at which all the iron work for the vans (4) is done; while just outside is the chalk pit, beside the chalk pit the mortar mill, and just beyond the lime kiln. From this centre starts our system of tramways, which traverse the field of building operations.

The chalk pit descends 60ft perpendicularly, from that level four galleries extend horizontally about 100ft each, and from these the chalk is being continually raised. The water that percolates into the pit is pumped up and distributed where needed. Some of the chalk is straightway carted off on the tramlines for making the roads, but most of it is first burned in the lime kiln, then slaked, then mixed with the fine sand, which by the way, overlies the chalk, to make the plaster for internal walls. The grey lime necessary for making mortar has to be purchased.

A little to the west of the carpenter's shed is the shed in which artificial stone is made. This is composed of Portland Cement and fine granite chippings, mixed, run into wooden moulds, which are made on the spot, deposited in a tank to set, and finally used for sills, copings, pier caps, etc.. In the same shed the plaster decorations are made, the cream-like plaster being poured into gelatine moulds. Everywhere about these sheds telephones are fitted up and connected with the drawing office and the central office, whence Mr Bethell directs the labours of his 450 assistants. ……'

The first brick of the estate was laid on May 28th 1900, and a tablet to commemorate the event was erected in the following October at the corner of Mcleod Road and Bostall Lane. When the R.A.C.S. Abbey Wood Branch Store was built on the spot some time later, the tablet was moved and fixed to the wall facing Bostall Lane.




Although natural resources were utilised on site, i.e. sand, gravel, chalk etc., no suitable brickearth was present in the immediate area so that bricks had to be purchased from local brickfields. The most probable source was the brick fields along Wickham Lane some 1.5 Km to the south-west of the new estate. At the end of the 19th century three brickworks were in full operation in that area, producing the distinctive yellow London stock bricks. (5)

By the latter half of 1903, 350 houses had been leased and 70 let on a weekly tenancy. The London County Council bought a parcel of land along Bostall Lane from the Society, and in 1903, built a school for 1000 children. [IMAGE PRICES]

Building continued on the estate until about March 1908 when the Society's committee did not wish to proceed with the development faster than the state of the district demanded. By October 1909 all building work had stopped on the estate. The chalk mine had ceased operation three years before, although it features in the Inspector of Mines Reports until1912. (From 1907 to 1912 both workforce and output were given as nil)

As demand built up, building work re-started in 1912 and continued until 1914. The chalk mine, however, did not re-start during this period. It is probable that the site had a stockpile of previously excavated chalk, which was sufficient for the new demand. When completed a total of 1,052 houses had been erected on the estate. With the estate finished all the workshops were dismantled, the shaft to the chalk mine was capped with a steel grill and the Works Department moved back to their headquarters in Powis Street, Woolwich. The works canteen was, however, not demolished but left to the new local community and named the Co-operative Hall. It was later re-named Federation Hall and used for many years by the local authority social services department as a day centre. The London Borough of Greenwich, who

had leased the Hall and adjacent land, finally purchased the land from the R.A.C.S. in 1975.

The building of the Estate was a bold venture for a relatively young Co-operative society in the 1900's, and was a 'model' estate when completed. The houses and roads of the estate have now been absorbed in the urban expansion between Plumstead and Abbey Wood and little remains to remind modern visitors of its origins. Only the road names give a clue to Co-operative movement's involvement – Federation Road, Congress Road, Conference Road, etc.

## The Chalk Mine

The 8ft (2.4m) diameter shaft was sunk in January 1900 in a corner of the works area near to the mortar mill and limekiln. (NGR TQ 4717 7852)
Four main headings were driven from the base of the 53ft (16.17m) deep shaft to commence mining operations. At that time the floor of the mine was on or just below the water table as the mine was also used to supply water for the manufacturing processes on the surface.

The mine was drained by pumps driven by the 16hp surface engine, which also powered the winding hoist and provided electric power for lighting the underground tunnels. This was a most unusual feature as most mines of this period were worked by the illumination of candles or oil lamps.

In the first full year of operation four men worked underground cutting out the chalk with picks and wheeling the excavated material to the shaft bottom in barrows. Two men were employed on the surface to unload the chalk from the tub and barrow it either to the limekiln or to a nearby dump for collection by the road building gangs.

By 1902 the workforce had increased to six men underground and four on the surface. From 1903 until 1906 the figures were five below and two above ground. After 1906 the mine had ceased operation. (6)

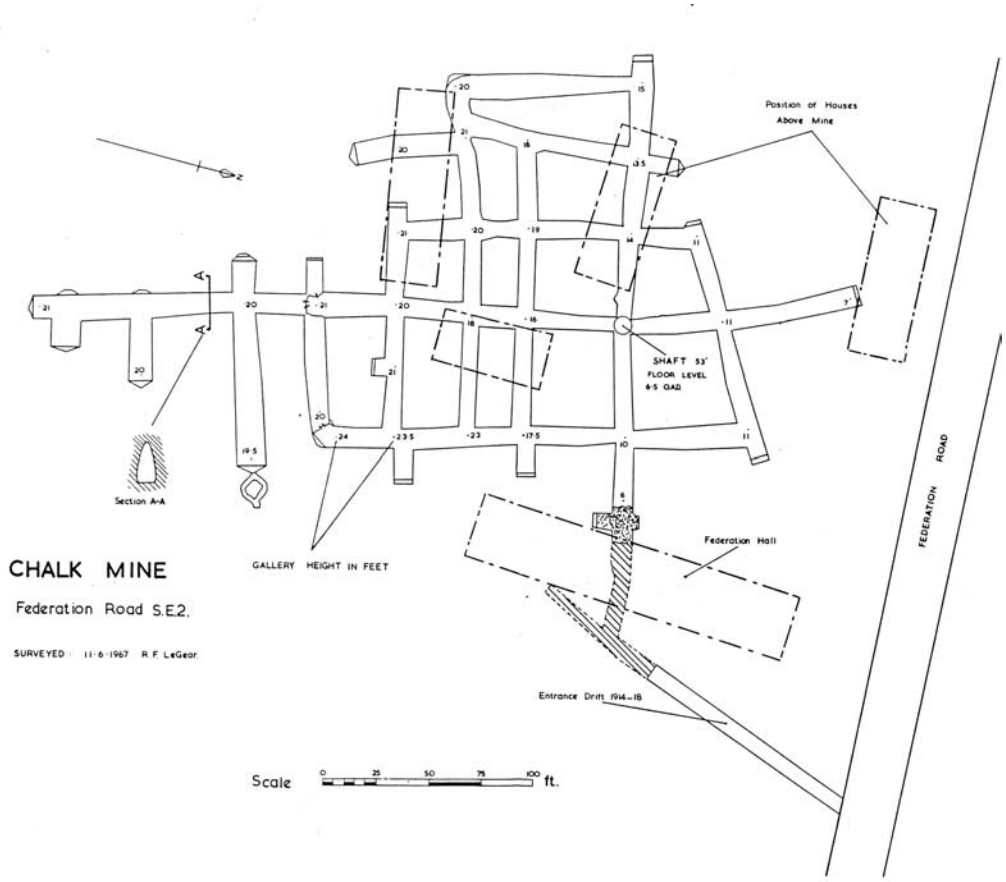
For the first two years of its life the mine was recorded in the Inspector of Mines Reports as 'Suffolk Place Mine'. From 1902 it was shown as the Bostall Estate Mine. Originally the mine had been named after the land on which it was situated – Suffolk Place Farm, one of the two parcels of land that made up the development. The committee of the R.A.C.S., however, finally chose to name the estate after the first farm they hade purchased in 1887 – Bostall Farm. This dual naming of the mine has, in the past, lead to erroneous fears that another deep mine existed under the estate.

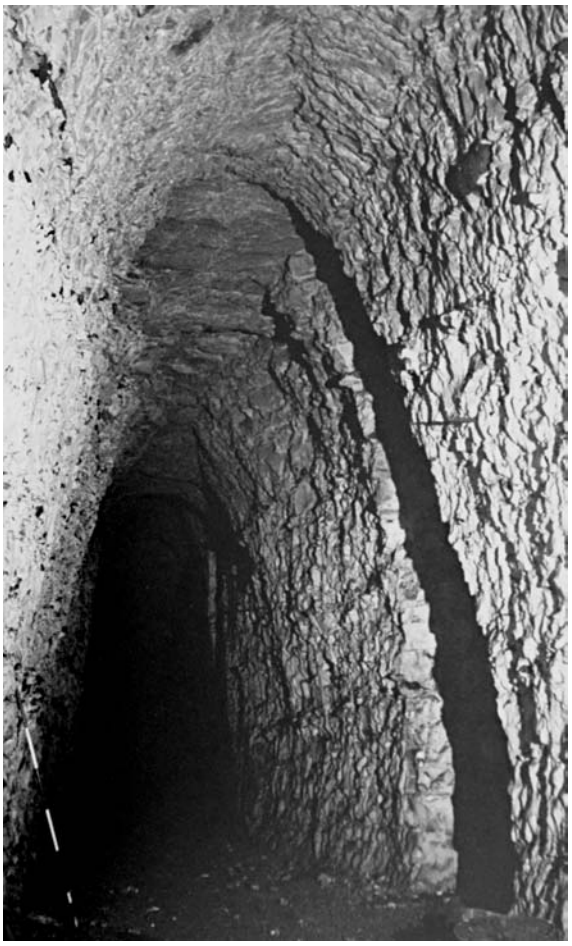
In 1914 the underground galleries of the mine were converted into an air-raid shelter by the addition of a sloping entrance by the side of the Co-operative hall. The shaft provided excellent ventilation but, as the floor of the mine was wet, boards had to be laid on the floor. Electric lighting was provided and the local residents considered the chalk caves a very safe refuge. With the coming of the Second World War the mine was once again considered as a shelter and Howard Humphreys and Sons of Westminster made a detailed plan of the workings for the local authority. Despite strong protests from the local residents who all wished to use the deep caves as in WW1, it was decided by the controlling authorities that the mine was no longer suitable as a deep shelter due to the lack of a second exit.

The underground galleries remained accessible up until the 1960's when it was still possible to crawl into the now rubbish filled 1914 entrance adit. Harry Pearman of the Chelsea Speleological society entered by this method in 1960 and produced a quick survey plan (7). Shortly after this time the sloping entrance was completely filled by the local authority following fears that children, who were known to explore and play in the caves, could become lost or injured.

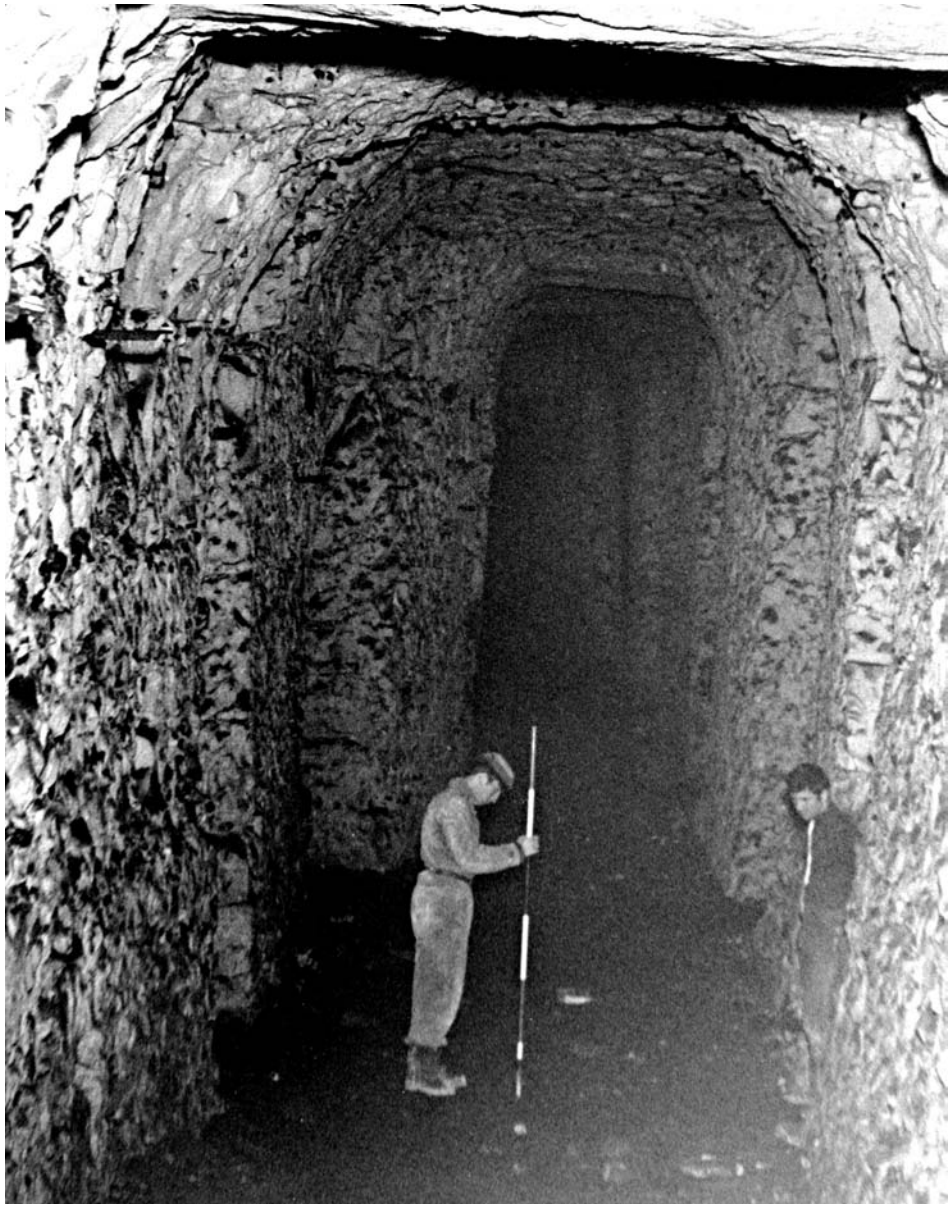
## 1967 Investigation

The next visit to the site was in 1967 when, with the kind permission of the R.A.C.S. and the Local Authority, a small group of mining archaeologists lead by the writer made an examination and re-survey of the underground galleries. The strong steel grill sealing the top of the shaft was removed by workmen from the London Borough of Greenwich, (the principle Lessee of the site) in order to gain access.



The mine was found to be in excellent condition with no roof falls or signs of stress in the walls. The galleries averaged 10ft (3m) wide and 18ft (5.5m) high with an arched roof profile, which gave a mechanically strong cross section. The junctions of galleries were cut with great care to ensure that weight of the land above was spread correctly. The highest tunnels were to the south of the shaft where the main development of the mine took place, with the roof being 20ft (6m) high in this section.

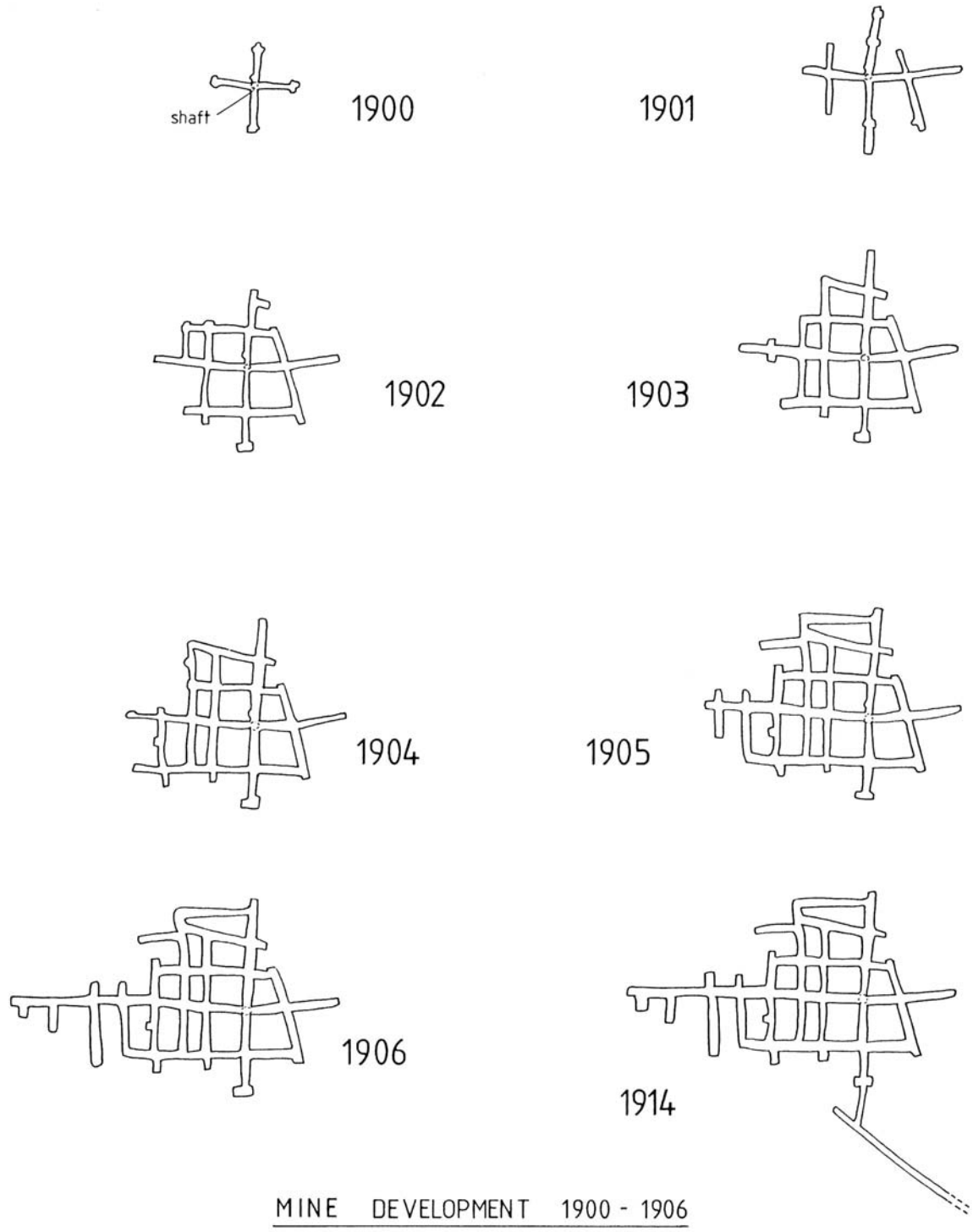


Only three galleries were dug to the north of the shaft and were much lower, in the order of 11ft (3.3m) high. In that part of the mine the depth of the roof below the surface is only about 17ft (5.18m). The excavators wisely did not extend the mine further in this direction as the surface slopes down to the north and the roof cover would have been decreased to a point when the risk of subsidence would have become acute.

The mine proceeded forward in a series of steps or benches, the miners cutting away their working platform as the adit was extended. Such working benches can be seen in any chalk mine and their presence has lead to tales of Druid's altars in some tourist caves.

The final layout of the mine developed from the four original galleries radiating from the shaft. From these main driveways other adits were cut at right-angles to be joined by cross passages which created large pillars of chalk to support the ground above, a style of mining known as 'Pillar and Stall'. From a careful study of the

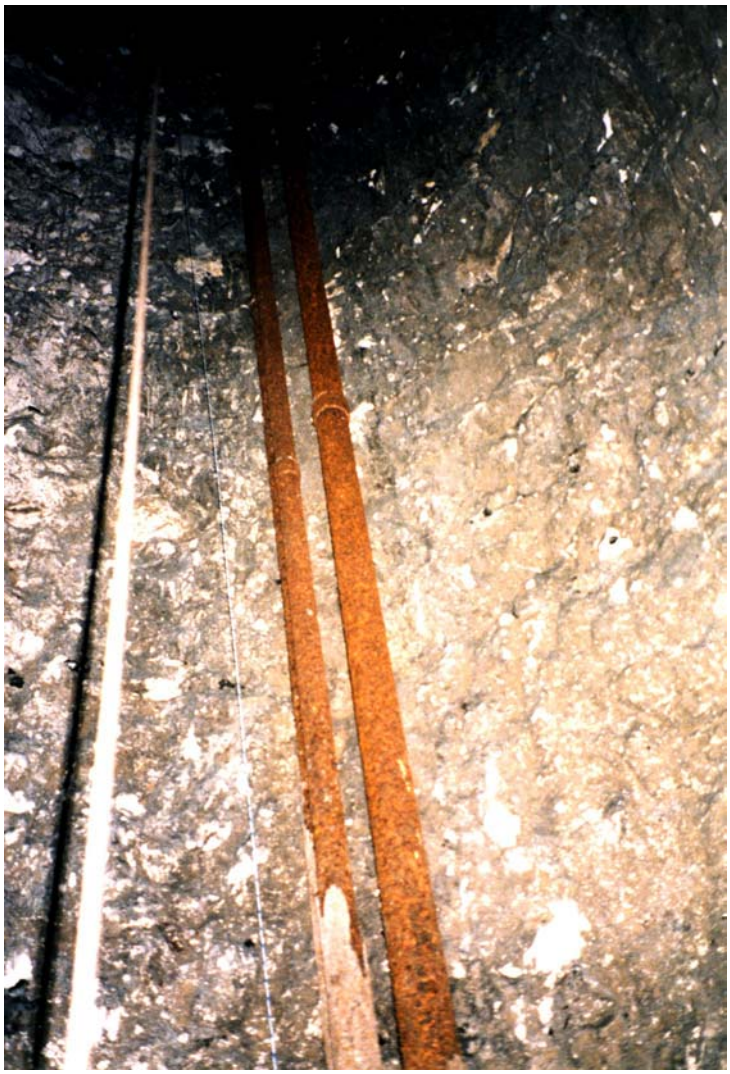
underground galleries and the tool marks left by the miners, it is possible to re-construct the probable development sequence of the mine.




MINE DEVELOPMENT 1900 - 1906

The last section of the mine to be worked was an extension to the south when a further 180ft (54.8m) of passages were excavated in 1906, the last year of operation.

The final addition to the mine was made in 1914 when the sloping drift entrance was dug at the side of Federation Hall to enable the underground tunnels to be used as an air-raid shelter. The sloping tunnel from the surface was intercepted by another dug from the main east driveway of the mine to create the shelter entrance. Although the water table had dropped since the mine was abandoned, it was found necessary to put boards and gravel on the floor, as parts of the mine were wet. In 1967 no water was present, although a long period of dry weather had preceded the date of the investigation. The metal pipes used to pump water to the surface when the mine was in operation were found to be still in situ in the south east quadrant of the circular shaft.



By 1939 parts of the entrance drift had fallen in and it was declared unsafe. This instability, plus the lack of a second exit, stopped the mine being used as a shelter in the Second World War, despite vigorous protests from the local residents.

Upon completion of the two-day investigation of the mine in 1967, the shaft was re-sealed and made safe. The original steel grill was replaced by a strong reinforced concrete slab to stop any unauthorised access.

## 2004 Survey

**In February 2004 the mine was re-entered by members of the Kent Underground Research group on behalf of Stonechart Developments Ltd, a building development company, who had purchased the parcel of land containing Federation Hall and the shaft top from the local council. At the time of this visit most of the mine was found to be flooded to a depth of 0.5 to over 1.0m in depth. Apart from the water, no significant changes in the condition of the mine since 1967 could be detected. After the visit the shaft was once again sealed and made safe and at the time of writing (April 2004), plans for the redevelopment of the surface land were well advanced.**

(1) 'Comradeship' No 14 May 1900
(2) As well as the house sewers, a 24-inch (60cm) main sewer was laid along the length of Mcleod Road.
(3) 'Comradeship' No 26 May 1901
(4) As the whole of the Society's Works Department had moved to the construction site, normal work was carried out at the new location, such as the construction of delivery vans etc.

(5) The three brickfields were: Wickham Lane (also known as Gregory's), South Metropolitan and Cemetery. Each had its own deep chalk mine.
(6) H. M. Inspector of Mines Reports 1900 to 1906

(7) Chelsea Speleological Society Records vol. 6 p53