APPENDIX

ROYAL WORCESTER PORCELAIN WORKS, HISTORICAL AND INDUSTRIAL RESEARCH OF THE GROUP COMPOSED OF BUILDINGS A, B, C, C1, F, H and I

John van Laun Associates

Text by John van Laun and Wendy Cook

Edited by Julie Phillips and Jerry Newby-Vincent

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Buildings A to I

This group is made of a number of linked buildings which form an 'L'. Starting from the old Showroom (now the cafeteria and, although not part of this survey, is summarily dealt with) it runs east through Building A (which has the accretions A1 and A2) to B and further east into Building C1 which it follows round to turn south to join Building F. Building F adjoins Buildings H and I.

Figure 1: View from the north showing from left to right: buildings C1, B, A2, A1 with A behind

Figure 2: The Old Slip House Range (Building A) and extensions (A1 and A2) from the north-east. Building B lies to the left behind A2.

Figure 3: Buildings A1 through to C1 viewed from the north-west

Figure 4: View from the north-west with, from left to right, Building C, A2 (to front) B, A and A1

Outline development of the buildings in groups A, B, C, C1, F, H and I

The chronological development of the standing buildings in this group starts with Building A which was built before 1863. A Sagger House was built on the site of Building H which had replaced it by 1884. By 1898 Building B was built and, soon after, Building A was modified. There then followed a lull until Building F was built around 1935 adjacent to the Worcester & Birmingham Canal with Building I, which adjoins it at the south, added around 1941 for Steatite production. Although there were bins in the area of Building C1 in 1940, the first-storey over them was not built until 1942. The accretions to Building A lie on the site of pre-1863 buildings but the present lean-to (A2) dates to around 1934 and its more prominent neighbour, which juts into the car park (A1), to the wartime production of Steatite. The unsightly overall shed which perches on Building A was built at much the same time. Finally the portico which gave access under C1 and lies roughly on the fossilized lane running north to south through the site was added in 1990. The detached building (C) was built around 1928 was an electricity sub-station.

Outline development of the buildings in groups A, A1 and A2

A: The Old Slip House Range

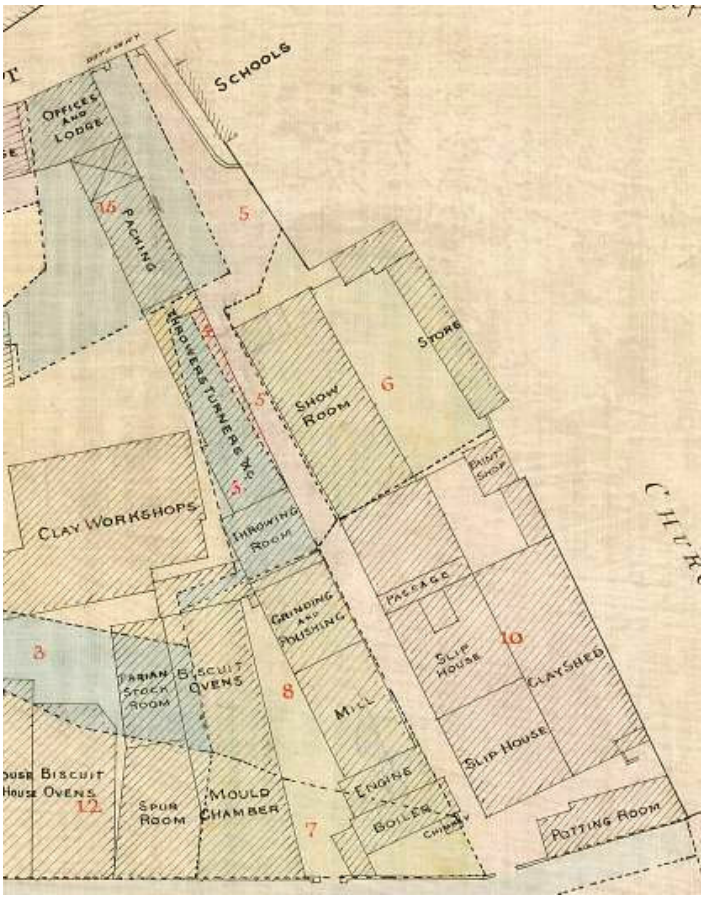

Figure 5: The area of Buildings A, B and C in 1875

Land acquired December 1842 numbered '6' and land acquired in March 1853 numbered '10' (source: Worcester Porcelain Museum 'Copied from the PLAN on the MORTGAGE dates 2 June 1875 and numbered and coloured to show the Title under which the various parts thereof are held')

It was not built at the same time as the adjacent Showroom (now cafeteria) to the west – there being clear construction breaks between the two and undoubtedly the Showroom came first but at different times they worked together as Showroom and museum). The structural evidence suggests that the original roof was removed, the side walls raised, and a new flat roof with raised central lantern roof added at a later date, probably towards the end of the 19th century (see Figure 6).

Subsequently there have been other changes, including modernisation to the interior removing most historic fixtures and fittings, and the fairly recent addition of the steel-framed sheeted tower structure towards the western end. Additions have also been added on the north side of the building, adversely affecting its appearance.

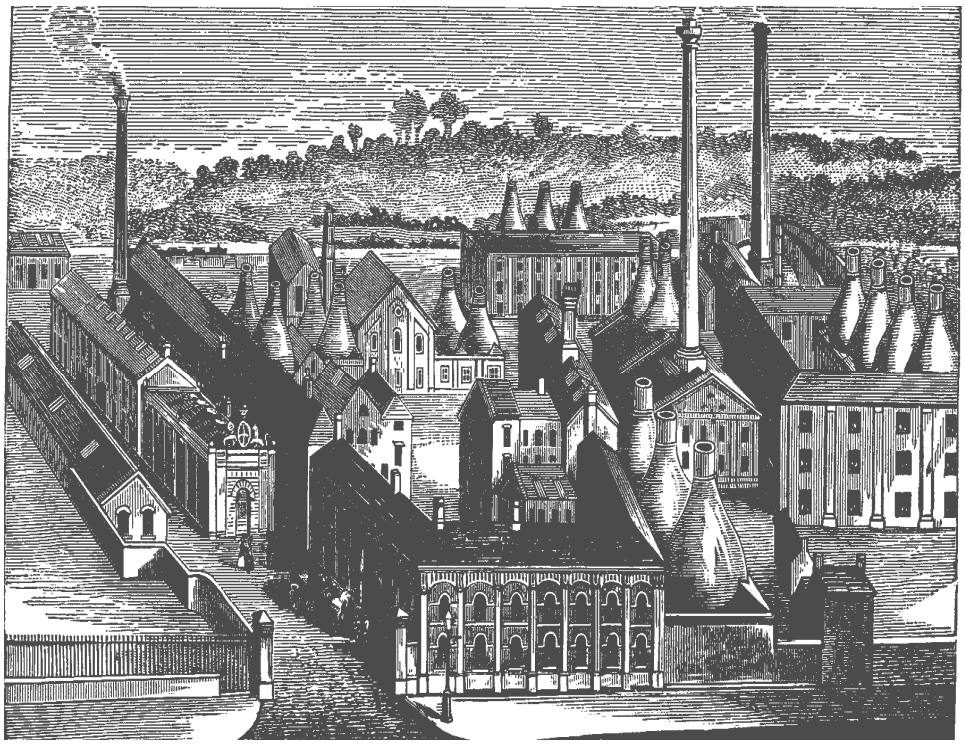

Figure 6: The Showroom and Slip House in 1875 (left) (source: 'A Guide through the Royal Worcester Porcelain Works Worcester' [Worcester 1875], 10 – 12)

Historical development of the 'A' Buildings with reference to the Showroom (cafeteria)

The 'A' buildings are the successors to a number of structures which were associated mainly with the production of slip. The land on which this northern group was to lie was conveyed in two parts to Messrs Chamberlain & Co: that of the Showroom in December 1842 (Figure 5, numbered in red '6') and that of the slip room and northern accretions in March 1853 (Figure 5, numbered in red '10'). Before then slip was produced in the area on the other side of Severn Street opposite the museum where a horse engine lay for grinding the raw materials into a fine powder in a water base to reduce harmful dust. It was then reduced to a fine paste in kilns (see Figure 12).[1] When the Bone Mill came into operation,[2] slip was moved to Building A with kilns lying in A2 (Figure 13, number 42). The new building was the work of Robert Williams Armstrong who was also responsible for the adjoining Showroom which had been built some years before.

The ground floor of the building was probably first used as a Slip House in the early 1850s (Figure 5). Here the ingredients (calcined bone, calcined flint, china clay, china stone and feldspar) which had been ground down to a fine powder were mixed together with water in large tanks or arks. Large paddles with rows of magnets (to remove any iron particles – electromagnets were later used (Figure 8) stirred the liquid mixture or slip. In early days the tanks were probably lined with glazed bricks and were tiled later. The tanks and sumps extended out into the yard next to the Bone Mill and are accessible through trap doors and possibly via the mill basement.

Next the clay would pass through a series of mechanical sieves to remove any gritty particles. Although kilns were at first applied to evaporate excess water, at the end of September 1862[3] it was decided to remove the two slip kilns and substitute Needham & Riles patent pressure slip machines at a cost of £400. These arrived in March 1863,[4] but the kilns were still in place in July (Figure 13; number 42). The 'patent' machines were made up of a number (Figure 9) of linen-lined chambers into which liquid clay was pumped and the water squeezed out under pressure which was poured onto the tiled floor and down large drains. The employees had to paddle around in water that was sometimes several inches deep.

Although the 1863 plan shows the ground floor of Building A as occupied by 'Offices and Workshop' (Figure 13) it is likely that the part west of the passageway (next to the Showroom) were the offices and on the other side of this divide was the Slip House where mixing and pressing took place, with some potting going on.

The final stage of the process was to allow the clay to mature in a clay cellar where it was repeatedly kneaded or 'wedged' to remove as much air as possible. From the 20th century the air was removed from the clay using a 'pug' machine which extruded the clay at the end of the process as a long cylindrical pug that was cut with cheese wire into sections approximately 24 inches long. These pugs would be taken away by trolley to the various production departments.

The Directors' report for December 1872 summarised the need for more space in the Slip House.[5] 'The slip house or clay mixing room is far too small, and has an insufficient number of tanks, five different clays (parian, bone china, earthenware,

1 By 1863 it was known as the 'Old Engine House' and was probably disposed of in 1867
2 The land for this was conveyed in June 1851
3 Company Minute Book Minute 30th September 1862 (Worcester Porcelain Museum) hereafter shortened to Minute (Worcester Porcelain Museum)
4 Minutes 132 and 169. (Worcester Porcelain Museum)
5 Minute 1683 (Worcester Porcelain Museum)

vitreous and terracotta) having to be mixed in two tanks, we also want another clay machine here, more room can be obtained by providing for two potters elsewhere'.

The result of this was that the potters had been moved into the building close to the canal by 1875 (Figure 5) which had previously been stores (Figure 13; number 45) and in October 1874 George B Ford drew up a plan for a newly equipped House with storage arks and tanks located in the 1863 'Workshops' east of the passageway (Figure 14). The arks lay underground in the passageway between Building A and the Bone Mill (D) and exist today against the wall of Building D. There were separate arks for flint, stone and bone. There were distinct China and earthenware slip areas each side of a dividing wall. The hexagonal mixing pot (see Figures 10 and 14) fed into the sieves (Figure 11) which appear to have been driven by a lay shaft (possibly from the Bone Mill). From then until the 1930s the area to the north was occupied by a large 'Clay Shed' (Figure 5). It was here that 'wedging' took place.

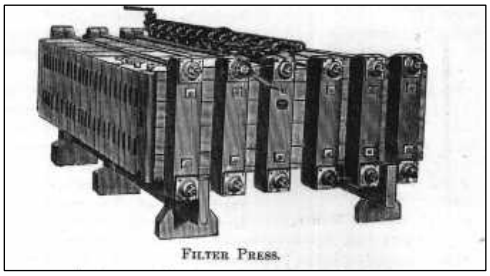

Figure 7: The Slip House *c*1895, with a filter press of William Boulton (source: Worcester Porcelain Museum)

Figure 8: By the 20th century removal of any metallic particles from the liquid clay was done electromagnetically (source: Worcester Porcelain Museum)

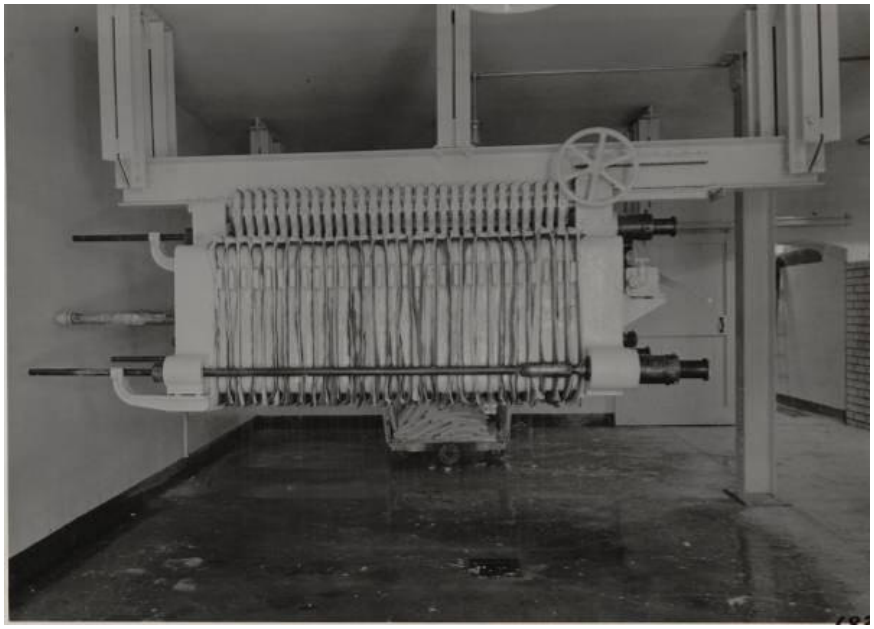

Figure 9: Clay press used in the Slip House in the 1880s (source: Worcester Porcelain Museum)

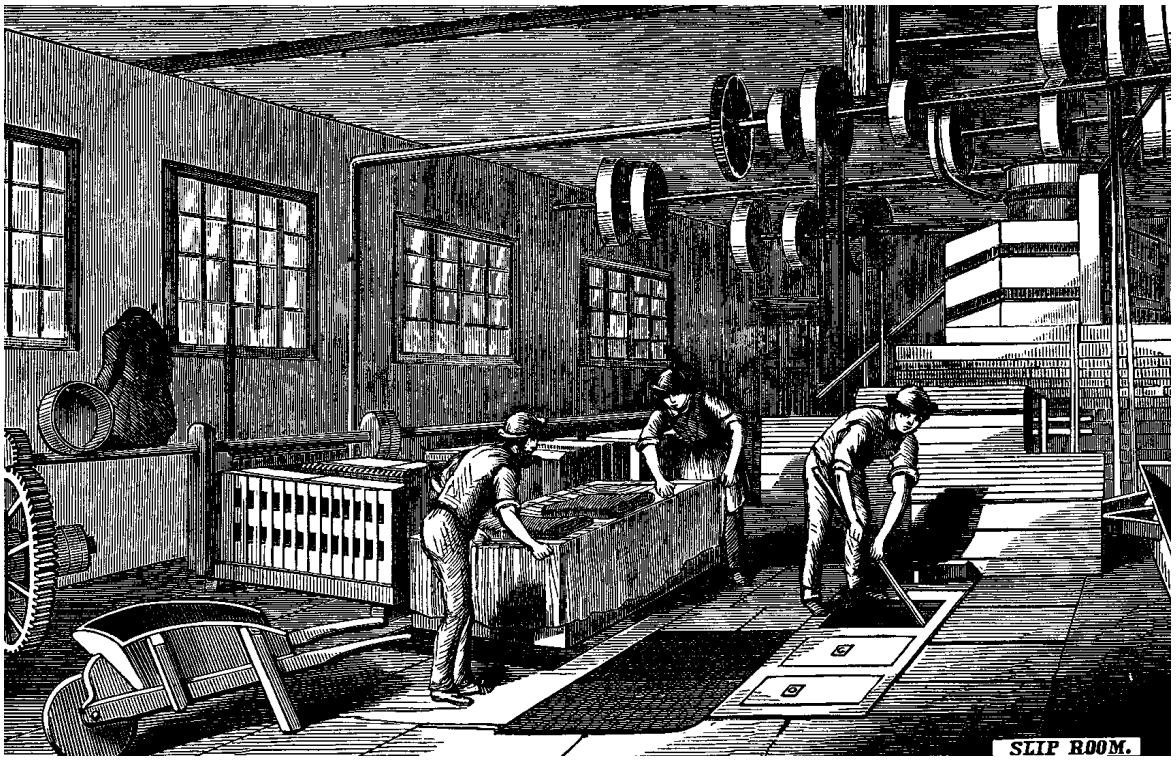

Figure 10: The Slip House at Worcester (source: Worcester Porcelain Museum). The presses are on the left and a mixing pot on the right (source: 'A Guide through the Royal Worcester Porcelain Works, Worcester' [Worcester 1875], 10 – 12).

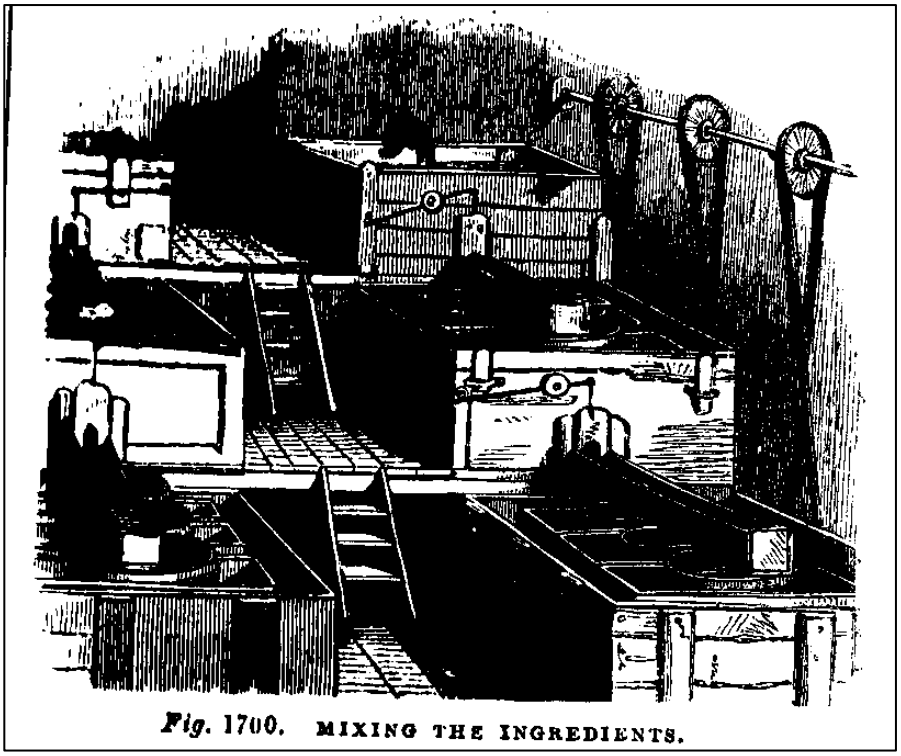

Figure 11: A series of sieves (source: Tomlinson's Cyclopaedia 1851)

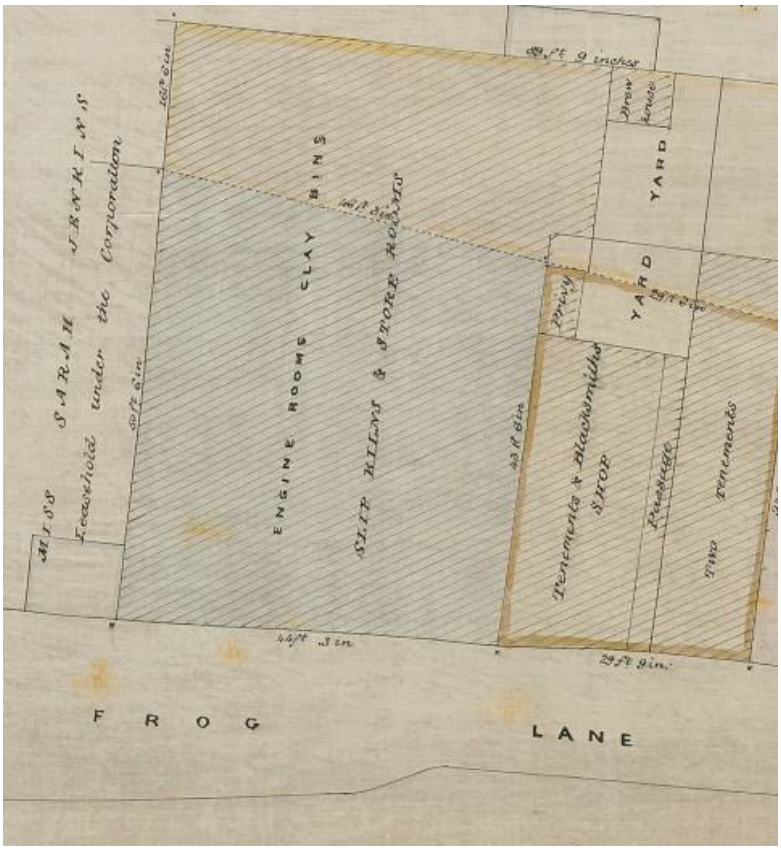

Figure 12: 'COPY of the PLAN on the CONVEYANCE dated 21st Decr 1842 by the Trustees of Mr Humphrey Chamberlain to Messrs Chamberlain & Co' showing the 'Engine Rooms', 'Clay Bins' and 'Slip Kilns and Store House' on Severn Street 'Frog Lane' (source: Worcester Porcelain Museum)

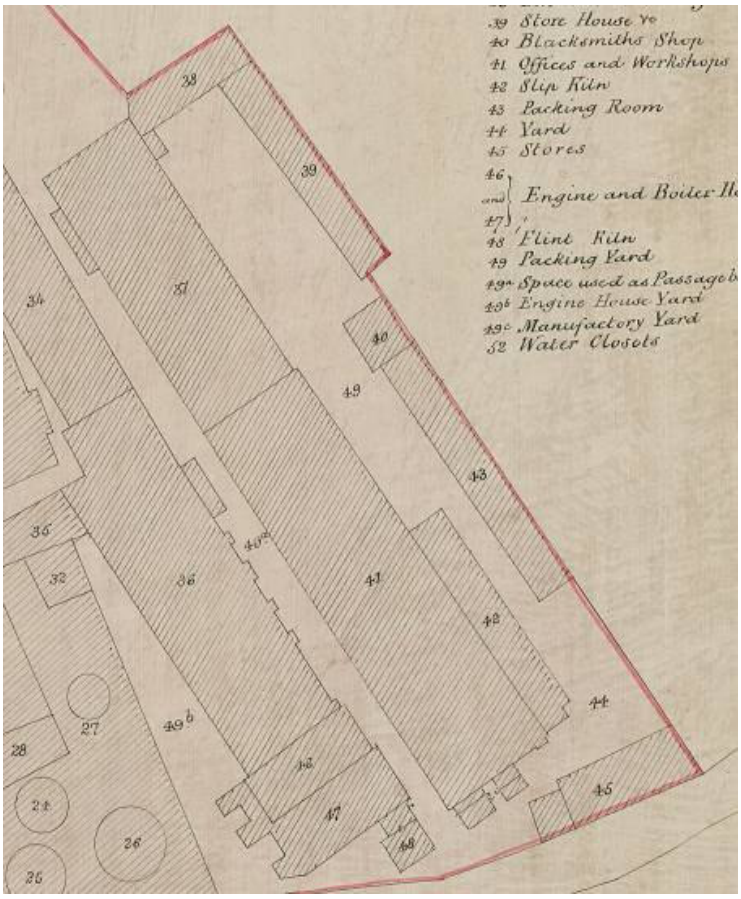

Figure 13: Extract from 1863 plan

Extract from a 'COPY of the PLAN on the LEASE dated 28th day of July 1863 by Mr John Stone to the Worcester Royal Porcelain Company Limited' (source: Worcester Porcelain Museum)

37: Show Room

38: Printers and Glaziers Shop

39: Store House

40: Blacksmiths Shop

41: Offices and Workshop

42: Slip Kilns

43: Packing Room

44: Yard

45: Stores

49: Packing Yard

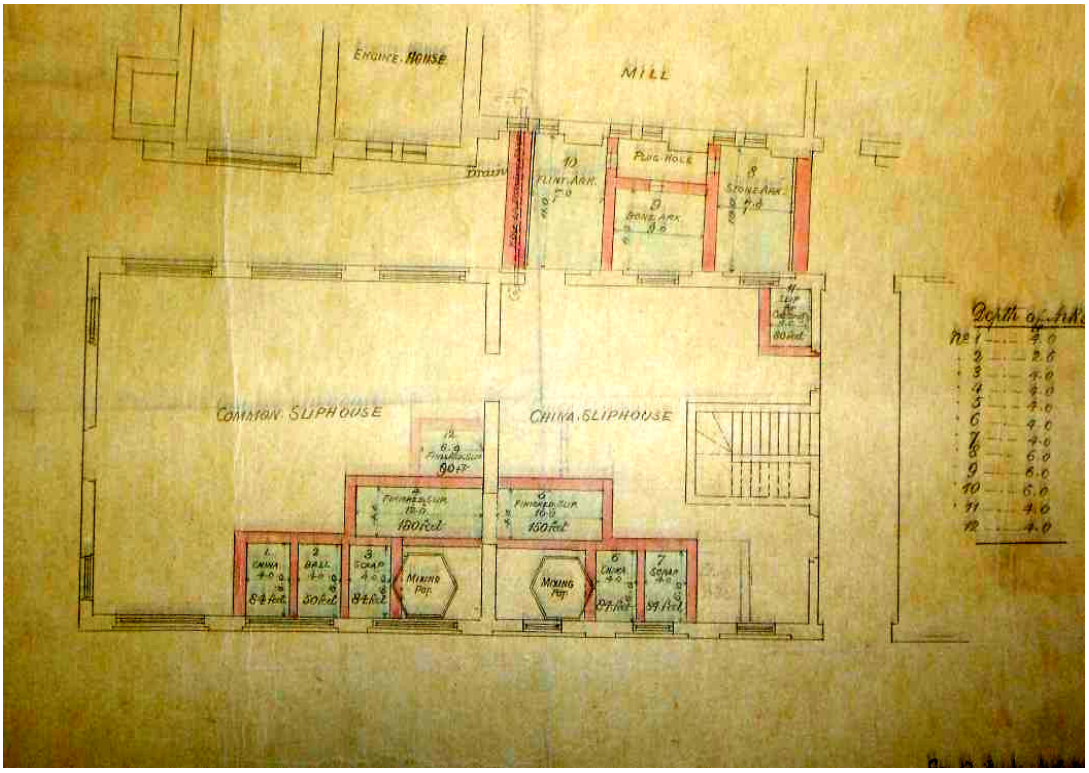

Figure 14: Building A. The Slip House by Geo B Ford October 1874 (source: Worcester Porcelain Museum RW 254).

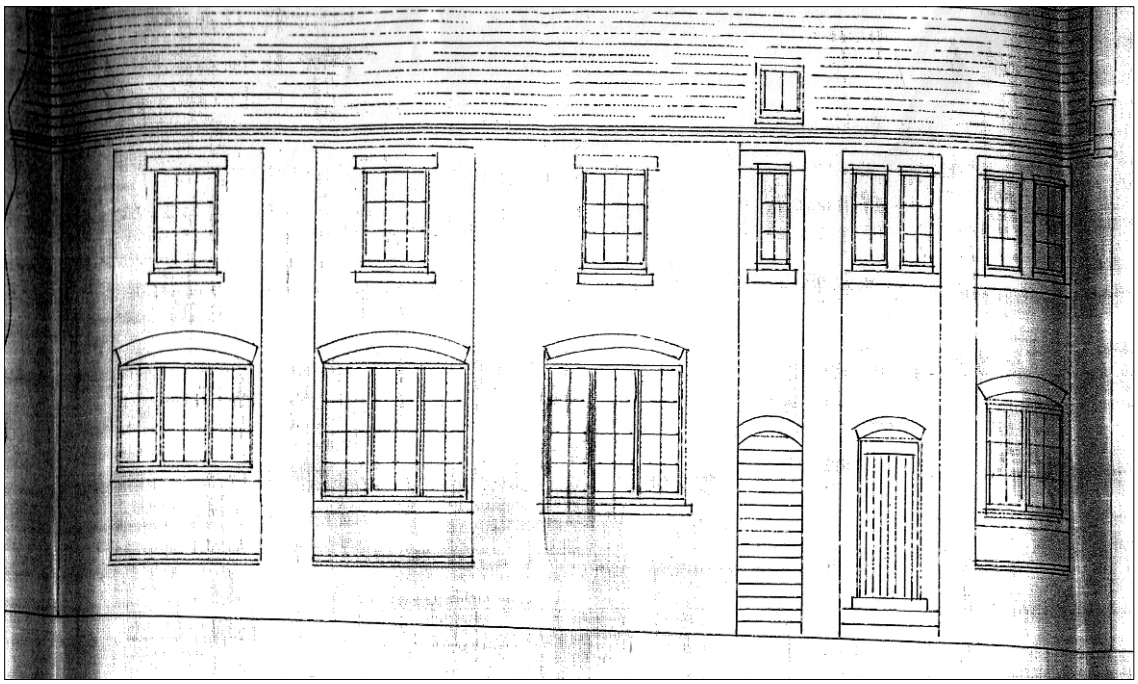

Figure 15: Building A with B to the right (south elevation). The Slip House lies to the left of the stairs (source: Worcester City Planning Application 1437 23.1.1890).

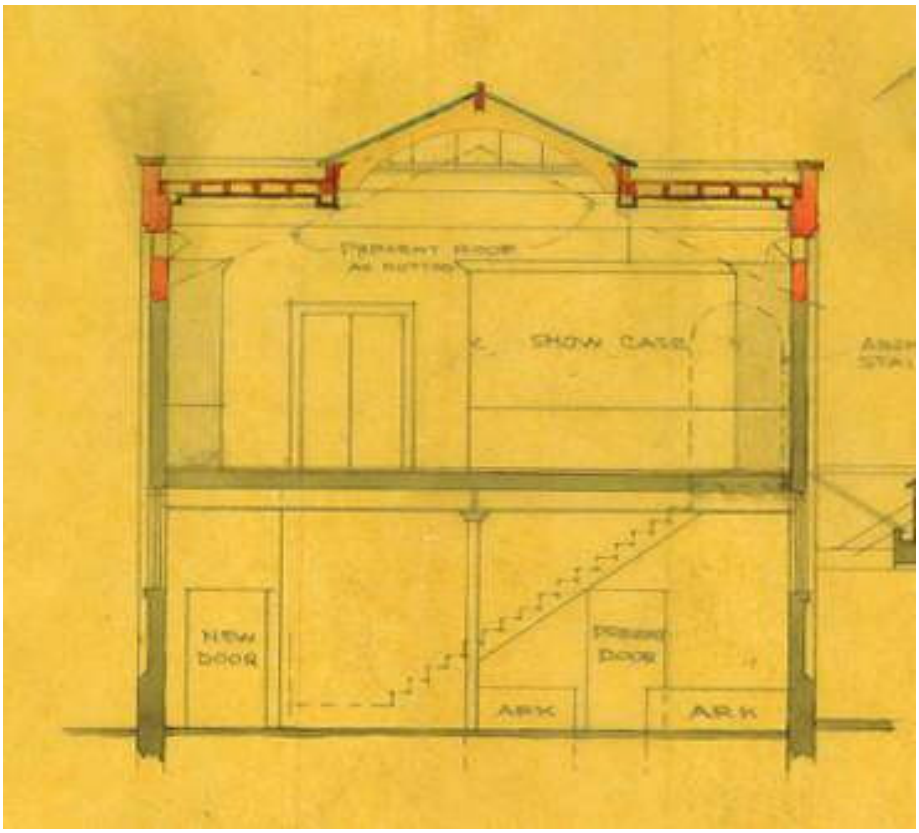

Figure 16: Internal section of Building A

This shows the original roof line. This sprang (the dotted lines) from the original walls (coloured blue). The extension into the parapet to support a lantern roof is coloured red (source: Plans and elevations by Thomas Sutton *c*1900, Worcester Porcelain Museum).

These processes of slip production at Worcester were described in 1875 and can be assumed to be the result of Ford's changes.[6]

"Underneath the floor of this building are large arks, which act as reservoirs for the materials from the mill and clay house [here in 1875 part of the building to the north]. Here are the mixing pots, into which the ground bone or stone, etc, are thrown by pumps. In the mixing pot is a shaft from which radiate arms having arranged on them rows of magnets which work through the materials so as to remove any particle of iron that may by accident or abrasion have got into it. From the mixing vat the material passes through a series of sieves working by machinery. It is then pumped into the clay press. This is a machine where the slip is received into a number of chambers lined with linen bags, and where by hydraulic pressure the water is expressed until the mass assumes the consistency of paste. The clay from the press, being in a state of paste or dough, is taken to a vault or clay cellar where is irregularly beaten and turned over and again beaten and kneaded to make it tough.

When the proper consistency and homogeneity have thus been imparted to the dough it is ready for the workmen. The usual methods of manufacture are three – 'throwing', 'pressing', and 'casting' – the two former with clay in a state of paste, the latter when in a state of slip".

6 A Guide through the Royal Worcester Porcelain Works 1875

The outer fabric of Building A, including the Showroom, remained the same up until about 1900, and contemporary illustrations give us a reasonable idea of the elevations and which show that there were windows on both storeys of the Slip House (Figures 6, 18 and 21). The details of the windows are shown in Figure 15 and the original roof line and increase in height by the addition of a parapet can be seen in Figure 16. There is a semblance of pilasters on the Slip House which was taken up in the present building to which we shall return below. Unfortunately, perhaps for artistic reasons, the known out houses are not shown in any detail. It is more likely however that the Clay Shed, which covered the Yard by 1875, had not been built. If this is the case then the photograph must date from the early 1860s (Figure 18).

Figure 17: The entrance to the Showroom from the cover of Messrs Kerr & Binns factory guide book, dated 1853 (source: Worcester Porcelain Museum)

Up until 1881 the Showroom and Building A were distinctly unconnected buildings but there now began a steady move of related functions into Building A from the Showroom after £37 was spent for a 'tile floor for the lower Showroom'. This lower Showroom replaced the former 'Office' of 1863 which was reached by breaking through the rear wall of the Showroom and running stairs downwards from the Showroom (Figures 22 and 23). The Showroom had been designed by Robert William Armstrong in 1852 as part of a grand scheme to turn the factory round to face a new entrance from Severn Street. The building was designed to be top lit with displayed shelving around the walls and central units to display the wares. The building was approached up a small fight of stairs, through two pairs of mahogany doors with specially made brass handles decorated with the letter W, one of which survives.

Figure 18: View from the Cathedral. The Slip House lies to the left and the Showroom to the right (detail of photograph taken prior to 1875) (source: Worcester Porcelain Museum).

Figure 19: Detail of the portico with the original Coat of Arms (source: Worcester Porcelain Museum)

Figure 20: The entrance with the original steps and added pavilions (source: Worcester Porcelain Museum)

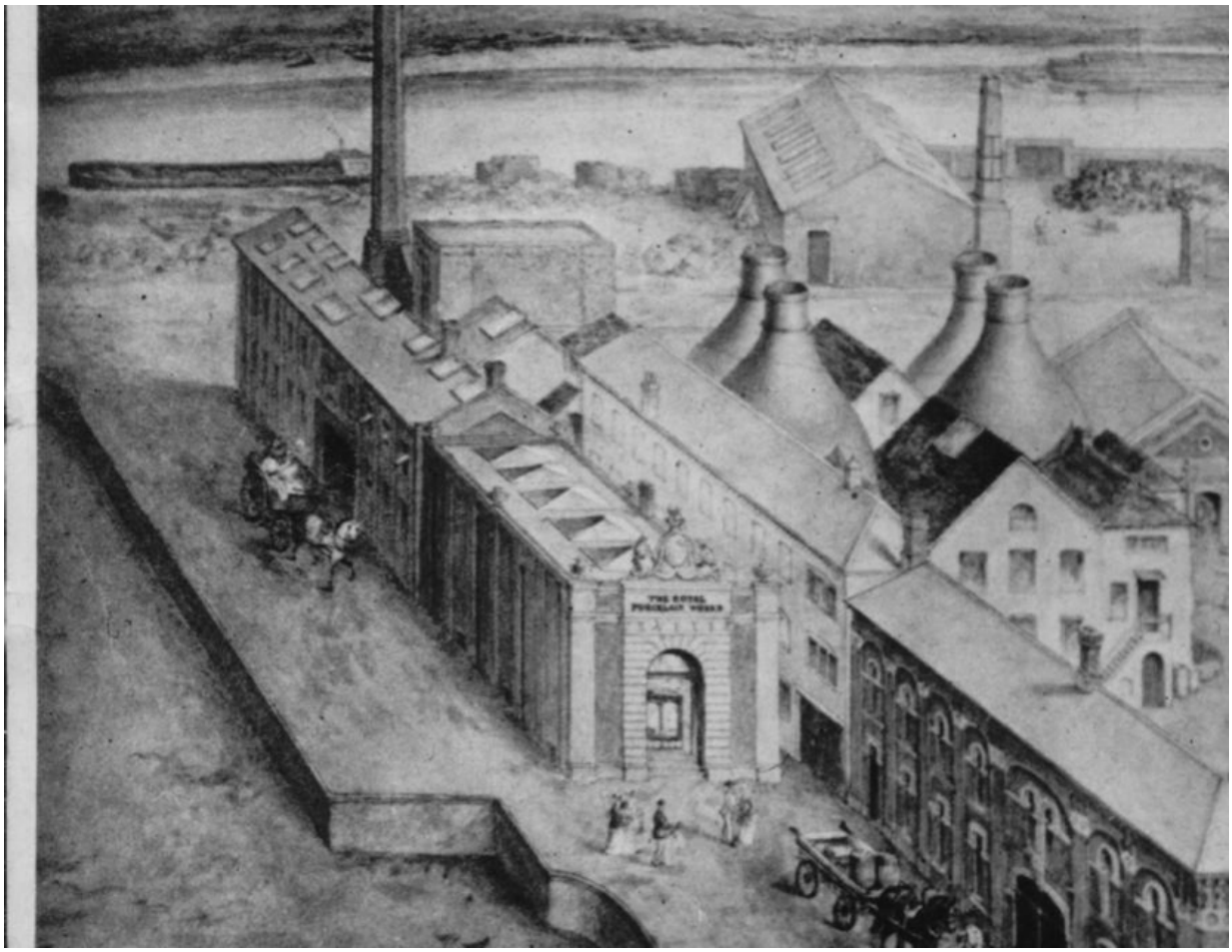

Figure 21: Watercolour of the Severn Street factory by James Callowhill *c*1880 (Property of Royal Worcester Spode)

Figure 22: The rear part of the Showroom *c*1900. It shows the doorway leading down to the lower showroom located in Building A. The doorway was framed by two velvet curtains, the mahogany pelmet and large clock were retained from 1862 (source: Worcester Porcelain Museum).

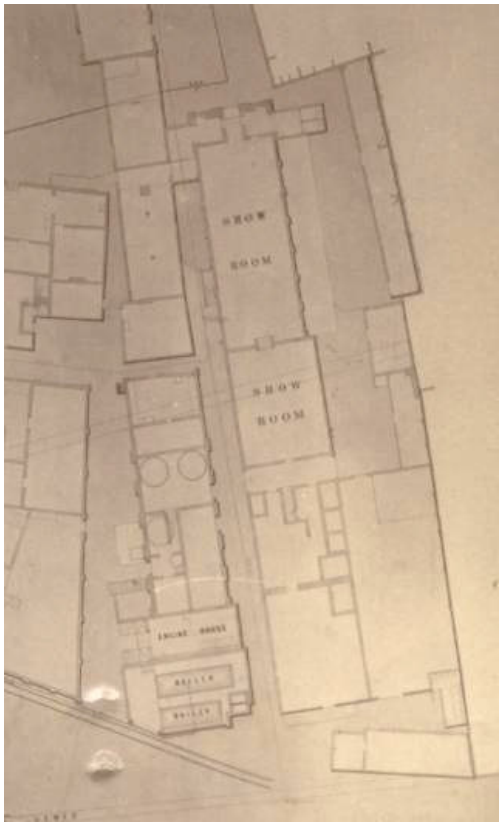

Figure 23: Plan of *c*1885 showing the new lower showroom in Building A (source: Worcester Porcelain Museum)

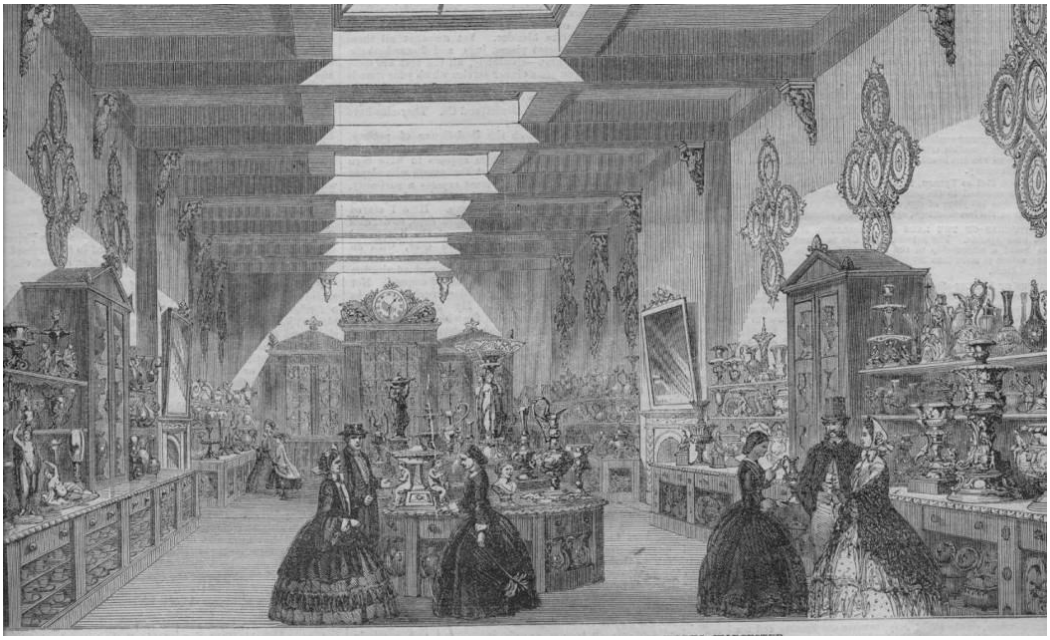

Figure 24: The Showroom in 1862 (source: London Illustrated Times, May 1862)

At the far end of the room are three grand display cases with a clock over them and in the centre at least two circular displays. There are two fire places with mirrors above which may be those ordered in September 1862 at a cost of £21.18.0. There was further shelving around the walls. The top half of the walls were decorated with large quatrefoil carved frames, probably made of plaster and each housing five plates.

Figure 25: The Showroom in 1875. The large chandelier was probably made at the works under Edward Phillip's management prior to his resignation in 1875 (source: Worcester Porcelain Museum).

Figure 26: Photograph of the main Showroom taken in 1894 for the visit of the Duke of York. This shows the new central fittings with a new dresser style top section added to the wall displays. The clock is still *in situ*.

The exterior of the building was of brick (Figures 17, 19 and 20) with, at the west end, a rusticated stucco portico, surmounted by a Coat of Arms attributed to the reign of King George III above an inscribed attic storey. This was in Coade stone and dated to around 1806 and was probably moved from the Warmstry House factory that closed in 1850. The façade is terminated by two Coade stone urns. The steps were altered to extend out from the front of the building in the 1950s. In 1976 the exterior was rendered and painted, two flag poles were added and the coat of arms was replaced with the current arms of Queen Elizabeth II. The interior as shown in 1862 (Figure 24) gave the appearance of a long gallery with two fireplaces with mirrors over them. A slight 'baronial' affect was given by the use of quatrefoil carved frames which supported plates like armorial achievements.

By about 1875 (Figure 25) two large display cases had been erected in the centre of the room and on the end wall two displays had been replaced with mirrors (with drawers under).

When the lower showroom was opened in 1881 in Building A (see Figure 23) there were changes made to the main Showroom which included "Fixing glass cases around showroom with new stands for the middle of the room including plate glass backs" at a cost of £183.[7] These changes can be seen in Figure 26.

Around 1900 Thomas Sutton drew up changes to Building A which were to result in further expansion to the Showroom facilities.[8] At this time the whole exterior character of the first storey was changed by the addition of a parapet and a matching skylight, in many respects, that of the Showroom (Figure 16).

7 Summary of special expenditure for July 1881 (Minute 2669, Worcester Porcelain Museum)

8 Building B was completed in 1898 with the same roof line at Building A at the time. Changes to A must have taken place after that date.

Thomas Sutton's plans of around 1900 (Figures 27 and 28) show the radical changes made to the general fabric so that the grand portico at the west end could now be read as the entrance to an extended Showroom with a newly created skylight in keeping with the old Showroom. This not only brought in light for display purposes (Figure 29) but the additional height prompted the reversal of the central stairway from down to up. The side panels were opened at the end of the Showroom to allow a double stairway either side to reach the lower showroom (Figures 30 and 31) which had been converted from 'Offices' in 1881. Beyond this upper showroom it was planned to make a museum but, as we shall see, it was some years before this was affected.

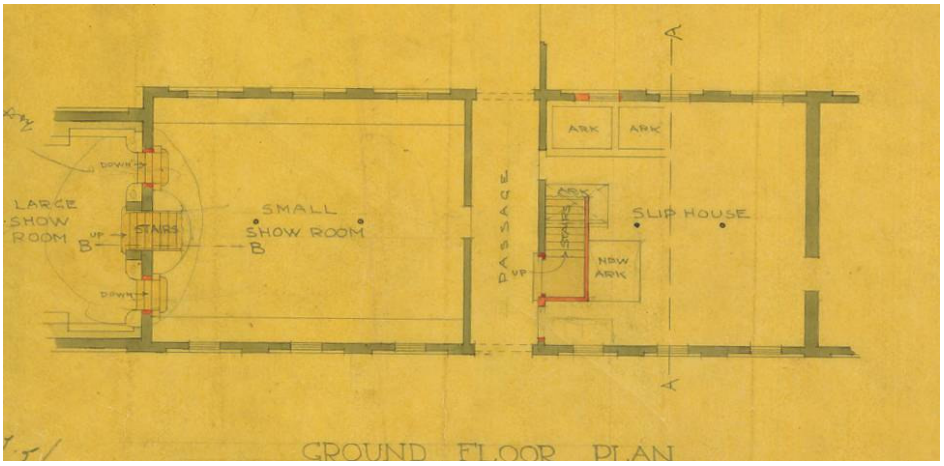

Figure 27: The ground floor of Building A as planned by Thomas Sutton *c*1900 (source: Worcester Porcelain Museum)

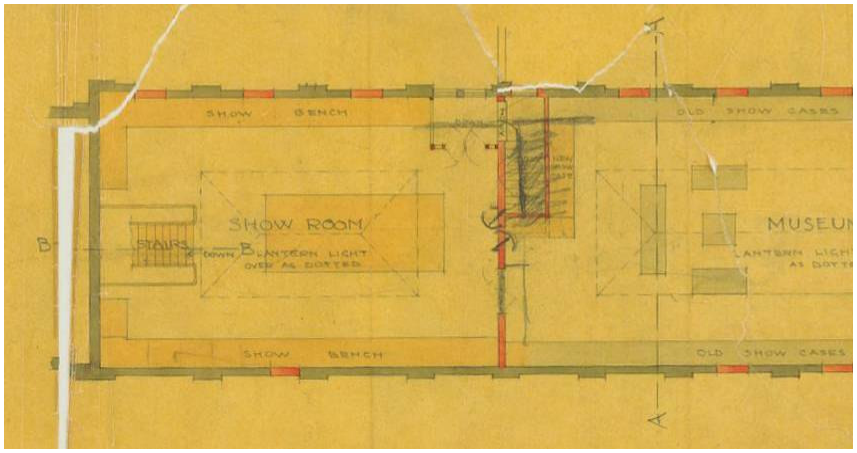

Figure 28: The first floor of Building A. The new Showroom and planned Museum is beyond and above the Slip House (source: Worcester Porcelain Museum).

Figure 29: The skylight designed by Thomas Sutton around 1900

The previous use of the first floor of Building A is somewhat obscure but in 1862 alterations were made here for a glass cutting shop at the time Edward Phillips joined the firm as Managing Director bringing with him a glass business he owned in Hanley. It seems some of the glass chandelier work was done in workshops at Worcester (see Figure 25). The steam engine was also altered for glass cutting.[9] The glass business was removed in the 1870s and altered around 1888 to house mould makers as part of the planned extension into a new building (Building B).[10]

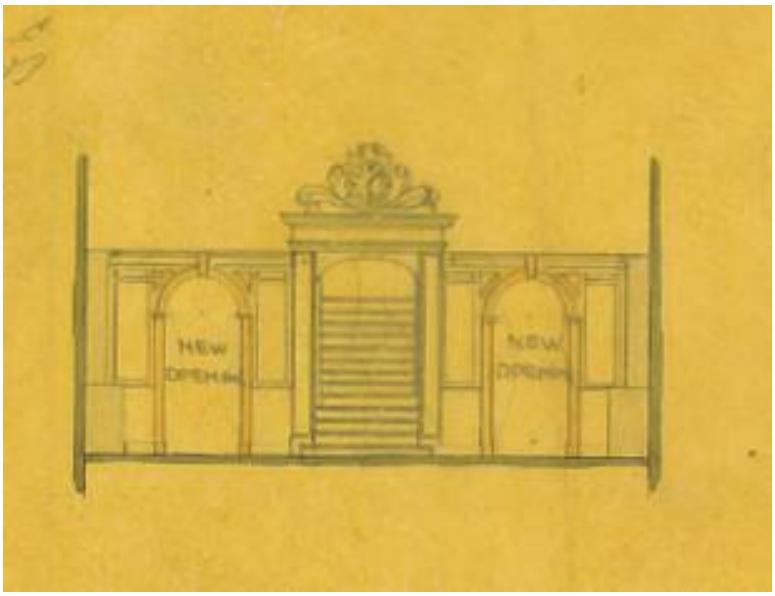

Figure 30: Detail of Thomas Sutton's elevation for the end wall of the Showroom. This shows the central stairs leading up into the first floor Showroom and the new stairs either side leading down into the 1881 lower showroom (source: Worcester Porcelain Museum).

9 Minutes 83 and 85 (Worcester Porcelain Museum)
10 Plan by Thomas Sutton RW25.22 (Worcester Porcelain Museum)

Figure 31: Photograph showing the new arrangement for reaching the upper and lower showrooms. The central doorway leads to the upper and the two side arches, where there were formerly mirrors, to the lower (source: Worcester Porcelain Museum).

Figure 32: The upper showroom in Building A looking towards the museum above the Slip House (the giant Chicago vase stood on its plinth in the centre of the room). The top of the stairway from the old Showroom can be seen in the foreground (compare with Figure 34). Electric light fittings date this photograph to the early 1930s (source: Worcester Porcelain Museum).

In October 1924 Managing Director, Gilbert Solon, reported that the beams supporting the Showroom roof were about to collapse. It was decided to strengthen them from above using iron girders and at the same time (January 1925) to install electric lighting which appears to have been carried out in both the Showroom and Building A.[11]

Although planned as a museum in around 1900 (see Figure 28) the room above the Slip House continued as a mould chamber until in December 1928 it was decided to move the museum into this location and provide an opening through into the company showrooms.[12] The work was still in progress in April 1929.

The alterations were progressing well by August 1929 and were completed soon after (Figure 32). Visitors could now progress through the old Showroom, down one set of stairs into the lower showroom and up the others back into the old Showroom. From here they could access the upper showroom and then pass through the museum where, at the far end, there was an attractive lobby (Figure 33) with stairs beyond into the yard close to the Bone Mill – one of the features of a tour of Royal Worcester.

Figure 33: The lobby exit from the museum

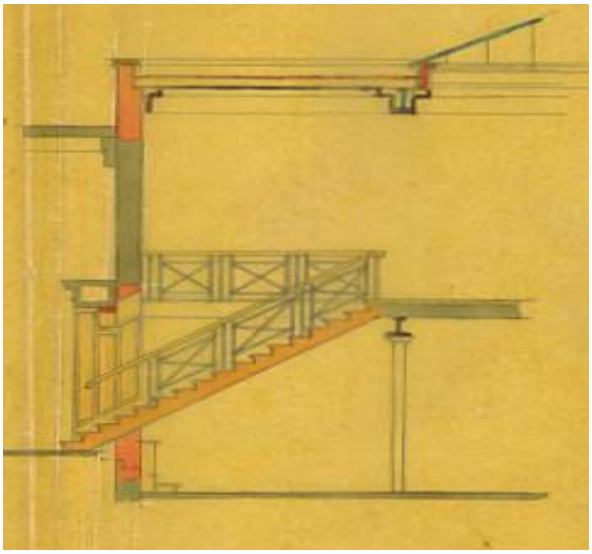

Figure 34: The stairway leading to the upper showroom. The old showroom is on the left as seen in Figure 32 (source Worcester Porcelain Museum).

A plan of 1934 (Figure 35) shows that the ground floor continued to function as a two-room Slip House as well as a lower showroom. During World War II a large quantity of finished china stock from the showrooms and museum had to be removed and stored to make the building available to the Ministry of Aircraft Production. The contents of the museum and other furnishings were being removed for storage to the second floor of a warehouse belonging to The Bowman's Remedy Company, which had been acquired at an annual rental of £45 inclusive of rates from 15th July 1940 for the duration of the war and twelve months thereafter.

11 Minutes 8821 and 8846 (Worcester Porcelain Museum)
12 Minute 9593 (Worcester Porcelain Museum)

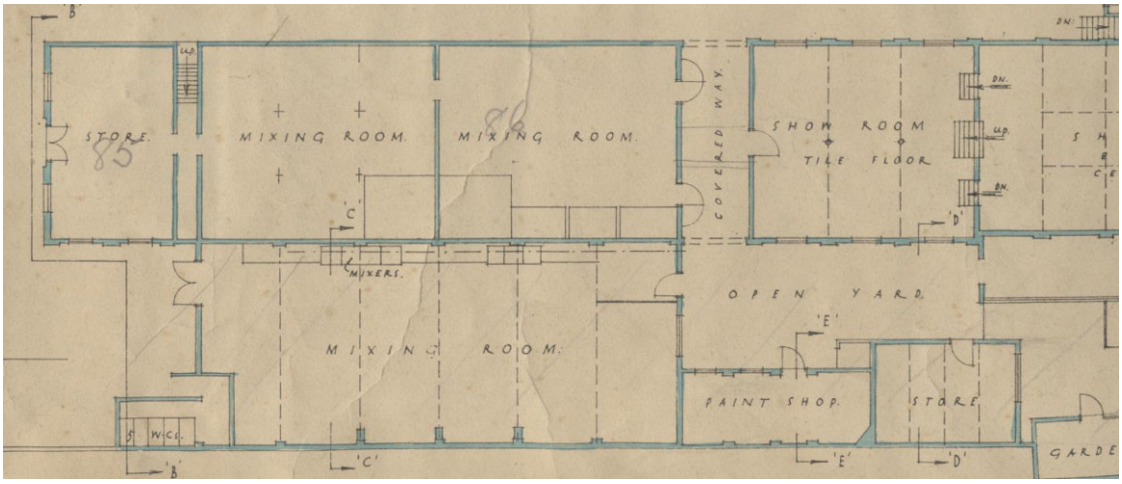

Figure 35: Buildings A, A2 and B in 1934. Left of passage 'Mixing Rooms' with right 'Show Room' (source: Worcester Porcelain Museum Drawing 20495/1 Sam Cooke September 1934).

This made space for the Ministry of Aircraft Production (MAP) which oversaw and paid for the work of three companies who all worked together on the Royal Worcester site during the war years. (Steatite & Porcelain Products Ltd of Stourport, Welwyn Electrical Products [resistors] and Pacey & Co Ltd Rodex Works, Bletchley, Buckinghamshire [spark plugs]). Royal Worcester was classified as an essential manufacturer and a Nucleus Company by the Government. In order to realize output the factory underwent many alterations with a huge proportion of the site going over to war work and although bone china production was permitted to continue, 80% was for export only.

Figure 36: The laboratories on the first floor of Building A

There were therefore radical changes to Buildings A around 1944, under the direction of the chemist Dr Wearmouth, when the first floor Showroom was converted into a special factory for the production of spark plugs which made over 30,000 per week. This was probably when the large steel structure was erected over the first floor.[13] During the early war years the large Clay Shed (on Figure 35 it is shown as a third 'Mixing Room') which lay to the north of Building A was demolished and its function replaced by bunkers or bins beneath Buildings B and C1 thus releasing the area for the construction of Buildings A1 and A2. Meanwhile, there was a run of laboratories through from Buildings B and C1 into the rear part of the first floor (the museum) which continued after the War until closure in 2006 (Figure 36).

After the War consideration was given to reinstating the museum and in 1946 Charles William Dyson Perrins decided to unite the Royal Worcester Factory Museum collection and library that he had purchased for £15,000 in 1934 (and never taken home) with his own private collection of 18th century Worcester Porcelain, forming the Perrins Museum Trust. He aimed to preserve and protect the collections and the history of the company for future generations. By then the former museum at the rear of Building A was in full swing as an extension to the laboratory and it was decided to convert the original Showroom building into the museum and employ Cyril Shingler as the first Curator to arrange the unpacking of the collections from their wartime storage. The new Museum was opened to the public by Princess Elizabeth in June 1951.

The galleries remained in the Showroom building until St .Peter's Junior School building was purchased as a permanent home for the collection in 1967. From 1967 to the 1990s the building was used as a clearance shop for seconds wares and in the mid 1990s it was converted into the current restaurant.

As for the ground floor Slip House after World War II: holding tanks (Figure 37), pug mills and agitators were installed as well as extra machinery for mixing but the tanks beneath the Slip House were retained as well as those put in between the Bone Mill and Slip House in 1874 survive (see Figure 14). The presses, although larger, worked on the same principle as in 1875 (Figure 38). The lower showroom and extended into Building A1 was used for storage.

Figure 37: A holding tank in the Slip House

13 Planning permission for this was not granted until 1946. Although part of Building A, it does not form part of the historic core and is dealt with under Building A1

Figure 38: A slip press (source: Worcester Porcelain Museum)

Buildings A1 and A2

The car park which now lies north of the Showrooms and Slip House is a shadow of how it would have appeared in 1884 (Figure 39) when it was covered with buildings almost up to St Peter's School. In 1863 (Figure 13) a yard lay north of the showrooms in Building A with a Packing Room beyond it which formed the northern boundary of the porcelain works. Attached to this, on the west side, was a blacksmith's shop and at the terminal west end (running at right angles to the showroom) there were printers and glaziers shops and running at right angles to this (parallel to the north wall towards the blacksmith's shop) were stores.

By 1875 (Figure 5) the general footprint was much the same, except that much of the area of the Yard and Packing Room was covered over to make a clay shed. This general footprint continued until World War II.

In January 1924 the summary of expenditure for the previous year includes a payment for alterations and additions to the 'slip house & clay store & arks' at a cost of £91 'plus slip house & grinding & potters machinery supplied by William Boulton Limited with engineers, bricklayers & joiners work installing same, driving belts, galvanised piping etc £1377'.[14] This considerable expenditure may have partly gone into rebuilding the clay store. If so, this would explain the situation shown on a plan of 1934 (Figure 35) which shows 'mixers' lying against the north wall of Building A in much the same fashion as shown in Figure 46, and where the 1863 kilns had stood (Figure 13 – number 42). Judging from Figure 40 the original building was single storey and supported by wooden trusses which spanned from the pilasters of Building A across to a north wall. The gable roof did not therefore abut onto the north wall of A but rested solely on the trusses. However, whether the 1924 expenditure was related to a completely new build, a modification of the pre-1875 Clay Shed, or a new structure which was never built is not known.

14 Minute 8692 (Worcester Porcelain Museum)

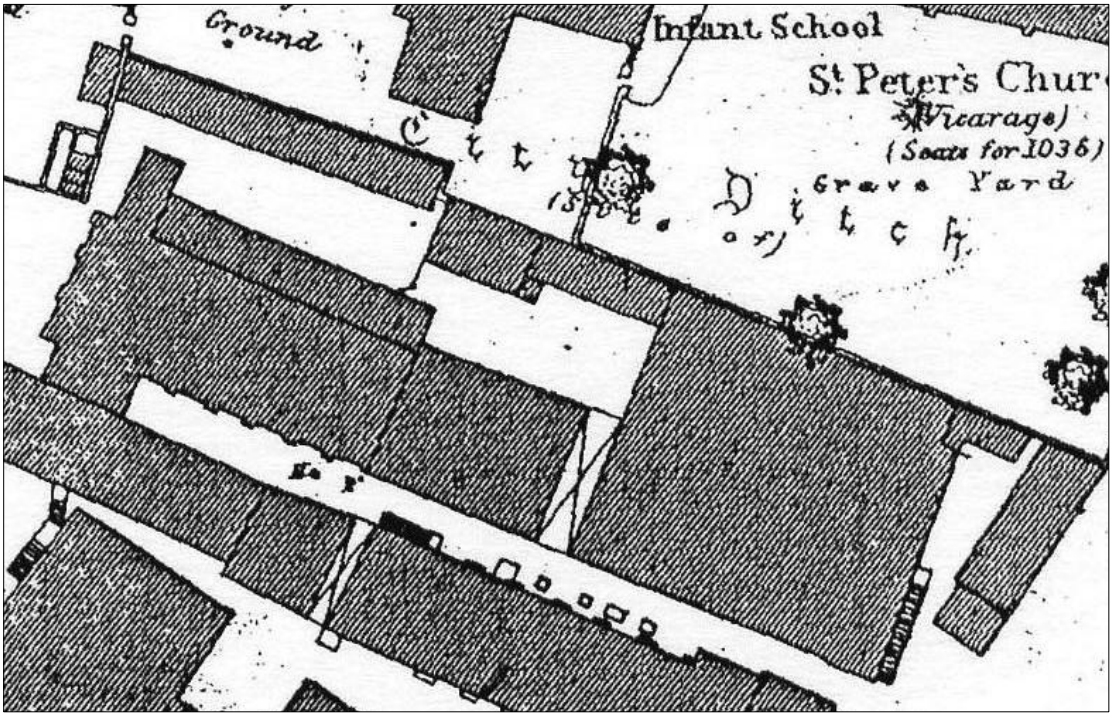

Figure 39: Extract from Ordnance Survey 25in to 1 mile map of 1884

By 1936[15] the accretions to the north of the Showroom and Building A had been demolished freeing up that space for other developments (see for these before demolition). Even so, the function of the Clay Shed had not yet been replaced by bins under Buildings B and C1 but the external mixers were in place and a lean-to built to cover them. This 'New Clay Mixing Room' extended down to the canal where it terminated in a gable-ended shed (Building A2 – Figures 2, 3, 4 and 44). An opening wide enough for vehicles was made for access to Building C1 through A2.[16] This access was altered in 1990 into a portico (Figure 42) and the brickwork re-laid in part as far as a line level with the east façade of Building A and the windows done away with for this new part. At the same time the gable end running into C1 (the bins area) was modified to continue the 1936 line of the lean-to.[17]

15 Building A2 is shown on Schofield's Insurance Plan of 1936
16 New Clay Mixing Room S N Cooke October 1934 20522 (Worcester Porcelain Museum)
17 Worcester City Planning Application P89/CO/70 (25.1.1990)

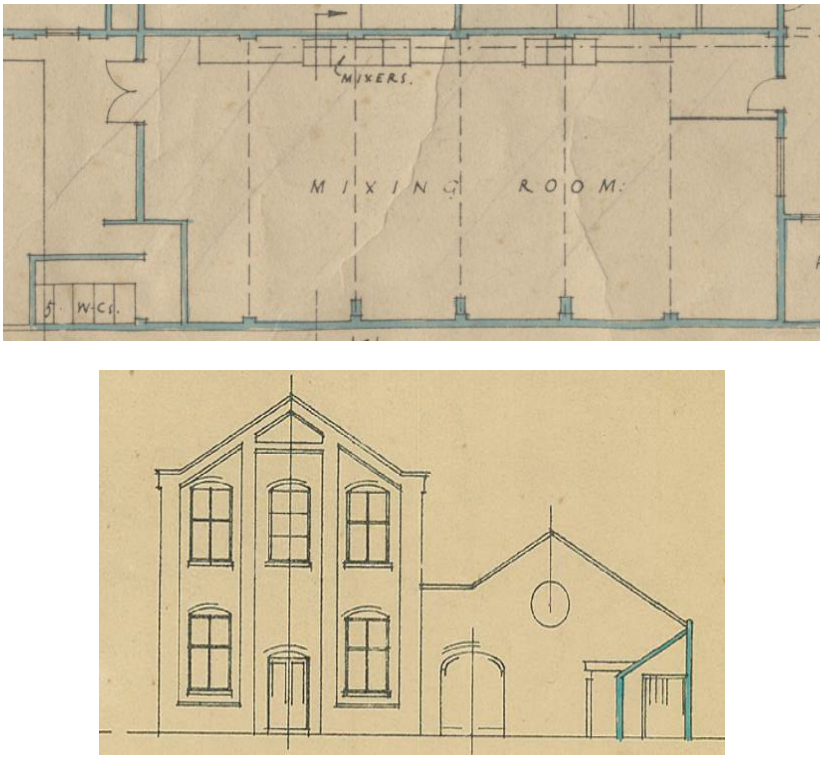

Figure 40: The Clay Shed used as a Mixing Room (top) and the east elevation in 1934 (bottom) (source: Worcester Porcelain Museum Drawing 20495/1 Sam Cooke September 1934)

Figure 41: Detail of Clay Shed roof (right) from Thomas Sutton's plans of *c*1900 (source: Worcester Porcelain Museum)

Figure 42: Access to Building C1 through A2 added in 1990

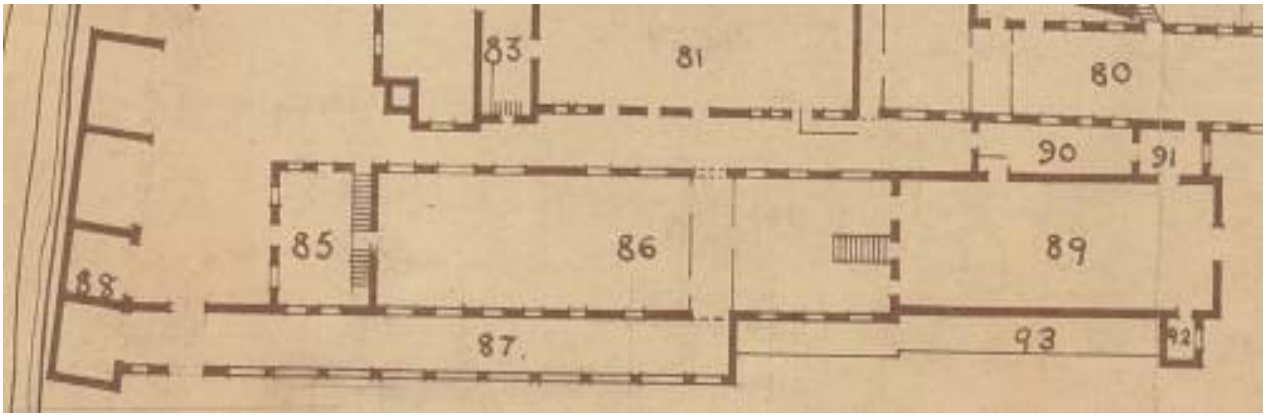

Figure 43: Building A2 (No 87) on a plan dated January 1941 (source: Worcester Porcelain Museum, Sam Cooke January 1941). The interior (Figure 45) of this narrow single-storey building has been stripped out except for the William Boulton mixer or rotary mill (Figures 46 and 47) and a small structure for dust extraction. However, there was a war-time shelter towards the canal end of Building A2, remains of which may survive.

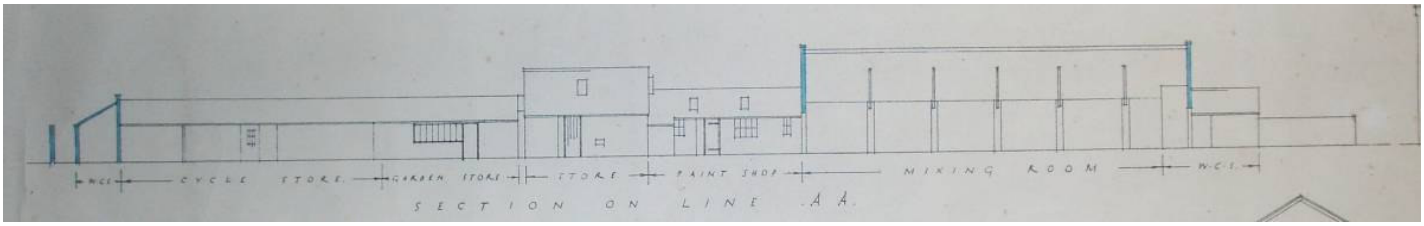

Figure 44: The south-facing section of the accretions before demolition. The building to the right is the clay shed (source: Worcester Porcelain Museum Drawing 20495/1 Sam Cooke September 1934).

Figure 45: The lean-to Building A2. This can be dated to around 1940. The north wall of Building A is on the right. The roof trusses are made of wood.

Figure 46: The rotary mixer in Building A2 by William Boulton

From around the year 2000 the front part of the building (A1 and A2) was used as a whiteware clearance shop (Figure 45). Building A1 was erected to accommodate the Ministry of Aircraft Production who were working on spark plug manufacture. It is in two parts – the wider of the two lean-to structures (see A2 above) and the overall steel and brick tower or cross wing that cuts through the skylight of Building A.

The lean-to part (Figures 3 and 4) was probably built by 1941 but appears to have been built in two stages. The first of these meant demolishing a small part of the western section of Building A2 so that a steel stairway could be fitted into an extended area (Figure 48) to reach the first floor of Building A. The second followed soon after and this was extended at a later stage into the lower showroom by removing part of the northern wall of Building A and inserting I-beams to support the upper wall.

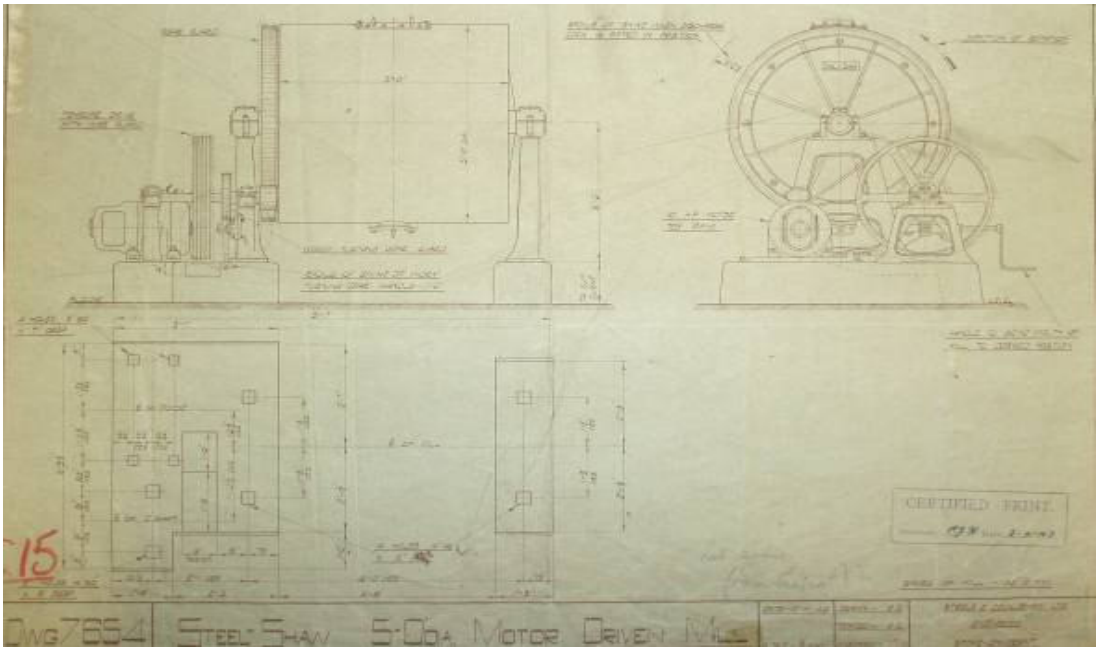

Figure 47: Motor Driven Mill of a type used in Building A2. 5ft diameter September 1946 Drawing 7654 (source: Worcester Porcelain Museum)

Figure 48: Stairs in Building A1. This leads up to the wartime overall shed for steatite production.

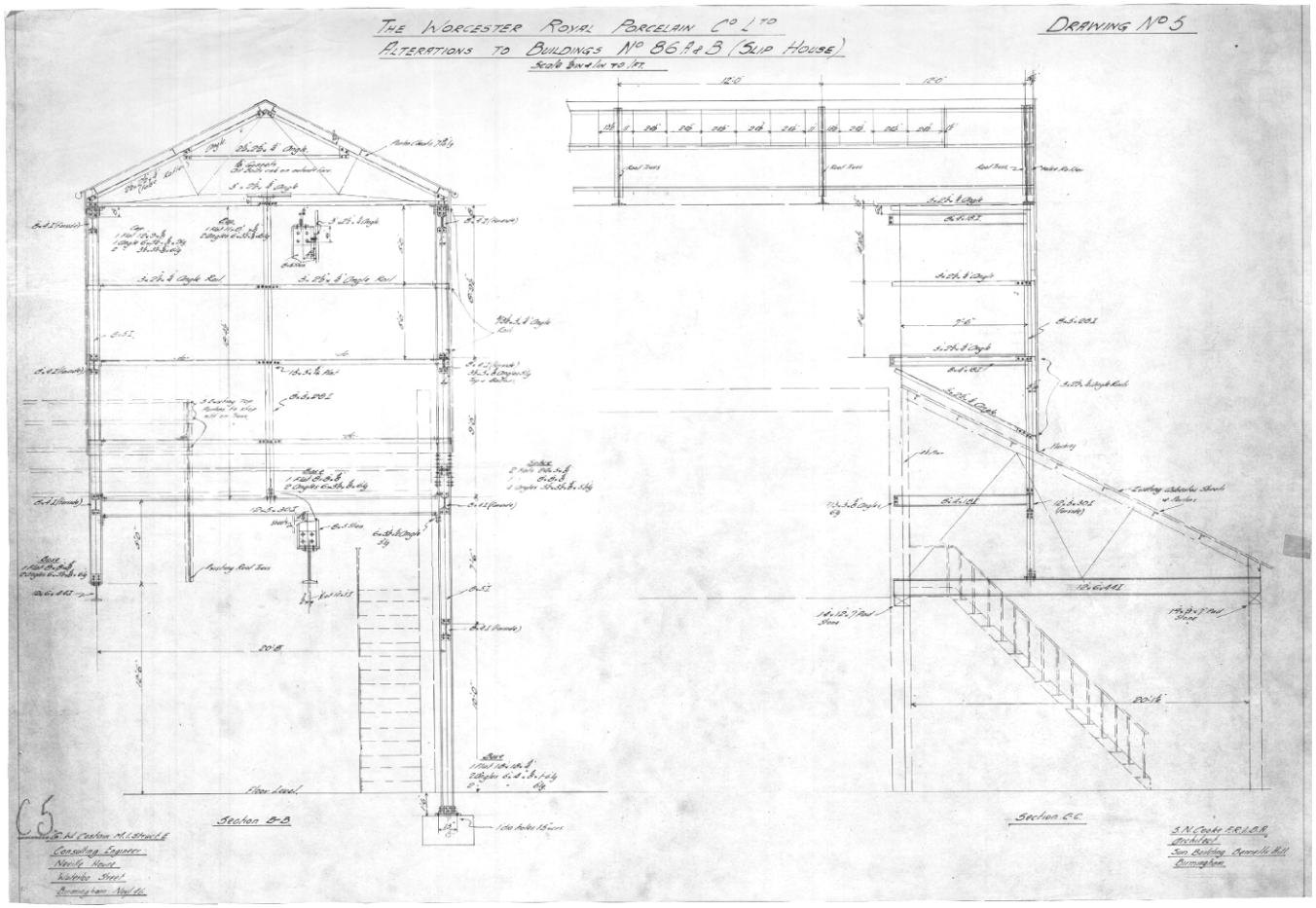

Figure 49: The overall shed (Figures 1 and 2) was erected around 1944 by Costains but did not receive planning consent until November 1946 (probably as a catch-up measure after the War). This was accessed by the steel stairway or through the laboratory on the first floor of Building A. This cross-wing gave adequate headroom for supplying the mixers (Figures 50 and 51) (source: Worcester Porcelain Museum).

Figure 50: In Building A beneath the cross-wing looking north-east. The door on the left leads to the steel stairs. A rotary mill (mixer) lies to the left and the wooden stairs lead to the charging platform for the mills. Beyond through the door lie the laboratories.

Figure 51: In Building A beneath the cross-wing looking south-east. A rotary mill (mixer) lies behind the wooden stairs which lead to the charging platform.

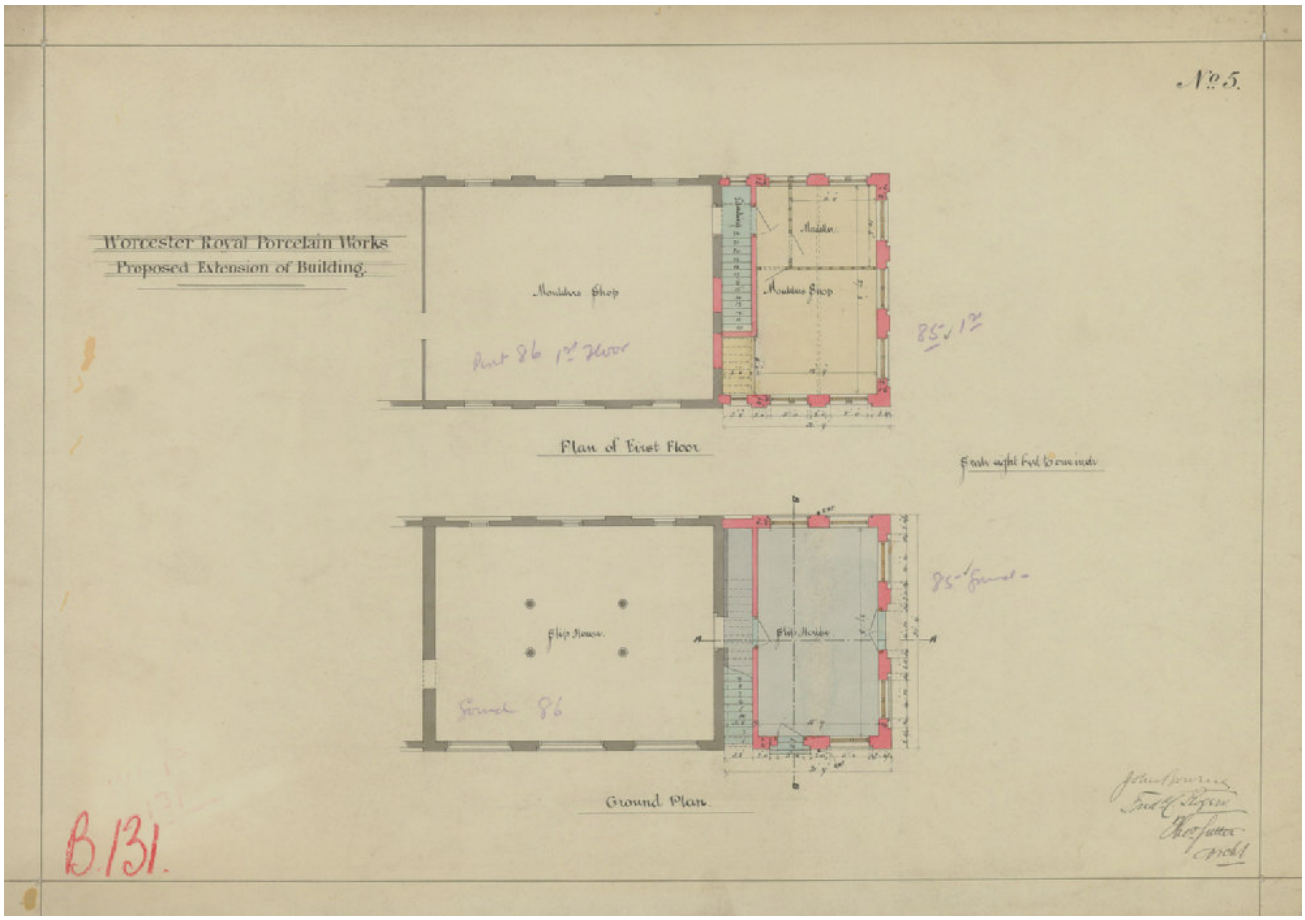

Figure 52: Building A (left) and Building B (right) by Thomas Sutton as planned in 1888 (source: W25.22 1888 Worcester Porcelain Museum)

Historical development of Building B

Plans for the proposed extension to the Slip House were presented to the Board by architect Thomas Sutton in January 1890.[18] Two new rooms were to be provided each 27ft x 16ft with the one on the ground floor serving as a Parian Slip House with tanks beneath and that on the first floor for mould makers with a separate area for a modeller (Figure 52).

Figure 53: The south side of the Slip House Range extension (Building B)

Figure 54: Building B from the south-east around 1900

The roof of St Peter's Church is behind (where the car park now is). The original roofline of Building A runs up to the party wall between the two. The east gable shows a pleasing terminal to the whole range (source: detail from a photograph held by the Worcester Porcelain Museum).

18 Minutes 4172 and 4183 (Worcester Porcelain Museum) and Worcester City Planning Application 'Proposed extension to building' (1437: 23.1.1890)

It was completed by 1898 if not before (Figure 53) in a typically late 19th century style verging on the Edwardian which presents a rather different appearance to its neighbour Building A. It should be borne in mind, however, that at the time the roofline was the same and the treatment of the gable end at the east would have given permanence to the whole. As planned (see Figure 15) it was to run as a direct continuation to Building A, but in its final form a party wall was built between the two buildings (Figure 54). This party wall was rebuilt to form the end of Building A around 1900 when it was extended upwards by a parapet and the distinction of Building B was lost amidst its neighbours (Figures 53 and 55). This point also confirms that the heightening of Building A was completed after 1898. The distinct building break between Buildings A and B is formed by the stairs (Figure 56). These, although continuous, are in two parts. The first leads by a dog leg into the first floor of Building A. The second continues upwards to the first floor of B. Thus the first floors of Buildings A and B are on the same level.

In December 1942 the ground floor was changed into (Figure 57) bins and the first floor opened out to run into Buildings A and C1 which was built at the same time there was therefore a continuous run between Buildings A, B and C1 with the opportunity to operate the whole together as the laboratories for which C1 was specifically built (Figure 58).

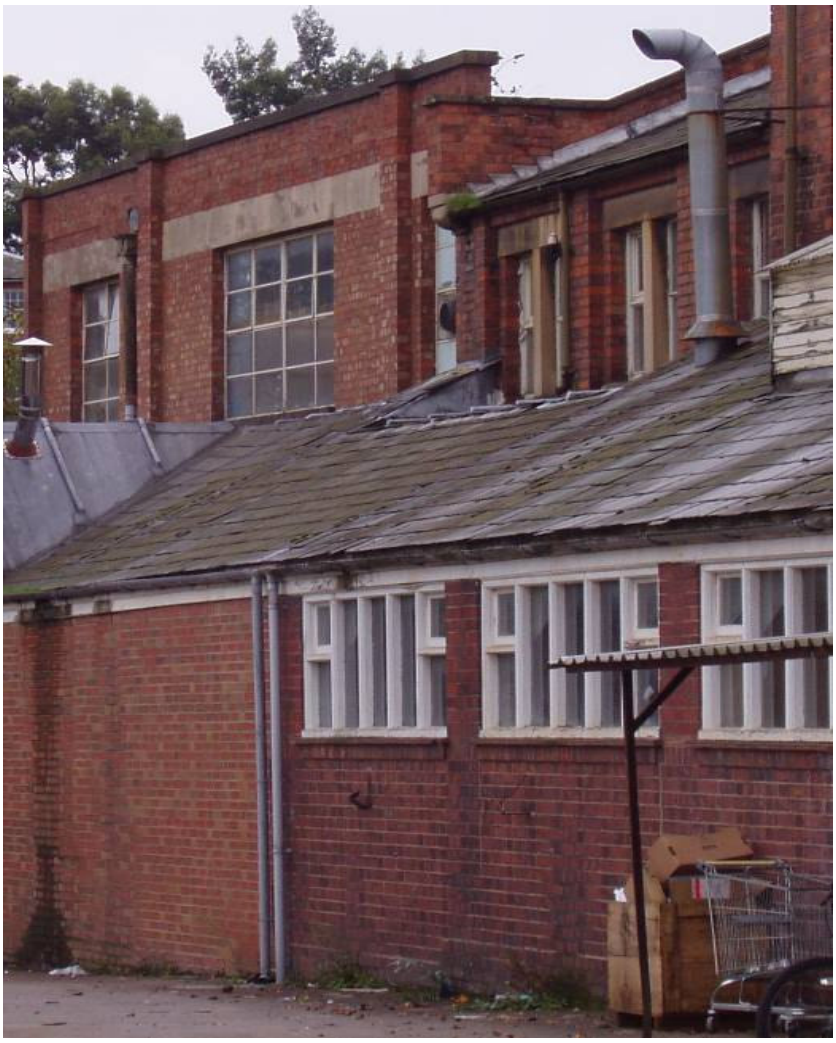

Figure 55: The north elevation of Building B lost amidst Buildings C1 (left), Building A2 (front) and Building A (right). Halfway up they turn into Building A but continue up to Building B.

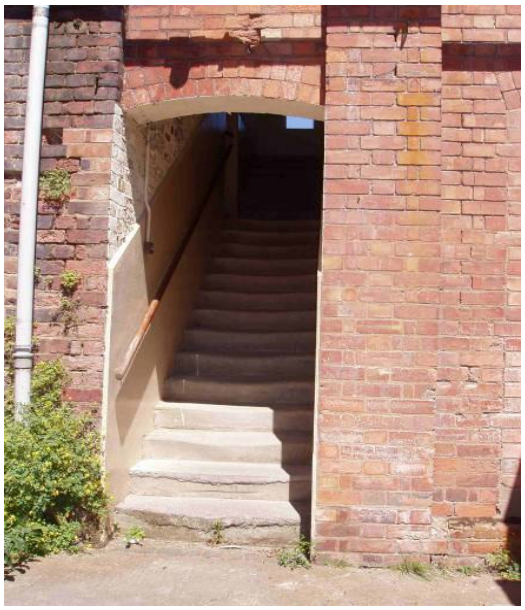

Figure 56: The stairs at the west end of Building B. Halfway up they turn into Building A

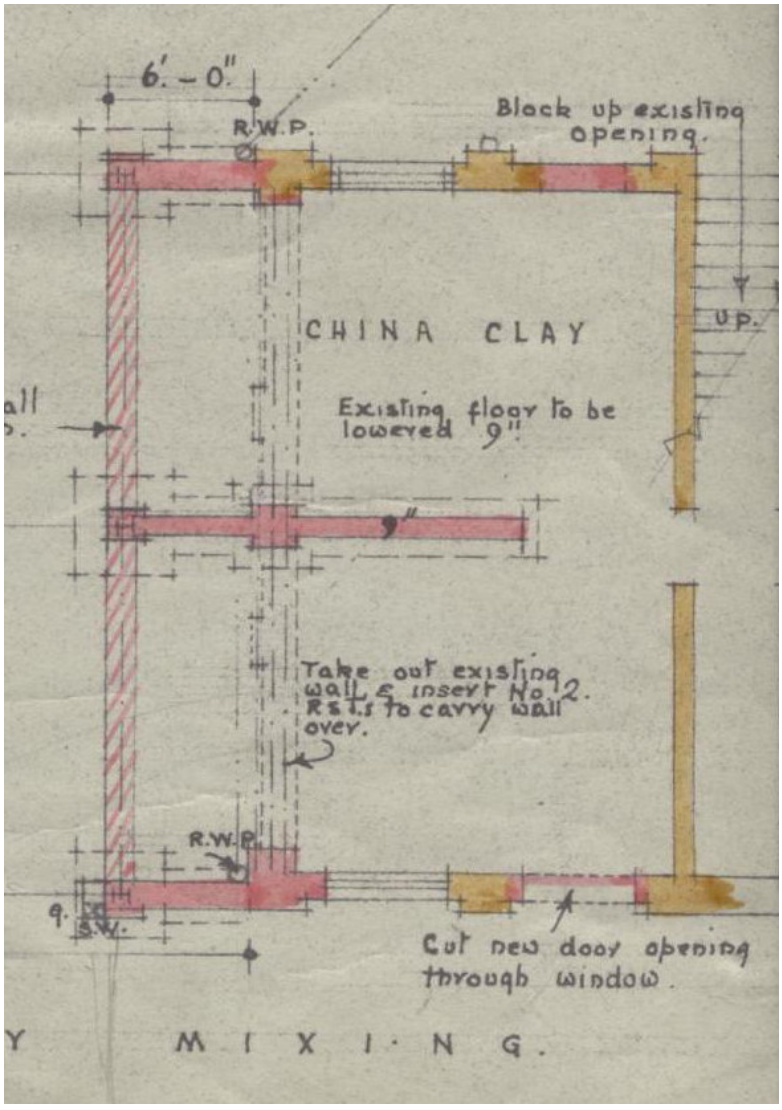

Figure 57: Building B

This shows the proposed changes to the ground floor of Building B to convert it into clay bunkers (source: Worcester Porcelain Museum Sam N Cooke December 1942 number WP4/9)

Figure 58: The interior of the first floor of Building B looking south east. The passage at the end leads to Building C1 (left) and Building A (right).

The Royal Worcester Laboratories and Laboratory Porcelain

The first floors of Buildings A and B were used at different times as laboratories and the first floor of Building C1 was specifically built for that purpose. This is therefore an appropriate place to examine the part played by Royal Worcester in the development of specialist porcelains.

From the very beginning of production on the Severn Street site around 1788, continuous experiments would have been conducted to improve recipes and manufacturing methods. In 1900 a research laboratory was established by George Hancock, the Company Chemist, and he was succeeded by F E Wooldridge in 1913, who had studied laboratory porcelain production in Germany. Prior to this all lab wares had been imported from Berlin so that with the outbreak of war in 1914, Royal Worcester was asked by the Government to attempt to develop British laboratory porcelain.

The lab ware catalogues of 1917 and 1923 outline the background to this:

"It was with some hesitation that we acceded to these requests, for no ware even approaching this type of porcelain had hitherto been made in England, and consequently there were no data to work upon. True, there were certain German text books, but these were in all cases misleading.

Extensive research work had to be done to find materials which could be reduced in the process of manufacture to a perfectly vitrified non-porous state, but which would be refractory when in use at high temperatures; glazes had to be accommodated to the body material which would not crack or break on rapid heating or cooling, and which would offer a high resistance to chemical reagents' (1917)".

"Royal Worcester's 'hard porcelain' body was improved over a number of years. It had high resistance to fracture and was vitrified to make it impermeable up to 1350

degrees centigrade. The glaze was of extreme hardness and did not soften until subjected to heating to 1100 degrees centigrade for four hours (1923)".

The hard porcelain was so successful that a cheaper range of lab wares called 'Sillax' for schools was introduced in 1931. New experimental laboratories were needed as production grew and the outbreak of war in 1939 put new pressures on the Worcester chemists. Royal Worcester had the only hard porcelain facility in the United Kingdom and was therefore asked by the Ministry of Aircraft Production to accommodate Steatite and Porcelain Products Ltd of Stourport. Insulators and resistors were made for aircraft radar and radio production. The expertise of Royal Worcester's chemists was utilised and, as a result, the laboratories needed to be extended. As a result the link building C1 was designed by Sam Cooke & Co. in 1942 as a laboratory extension and was constructed the following year (see Building C1 below).[19]

Figure 59: Lab ware production on the 1920s (source: Worcester Porcelain Museum)

During the Second World War a small pilot plant for the development of a revolutionary new product, 'Regalox' was set up at Worcester in Building I. Regalox is the registered trade name for the high grade sintered alumina ceramic made for industrial use. It was so successful that in 1959 a new company Royal Worcester Industrial Ceramics Ltd was set up and a new independent factory opened in South Wales and Lab ware production was moved from the Worcester site.

Led by Royal Worcester Chemist Paul Rado, in the late 1940s experiments were carried out to use the hard porcelain for domestic use. The Lab ware body with its

19 The Ministry of Aircraft Production agreed to allow the necessary plant and apparatus needed in connection with the Stealite project (Minute 307, 14th December 1942)

resistance to thermal shock was adapted for use in domestic ovens and freezers. The resulting 'Oven to Tableware' championed by TV cook, Fanny Craddock was to have an enormous impact on the companies success over the next 40 years.

Historical development of Building C

The background to this small electricity sub-station lies in the needs to supply power, lighting and heating for the works. The use of prime movers was never a great priority in the manufacture of domestic wares except for grinding the raw materials in the Bone Mill and their mixing in the Slip House. Coal for steam rising to drive the steam engine for these purposes was delivered to the Worcester Porcelain Works by canal. Coal also supplied the needs of the bottle kilns until the introduction of tunnel kilns and, from the 1890s, the boilers at the south-east of the site for heating. Lighting was very important and this would have been supplied by the Worcester Gas and Coke Company and was available from 1818. The demands on the steam engine grew in the 1870s with the addition of colour pans and its application to mixing in the Slip House next door. New boilers were tried and a modification to the application of the power through different gearing. None of these measures was wholly successful and the problem reached a climax in 1883 when a new engine was added to work alongside the 1852 beam engine (the history of the Bone Mill is covered under Building D).

However, before then in 1876, an Otto gas engine was used for grinding and polishing and the following year another engine suggested (but not applied until 1886) for throwing. The advantages of independent engines to relieve pressure on the over-worked steam engine were obvious in a dispersed works but the use of Town Gas was the only source of fuel available at that time.

The prelude to a change to electricity occurred in 1889 when the Lighting Sub-Committee of the Worcester City Corporation considered an approach from the Anglo-American Brush Electric Light Corporation for a scheme to light the City by electric light.[20] Rather than accept this proposal the City Council decided to produce their own scheme which the Royal Worcester board had wind of when, in September 1891, they considered the possibility of introducing electric lighting.[21]

After opposition to a site on the River Severn, Powick Mills on the River Teme was chosen and a hydro-electric scheme backed-up by steam power adopted: the classy new building was opened in 1894.[22] It appears that the scheme was limited to providing lighting and the Royal Worcester Works no doubt availed themselves of the supply.

The next stage in the development of electricity to the City also had a bearing on Royal Worcester when the horse-operated tramway company proposed in 1897 that its lines should be electrified. The power provided by the Powick station was insufficient and a grand new power station was made available by 1902. Part of the site at Powick was in the hands of Royal Worcester who inherited it when they purchased George Grainger & Co in April 1889 and had taken an additional lease for 21 years in September 1889.[23] Here Graingers' raw materials had been ground. In 1903 the City resolved that their part of Powick would continue but only as a hydro-electric station but the Worcester City Corporation wanted to extend the site by

20 This section is based on D G Tucker 'Hydro-Electricity for Public Supply in Britain, 1881 – 1894' Industrial Archaeology Review Volume 1. No 2 Spring 1977, 148 – 161

21 Minute 4441 (Worcester Porcelain Museum)

22 The distinctive building survives at SO 835 525 with the inscription 'CITY OF WORCESTER/ELECTRICITY WORKS/ 18 [Coat of Arms] 94'

23 Minutes 3943 and 3974 (Worcester Porcelain Museum)

purchasing the lease and in July 1906 made an offer to Royal Worcester.[24] In exchange for the lease of the site they would make available, on loan, two experimental motors to undertake the work done at Powick and lay a main free of charge to the Severn Street works. The offer was accepted and the way was paved for the full acceptance of electric power throughout the works (see also Building D).

In 1920 the City proposed to change the electricity supply to the factory from 230 volt Direct Current to 200 volt Alternating Current and build a sub-station near the Sidbury entrance to the works. In spite of an offer from the City to convert the existing electric motors over from DC to AC the works wished to soldier on with DC[25] until in June 1924[26] the constant trouble they were having with the motors installed in 1907 forced them to capitulate. This opened the way for electricity to be installed more generally in December 1924.

After much deliberation as to a suitable site, in was agreed with the City Corporation to build the electric sub-station at the end of Prince's Drive. The building was designed not to restrict access to the factory along the road from Sidbury and dates to 1928.[27]

Historical development of Building C1

As early as 1863 there was an acute angle in the north-east boundary of the site which contained a store (Figure 13). By 1875 (Figure 5) this had been changed into a Potters Shed and this situation was the same in 1936 (Figure 60, number 88).

In the 1880s the ground floor was converted and used as a loading bay for the dispatch of finished goods and the roller shutter doors were installed probably at the time the portico into Prince's Drive was built (Figure 42).

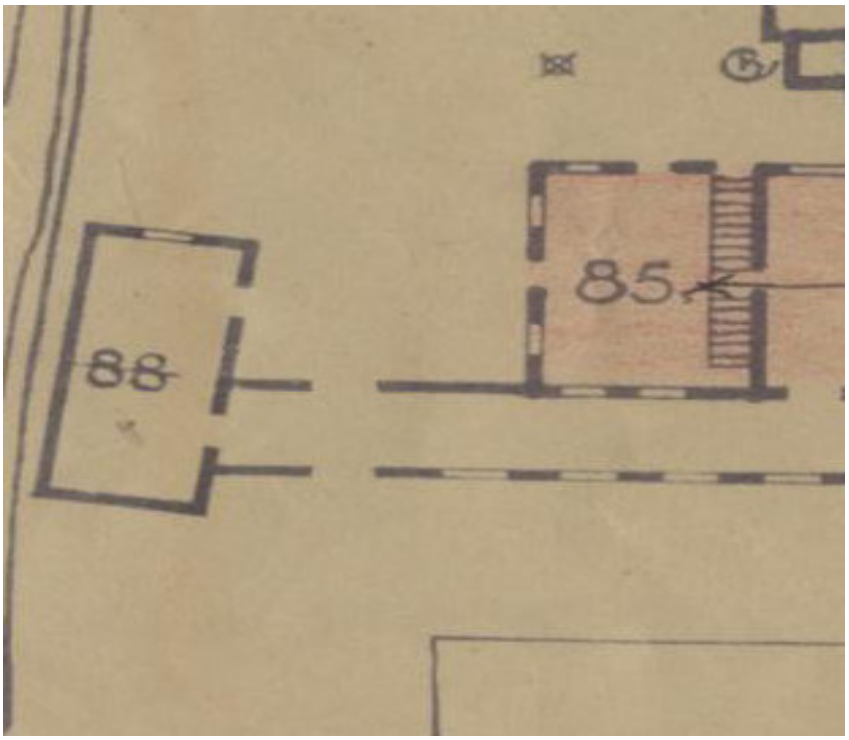

Figure 60: The area of Buildings B (85) and C1 (88) in 1936. (source: Schofield's Insurance Plan of 1936)

24 Minute 6291 (Worcester Porcelain Museum)
25 Minute 8135, July 1920 (Worcester Porcelain Museum)
26 Minutes 8833 and 9030 (Worcester Porcelain Museum)
27 Minute 9426, June 1928 (Worcester Porcelain Museum)

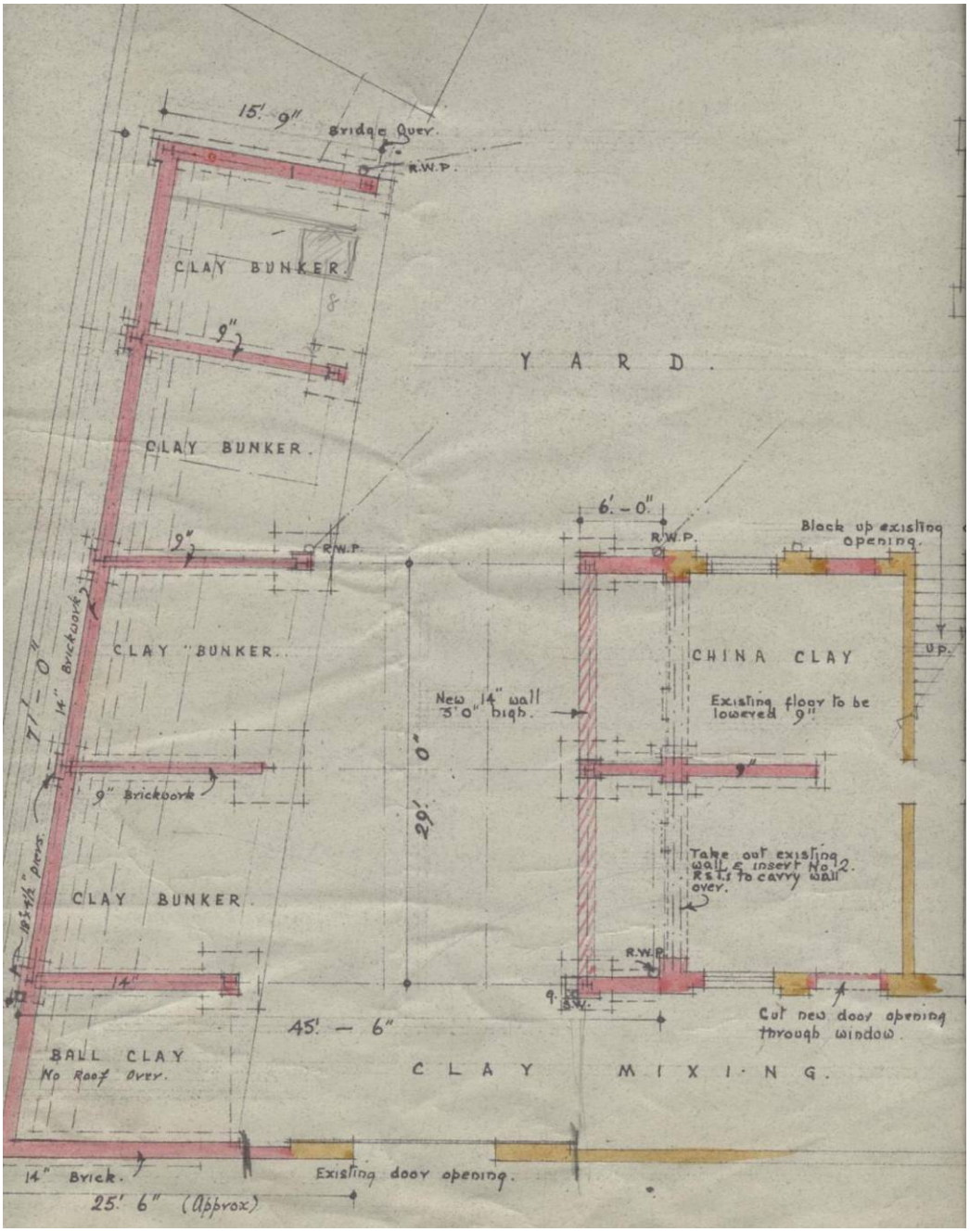

Figure 61: Plans for the ground floor of Building C1 with the new bunkers. The ground floor of Building B lies to the right bunkers (source: Worcester Porcelain Museum Sam N Cooke December 1942 number WP4/9).

By 1942 there were plans for a new range here running up to Building F (Figures 61 and 62).

Five bunkers to lie on the east side towards the canal were planned and built (Figures 63 and 64) and a flat-roofed laboratory to run over the top of three of them to join Building B with the ground floor open where it passed over Prince's Drive. The area in front of the two southern bunkers was covered over by sheeting in recent years (Figures and 65 and 66).

The first floor of the laboratory was not built as planned particularly where it adjoins Building F. As conceived there would have been a corridor running along the west side and dropping by flying steps into Building F. Parallel to the corridor would have been a Balance Room on the canal side. As built, the arrangement for the steps was turned around so that they lay on the canal side and the space beneath filled (Figure 68) The 1942 plans made provision for a library in Building B, however it appears that the laboratory instead was partitioned off for this purpose (Figures 68 to 71).

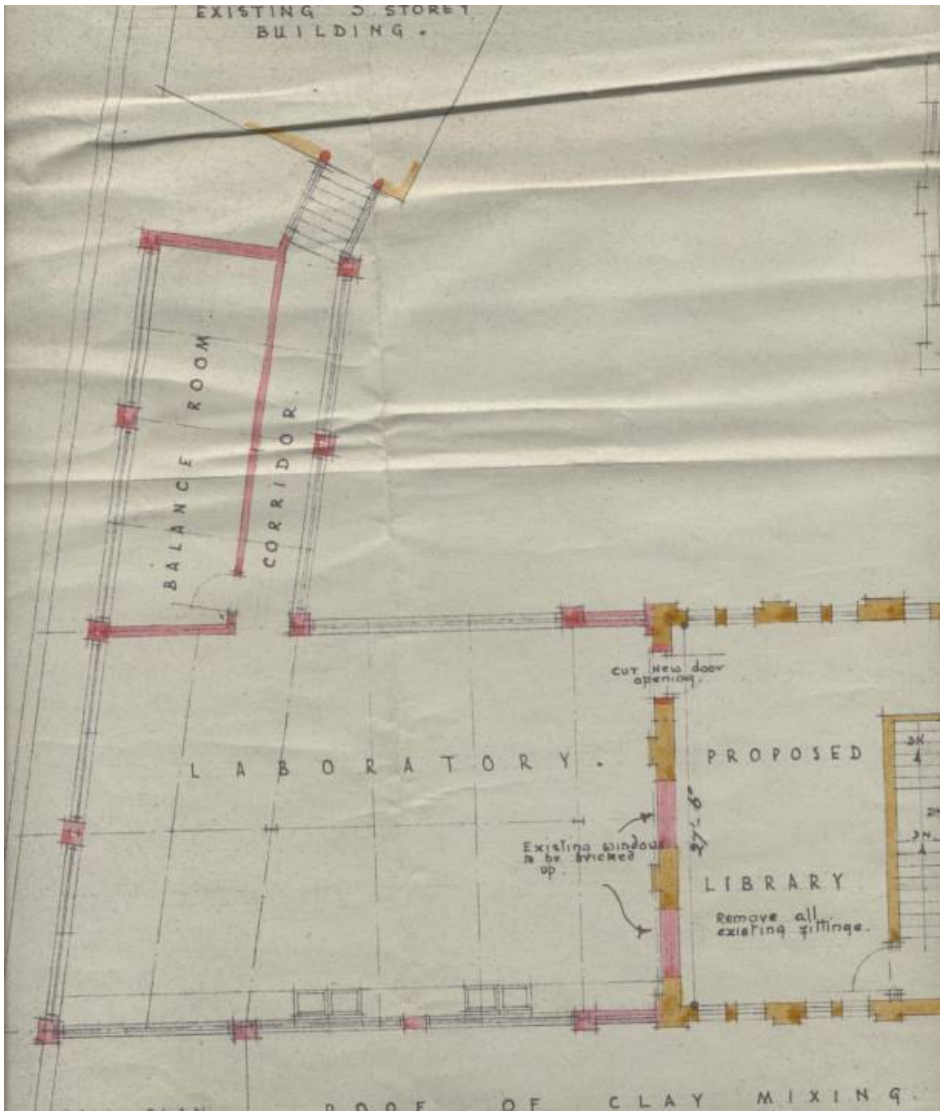

Figure 62: Plans for the first floor of Building C1. This shows the laboratory running over the top of Prince's Drive and joining Building B. The spur onto Building F (top left) was modified so that the corridor ran to the east side through the proposed Balance Room (source: Worcester Porcelain Museum Sam N Cooke December 1942 number WP4/9/).

Figure 63: The bins at C1 when newly built (source: Worcester Porcelain Museum)

Figure 64: The bins at the ground floor of Building C1

Figure 65: Building B with C1 to the right. Building A is to the left.

Figure 66: The steel sheeting lies on Prince's Drive and hides the bunkers shown in Figure 61

Figure 67: The east elevation of Building C1 from the canal. The link to Building F lies to the left.

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Figure 68: First floor interior looking toward the south window. Building B lies off to the right with the spur towards Building F on the left.

Figure 69: First floor or Building C1 looking towards Building B. The library lies to the left.

Figure 70: The laboratory in the 1950s with the north window. The library lies to the left (compare with Figure 69) (source: Worcester Porcelain Museum).

Figure 71: Building C1 looking towards the windows overlooking the canal. Upper floor interior looking towards Building B.

The role of Buildings F, H and I in the production of Laboratory Ware and Fireproof Porcelain

Following the transfer of Building I back to Royal Worcester Buildings F, H and I were opened up in 1946 to form one single unit for the production of laboratory ware and fireproof porcelain.

The ground floor of Buildings F and H were used for casting fireproof porcelain and laboratory wares.[28] They were then transported up a hoist to the first floor of H which was used as a green room for storage and drying of wares before they were taken over a bridge into Building G to be fired for the first time. They would then return via the bridge to the first floor of Building F where they were fettled: in this process the seams left by where the mould joined and any imperfections were removed. They were then finally inspected.[29]

Laboratory ware production was removed from the Royal Worcester site in 1959 leaving these buildings free for the production of hard porcelain. This was the 'Oven to Table' type porcelain which had evolved from the fireproof body.

In 1948 the narrow end of the ground floor of Building F had been established as a small slip house for mixing the ingredients.[30] In the 1960s, following the removal of laboratory porcelain production, this area was used for porcelain and the ground floor of Buildings H and I was the Jollying Shop where hollow wares such as casseroles, gravy boats and serving dishes were pressed by hand into Plaster of Paris moulds. Fettling remained on the first floor of Building F and Building H became the porcelain cup-making shop. The second floor of F was used by the porcelain tableware casting department.

Thus all hard porcelain production was concentrated in Buildings F, G, H and E from the 1960s and remained there until the late 1980s when the whole factory was rationalised and all hard porcelain production was moved to the Portland Street Factory. Then the whole block made up of Buildings F and H reverted to being a warehouse for finished seconds goods.

Historical development of Building F

Until 1935 there was an open area which lay between Building H and Building B (Figure 72). This was used for the off-loading of coal and raw materials, but it was also a traditional area for dispatch (Figure 73) having been in the possession of the Company since April 1862. [31]

Building H was built as a sagger house before 1875 but with extensive re-organisation and modernisation of the works under C W Dyson Perrins in the 1930s the potential of this strip of land between Buildings H and B was realised. In 1935 comprehensive plans were therefore prepared to build on this vacant space (Figures 74 and 75).

As built it conforms pretty closely to the plans and elevations by Sam Cooke. At the south end it adjoins Buildings H and I which were opened out on the ground floor in1946 to make one area when laboratory ware and fireproof porcelain were produced here. In the 1980s it reverted to being a finished seconds goods warehouse. The interior is shown Figures 76 to 79. During World War II it was used for the production of laboratory porcelain with an air raid shelter built behind.

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28 The layout is Shown on plan WRP19 (Worcester Porcelain Museum)
29 Fettling shop layout plan (Worcester Porcelain Museum WRP9)
30 Minute 252, March 1948 (Worcester Porcelain Museum)
31 Worcester Porcelain Museum 'Copied from the PLAN on the MORTGAGE dated 2 June 1875 and numbered and coloured to Show the Title under which the various parts thereof are held'

Figure 72: The open area on which Building F was built

Building H lies to the left with Building E in the middle and on the other side of Prince's Drive. The chimney belongs to the Bone Mill (D). To the right again is Building B (source: Worcester Porcelain Museum).

Figure 73: Narrow boats by Building H. The open area where Building F would be built is behind. Building B lies in the centre (source: Worcester Porcelain Museum).

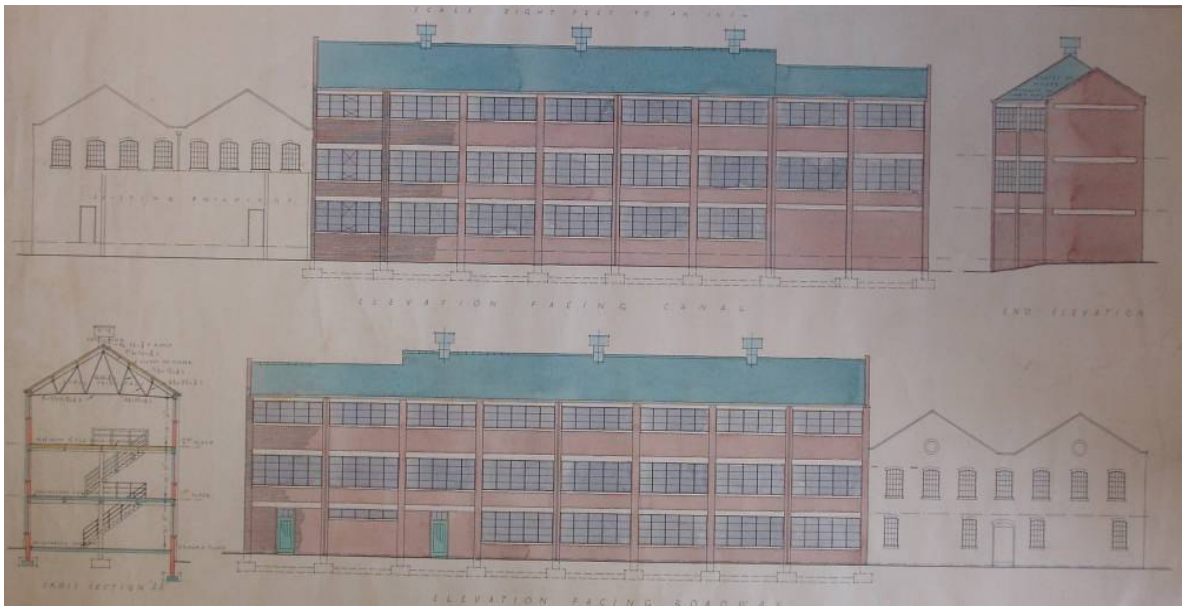

Figure 74: Building F Elevations

Top is the east elevation (facing the canal), bottom is the west elevation (facing Prince's Drive). The ghost image is Building H (source: 'Proposal for extension to warehouse [Building H]' Worcester Porcelain Museum Sam Cooke March 1935 20727/5).

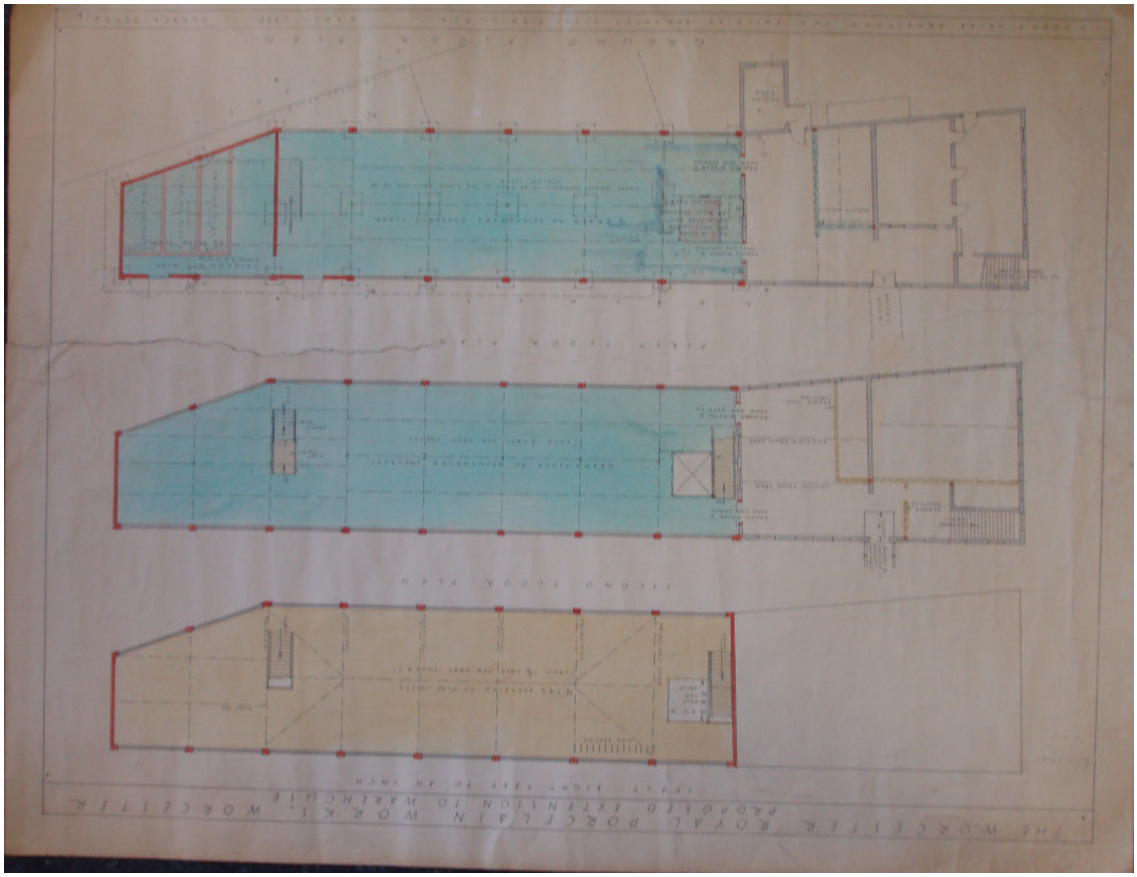

Figure 75 Plans of the three floors to Building F

(Top: ground floor, middle: first floor, bottom second floor. North is to the left (source: 'Proposal for extension to warehouse [Building F]' Worcester Porcelain Museum, Sam Cooke March 1935 20727/5).

Figure 76: Building F (second floor) looking south-east

Figure 77: Looking into Building F from Building H ground floor. The ground floor of Buildings F and H were used for casting fireproof porcelain and laboratory wares.

Figure 78: Building F. Ground floor supports at the narrow north end adjacent to Building C1.

Figure 79: Building F second floor. Looking from the Building C1 end toward the south. On this floor porcelain tableware was cast.

History and development of Building H

The land on which Building H was to lie was purchased in August 1866 together with that part of the private road (later Prince's Drive) which led up to it from the north (Figure 80 – numbers 26 and 28) these were the lasting a patchwork of purchases made along the west bank of the Worcester & Birmingham Canal which began in February 1857 with the acquisition of an area for a coal yard to the south and in July 1957 with an area to the north (Figure 81).

Today a wall retains the west bank of the canal but in 1875 this was limited to enclosing the coal yard and the northern area shown in Figure 82. There were suitable gaps for access from the canal and road. In July 1876 payment was made of £147 6s 1d for the installation of a tramway and new wagons which was presumably for the transport of heavy raw materials from the canal.

By 1875, if not already built soon after August 1866, there was a Sagger House and clay pit on the plot which was specifically dedicated for these purposes (Figure 80 – number 26). At this time the building here was divided from the coal yard by a wall and appears from a contemporary illustration to have been a single gable-ended building (Figure 82).

As a sagger house this would have served the kilns opposite at Buildings G and E which had kilns at that time. The sagger house was a very important and often large building in a ceramics factory. Saggers were stacked inside the bottle kiln and protected the wares from the harsh direct heat. They had a short life-span and therefore constant production of new saggers was necessary. Saggers were made of rough clay or grog and some biscuit-fired pieces were ground down and reintroduced into the sagger clay. Figure 83 shows one end of this building which would have been consistent with the need to fire the saggers.

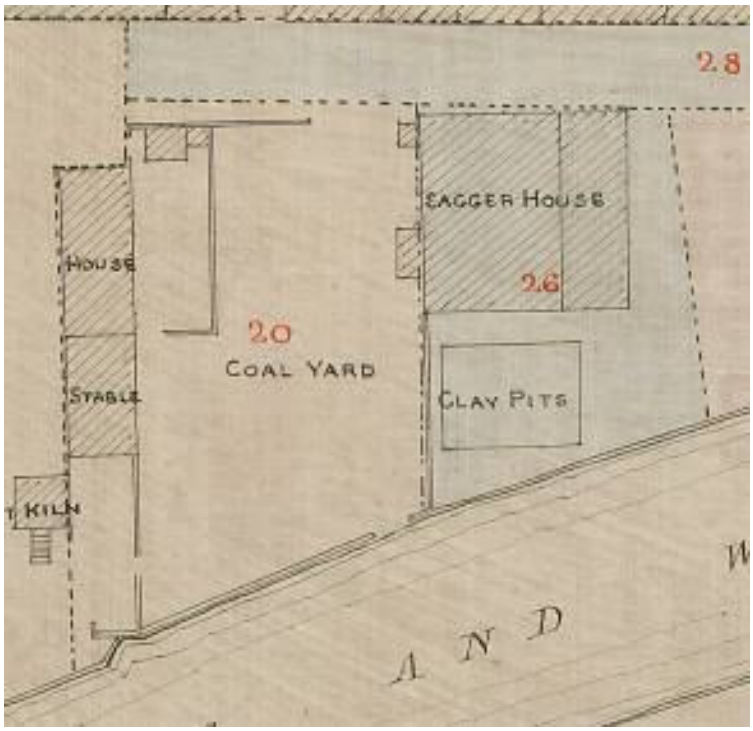

Figure 80: The site of Building H in 1875.The roof ridge may have been the line cutting through the building (source: Worcester Porcelain Museum 'Copied from the PLAN on the MORTGAGE dates 2 June 1875 and numbered and coloured to show the Title under which the various parts thereof are held')

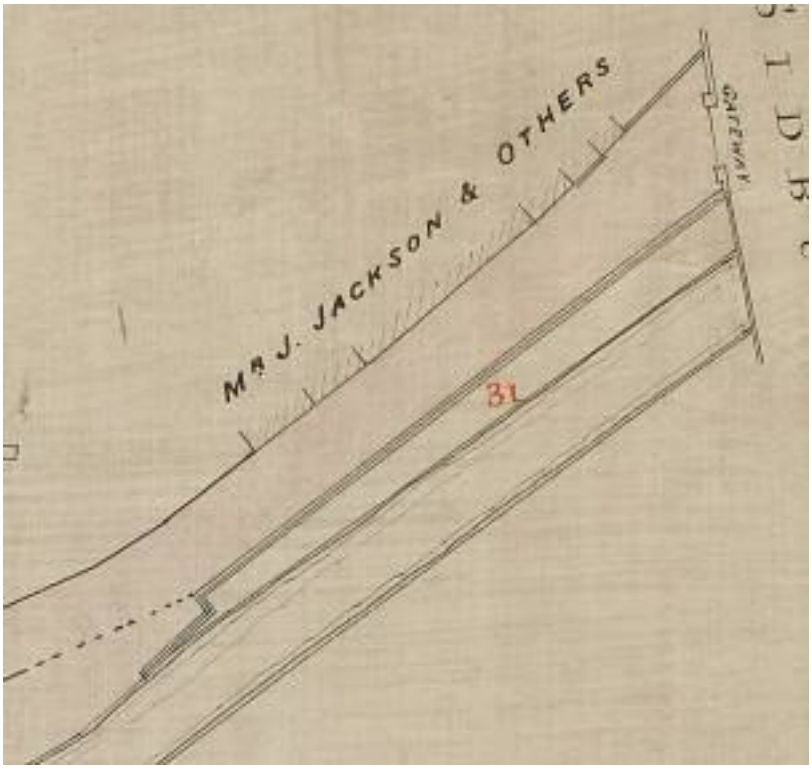

Figure 81: The northern part of the private road where it ran through the present car park to the north of the works, Number 31 shows the wall enclosing the area by the canal (source: Worcester Porcelain Museum. Copied from the PLAN on the MORTGAGE dated 2 June 1875 and numbered and coloured to show the Title under which the various parts thereof are held)

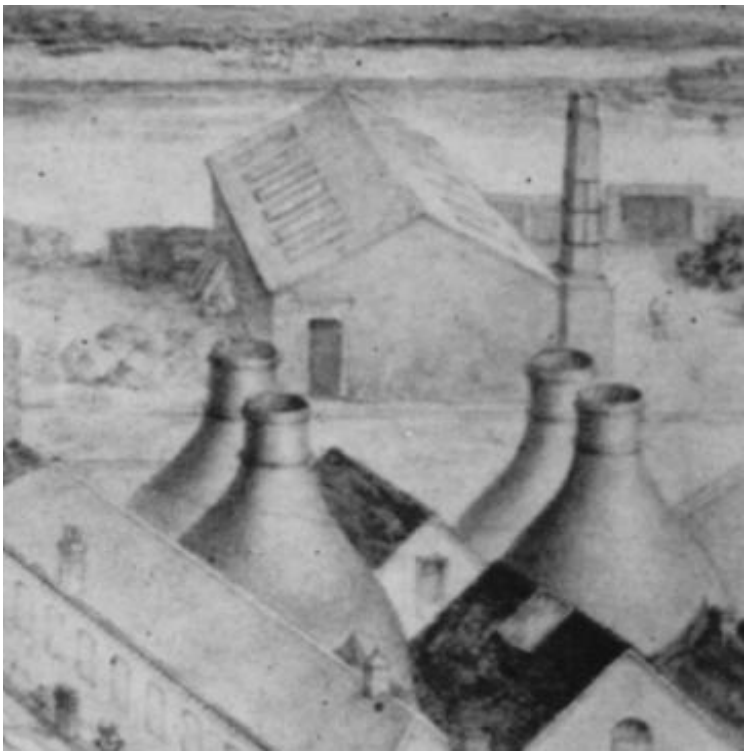

Figure 82: Detail from a picture of the 1860s showing a building on the site of Building H. (source: Worcester Porcelain Museum)

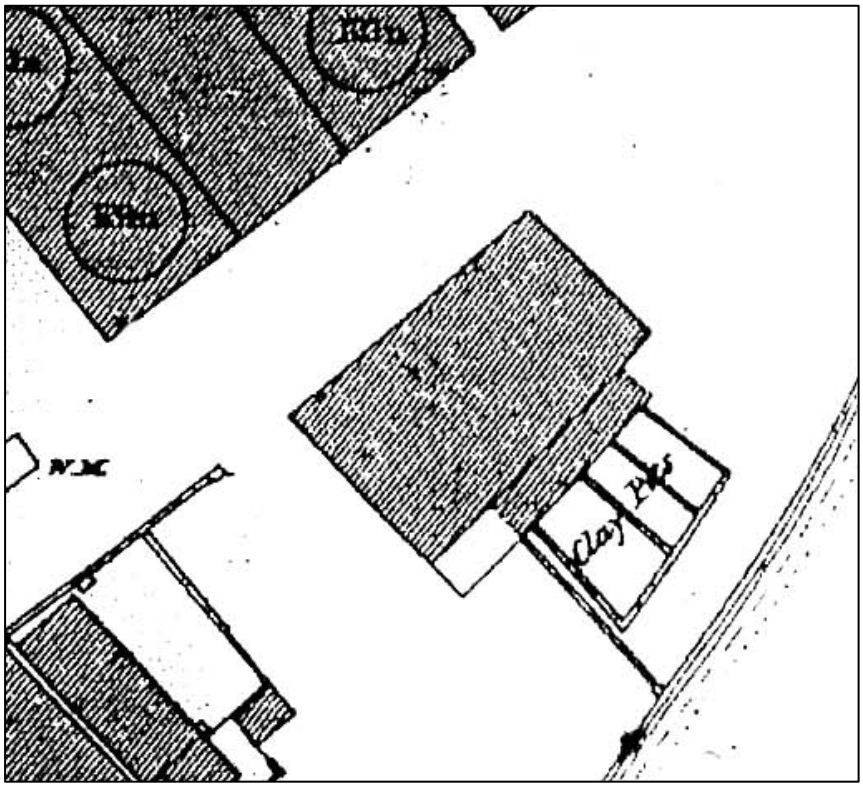

Figure 83: Building H in 1884. The southern limit can be compared with by the wall running close to the clay pits (source: Ordnance Survey 25in to 1 mile enlarged).

By 1884 (Figure 83) the footprint for the building appears the same but in fact comparison with Figure 80 shows we have by then a building which extends further south beyond the boundary wall into the coal yard. All in all the 1884 building appears to be a replacement although there is a possibility that the northern part was retained and absorbed. This supposition is based on the convention used on Figure 82 which suggests that the gable was asymmetric – shorter and steeper at the north (the retained part).

The 1884 modified building is more clearly shown in Figure 84 dating to 1898. Here we can see what is probably the double ridge without the valley with the northern ridge matching that shown in Figure 80.

Finding an architect for the 1875 to 1884 Building H is based on stylistic considerations. Buildings K1 and Q were built by Thomas Sutton in the late 1880s and, although later than H have similarities such as engineering brick sills, cast-iron window frames and round-headed windows.

The new building was probably used as a white glost warehouse. Glazed white bone china and porcelain tableware was stored in large quantities, stacked on the floor and on some shelving. The wares would only be decorated as the company received orders. Any number of patterns could be applied to a particular shape.

Figure 84: Building H and the clay pits in 1898. The divisions are suggested as the ridges to each range (source: Worcester Porcelain Museum)

Historical development of Building I

Building H was built before 1875 as a Sagger House[32] and there were clay pits to the east which are more clearly shown on the 1884 OS map (see Figure 83). On this source a small extension to H can be seen projecting into the area where Building I would lie. In 1936 there was a small extension to the east of Building H[33] which probably equates with that shown in Figure 83. This was replaced by the present building by 1940 (Figure 85).

32 Schofield's Insurance Plan of 1936 (Worcester Porcelain Museum)
33 Sam Cooke's Revised Plan of 1940 No 60 (Worcester Porcelain Museum)

Figure 85: Building I (60) (source: Revised Block Plan Sam Cooke January 1940, Worcester Porcelain Museum)

This single-storey building was erected by Messrs Steatite & Porcelain Products Ltd at a cost of £800 as a 'Faradex' Body Preparation department. The building was transferred back to Royal Worcester's use in July 1945[34] and, as we have seen, it was integrated into the complex made up of Buildings F and H in 1946 when it was used for manufacturing laboratory ware and fireproof porcelain production.

A lavatory block was built to the north of Building I. The proposal for these is shown on Figure 85 – number 62 and on Figure 86.

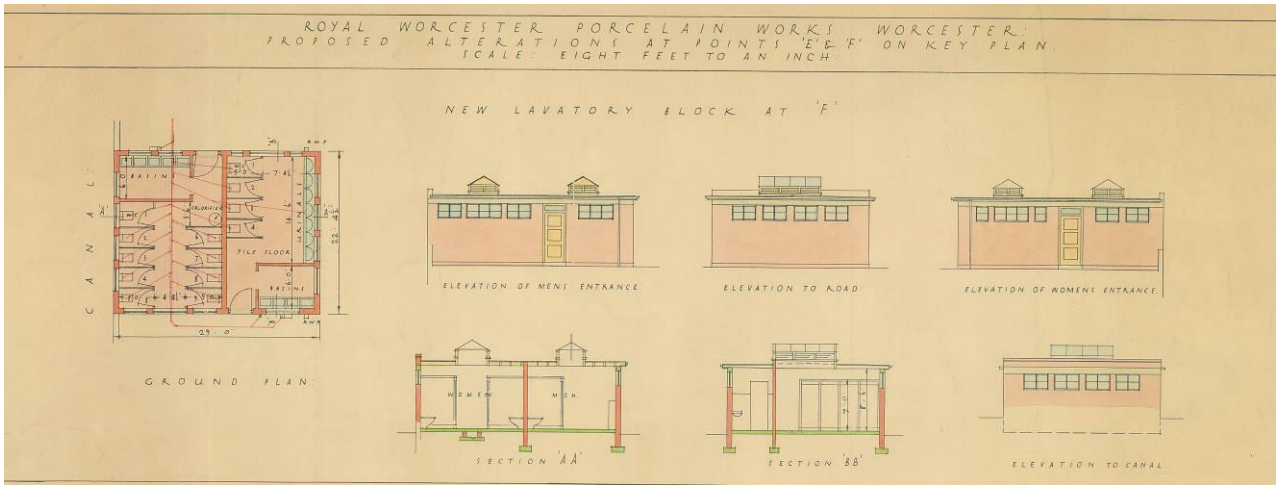

Figure 86: Plans for the lavatories in 1934 (source: Worcester Porcelain Museum)

34 Minute Book 379 (Worcester Porcelain Museum)

Bibliography

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Tomlinson, Charles (editor), 1851	Cyclopaedia of Useful Arts, London