ENGLISH HERITAGE

ARCHITECTURAL SURVEY REPORT

MUMFORD'S FLOUR MILL

23-25 GREENWICH HIGH ROAD

GREENWICH

LONDON SE10

Surveyed: August 1999
Report by Jonathan Clarke
Drawings by Andrew Donald
Photographs by Sid Barker

NBR No: 103201
NGR: TQ 3752 7698
Grade II Listed

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Architectural Survey and National Monuments Record **London Office**: 55 Blandford Street, London W1H 3AF
Tel: 0171 2088200 **email**: london@rchme.gov.uk

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SUMMARY

Throughout Europe and beyond, the late 19th century witnessed a revolution in flour milling, involving a radical transformation in the technology, work organisation and location of one of the oldest of industries. This changeover from traditional stone milling to roller milling was accompanied by an increasingly ambitious approach to architecture that matched the escalating sophistication and ingenuity of the machinery within; technology and architecture were parallel mediums to be exploited in an ever fiercer commercial environment. By 1897 Mumford's Mill boasted a visually arresting and technologically sophisticated grain silo designed by Aston Webb, one of the most renowned and accomplished architects of the era and fitted by Henry Simon, the leading roller milling engineer in the country.

The site of Mumford's Mill on the south bank of Deptford Creek – the tidal stretch of the River Ravensbourne – represents over two centuries of complex, accretive development. Allegedly built in 1790 as a tidal-powered, timber-built flour mill, the earliest surviving components are of brick, comprising an early-19th-century site office and two early-19th-century three-storey stone-grinding flour mills, here called the East Mill and the West Mill. Documented build dates of 1802, 1817, and 1821 may relate to these three blocks. The East Mill, which was originally of 11 or 12 bays length, was subsequently raised a further storey, and the southern end bay partially rebuilt as a tower, possibly housing a steam engine. The West Mill was also raised a further two storeys - possibly in two discrete episodes. Finally, the East Mill's west side was raised a further storey, bringing the yard elevations in line with one another. The last of these alterations, which probably relate to the partial changeover to roller milling, may tie in with Webb's first recorded involvement with the mill *c.*1879.

The most dramatic change to the complex came in 1897, when a huge grain silo was built to the elaborately Italianate designs of Aston Webb. Facing the creek and probably replacing an earlier granary, this edifice exploited advanced techniques of internal metal framing, comprising a grid of rolled-steel beams supported at their intersections by cast-iron columns to produce robust 'fireproof' structure. Although little direct evidence of the mechanical plant survives, this was equally progressive: manufactured and fitted by Henry Simon Ltd, whose firm was responsible for the greatest number of roller installations nation-wide. The construction of the silo was probably accompanied by the insertion of steel-framed floors in the East Mill, for the support of heavier roller-milling machinery, and the creation of a larger wheat-cleaning wing, also internally supported by steel members. Twentieth-century changes include the raising of the wheat cleaning wing, the adoption of electric power and the construction of ancillary buildings, including a mess room, smithy and garage.

Mumford's Mill is of considerable interest for a number of reasons. In the context of industrial history, it provides a palimpsest of structures that document the impact that the late-19th-century revolution in roller milling had on traditional practices. Late 19th-century flour mills are an obsolete, poorly understood, and fast-disappearing class of building. From an architectural historical perspective the interest resides not only in relation to the formative development of Sir Aston Webb, but as an example of how the field of industrial building design could attract leading architects more typically associated with 'polite' buildings. Allied to this, from a construction history viewpoint, Mumford's Mill is illustrative of an emerging narrative which places the take-up of increasingly sophisticated techniques of internal steel framing in the late 19th century, anticipating the full steel framing of the early 1900s.

PREFACE

This survey report results from building recording carried out by the Architectural Survey (London) section of English Heritage, under the framework of its emergency recording programme. English Heritage gratefully acknowledges the occupiers, owner and estate agents of Mumford's Mill , especially Raphael Maklouf of Tower Mint Limited, and Mark J. Maynard of Humphreys Skitt & Co. English Heritage would also like to thank the staff of Greenwich Local History Library, and Ian Dungavell for providing some useful references on Aston Webb. David Perrett and Dennis Smith provided useful insights. The assistance of John Hardy, Conservation Officer at the London Borough of Greenwich is also gratefully acknowledged.

For English Heritage Jonathan Clarke was responsible for the building recording, including documentary research, as well as for the text and layout of this report. Andrew Donald undertook measured survey and produced the drawings, and the large-format photographs are by Sid Barker.

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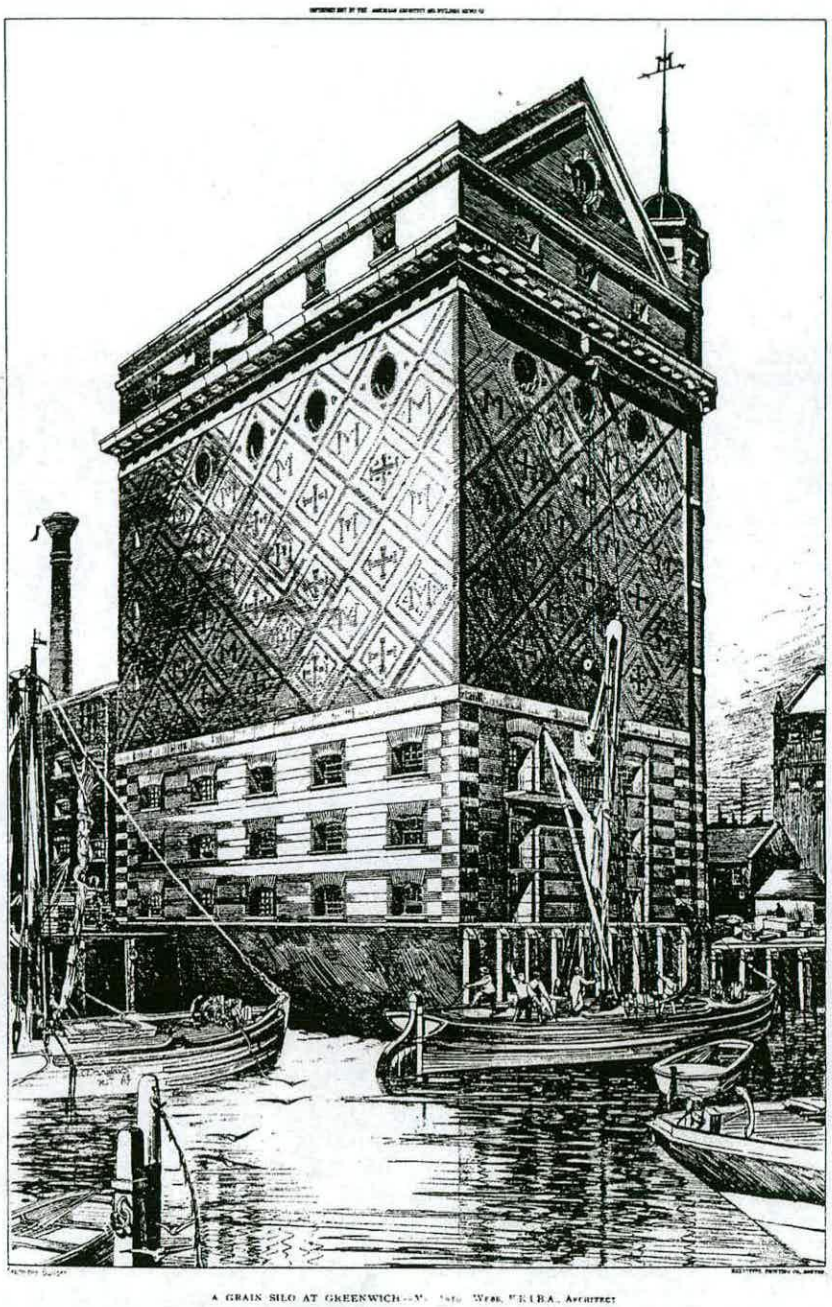


A GRAIN SILO AT GREENWICH.—W. [illegible] Webb, R.I.B.A., Architect

Fig. 1 – Grain silo at Mumford's Mill, Aston Webb, architect, from the north east, as depicted in the The Builder *and* American Architect and Building News *in 1897.*

The construction in 1897 of a towering, visually arresting and technologically sophisticated grain silo on Deptford Creek represented both the prosperity of an established local family firm of flour millers, and its close working relationship with the renowned architect Aston Webb. For Samuel Pretyman Mumford, head of the firm of S.P. Mumford and Co., it perhaps also signalled, in suitably attention-grabbing form, the final, complete changeover from traditional stone milling to roller milling at his Deptford mills – part of a radical transformation in the technology, location and work organisation of flour milling that swept

through Britain in the last two decades of the nineteenth century. For Webb, who had already designed a house on the Isle of Wight and rebuilt part of an earlier mill on the same site for Mumford, it perhaps provided his most ambitious project to date for a longstanding client.

The Mill: 1790 to 1897

The brothers Samuel (father of Samuel Pretyman Mumford) and Peter Mumford were already an established firm of millers and granary keepers (operating as S. and P. Mumford) when, in 1848, they acquired an old flour mill fronting Deptford Creek, the tidal end of the river Ravensbourne. It is uncertain when they set up in business, but prior to their move to Deptford, they worked a flour mill further inland on the Ravensbourne at Catford Bridge from *c.*1837 to 1847,[1] and a granary at Newcastle Street, off the Strand.[2] The circumstances regarding the construction and original ownership of the Deptford flour mill, built 'entirely of timber in 1790', are unclear, but prior to the Mumfords' acquisition, it had been worked 'for many years' by Mr John Carpenter, 'a very noted London miller in his day'.[3] An earlier owner was probably Charles Ritchie, who, according to the Greenwich rate books was rated for a new dwelling house from 1802, a mill from 1817, and for two mills from 1821.[4] John Carpenter may thus have taken over the mill in the 1820s, subsequently conveying it to a relative, for the *Pigot Directories* for 1832 and 1839 show that it had passed into the ownership of William Carpenter. Whether the Mumford brothers effected any changes to the mill following their acquisition of it in 1848 is unclear, but following Samuel Pretyman and Charles Mumford's succession to head of the firm by 1870, alterations, and possibly technological improvements, were made.[5] In *c.*1879, Aston Webb (1849-1930), who had set up in private practice in 1874, designed 'a granary at Deptford' and 'steam mills at Greenwich'.[6] Almost certainly one or both of these structures related to the Deptford Creek site (the confusion in localities, which persists today, perhaps resulting from it being sited at the edge of the two administrative areas), for contemporary accounts of an outbreak of fire on 27 Feb. 1880 record that it affected only the recently completed portions:

> The fire, which originated in the grain cleaning and smutting rooms, was discovered by a policeman . . . The building, which was but recently erected for grain cleaning and storing purposes, contained five floors 40ft by 15ft... the four upper floors were burnt out, but fortunately the flames did not extend to the mill immediately adjoining, separated by a fire-proof wall, or the result would have been more disastrous.[7]

> . . . About a quarter to three on Friday morning an alarming fire was discovered to have broken out in the recently added portion of Messrs. Mumfords flour mills, at Deptford Bridge, the position of which is marked by the conspicuous chimney shaft erected eight or nine months ago and shortly afterwards deemed dangerous, and, being apparently cracked, was subsequently encircled by a number of bands or belts to strengthen it. The new building, we are informed, was erected on an improved fire-proof principle, which, as it turned out, was most fortunate. The adjoining portions of Messrs. Mumford's premises on the Deptford side, built entirely of wood, and the immediate contiguity of the immense stacks of timber on Messrs. Trenehard & Smith's wharves rendered the outbreak doubly alarming… Fire...completely gutted the building in little more than an hour. It was fortunately confined to the new portion of the building, and although showers of sparks were continually rained upon the adjoining wooden buildings and timber, no extension of the conflagration resulted... We are informed that some valuable machinery lies buried in the ruins, but we understand the whole of the property is insured.[8]

Fire, the prevention of which was of obsessional interest to flour-mill owners and designers, again blighted the complex three years later in July 1883:

> On Tuesday night a portion of the large mills of Messrs. Mumford & Co., flour millers, of Greenwich-road, Greenwich, became engulfed. The building was one of six floors; the two upper floors were in flames when the brigade arrived, and they were destroyed . . . [9]

> As the wheat-cleaning department was isolated by iron doors from the mill proper the latter did not suffer from the flames, and in consequence the business operations of the firm will not be seriously interrupted. The two floors of the wheat-cleaning department were burnt out, and a portion of the roof injured; and although the cause of the fire is not known, it is supposed to have originated in the smut room; but fortunately the Messrs. Mumford were insured.[10]

Webb, in his nascent career as a flour mill designer, was clearly interested in methods of fire-prevention, as the following abstract from a paper by William White on 'Fireproof closing of openings, in relation to the Metropolitan Buildings Act', given at a RIBA meeting, shows:

> he had been told by Mr Aston Webb that on two occasions of a fierce fire in the smutting-room of a mill at Deptford, which was thoroughly burnt out, the ordinary iron doors fitted in this manner [door fitted into a rebated frame, so that no draught could pass around the edges] effectually resisted the communication of fire to the adjoining division of the building, although in each case one of the doors was found to be warped out of its rebate. This doubtless took place on cooling, when the worst of the danger was passed.[11]

Whether the mill was simply rebuilt to Webb's designs of *c.*1879 following the two fires, or whether the original (1790) and possible early-mid nineteenth century components were also supplanted by new structures built along more fire-resistant lines must remain speculative, but it seems likely that the complex was at least partially fitted with Simon roller plant *c.*1880 - 1883.[12] At this stage, during the development phase of roller milling nationwide, Messrs. Mumford & Co. were probably running a combination mill employing both stones and rollers. Bit-by-bit replacement of gradual-reduction stone milling with the new technology enabled millers to increase roller capacity slowly and cautiously at less risk to their business, since design problems could be ironed out empirically.[13]

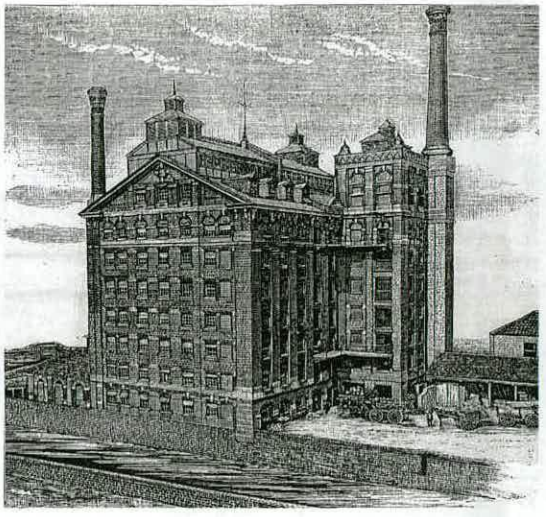


Fig. 2 – J. & H. Robinsons' Deptford Flour Mills, as illustrated in The Miller *in 1887.*

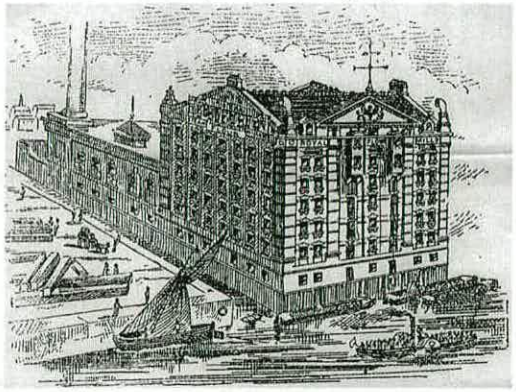


Fig. 3 – The Royal Flour Mills, Albert Embankment, as illustrated in The Miller *in 1887.*

A neighbouring and rival, concern Messrs. J. & H. Robinson's Deptford Bridge Flour Mills, which was totally destroyed by fire in 1881, was rebuilt and fitted up with a combination roller mill and millstone system at this time.[14] (Fig. 2). In 1883, according to *The Engineer*, 'the great rush in roller milling set in', and the following year saw Seth Taylor, the largest remaining stone miller in London and a (former) keen advocate of stone milling, change over to complete roller milling using Simon machinery.[15]

By 1883 Webb probably already had the benefit of experience of converting older stone milling buildings to roller milling. Peter Mumford, who entered into business on his own account in 1866 as a miller in Bermondsey, appears to have been the most technologically adventurous of the family. In *c.*1878[16] he removed to The Royal Flour Mills, situated near the southeast end of Vauxhall Bridge. This building of 1873[17], long demolished, was credited by *The Miller* as presenting 'unusually good architectural features' and forming 'an important feature on the Albert Embankment' (Fig. 3).[18] It was probably in concert with his removal to The Royal Flour Mills that Peter Mumford employed Webb to furnish the complex with a vast silo system, 'erected on the most approved lines', and to effect the necessary structural changes necessary for replacing the existing millstone system with a plant of Ganz roller mills. These changes took place 'at a time when the typical British miller scarcely knew what roller milling meant'.[19] On its report of his election as president of the National Association of British and Irish Millers[20] in April 1895, The *Miller* named Peter Mumford as one of the pioneers of roller milling in England.[21] The Royal Flour Mills was subsequently another casualty of a conflagration, when in January 1892 the smutter room on the fifth floor and the air shaft to the roof exploded in flames, brilliantly lighting up the Thames.[22] In the wake of the fire, Peter Mumford installed an automatic sprinkler system and founded the National British and Irish Millers Insurance Company, under his own chairmanship. This company issued policies only to those premises protected by approved sprinkler installations, for which owners enjoyed liberal reductions in their rates.[23]

The Silo of 1897

In 1897, therefore, when Webb designed the huge new grain silo fronting Deptford Creek for S.P. Mumford & Co., he was ably versed in flour mill architecture.[24] Although one source suggests he 'completely rebuilt' the entire mill complex,[25] both the structural evidence of the extant buildings, and Webb's published drawings indicate that he was involved principally with the silo building at this date, effecting only minor changes to the earlier brick structures to integrate them into the modified flow of working. The towering scale and decorative handling of the silo - the diaper brickwork incorporating huge 'M's and potent crosses since obscured by accumulated grime - was surely a mighty proclamation of the company's prosperity (Fig. 4). An illustration of the silo exhibited at the Royal Academy (Fig.1) induced one architectural journal to comment 'The view shows how broad surfaces of brickwork, unbroken except by a few openings, may be relieved; the bold stone cornice is a feature, and altogether we are conscious of an unpromising subject cleverly handled'.[26] *The Builder*, in characteristically sober mode when discussing industrial buildings, saw it as 'a good example of the application of architectural treatment to a utilitarian structure'.[27] Viewed from the creek, where rival concerns were located, this neo-Renaissance pile barely hinted at the technological sophistication within: only the steam powered grain elevator, poised to scoop rapidly the un-bagged, loose wheat from barges into the building, where it was automatically weighed and partly sifted before being dropped into the capacious brick bins, perhaps betraying industrial origins. All of this plant was supplied by Henry Simon - the foremost engineer in the roller milling transformation, responsible for the greatest number of roller installations nationwide[28]- who used an exterior photograph of Mumford's Deptford silo to advertise the 'Simon Roller Milling System'. This long running, full-page advertisement appeared in the technical press and boasted 'Complete Automatic Equipment of Grain Silos with Ship Elevators, Band Conveyors, Weighing Machinery, Wheat Receiving Plant, and Stationary Elevators'.[29] It seems logical to suppose that some or all of the pre-existing 'Simon' roller milling machinery in the rest of the complex was upgraded or replaced at this point, to match the scaled-up storage capability and the attendant capacity for continuous rather than intermittent production. Certainly, it seems highly likely that 1897 witnessed completion of the changeover from combination milling to fully integrated roller milling at Mumford's Mill.

Fig. 4 – The Silo as it appeared in 1999, viewed from the north-west (EH, 07/09/99).

When the grain silo was erected, Samuel Pretyman Mumford had practically retired from business, the managing partner of the firm being George Spicer. S.P. Mumford died in December 1901, and the obituary in *Milling* lauded his firm for having established 'an excellent reputation among metropolitan millers, and their household flour has become a household word with bakers'.[30] Mumford lived for most of the year in a house named 'The Briary', in Cowes , Isle of Wight, which Webb designed in 1886. To one architectural journal, the design of this house was generally agreeable, but it nevertheless saw the architecture of the gaping bay-window openings 'as rather akin to that of the speculative villa'[31]; this particular feature was, however, executed on Mumford's instructions. Webb subsequently went on to design the Yacht Club, Yarmouth, Isle of Wight, in 1897,[32] the work possibly arising from his association with Mumford, who was an ardent enthusiast of yachting.

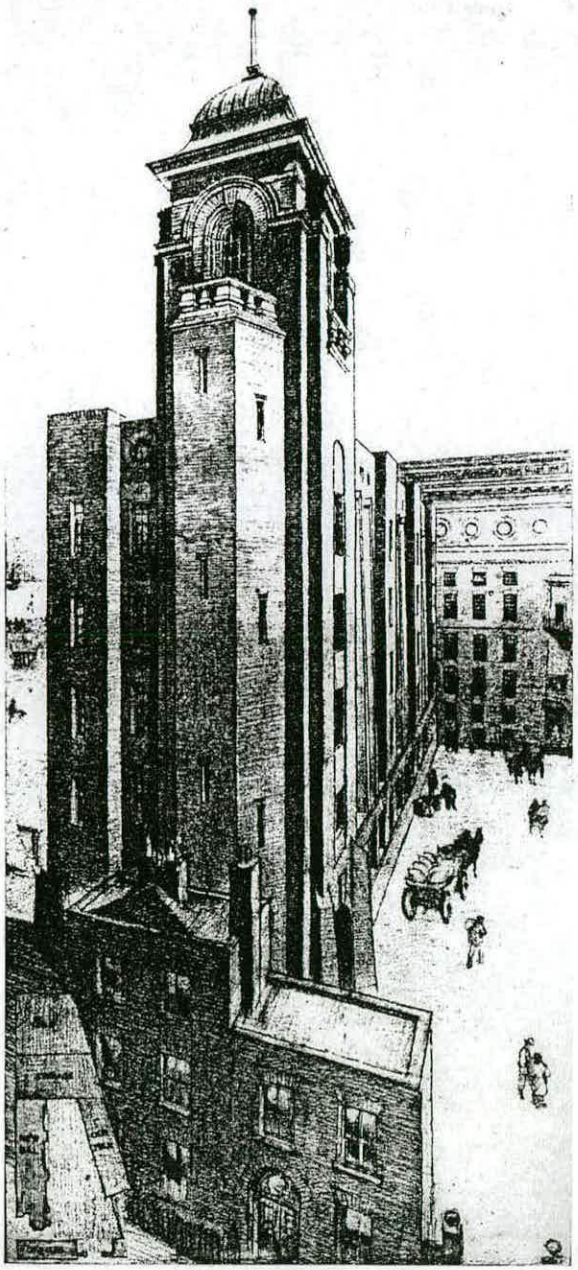


Fig. 5 – Aston and Maurice Webb's proposed (1919) addition to Mumford's flour mill, as illustrated in The Builder *in 1919.*

20th Century

Webb's involvement with the Mumford enterprise did not end with the construction of the grain silo at Deptford. In 1919 drawings depicting proposed additions to Mumford's Flour Mills were exhibited at the Royal Academy, and in the following year at the Royal Scottish Academy. Contrived by Sir Aston Webb - President of the R.A. in 1919-24 - and his son, Maurice E. Webb, this ambitious scheme (Fig. 5) was never executed.

S.P. Mumford & Co.'s (unfulfilled) expansionist plans were perhaps matched by their seeming involvement in improving milling machinery at this time. The sixteenth edition (1920) of Henry Simon Ltd.'s 'Modern Flour Mill Machinery' catalogue featured two machines designed to be employed in the preliminary cleaning stages of the milling process, each with a 'Mumford Patent'. These comprised 'The "Reform" Combined Washer, Stoner, and Whizzer', and 'The "Reform" Whizzerless Washer and Stoner' - the latter sagaciously devised for those millers who already had whizzers, could be easily linked-up via an inclined rinsing worm (Fig. 6).

The changing fortunes of S.P. Mumford & Co. through the rest of the twentieth century probably mirrored that of other small and medium sized mills that had initially prospered because of the technological transformations of the late nineteenth century, but which subsequently became victims of government deregulation, the predatory strategies of larger firms, and the Post-1945 fall in demand for

home-produced flour. In 1880 it was estimated there were about 10,000 mills in Britain, mostly powered by wind or water; by 1917 this number had diminished to 1,000, of which about one quarter accounted for 90 per cent of the total flour production. By the First World War a number of highly mechanised firms, gaining from economies of throughput and scale, had risen to prominence and grew further through internal expansion and acquisitions in the 1920s. By the late 1920s Rank, Spillers, and the Co-operative Wholesale Society between them were producing about two-thirds of the flour in the United Kingdom. In 1929 Rank and Spillers - responsible for nearly half the UK's milling capacity - and other large firms in the industry, formed the Millers' Mutual Association (MMA), a highly secretive organisation which benefited, through price fixing, the biggest, most efficient firms.[33] An alternative organisation, The Association of Flour Millers, was formed in 1930 to represent smaller concerns. Both S.P. Mumford & Co. and J. & H. Robinson's were members, but this Association was bought out by Rank in the 1930s.[34] Rationalisation and pruning out of the weaker mills in the industry continued through the mid-twentieth century, compounded by the post-war rise in living standards and the accompanying switch to foodstuffs other than bread/wheat. By the 1960s, the dominant position of Rank Hovis McDougall and Spillers was consolidated, reinforced by their integration into baking, and by the integration of the large baking group, Associated British Foods, into flour milling to ensure its source of supply. Concomitant technological changes - faster milling machines, electronic control, more sophisticated pneumatic conveyancing and bulk transportation systems - further benefited these three groups, which diversified more widely into other foodstuffs. The 1960s and 1970s effectively saw the expiration of those smaller mills that had clung on thus far.[35] S.P. Mumford & Co. survived until the mid-1960s by specialising in cake flours. The Deptford Bridge Mills of J. & H. Robinson Ltd. a few years longer.[36] Mumford's Deptford mills, including the surviving plant, was probably re-used for a short time for similar processes, for the 1967 Kelly's Post Office Directory records the building's use by Youma Ltd., malt products manufacturers. From 1969, however, the same source records the use of the building by a succession of non-related, light industrial concerns, including machine tool merchants, tube fittings manufacturers, precision instrument makers and sign manufacturers. Currently the building is partially occupied by a small number of enterprises, including souvenir coin minters.

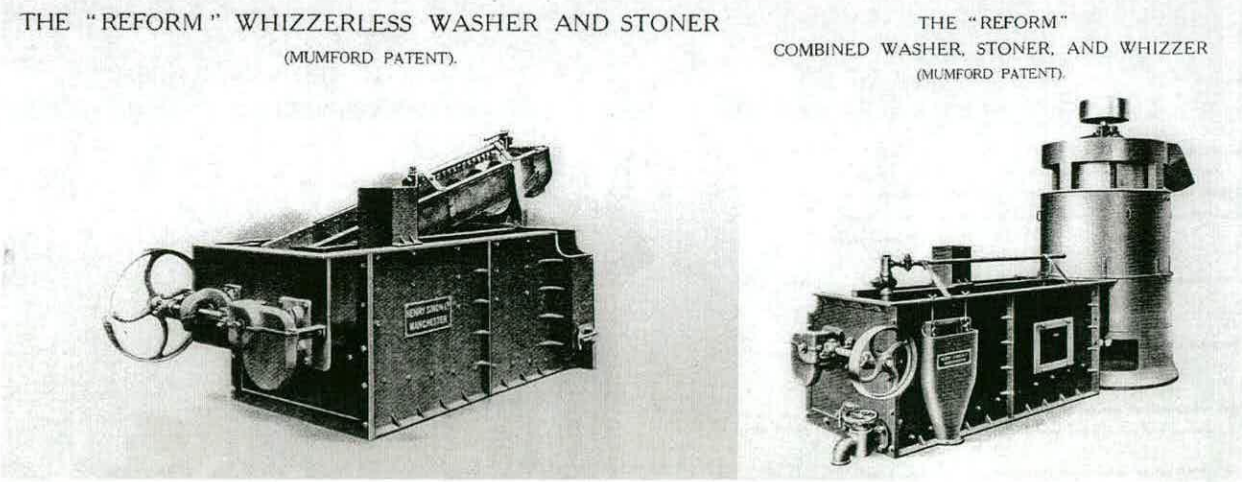


Fig. 6 – Two wheat cleaning machines devised by a Mumford and manufactured by Henry Simon Ltd.

SITE DEVELOPMENT AND OUTLINE PHASING

Viewed from the Creek, Mumford's Mill is seemingly composed almost entirely of the grand silo building of 1897. Ranged behind this, to the south-east, are groups of brick buildings, both contiguous and detached, that document the complex, accretive development over the last two centuries. The site enclosed a private yard and was bounded to the north by Deptford Creek, to the east by a timber yard, to the west by Ravensbourne Wharf and to the south by Greenwich High Road (Fig.7). Analysis of the surviving buildings in conjunction with cartographic evidence indicates that by the early 19th century, an L-shaped range of contiguous buildings consisting of two mills, a presumed granary and, other, unidentified components had developed along the northern and eastern boundaries of the site. In the southern part of the site, offices and iron gates controlled access into the yard from which all the buildings were entered. Through the early-mid 19th-century, the buildings on the site took on an inverted U-shape plan, as further wings and buildings were erected for ancillary processes. Many of these components, including an attached rectangular structure projecting eastwards into the timber yard, what may be a reservoir in 1867

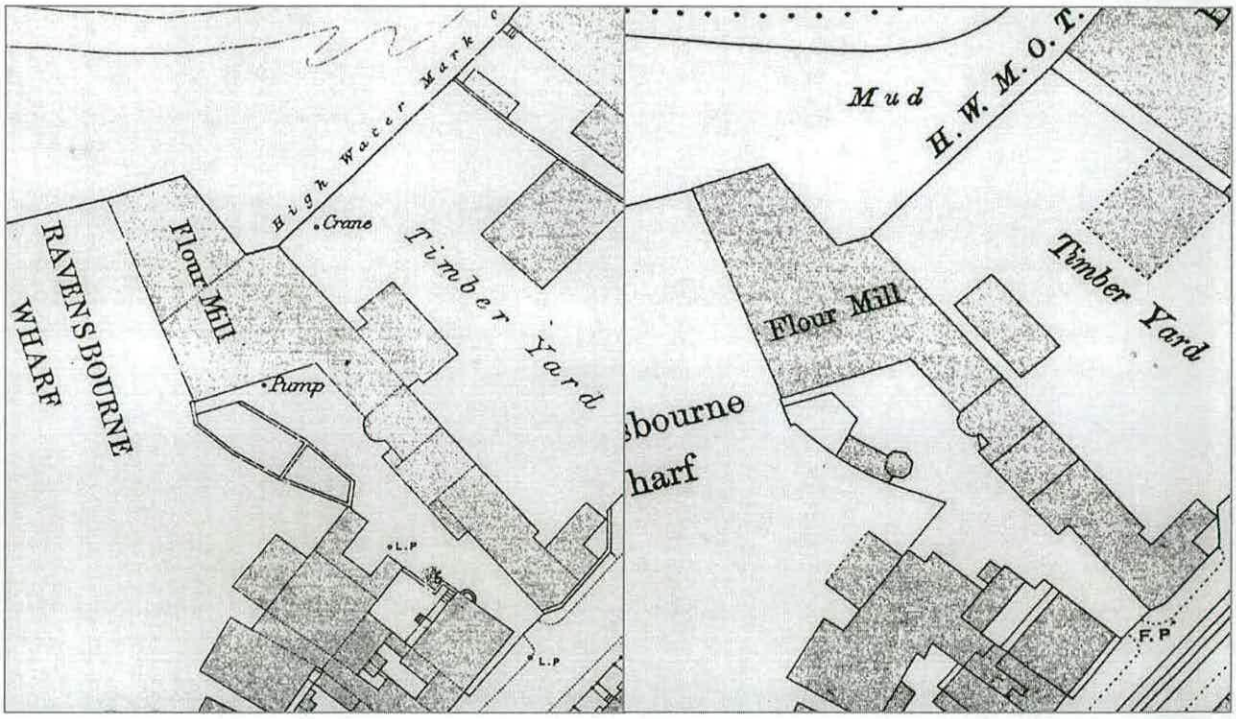


Fig. 7 – Ist and 2nd edn. 1:1250 Ordnance Survey maps: left hand side surveyed 1867; right hand side surveyed 1894.

and a boiler house in 1894 have been demolished. The interpretation of these earlier buildings lacks good documentary evidence - original drawings or property deeds, and leaves many questions unanswered, including the identity of Webb's earlier work on the site. What is clear is that nothing survives of the original timber-framed mill of 1790, nor indeed any of the other timber components of the complex perplexingly referred to in the newspaper reports of the early 1880s. Further, no machinery associated with flour milling survives. However, the surviving fabric and structure of the buildings does document a story of piecemeal, gradual growth and adaptation beginning in the early 19th century, punctuated by the late 19th-century building of the grain silo and re-flooring of the earliest surviving block, and ending with minor alterations, additions and demolitions in the early-to-mid twentieth century. Internally, the rate of technological change is likely to have run a faster course, the machinery being

replaced on a regular basis and modified process flows and complete re-fits periodically effected. Such ephemeral though technologically significant changes have left little in the way of tangible, intelligible evidence; consequently detailed discussion of the functional arrangements and working processes is limited.

Fig.8 – The East Mill from the West (EH, BB99/09864).

The earliest surviving components, two five-storeyed buildings (named here East Mill and West Mill), formerly abutted a large building in the northern part of the site. This building, which was presumably demolished when the silo was built in 1897, probably fulfilled a similar function to its (larger) replacement, receiving and storing grain and fuel delivered from the river. The East and West Mills were probably built as (stone-grinding) flour mills, the West Mill sub-divided by a full height fireproof cross wall to incorporate a one-bay wheat-cleaning wing. Structural evidence indicates that both mills were originally of three storeys, and that the West Mill post-dates the East Mill, which it abuts. Constructional and stylistic evidence suggests a likely date for this first phase in the early 19th-century, and the dates of 1817 and 1821 specified in the Greenwich rate books probably relate to the building of the East Mill and the West Mill respectively. The East Mill, which was originally of 11 or 12 bays length, was subsequently raised a further storey, and the southern end bay partially rebuilt as a tower, possibly housing a steam engine. The West Mill was also subsequently raised a further two storeys - possibly in two discrete episodes - and the East Mill, on its west side, a further storey, bringing the yard elevations in line with one another. The dating of these last alterations is uncertain, but may possibly tie in with Webb's first recorded involvement with the mill *c.*1879. The upper end bay of the East Mill was converted to be a water tower, perhaps along with the construction of an external boiler house by 1894, as indicated by an octagonal chimney stack and attached building (Fig. 7). The construction of the silo block in 1897 was probably accompanied by the insertion of steel-framed floors in the East Mill, for the support of heavier roller-milling machinery, and the creation of a larger wheat cleaning wing, also internally supported by steel members. Twentieth-century changes include the raising of the wheat-cleaning wing, the adoption of electric power - evinced by the depiction of a switch room on the Goad map, and the construction of ancillary buildings, including a mess room, smithy and garage.

The East Mill

The earliest surviving component of the mill complex seems to be the L-shaped block abutting the south elevation of the grain silo, gabled approximately east-west and north-south (Figs 7 and 8). A date of *c.*1817, when Charles Ritchie was rated for a Greenwich mill, seems entirely consistent with the appearance of the east and west elevations. The Goad fire insurance map of 1942 (Fig. 9) clearly

delineates this as a long, narrow mill building abutting the grain silo to its north, the West Mill to its west, and a warehouse block to the south. Viewed from the yard, the south and west elevations of this five-storey block present an ostensibly uniform appearance, despite a plethora of blocked and inserted openings, and other indicators of subsequent building activity. In fact, subtle differences in the fenestration of either elevation coupled with close inspection of the brickwork suggest that either arm of the L shape was built as a discrete block, probably within the space of only a few years of one another. The two blocks were linked at third-floor level by an external iron gallery, served by fireproof iron doors - probably added in the mid-late 19th-century. The broken-off stubs of the iron angles formerly supporting the gallery platform remain preserved in the East Mill, and three iron doors, inserted through the brickwork of either Mill remain *in situ*. This alteration is indicative of increased concern about fire, and was presumably accompanied by a reduction in the possible internal points of communication between the two mills.[37]

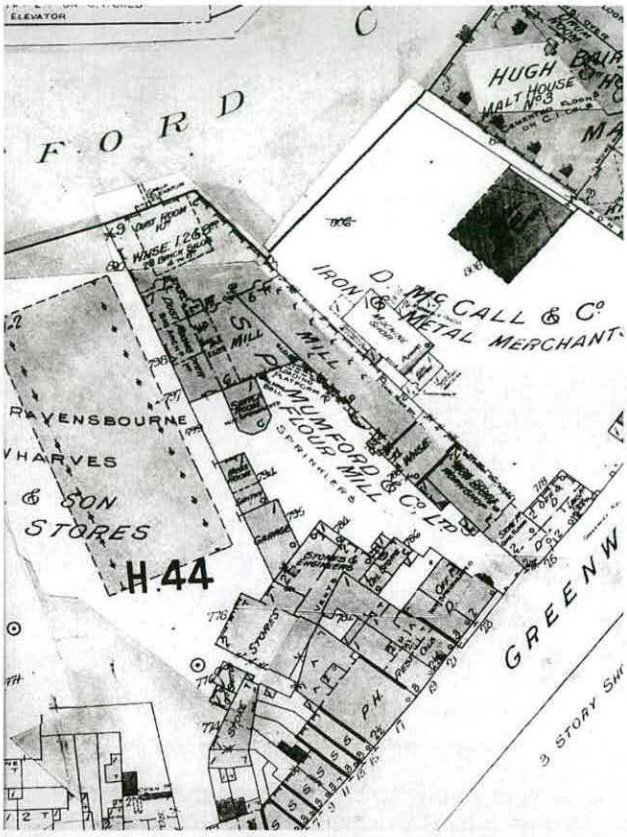


Fig.9 – Mumford's flour mill as depicted on Goad's fire insurance map of 1942 (resurveyed from 1891 original).

Exterior

The earlier of the two blocks is the East Mill (Fig. 8). That the East Mill is earlier than the West Mill is demonstrated by both the brickwork of the lower storeys of the south elevation, which is closed up in respect of the western elevation of the east block; and, more strikingly, by the presence of blocked windows in that portion of the west elevation of the East Mill which lies behind the West Mill (discussed below).

Only the southern part of the west elevation , and the majority of the eastern elevation (Fig. 8 and 10) are externally visible. Segmental-headed windows punctuate English-bond brickwork, and the west elevation has a two-storey bow with a window set over an architraved entrance. This bow window overlooking the yard probably lit a manager's or supervisor's office; the entrance is probably an early-20th-century rebuild of an earlier doorway. The original northern extent of this block is uncertain. The presumed

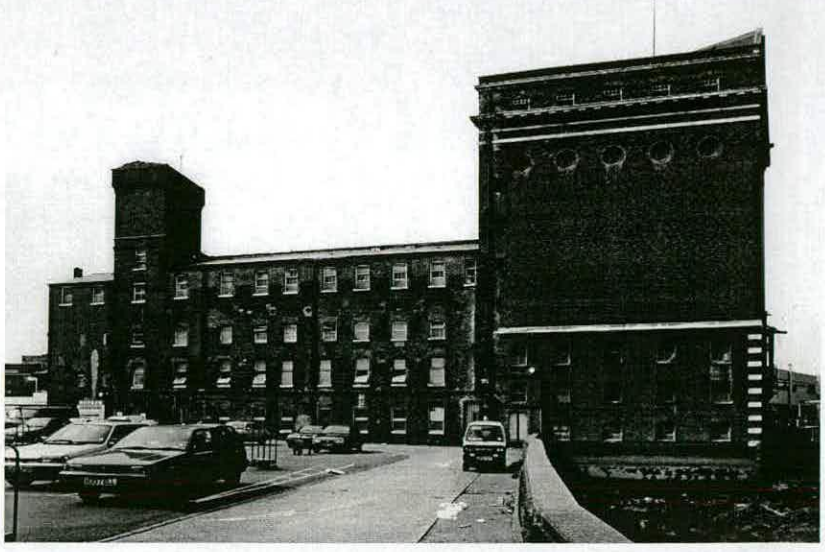


Fig. 10 – The east elevation of the East Mill, truncated to the north by the 1897 Silo, and raised to the south to create a water tower (EH,BB99/09872).

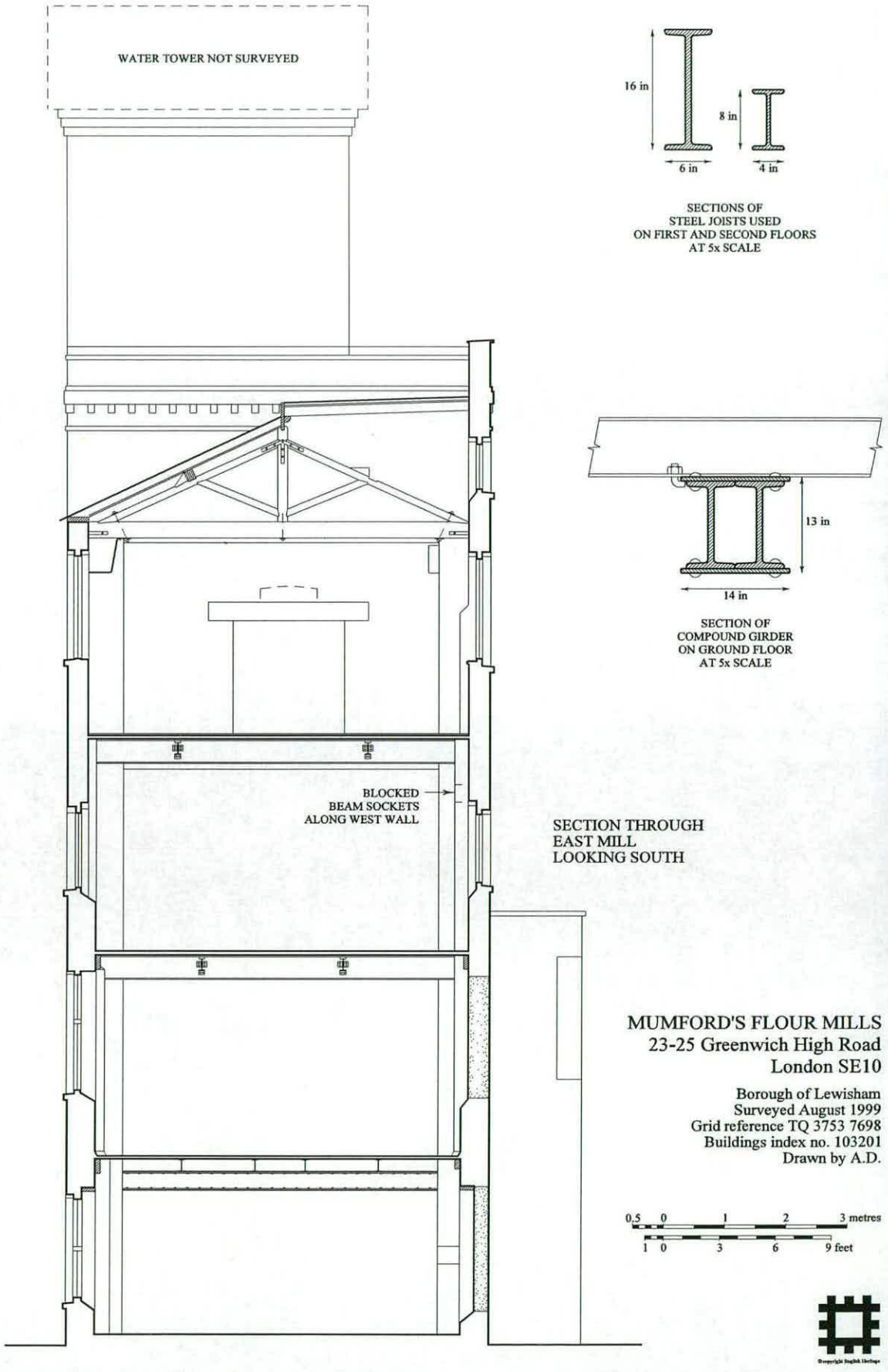
granary block to the north was entirely replaced by the silo in 1897, which occupied a larger 'footprint' to the south and thus obliterated the original internal dividing walls and end walls. It seems likely that the East Mill formerly extended northwards as far as the creek edge, marked on maps as the 'High Water Mark of Ordinary Tides' (Fig. 7). Despite an internal division immediately north of the first-floor bow window, the evidence of the exterior brickwork, and of internal divisions (see below) indicates that the water-tower block marked the southern bay of the East Mill.

The four-storey east elevation (Fig. 10) is one storey shorter than the west elevation. The eaves line of the east elevation is marked by rectangular spreader plates, set between the windows. These are mirrored on the west elevation, and the brickwork above this, incorporating shallow fifth-floor windows, and enlivened by string and dentil courses, is perceptibly lighter in colour. Examination of the interior of this attic space confirms that the western side of this space was raised to permit additional windows (see below). This alteration may have been made at the same time as the construction of the West Mill and the construction of the adjoining water tower block to the south, all of which are unified by identical string and eaves courses (see below). On the evidence of spreader plates alone, and of window heights and window-head form, it is likely that the fourth storey itself may be a later addition. The lower three storeys are characterised, on both elevations, by circular spreaders and by segmental window heads with heads of a stretcher-and-a-half depth (and gauged flat arches on the ground floor, only partially preserved on the west elevation). In itself this is a weak indicator of a separate phase, but coupled with the disproportionately greater height of the fourth floor windows (whose window heads are a single stretcher in depth), there is a more compelling case.

Interior

The interior of the East Mill, perhaps reached originally through double doors set below the bow window, or by doors in what became the water-tower block, preserves little of the early-19th-century structure. The original structure probably consisted of non-fireproof timber floors, formed from transverse timber beams supporting longitudinal joists on which the floorboards were laid. The narrow internal width of the building [(20.7ft (6.3m)] probably obviated the need for a central row of props, and ensured that the interior was fully lit by the windows. The principal change has been the replacement of the original timber floors by robust steel-framed floors. These were probably inserted in 1897, to accommodate the possible refitting of larger, heavier roller-milling machinery. Throughout, the judicious use of heavy steel girders bypassed the need for intermediary vertical support, thus preserving the presumed open plan of the floors.[38]

Fig. 11 – Ground floor of the East Mill looking north (EH, BB99/09862).



Fig, 12 – East Mill, section looking south and structural details.

The ground floor presumably rests directly on the riverbank, since there is no evidence of any basement. Above this, the first floor is formed by heavy transverse steel beams that span between deep piers that in turn support slender rolled steel joists arranged in four transverse lines. This floor, unlike the others, is curiously hybridised in the arrangement and form of its structural members. The transverse beams are for the most part compound girders, built from two I-sections riveted together side-to-side by plates (Figs 11 and 12). At either end however, these are substituted for extremely deep [16in. (46cm)] rolled I-section girders manufactured by Dorman Long & Co. Ltd. The compound girders are set below the underside of the floorboards, to enable the 8-in. deep rolled-steel joists to rest on top of them. The joists are connected by fish-plates directly above the compound girders. This arrangement presumably imparted a greater load bearing capacity to the central part of the building. In contrast, the more slender joists employed at either end of the building rest on angles bolted to the web of the I-section girder.

The floors of the second and third floor are identical in their arrangement, formed from 16in. rolled I-section girders spanning between (shallower) piers, in turn supporting two rows of 8in. (23cm) steel joists connected to the girder webs by angle brackets. Some of the girders exhibit the rolling mark 'LEEDS STEEL WORKS ENGLAND', indicating the steelwork was sourced from at least two different suppliers. Because of the accumulated layers of paint, which obscure the brickwork, it is uncertain whether the inside long walls were always of 'pier and panel' construction. Certainly, given the comparatively greater dead weight of the inserted steel-framed floors alone, compared to the original timber floors, it seems likely that piers were introduced in concert with the re-flooring. This would also account for the absence of original beam sockets, although some are partially evident on the west wall of the second floor.

The added fourth floor, still preserves what is probably the original king-post roof, possibly re-sited from the floor below (Fig. 13). When the western wall was raised to permit additional windows, the western purlins, rafters and roof covering were removed. It is unclear what advantages accrued from this alteration, since a new floor level was not created. It may have improved the lighting of the floor - a requirement perhaps of a new process introduced into storage space, and/or additional height for new plant. There is no evidence to suggest that the same wall was ever fenestrated in the northern portion, either on fourth-floor level or in the raised upper part. This suggests that the fourth floor was added with, or perhaps just following, the construction of the West Mill, which adjoins to the west. Cast-iron pipes, suspended from the original and raised sides of the roof form the remains of a sprinkler system which may have been introduced when the water-tower block, was created from the south end (see below). The south wall, separating the water-tower block has been knocked through leaving stub walls. These support a reinforced-concrete lintel, which spans the opening. The northern end wall is presumably formed from the south wall of Webb's grain silo. It is not perpendicular to the long walls, running at a slight angle that, when built, necessitated the truncation of one of the northern

Fig. 13 – Fourth floor of the East Mill, view from north (EH, BB99/09857).

trusses. This 'half truss' remains curiously embedded in the west wall, despite being structurally redundant.

The West Mill

Exterior

This four storey-with-attic block was built adjoining the west side of the East Mill and (presumably) the south wall of the original granary that was replaced by Webb's silo building. The external brickwork and architectural details indicate the lower three storeys were put up soon after the East Mill, possibly in *c.*1821, when Charles Ritchie was first rated for two mills. The lower dentil course, a feature more typically associated with the mid-late 19th-century, may have been added when the building was raised, replacing an original eaves course. On the basis of the shared attic storey string course and dentil course, it seems likely that the reconstruction of this mill was accompanied by the raising of the west wall of the East Mill, and the building of the water tower-block. This, however, is at odds with the brickwork evidence; the entire south elevation of the West Mill is laid to Flemish bond, of variable regularity, as is the brickwork of the water-tower block. The entire west elevation of the East Mill, right up to the parapet, is in English Bond, also of variable regularity. One possible explanation for this is that a conscious effort was made to retain uniformity of bond vertically throughout the East Mill when it was raised, rather than homogenising the upper-storey bond with that of neighbouring block.

Fig. 14 – South elevation of the West Mill, showing the wheat cleaning wing at the far left (EH, BB99/09873).

Independent access into this block can have been from the yard, since the earliest maps indicate the land to the west as Ravensbourne Wharf. Of the three ground-floor taking-in doors currently in use, that in the west (end) bay appears original, although the other two, despite being later insertions, may reproduce former openings. This end bay, which interlinks internally with the Silo block, was probably used as a wheat cleaning area, separated by a full-height fireproof cross wall. It was raised in the early-mid twentieth century to create an additional storey, used for drying (discussed below). Like the yard elevation of the East Mill, the lower storeys have been extensively transformed by episodic campaigns of alterations, although enough of the original fenestration remains above to read the overall pattern of segmental and flat-arched windows.

Interior

The irregular plan form of the building, and internal dividing walls shown on the Builder illustration of 1897 by Webb (Fig. 15), are largely preserved, although many of the original spaces have been recently subdivided. The surviving evidence of the internal construction of the mill suggests a cheap, 'rough and ready' non-fireproof timber floor system incorporating many re-used structural members. Because of the depth of this trapezoid shaped block, central rows of props were required to support the beams. In the lower ground floor (which is set a few feet below yard level), thick cylindrical cast-iron columns support heavy transverse timber beams, arranged east-west, which formerly supported a heavy joisted floor (Fig. 16). The beams are joined together below the column 'capitals' by iron straps, their ends resting on lugged brackets reinforced by sizeable ribs. The diminutive column 'capitals', which rise above the beams, are socketed to accept the base castings of the columns above, the two in effect creating a single column that extend two storeys. The ground-floor columns, which are considerably more slender, are cast with a square capital, the flat upper surface of which is also socketed to receive a shallow cylindrical projection cast on the soffit of the beams. In cross section these cast-iron beams are of inverted T-shape, with a narrow bottom flange but no top flange. At their mid-point, the flange enlarges into a square shape with a projecting cylindrical lug - matching the column capital - and at their ends the flange forms a half-square (and presumably semi-circular lug) so that two ends can join together over a column., timber joists are clamped either side of the web by bolts which presumably pass right through the metal, probably to strengthen the beams. Both these 'Flitch beams', and those of the ground floor appear to be original with the west wall, being firmly embedded and resting on corbelled padstones, with no obvious evidence for their later insertion. (The east wall has been obscured by a recent breeze-block partition). Irregularly spaced timber joists span over the top of these cast-iron/timber composite beams, in turn supporting the plank floor of the second floor.

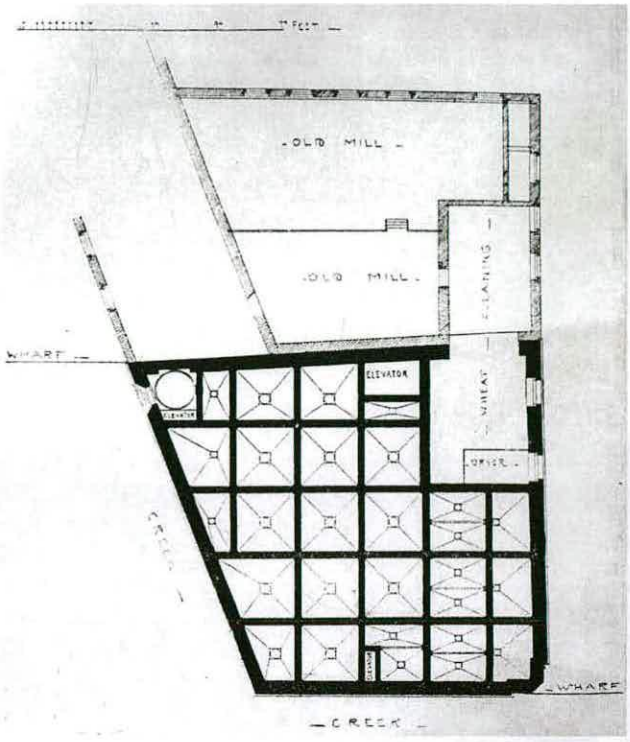


*Fig. 15 – Webb's first-floor plan for the Silo, also showing the West Mill. (*The Builder, *1 May 1897, 400).*

Fig. 16 – Lower ground floor of the West Mill, from the south-east (EH, BB99/10977).

Although the form of these beams (and columns) is not inconsistent with a date of *c.*1821, and notwithstanding the apparent lack of evidence for the beams having been inserted in the (visible) west wall, the overall disorganised appearance does raise the possibility that this is a

replacement of the original (perhaps timber-framed) floor system, perhaps utilising a consignment of scrap parts from a demolished early-mid nineteenth century warehouse.

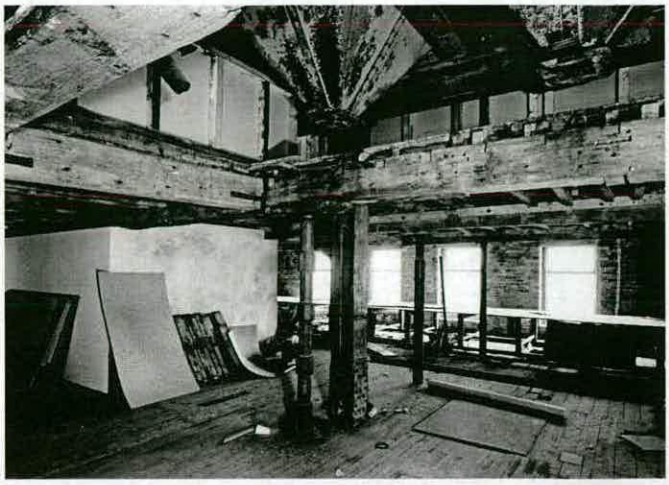


Fig. 17 – First floor of West Mill, looking south, showing reused props and steel hopper-bottoms (EH, BB99/09896).

The internal construction of the first and second floors also comprises heavy timber floors supported by intermediate metal props. On the first floor a whole assortment of reused ironmongery has been brought into structural service to support the beams: axles and driving shafts from steam-powered machinery, and, more conventionally, a variety of slender cast-iron columns, one with an elaborate foliate capital, removed, perhaps, from a Victorian theatre or music hall (Fig. 17). Those on the floor above are at least consistent in form, being extremely attenuated with a square capital, but the insertion of packing pieces of wood to make up the requisite height between the column capitals and the transverse beams is similarly redolent of adaptive reuse (Fig. 18). The eastern wall of this floor preserves blocked windows, indicating, together with the other evidence already discussed, that it is the west wall of the east block.

Fig. 18 – Second floor of West Mill, looking southwest (EH, BB99/09894).

The most tangibly functional surviving component of this block is a wood-wall silo,[39] situated on the east side of the wall dividing the 'Wheat Cleaning' block and the 'Old Mill' (Fig. 15). Owing to the inaccessibility of the upper floors, the true height of this is uncertain, but the lower portion of the timber walls of the bin compartments is visible on the second floor (Fig. 19), and the steel hopper-bottoms are visible on the floor below (Fig. 17). The weight of this silo, comprising six compartments or bins, is supported by a steelwork frame made up of a grid of Dorman Long I-section beams that 'grip' the hopper-bottoms. This frame is itself supported by steel stanchions and the flanking wall. In view of the 'Dorman Long' rolling marks visible on the larger [6in. by 14in. (15.2cm x 35.6cm)] I-beams of the framework, the earliest this silo could have been introduced is the late 1880s, when the company began production. It seems likely that it was added in *c.*1897, as an adjunct to the main silos. Unlike those, which received 'crude' or dirty wheat, this probably acted as a secondary storage receptacle for turning over or mixing different consignments of wheat, or for supplying the dirty wheat mixture to the cleaning department wing next door.

Fig. 19 – Lower portion of wood-wall silo visible on second floor (EH, BB/09893).

The 'Wheat Cleaning' wing (Fig. 15) is reached through double-leaved fireproof iron doors set just north of the hopper-bottoms on the first floor. The original function of this tall, narrow component of the mill is unclear, but in *c.*1897 its north wall was seemingly knocked through to interconnect with the south-west corner of Webb's silo building, creating (or enlarging) the wheat cleaning area. In tandem with this, perhaps, it was comprehensively re-floored for increased loading; rolled steel joists [6in. by 8in. (15.2cm x 20.3cm)] span the narrow width of the block, supporting plank floors. The numerous inserted openings and blocked openings in these floors testify to the frequency with which hoists, bucket elevators, chutes and other methods of vertical conveyance of grain were re-positioned in accordance with modified process flows. Similarly, in the east wall, cast-iron wall boxes for the support of line-shaft bearings, some infilled with brickwork, document at least two different episodes of early power transmission. On the third floor, the remains of early 20th century switchgear denote the changeover to electric power. The uppermost part of this component was raised above the exterior dentil course line, probably in the early 20th-century on the basis of the brickwork and form of the large square windows with concrete lintels. This may have been carried out for the purpose of drying grain, since inserted slatted floors remain *in-situ*. The northern part of this wheat-cleaning block, which is structurally part of Webb's Silo block, is discussed below.

The Water-tower block

This tall one-bay block attached to the south end of the east block seems to incorporate two phases of building. Viewed from the east, continuity of the brickwork and fenestration indicate that the ground, first and second floors originally formed part of the east block, perhaps the end bay (Fig. 10). Above this, a straight joint divides the two blocks at third-floor level, and the water tower block becomes stylistically distinct, with a square-headed window flanked by a string course. In the first phase, therefore, the east block was raised to five storeys, utilising the original fabric in the lower part, but creating a suitably distinct identity higher up (through the string and dentil courses) as befits an end bay. The reason for this modification is unclear - perhaps it created a stair tower whose traces have been effaced - but this phase possibly accompanied the raising of the west wall of the East Mill, and the construction of the West Mill. *The Builder* illustration of 1897 (Fig. 1) depicts a tall Italianate stack in corresponding position, and this may be the stack attributed to Webb in *The Miller* fire report of 1880. Thus, in *c.*1879 this end bay may have been raised to create a stair tower, supporting a (demolished) stack, with a possible boiler house on the ground floor. Above the stone band, the brickwork changes from Flemish to English bond, forming the unfenestrated shaft of the water tower. On the west elevation the water tower also steps back a few feet, denoting its functional difference. The construction of this brick shaft, supporting a large rectangular cast-iron water tank that fed the sprinkler system, probably occurred in the late 19th century[40] - possibly in tandem with the erection of the external chimney and stack.

South block and attached single-storey structures

A two-bay four-storey block gabled north-south was attached to the south end of the water tower block, probably in the late 19th-century (Figs 7 & 9). Little or no attempt was made to harmonise it stylistically or spatially with the earlier work: it has a lower roof line, projects into the yard and is dissimilarly fenestrated. Originally it may have been separate from the adjoining water-tower block; in the attic space, where the evidence is unconcealed by modern partitions, a wide opening spanned by a reinforced-concrete lintel has been crudely knocked through the north party wall. This wall also exhibits wall boxes and oil stains, which, together with the pulley wheels attached to the king-post trusses, indicate former mechanically-driven hoisting. The Goad Fire Insurance map of 1942 denotes this as a warehouse; another source suggests this building may have been added when small-unit bagging was performed on site.[41]

Attached to the gable end of the south block are the surviving components of an L-shaped range of contiguous buildings (Figs 7 and 9). The crudely built single-storey building attached to the south block were probably the toilets for the workers.

Site Offices

Denoted (Fig. 7) as a single large block in 1867, No.23 Greenwich High Road consists of three adjoined, yet chronologically discrete dwellings that may intercommunicate internally. On stylistic grounds, the earliest is probably the two-bay, two-storey (with basement) building that both overlooks the site entrance and faces Greenwich High Road (Fig. 20). Although modest in scale, it is well-proportioned with interesting details that enliven the Flemish brickwork, including a decorative panelled door (formerly with fanlight) and a ground-floor round window on the side elevation. This may be the house Charles Ritchie was rated for from 1802. The two-storey (with basement) building behind this has lost its original door, but still preserves the corbelled door-arch and hornless twelve-sash windows. This probably dates from the 1820s or the 1830s. The tall, deep and narrow building to the west of these two buildings seemingly dates from the early-mid 19th century. Because it was not provided with a front door, it was reached either from the earlier building, from the back door that opens onto the yard, or possibly from a side door prior to the construction of the third building.

Fig. 20 – The Site Offices facing Greenwich High Road, looking North (EH, BB99/09854).

The Silo

Exterior

Much the most visually commanding component of the entire mill complex, this block preserves much of the original exterior detailing and fittings depicted on the contemporary illustration (Fig. 1), although years of accumulated grime have dulled the decorative brickwork (Fig. 21). Both formally and decoratively, Webb produced a building that virtually hid its true purpose behind the polite mantle of Italianate classicism: the harmonic proportions of the basement and attic bracketing a vast 'piano nobile' of decorated brickwork with high-level oculi. In this respect, it is an unusually distinctive industrial building that boasted the signature of an architect of national standing.[42] The round windows, which almost fully encircle the building above vast expanses of unfenestrated brickwork, are perhaps the only architectural feature to express the interior use: they light the outer ranks of brick bins, which when full would (on close inspection) have displayed the grain pressed against the glass. The tourelle, capped by a pinnacled octagonal dome, is purely decorative, enclosing one of the capacious brick bins. The triangular pediment facing the creek forms the front elevation of the aspirator room, lit by a circular window (a modification of an original segmental-headed design). The three lower floors, and the uppermost floor are all fenestrated and open, effectively 'sandwiching' the silos between. The central portion of the eastern elevation is however fenestrated for two bays; this is the wheat-cleaning wing which continues southwards into the West Mill.

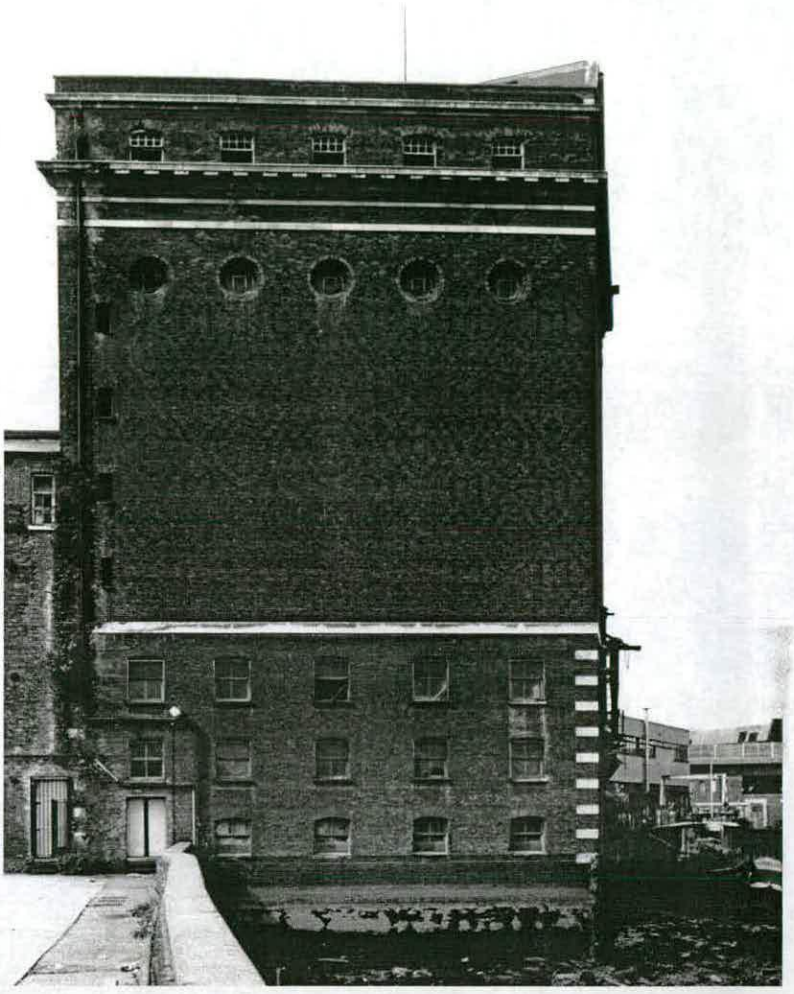


Fig. 21 – The Silo from the east (EH, BB99/09866).

To withstand the great pressures exerted by stored grain, the building was constructed in chain bond (where embedded long stones, iron bars or chains are used to strengthen the brickwork), using cement mortar. The river wall is faced with blue bricks, and the upper portions with stocks enlivened with red brick dressings and diaper ornament. The contractors for the whole work, including the foundations, (which were built in the Creek during periods of low tide) were Jerrard & Son, of Lewisham. The steam elevator, the remains of which remain affixed to the riverfront, and the rest of the machinery, was erected and fitted by Henry Simon Ltd.

Interior

The internal construction of the Silo exhibits a robustness and technological sophistication paralleled on this site only by that of the East Mill. A grid of longitudinal and transverse primary beams, formed from rolled-steel and supported at their intersections by hefty cast-iron columns support the lower (fireproof) concrete floors, and transmit most of the colossal weight of the grain bins directly to the foundations (Figs 22 and 24). This method of interior framing, whilst reliant on the walls to carry the outer ends of the beams, nevertheless virtually eliminated the horizontal thrust into the walls generated by the cumulative floor weight: a problem with earlier fireproof systems reliant on jack-arching.

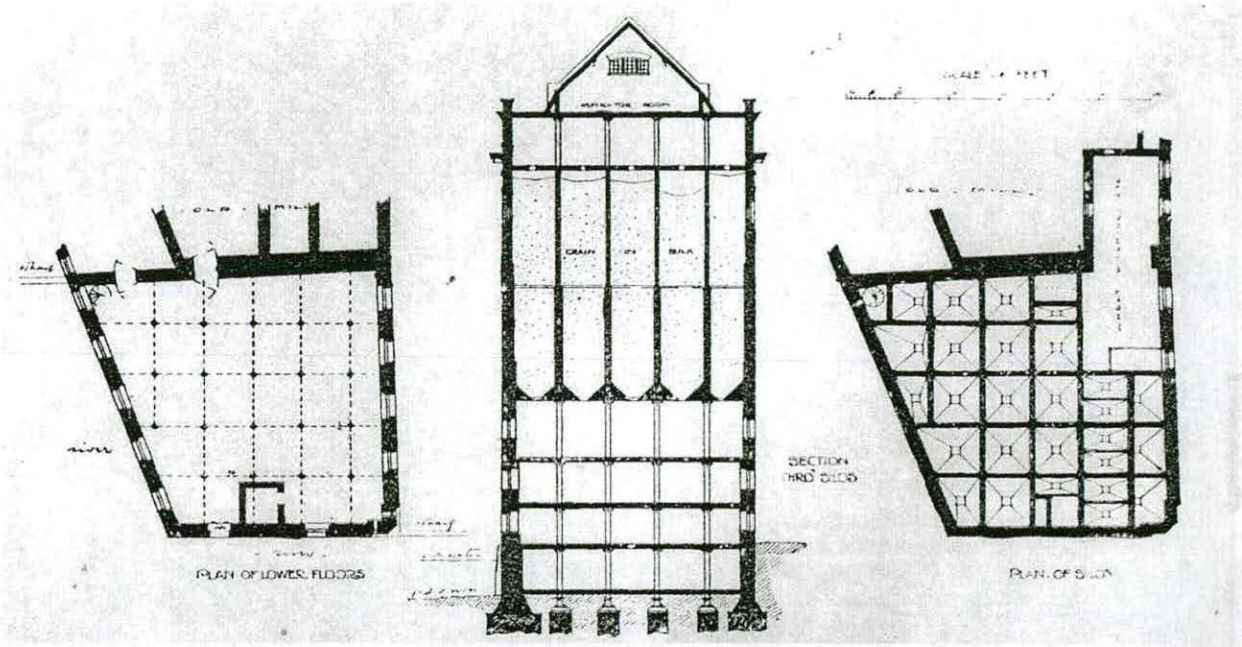


Fig. 22 – Webb's plan and section of the Silo building, (from Academy Architecture *No.12 (1897), 82).*

In the basement and on the ground floor, the fireproof floor system uses lighter, rolled-steel joists, whereas the first floor incorporates, in addition to these, heavily rivetted plate or compound girders - presumably a reflection of different live loadings. On all these floors, the webs of the primary members forming the grid, and those secondary members serving to strengthen the floor still further, and the connections, are concealed by concrete. This technique of fireproofing, resulting in a 'troughed panel' appearance to the ceiling (Fig. 23), was employed by Webb elsewhere.[43]

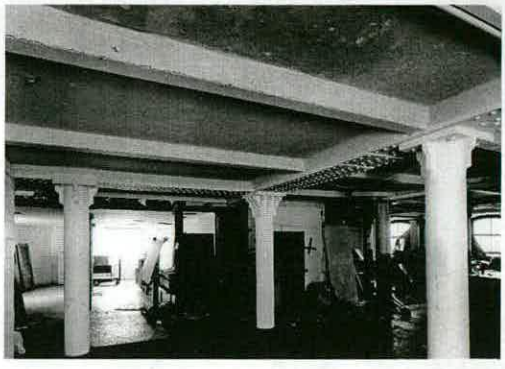


Fig. 23 – First floor interior, looking north-west. (EH, BB99/09901).

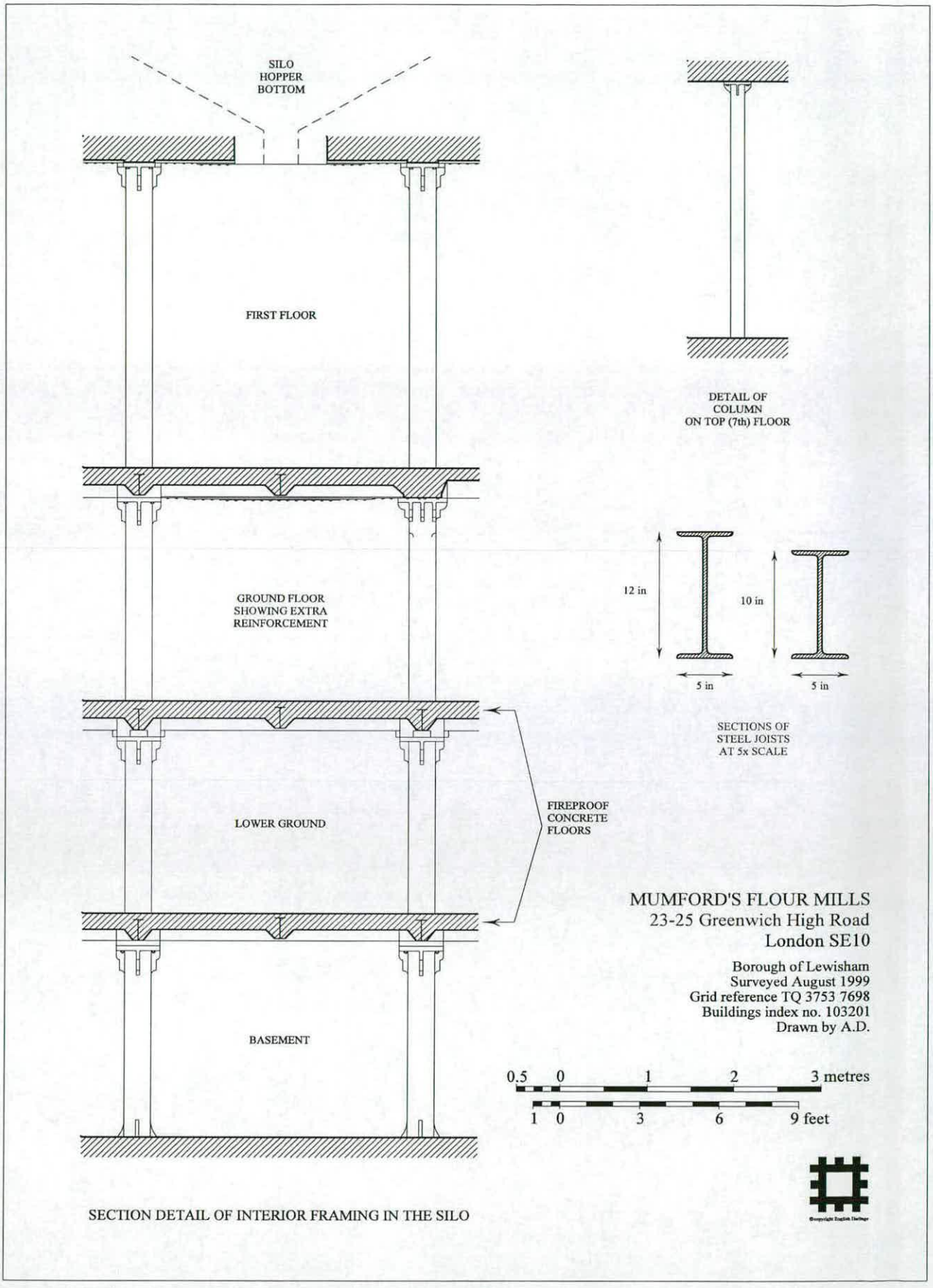


Fig. 24 – The Silo, section showing framing of lower floors and structural details.

The second floor, which supports the 47ft (14.3m) high walls of the brick bins, is more heavily reinforced still, the grid exclusively formed from compound or plate girders. Secondary beams 'grip' the hopper bottoms which partially project below the concrete ceiling (Fig. 24). The seventh floor, which only supports the roof and aspirator house is frail by comparison, with slim columns supporting slender joists (Fig. 25). Although rolling marks testifying to the source of this steelwork may lie concealed by concrete, it seems likely that Dorman Long steel was used here given its use elsewhere in the complex, and elsewhere in some of his Tooley Street buildings. Some of the columns in the lower floors bear the maker's plate 'H.EDIE & Co. BOW'.

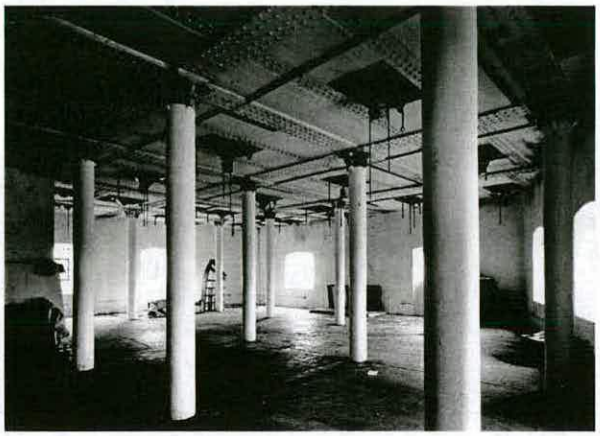


Fig. 24– Second floor of grain silo, looking north-west (EH, BB99/09898).

Fig. 25– Seventh floor of grain silo, looking north-west (EH, BB99/09901).

The bins themselves, each with a capacity of 370 quarters,[44] are brick-built throughout (Fig. 26). Band conveyors, arranged in lines between the narrow silo openings on the seventh floor delivered the grain into the bins. Although this plant has been removed, the traces of base fittings remain in the concrete floor (a view of how this may have been arranged is shown in the appendix). Similar evidence survives on the first floor, where band conveyors placed beneath the hopper-bottoms conveyed the stored dirty grain for the next stage in the cleaning process. It is unclear what the three open floors below this were used for, since most late 19th-century/early 20th-century silo buildings do not seem to seem to have been provided with floors below the hopper-bottoms. Given the robust, fireproof nature of their construction, it seems likely that they functioned as warehousing, or for further cleaning operations.

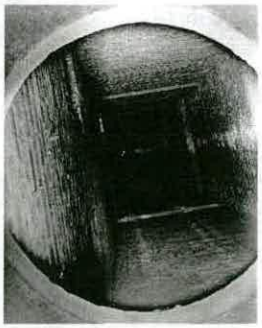


Fig. 26 – Interior of brick bin (EH, BB99/09885).

The upper storeys of the south-west corner of the building functioned as a wheat-cleaning wing. Because this area presented a high risk of fire, it was separated by full-height brick walls fitted with heavy fireproof iron doors. The (presumed) former wheat-cleaning wing was interlinked with it during the construction of the silo block, presumably to accommodate larger machinery. The surviving evidence indicates that the upper floors were used for wheat washing, with gravity used extensively in the processes to avoid the need for mechanical pumping of waste water or the movement of the wet wheat. The top floor seemingly acted as the washer floor, the concrete floor provided with slopes and channels to drain away the scum and dirty water from the washing and whizzing plant, the position of which is marked by impressions in the surface. It was presumably supplied with water from a tank situated on the flat concrete ceiling, which preserves numerous circular openings and *in situ* iron pipes, although the latter may relate to a sprinkler system. A small

timber hut in the corner of the room probably protected a supervisor from water spray (Fig. 27). The lower floors, which are plank floored, probably housed the drying and conditioning plant. Numerous openings through these floors, including trap doors in the north-west corner indicate the importance of vertical conveyance of wheat in varying states of cleanliness and moisture content. One distinctive large opening consisting of two paired holes that runs through virtually all the floors (Fig. 28) may mark the position of a former conditioner. These machines often consisted of two vertical cylinders of perforated metal through which the grain descended, with hot and cold air currents providing gradual drying and conditioning. The east wall, like that separating the southern portion of this space from the West Mill, was the 'gearing wall'; with wall boxes surviving *in situ* on each floor throughout the height of the building.

Fig. 27 – Top (7th) floor of wheat cleaning portion of the silo, from south-west (EH, BB99/09889).

Fig. 28 – Aperture for (possible)wheat conditioner machine (EH, BB99/09892).

Fig. 29 – The Aspirator House from the south (EH, BB99/09881).

The gabled brick structure on the flat roof of the silo is marked on Webb's section as the Aspirator House (Fig. 29). It was formerly used for the preliminary cleaning of dry wheat, with plant being used to dislodge dirt and dust from the grain through the application of air currents. The siting of this wing on the roof presumably served to isolate this extremely dusty process from the rest of the building.

Early 20th-century Buildings

The majority of the buildings flanking the west side of the yard still survive (Fig. 9). These one and two-storeyed, largely unembellished sheds evidently functioned as a mess room, smithy, garage, general store, engineering shop and oil store. Stylistically they are of early-20th-century appearance, and comparison with the 1894 OS map shows that they replaced an assortment of 19th-century buildings (Fig.7).

CONTEXTS

The Flour Milling Process at Mumford's Mill

Numerous accounts of flour milling are available, concerning both stone-grinding and roller-milling systems, and this report will not set out lengthy explanations of the principles underlying the various stages. Despite the numerous additions and alterations to the complex as it developed accretively through the 19th century, it seems likely that the basic stages in the process flow were preserved from that established in the early part of the century: the receipt and storage of wheat at the river-front; cleaning in a screened-off wing; milling in the East and West Mills; and bagging, storage, and dispatch of the flour from buildings to the south, near the site entrance. The offices at the site entrance fulfilled the administrative functions associated with the purchasing, marketing and invoicing of products, and the management and payrolling of the workforce. Ancillary buildings, including a smithy, mechanic's shop, and a workshop enabled the on-site repair and maintenance of machinery and power transmission systems which was liable to frequent wearing out and breakage. The most decisive changes probably came with the gradual changeover to roller milling, probably in the early 1880s. This demanded steam power in replacement of the presumed tidal power, and Webb's documented involvement in *c.*1880 probably saw the construction of a boiler house and engine house which, following the construction of a separate, external replacement, was converted to the water tower still extant.

The 'Simon' System of Roller Milling

Following a successful experimental introduction of roller plant at the McDougall Brothers mills in Manchester in 1877-9, Simon claimed that by 1882 his system had been installed 'more or less in its entirety' in twenty-five British mills.[45] By 1887, Simon asserted that there were 143 British mills running on his complete roller system, and 90 employing a combination of rollers and stones. Initially, Simon favoured the technically advanced Daverio three-high roller plant, but from 1882 he began developing and installing designs of his own.[46] It seems likely therefore that the system installed at Mumfords Mill c.1879-83 was the Daverio-Simon system - probably in conjunction with stones - and that this was subsequently replaced by a complete 'Simon' system in 1897.

The Daverio-Simon system, in common with other high-grinding, or gradual-reduction systems, consisted of three distinct processes following the cleaning of the wheat: the reduction of the wheat into flour, middlings, and bran (granulation); the purification of the middlings; and the reduction and grinding of the purified middlings into flour. However, it differed chiefly from other rival roller systems in that it used three (chilled-iron) rollers as opposed to the conventional four, which still gave two grinding surfaces, but presented a significant saving in power. The processes were highly interlinked, with numerous 'feedback loops' within and between the three stages to separate the offal from the flour, and to produce various qualities of flour (Fig. 30). Simon's description of the arrangement of plant in a small mill (measuring 38 feet long by 24 feet wide for the roller-mill department and 14 feet wide by 24 feet long for the wheat cleaning department) is probably largely applicable to Mumford's Mill *c.*1880-83, although stones were probably used as a complement to the roller mills:

> . . . the patent granulator and five reducing roller-mills stand on the first floor along each side. Above the reducing-mills are the purifiers with worms to collect the purified semolina and convey it to the rolls, and also to convey away the offal; behind these is the grinding hopper, and on the floor above are the centrifugal dressing-machines; those for the break-flour and the finishing operation on the one side of the room, and those for the reducing and grinding of the best semolina and middlings on the other side... At the end of the building is a space divided off

by a wall with double iron doors for the wheat-cleaning department. Henry Simon, 'Modern Flour-Milling in England'.[47]

Although Simon remarked that the period 1893-8 was one 'of quiet application of the recognised principles of roller milling and of improvement in the details of machinery and system . . . unmarked by

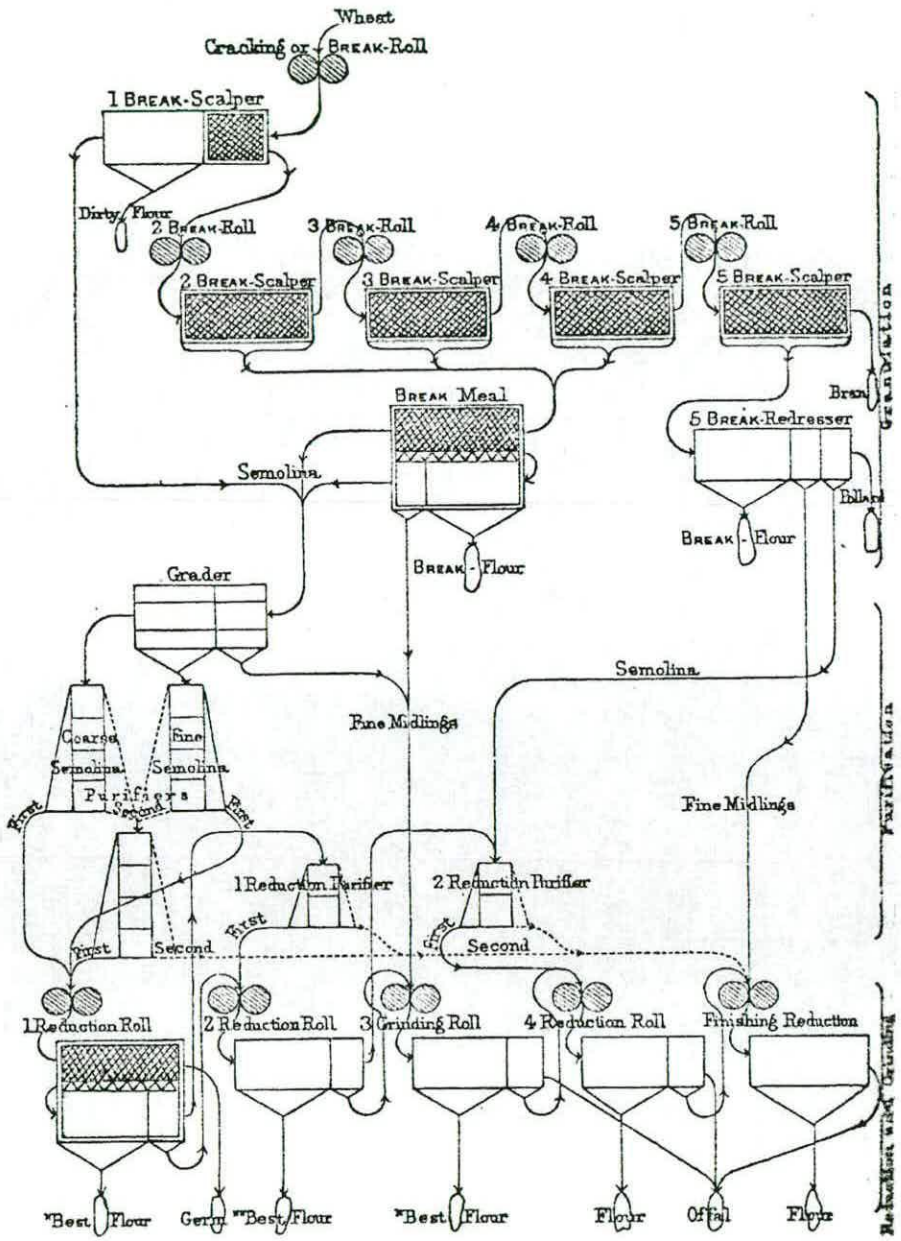


Fig. 30 – Diagram illustrating the three stages of the (Simon) system of gradual reduction

startling mechanical invention or revolutionary changes in milling practice', the technological advances in terms of the integration, efficiency and capacity of plant of the 1897 mill compared with that of *c.*1880-83 was surely fairly striking.[48] Amongst the many improvements and 'upgrades' that were probably installed in the revamped wheat-cleaning component of the complex would have been dustless, self-contained aspirator and separator machines, vertical (as opposed to horizontal) ventilated whizzers,

horizontal scouring and brush machines and wheat washer and stoning machines. For the actual rolling mill itself, the most dramatic changes would possibly have been the installation of larger rolling machines, of four-high or two-high configuration (only one three-high model is illustrated in the 1898 catalogue, suggesting only limited success of the Daverio design), and the appearance of purifiers, which simon patented in 1892. Ironically, the late 1890s saw a resurrection of an older, centrifugal form of break scalping device that was common in 'Simon' roller-mill plants of the early 1880s, but which subsequently became the object of severe criticism on account of its perceived brutal treatment of the wheat bran. In addition to this was the plant necessary for the automated movement, receipt and weighing of grain to and within the silo building. A selection of this machinery, taken from the 1898 catalogue, is illustrated in the appendix.

Architectural Context

The take-up of roller milling seems to have been accompanied by an increasing elaboration in the design and ornament of flour mill buildings, some outshining the since better known and more celebrated textile mills. Part of the reason for this seems to have been the emergence of milling as an increasingly distinct trade in the late 19th century, with 'in house' trade journals quickly reporting and advertising developments across the country and beyond. The increasingly fierce commercial competition between mill owners was articulated both technologically and architecturally, each seemingly attempting to outdo the other with eye-catching edifices housing the most cutting-edge plant. Allied to this was the increasing shift away from remote rural to waterside, often urban locations, which provided unparalleled opportunities for display for mill owners and entrepreneurs. Many illustrations in the trade press of the era depict the mills picturesquely, their colossal, ornamented forms reflected in lakes and rivers (Fig. 31). In this context, Webb's silo building of 1897 - an expression of Mumford's wealth and status - was not exceptional in its scale and grandeur, although from a local perspective, it probably was. Compared to the nearby and highly utilitarian Central Granary of the Millwall Docks, it illustrates a dichotomy in approaches to mill building between smaller, individual companies and the larger concerns arranged on a more collective basis. Built in 1900-3 by the Millwall Dock Equipment Company, the Central Granary was the most technologically advanced building for the storage of grain then built in the capital, 'a *tour de force* in the application of machinery to grain handling'.[49] But architecturally it was unremittingly plain: the MDEC, presumably, unable to justify commensurate investment in architectural display to the shareholders. The Mumford enterprise, like most other individual businesses, was answerable only to itself, and consequently could advertise itself as showily as it saw fit. However, the somewhat ordinary character of Webb's earlier involvement with the site does not fit into this framework, if indeed the upper portions of the East and West Mills are indicative.

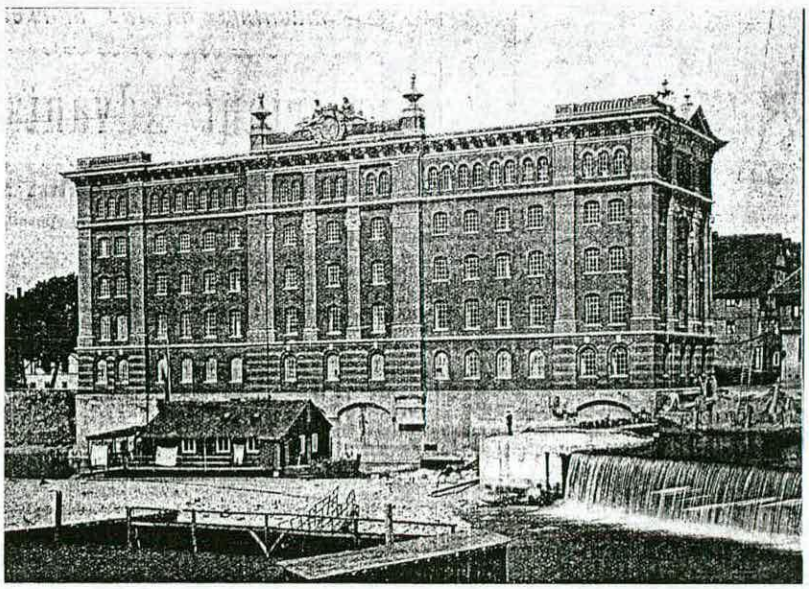


Fig. 31 – 'A large [unprovenanced] mill on the Luther Plansichter System': an advertisement appearing in The Miller *in 1897.*

NOTES

1. EH historian's file, correspondence from John Coulter to Chris Miele dated 11 March 1996, based on Godfrey Smith's research into the earlier history of Mumford's mill.

2. *Milling*, 21 December 1901, 425 (obituary of Samuel Pretyman Mumford); the *Post Office London Directory* of 1846 lists Samuel and Peter Mumford as flour and corn factors, 11 Newcastle St., Strand,

3. *Milling,* 21 December 1901, 425; the statement that it was 'built entirely of wood' was made in the description of fire of 1880 in *The Kentish Mercury*, 28 February 1880, 5.

4. Correspondence from John Coulter to Chris Miele, *op.cit.*

5. The *Post Office Directory of Kent* for 1870 lists only 'Mumford, Samuel P. and Charles, millers, Greenwich Road'. *Green's Directory* of Greenwich (1874-5) lists 'Mumford, Samuel P. & C., millers, Greenwich Road'; *Kelly's Directory* of Greenwich and Woolwich (1878) lists 'Mumford, Samuel P & Charles, millers, 25 Greenwich Road' and *Kelly's Directory* of Kent (1891) lists 'Mumford, Samuel; Pretyman & Charles, steam mills, Albion & Ravensbourne Wharves, Greenwich Road'.

6. Jill Lever (ed.), *Catalogue of the Drawings Collection of the RIBA*, (London, 1994), 130, records these executed designs, although the original drawings are missing.

7. *The Miller*, 1 March 1880, 55.

8. *The Kentish Mercury*, 28 February 1880, 5.

9. *The Times*, 26 July 1883, 8.

10. *The Miller*, 6 August 1883, 432.

11. *British Architect*, 23 (1885), 41.

12. *Milling*, 21 December 1901, 425: 'this mill [Deptford] was fitted with *a* roller plant some years ago by Mr. Henry Simon and was completely rebuilt about 1897'[emphasis added]. Installing roller plant in buildings designed around the exigencies of stone milling was notoriously difficult, so it seems logical that Webb's designs of *c.*1880-1883 would have effectively dovetailed with those of Mr. Henry Simon.

13. For an historical overview of the transformation from traditional stone milling to roller milling, see Jennifer Tann and R. Glyn Jones, 'Technology and Transformation: The Diffusion of the Roller Mill in the British Flour Milling Industry, 1870-1907', *Technology and Culture* 37 (1996), 36-69. Contemporary accounts of the revolution in milling technology, with detailed comment on the various systems in use, are given in William Proctor Baker, 'On the Various Systems of Grinding Wheat and on the Machines used in Corn-Mill', *Proceedings of the Institute of Civil Engineers* (henceforth *PICE*), 70 (1882), 160-190; Henry Simon, 'Modern Flour-Milling in England', *PICE*, 70 (1882), 191-233; Alfred Chatterton, 'Flour-Mills and their Machinery', *PICE*, (1887), 366-81; Rhys Jenkins, 'Roller Mills: A Historical Sketch', *The Miller*, July 1887, 200-205.

14. The eight-storey mill that replaced the original 1870 mills destroyed by fire on 22 December 1881, boasted two distinct plants of roller mills and millstones with a total capacity of 30 sacks per hour. Each plant of machinery, which included both Gray's and (C. J.) Robinson's roller mills and three pairs of millstones, was driven from a horizontal compound engine and two beam engines, so that either could work independently of the other if a stoppage occurred. *The Miller*, 6 June 1887, 136-8.

15. Tann and Jones (1996), 51.

16. *The Miller*, 3 June 1895, 253.

17. *Milling*, 15 June 1901, 426.

18. *The Miller*, 6 June 1887, 138-9.

19. *The Miller*, 3 June 1895, 253.

20. The establishment of this organisation in 1878, and the trade journal *The Miller* in 1875 presaged the revolution in flour milling. Howard F Gospel, 'Product Markets, Labour Markets, and Industrial Relations: The Case of Flour Milling', *Business History* 31 No.2 (1989), 86; Brian Simon, *In search of a Grandfather: Henry Simon of Manchester 1835-1899*, (1997), 48.

21. *The Miller,* 3 June 1895, 253.

22. *The Times*, 28 January 1892, 7.

23. *Milling*, 15 June 1901, 426.

24. It is not inconceivable that Webb designed other flour mills besides those for the Mumford's. The president of the RIBA, in his presentation speech accompanying Sir Aston Webb's award of the Royal Gold Medal in 1905 declared 'The Flour Mills and Granaries for Messrs. Mumford are amongst his most successful buildings *in this kind*' [emphasis added], implying, perhaps, other undocumented mill buildings in the architect's vast list of works. *Journal of the Royal Institute of British Architects*, 24 June 1905, 528.

25. *Milling*, 21 December 1901, 425.

26. *AA Notes* 13 (June 1898), 73.

27. *The Builder*, 1 May 1897, 400.

28. Tann and Glyn Jones (1996), 37

29. For example *Milling*, 22 December 1900.

30. *Milling*, 21 December 1901, 425.

31. *British Architect*, 14 May 1886, 490.

32. This particular work is listed in Jill Lever (ed.), (1994), 130.

33. Gospel (1989), 86.

34. Tanya English, 'The Mills on the River Ravensbourne', unpublished report, Ironbridge Institute (1993), 56.

35. Gospel (1989), 86-7; 92-3.

36. Tanya English (1993). S.P. Mumford & Co. Ltd. appear to have continued, organisationally at least, until

1971. The National Register of Archives (NRA) indexes the following records: NRA 28724 Rank Hovis McDougall (S.P. Mumford & Co. Ltd) reference 87, Minutes of board meetings 1936-1939; ref. 464, Minute book 1920-31; ref. 465 Register of Members 1920-1969; ref. 466, Minute book (indexed) 1939-1971. The Rural History Centre, University of Reading holds this archive, which has not been consulted for this report

37. Following the second great Tooley Street fire in 1861, insurance companies clamped down heavily on premises deemed to pose a fire-risk. In 1864 the Wharves and Warehouses Committee was formed from a consortium of insurance companies, which inspected and rated premises according to the degree of hazard they posed. In this context, the confinement of fire to either mill block at Mumfords through the provision fireproof doors and an external iron gallery possibly reflected these London-wide strictures.

38. In this context, many early 19th-century textile mills were built narrowly to take high floor-loadings without the encumbrance of intermediate props. From a structural perspective, the 6.3m (ft) internal width of the East Mill at Mumfords was not excessive by early 19th-century London dock warehouse standards, which were designed to withstand immense floor-loadings: timber beams in these typically spanned distances of 20-25ft between timber or cast-iron posts. See Stephen Porter (ed.), *Survey of London, Volume XLIII: Poplar, Blackwall and The Isle of Dogs* (London, 1994).

39. Percy A. Amos, in *Processes of Flour Manufacture,* Third edition (London, 1925) 46, described the 'American "wood wall"' form of silo as the cheapest and perhaps most popular. The timber walls were typically formed of laminated layers of timber "bricks", ranging in section from 2¼ in. by 2½ to 6in. by 4in. Long spikes driven through two or three thicknesses formed the 'mortar'. The outer "cross" corners, usually a source of weakness in many structures was one of the chief strengths of this system. Other advantages included the absorption of moisture within the grain (unlike steel silos, which caused the grain to 'sweat'), and the insulation of the grain from extremes of temperature.

40. Although cast-iron overhead tanks were made in England from 1830, in the context of textile mills it was not until the 1870s that sprinkler systems were widely adopted. In these, the water tank was usually sited on the top of the stair tower. [Barrie Trinder, ed., *The Blackwell Encyclopaedia of Industrial Archaeology* (London, 1992), 832; Mike Wiliams with D.A. Farnie, *Cotton Mills in Greater Manchester* (1992), 99].

41. Tanya English, (1993).

42. Webb also employed some of the stylistic devices tested on this edifice on his Tooley Street distillery offices for Boord & Son (1899-1901): namely the round windows, block cornice, and corner tourelle. Jonathan Clarke, *Boord and Son Distillery Offices, Tooley Street*, EH Survey Report, (December 1999).

43. Webb's Tooley Street distillery offices utilised similar fireproof floors in the basement and sub-basement.

44. *The Builder*, 1 May 1897, 400.

45. Henry Simon, 'Modern Flour-Milling in England', 216.

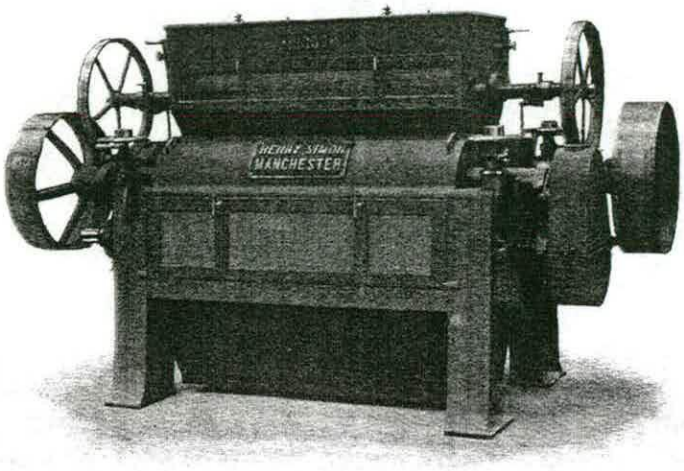
46. Tann and Glyn Jones, (1996), 49-51.

47. *PICE*, 70 (1882), 232-233.

48. Henry Simon, Ltd., *Modern Flour Mill Machinery*, Second Edition (Manchester, 1898), 3.

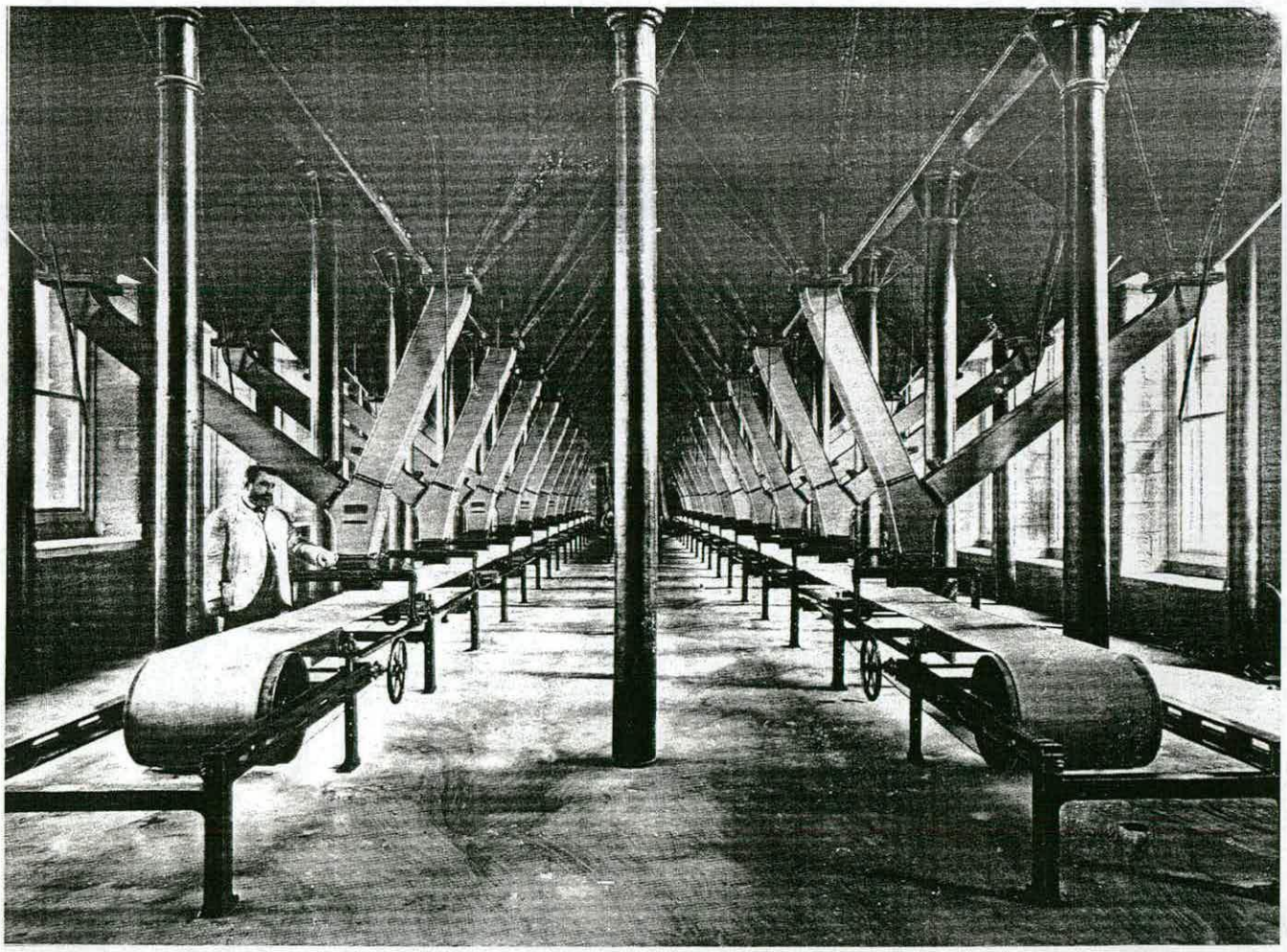
49. See Stephen Porter (ed.), (London , 1994) 362-3.

APPENDIX 1

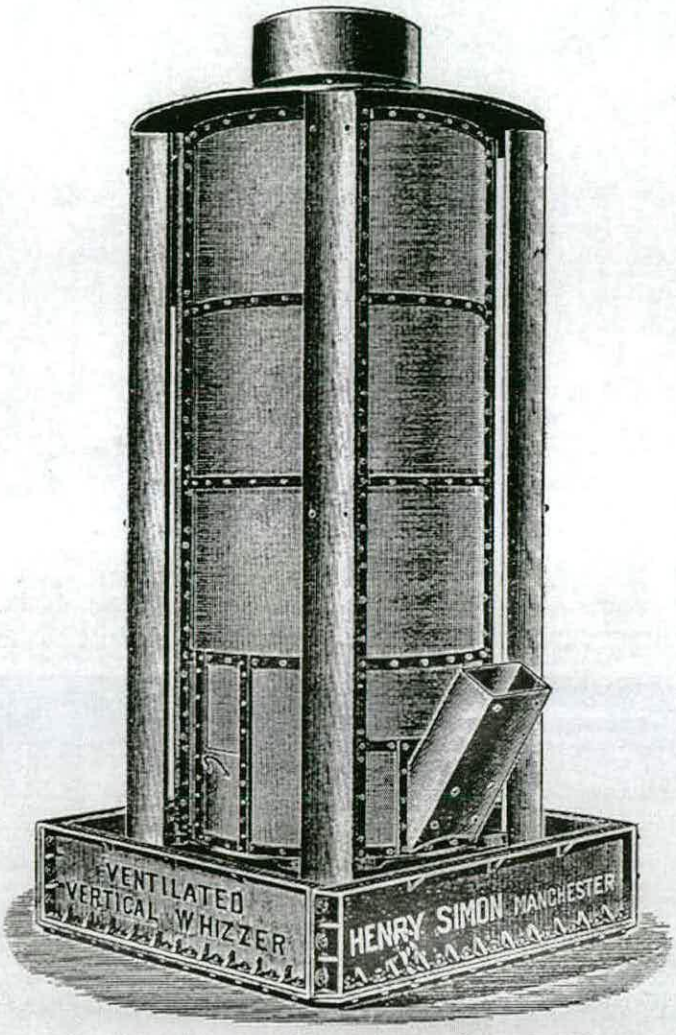


THE "SIMON" 60-INCH FOUR-ROLLER MILL.

HENRY SIMON, LIMITED, MANCHESTER



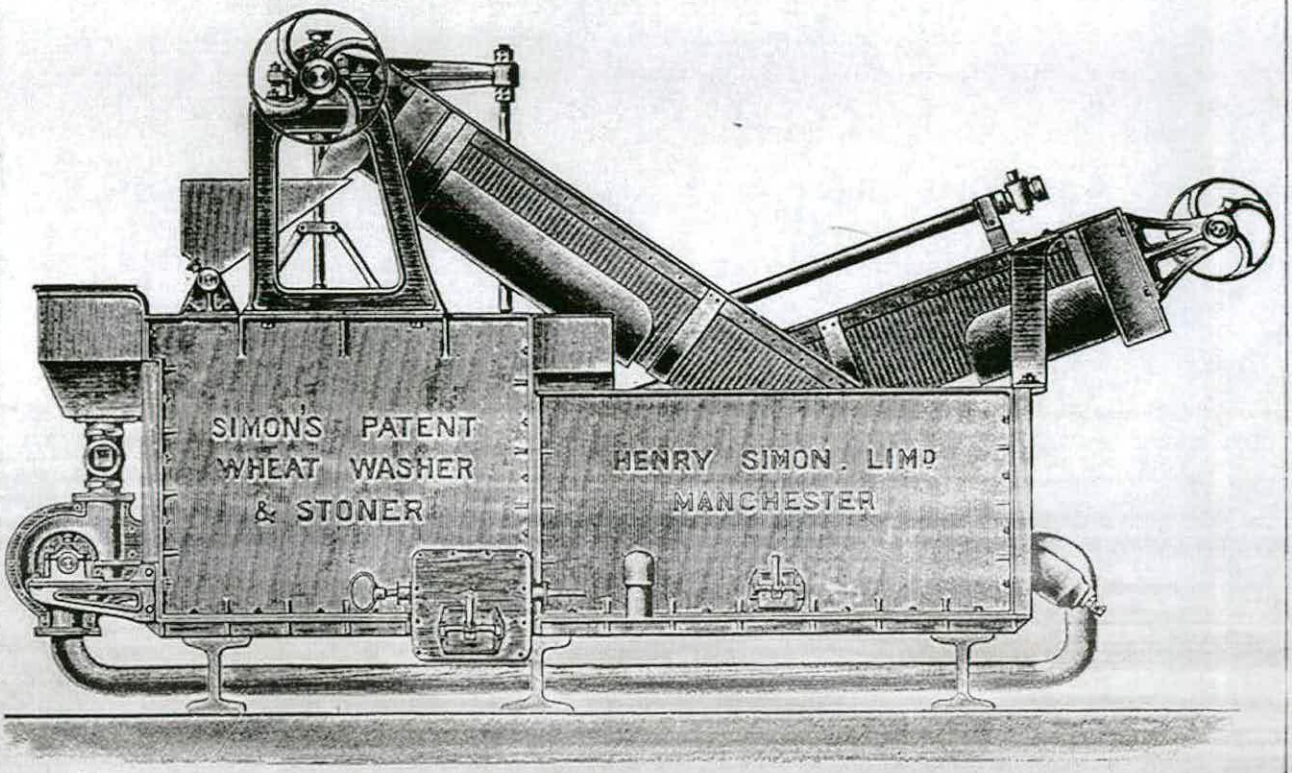
THE "SIMON" VENTILATED VERTICAL WHIZZER



DIMENSIONS AND PRICES

No.	Total Height.	Size over all on Floor.	Pulley.	No. of Revolutions per Minute.	Capacity. Sacks per Hour.	PRICE. Including Perforated Cover.
	Ft. In.	Ft. In. × Ft. In.	In. In.			
0	6 2	2 4 × 2 10	10 × 6	500	7	**£50**
1	7 2	2 6 × 3 0	12 × 6	490	15	**60**
2	7 3	4 0 × 4 0	14 × 6	480	20	**80**
2½	7 9	4 0 × 4 0	16 × 6	480	25	**85**
3	8 9	4 0 × 4 0	16 × 7	480	30	**90**
3½	7 9	4 0 × 4 0	18 × 7	460	40	**100**
4	8 9	4 0 × 4 0	18 × 7½	460	50	**105**

THE "SIMON" PATENT WHEAT WASHER AND STONER

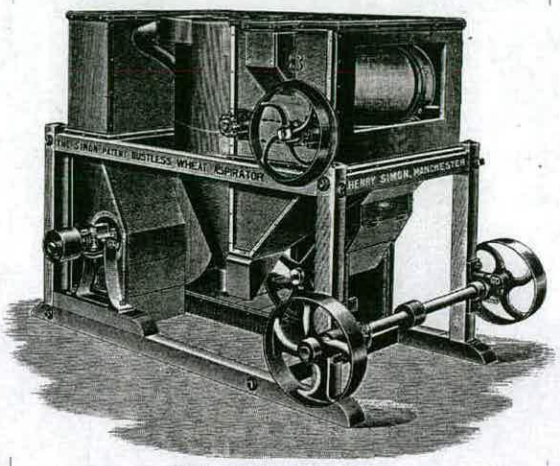


DIMENSIONS AND PRICES

No.	Extreme Length.	Extreme Width.	Extreme Height.	Driving Pulley.	Speed.	Capacity.	PRICE.
	Ft. In.	Ft. In.	Ft. In.	In. In.		Sacks.	
1 Double Worm	11 3	6 0	7 1	24 × 5	180	25 to 50	£250
1 Single Worm	11 4	5 1	6 4	20 × 5	180	20 to 40	200
2 ,,	10 5	3 9	6 8	24 × 4	180	10 to 20	175

HENRY SIMON, LIMITED, MANCHESTER

THE "SIMON" PATENT DUSTLESS SELF-CONTAINED WHEAT ASPIRATOR

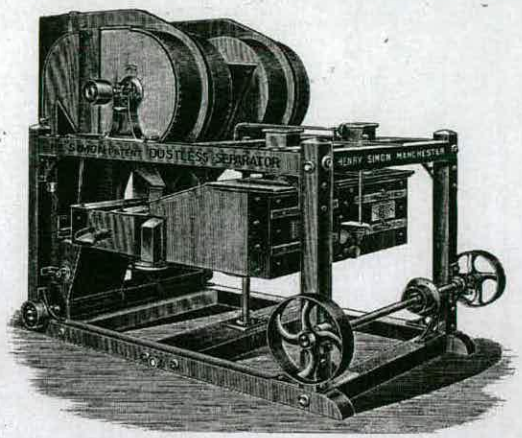


DIMENSIONS AND PRICES

No.	Extreme Length.	Extreme Width.	Extreme Height.	Size of Pulley.	Revs. of Driving Shaft.	Capacity in Bushels per hour.	Speed of Fan.	PRICES. With revolving cylinder.
	Ft. In.	Ft. In.	Ft. In.	In. In.				
1	10 6	8 0	7 6	18 × 6	300	550	1200	£140
2	8 7	5 1	7 0	18 × 5	300	375	900	120
3	8 1	5 4	6 0	18 × 5	300	175	900	100
4	6 11	4 7	5 0	15 × 4	300	95	800	65

HENRY SIMON, LIMITED, MANCHESTER

THE "SIMON" PATENT DUSTLESS SELF-CONTAINED WHEAT SEPARATOR



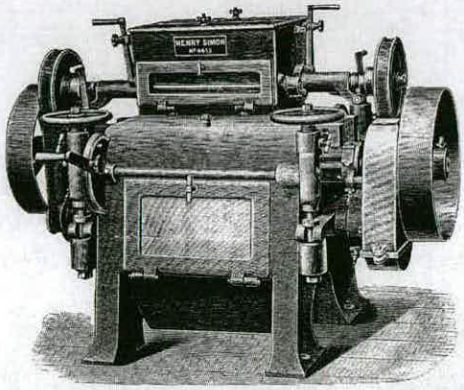
DIMENSIONS AND PRICES

No.	Extreme Length.	Extreme Width.	Extreme Height.	Size of Pulley.	Revs. of Driving Shaft.	Capacity in Bushels per hour.	Speed of Fan.	PRICES. With Revolving Cylinder.	PRICES. Without Revolving Cylinder.
	Ft. In.	Ft. In.	Ft. In.	In. In.					
1	11 2	6 8	7 5	15 × 5	300	240	900	£145	£125
2	9 6½	4 9½	5 11	12 × 4½	300	120	960	125	105

HENRY SIMON, LIMITED, MANCHESTER

THE "SIMON" FOUR-ROLLER MILL

LIGHT PATTERN



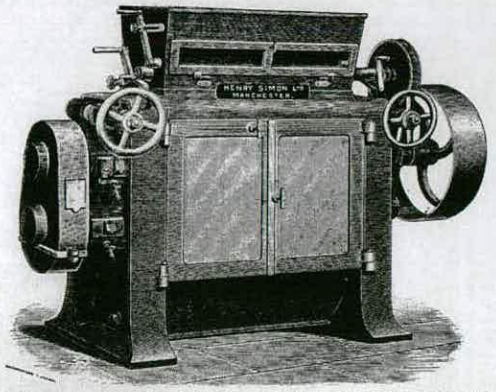
This machine is similar in design and construction to the heavier 9" and 10" roller mill, and has the same accurate adjustments and high finish. It has been specially designed to meet the requirements of those millers who require a plant of moderate capacity.

DIMENSIONS AND PRICES

Approximate Size of Rolls.	Extreme Length.	Extreme Width.	Extreme Height.	Size of Pulleys. Fluted.	Size of Pulleys. Smooth.	Revolutions. Fluted.	Revolutions. Smooth.	PRICE. Fluted.	PRICE. Smooth.
In. In.	Ft. In.	Ft. In.	Ft. In.	In. In.	In. In.				
16 × 7	4 5½	2 7½	3 4	18 × 4	18 × 4	350	260	£90	£75
20 × 7	4 9½	2 7½	3 4	18 × 4	18 × 4	350	260	105	90

HENRY SIMON, LIMITED, MANCHESTER

THE "SIMON" TWO-HIGH ROLLER MILL



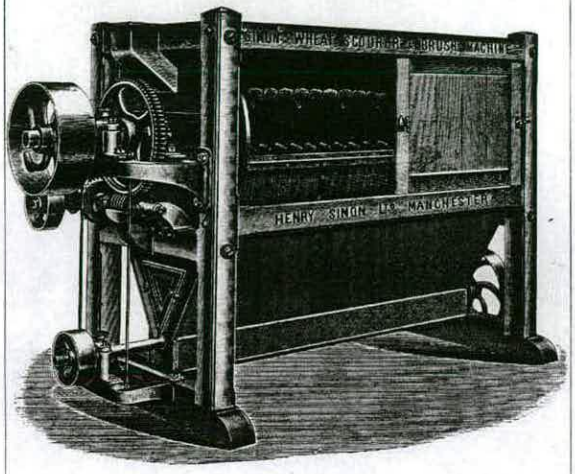
This mill, like the foregoing, has been specially designed for plants of small capacity. It is easy to adjust, accessible at all parts, compact, durable, and in all other points in material and construction equal to the larger four-roller mills.

DIMENSIONS AND PRICES

Approximate Size of Rolls.	Extreme Length.	Extreme Width.	Extreme Height.	Size of Pulleys. Fluted.	Size of Pulleys. Smooth.	Revolutions. Fluted.	Revolutions. Smooth.	PRICE. Fluted.	PRICE. Smooth.
In. In.	Ft. In.	Ft. In.	Ft. In.	In. In.	In. In.				
14 × 9	3 9	2 2	3 10	16 × 5½	20 × 5½	375	220	£50	£43
20 × 9	4 5	2 2	3 10	16 × 5½	20 × 5½	375	220	60	50
24 × 9	4 9	2 2	3 10	16 × 5½	20 × 5½	375	220	65	55
32 × 10	5 10	2 5½	4 5	16 × 5½	20 × 5½	350	180	85	75

HENRY SIMON, LIMITED, MANCHESTER

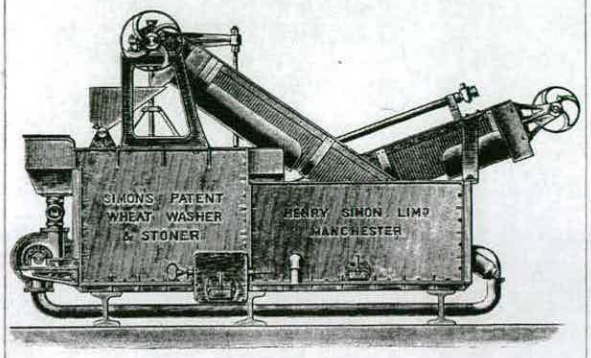
THE "SIMON" HORIZONTAL WHEAT SCOURER AND BRUSH MACHINE



DIMENSIONS AND PRICES ON APPLICATION

HENRY SIMON, LIMITED, MANCHESTER

THE "SIMON" PATENT WHEAT WASHER AND STONER



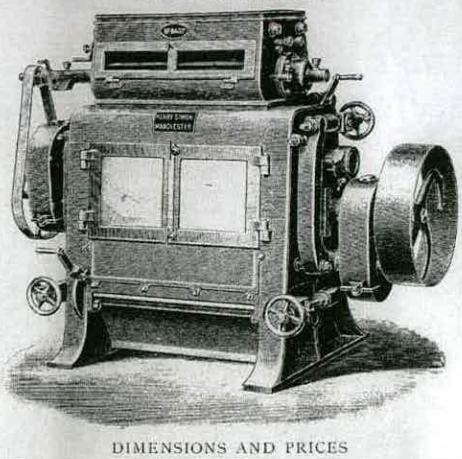
DIMENSIONS AND PRICES

No.	Extreme Length.	Extreme Width.	Extreme Height.	Driving Pulley.	Speed.	Capacity.	PRICE.
	Ft. In.	Ft. In.	Ft. In.	In. In.		Sacks.	
1 Double Worm	11 3	6 0	7 1	24 × 5	180	25 to 50	£250
1 Single Worm	11 4	5 1	6 4	20 × 5	180	20 to 40	200
2 ,,	10 5	5 9	6 8	24 × 4	180	10 to 20	175

HENRY SIMON, LIMITED, MANCHESTER

THE 'SIMON" THREE-HIGH ROLLER MILL

IMPROVED PATTERN

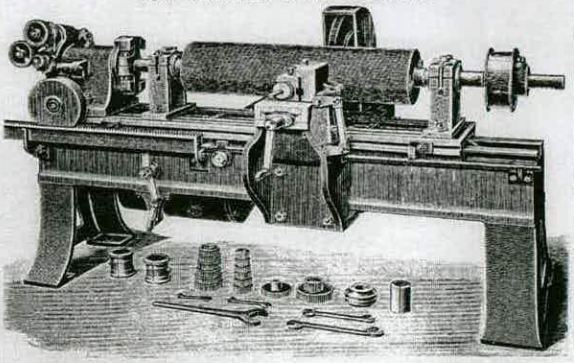


DIMENSIONS AND PRICES

Approximate Size of Rolls.	Extreme Length.	Extreme Height.	Extreme Width.	Size of Pulleys.		Revolutions.		PRICE.	
				Fluted.	Smooth.	Fluted.	Smooth.	Fluted.	Smooth.
In. In.	Ft. In.	Ft. In.	Ft. In.	In. In.	In. In.				
20 × 8	4 6	4 8	2 6	16 × 5½	20 × 5½	375	220	£100	£85
24 × 9	5 9	5 0	3 0	16 × 5½	20 × 5½	375	220	120	100
32 × 9	6 5	5 0	3 0	16 × 5½	20 × 5½	375	220	135	115
32 × 10	6 8	5 9	3 4	16 × 5½	20 × 5½	350	180	150	130
40 × 10	6 9	5 9	3 4	16 × 5½	20 × 5½	350	180	180	160

HENRY SIMON, LIMITED, MANCHESTER

COMBINED GRINDING & FLUTING MACHINE FOR CHILLED IRON ROLLERS



This machine, which is simple in construction, and easily worked, is specially adapted for the use of mill-owners. It is provided with an emery disc for grinding and polishing the rolls, and a tool for cutting the grooves.

Machine No. 1 is arranged to take rolls up to 24" long and 18" diameter.

Machine No. 2 is arranged to take rolls up to 40" long and 18" diameter.

Prices include one emery disc, all necessary keys, gear wheels, and change wheels, together with one set of tools.

For use in very large mills and in roller fluting works we also supply independent buffing machines either single or double, and fluting machines for treating two rolls at a time. The prices for these machines will be quoted on application.

DIMENSIONS AND PRICES

Size.	Extreme Length.	Extreme Width.	Extreme Height.	Number of Revolutions.			PRICE.	
				Of Emery Disc.	Of Roll.	Of Slide Rest Driving Pulley.	Without Counter Shaft.	With Counter Shaft.
	Ft. In.	Ft. In.	Ft. In.					
1	7 5	5 0	4 6	860	40	105	£145	£160
2	9 10	5 0	4 6	860	40	105	155	170

HENRY SIMON, LIMITED, MANCHESTER

JOB NUMBER 99/00134

DATE TAKEN 07/09/99 PHOTOGRAPHER SB
ADDRESS MUMFORDS SILO
23 GREENWICH HIGH ROAD

GREENWICH

NEGS TAKEN 51

BB99/09854	EXTERIOR, OFFICES AT ENTRANCE TO SITE, GENERAL VIEW FROM EAST	B&W
BB99/09855	EXTERIOR, OFFICES AT ENTRANCE TO SITE, GENERAL VIEW FROM NORTH	B&W
BB99/09856	INTERIOR, MILL, EAST RANGE, 3RD FLOOR (ROOF SPACE), NORTH END VIEW FROM SOUTH	B&W
BB99/09857	INTERIOR, MILL, EAST RANGE, 3RD FLOOR (ROOF SPACE), GENERAL VIEW FROM NORTH	B&W
BB99/09858	INTERIOR, MILL, EAST RANGE, 2ND FLOOR, VIEW FROM NORTH	B&W
BB99/09859	INTERIOR, MILL, EAST RANGE, 1ST FLOOR, VIEW FROM SOUTH	B&W
BB99/09860	INTERIOR, MILL, EAST RANGE, 1ST FLOOR, NORTH WEST CORNER	B&W
BB99/09861	INTERIOR, MILL, EAST RANGE, GROUND FLOOR, VIEW FROM NORTH	B&W
BB99/09862	INTERIOR, MILL, EAST RANGE, GROUND FLOOR, VIEW FROM SOUTH	B&W
BB99/09863	EXTERIOR, MILL, EAST RANGE, NORTH END, VIEW FROM SOUTH WEST	B&W
BB99/09864	EXTERIOR, MILL, EAST RANGE, GENERAL VIEW FROM NORTH WEST	B&W
BB99/09865	EXTERIOR, GENERAL VIEW TO SOUTH FROM ROOF OF SILO BUILDING	B&W
BB99/09866	EXTERIOR, EAST ELEVATION OF SILO BUILDING	B&W
BB99/09867	EXTERIOR, EAST ELEVATION OF SILO BUILDING COLOUR	Colour
BB99/09868	EXTERIOR, SILO BUILDING, VIEW FROM NORTH WEST	B&W
BB99/09869	EXTERIOR, GENERAL VIEW OF SILO BUILDING, FROM NORTH WEST	B&W
BB99/09870	EXTERIOR, GENERAL VIEW FROM SOUTH	B&W
BB99/09871	EXTERIOR, GENERAL VIEW FROM EAST	B&W
BB99/09872	EXTERIOR, EAST ELEVATION, GENERAL VIEW FROM NORTH EAST	B&W
BB99/09873	EXTERIOR, SILO BUILDING, SOUTH ELEVATION	B&W
BB99/09874	EXTERIOR, MILL, EAST RANGE, WEST ELEVATION, SOUTH END	B&W
BB99/09875	EXTERIOR, VIEW FROM ROOF OF SILO BUILDING, VIEW TO NORTH SHOWING DEPTFORD CREEK	B&W
BB99/09876	EXTERIOR, VIEW FROM ROOF OF SILO BUILDING, VIEW TO NORTH SHOWING DEPTFORD CREEK, COLOUR	Colour
BB99/09877	EXTERIOR, VIEW FROM ROOF OF SILO BUILDING, VIEW TO NORTH WEST	B&W
BB99/09878	EXTERIOR, VIEW FROM ROOF OF SILO BUILDING, VIEW TO NORTH WEST, COLOUR	Colour

BB99/09879	EXTERIOR, VIEW FROM ROOF OF SILO BUILDING, VIEW TO SOUTH WEST SHOWING DEPFORD CREEK	B&W
BB99/09880	EXTERIOR, VIEW FROM ROOF OF SILO BUILDING, VIEW TO SOUTH WEST SHOWING DEPFORD CREEK, COLOUR	Colour
BB99/09881	EXTERIOR, VIEW OF ROOF OF SILO BUILDING SHOWING ASPIRATOR VIEW FROM SOUTH	B&W
BB99/09882	INTERIOR, ROOF OF SILO BUILDING, ASPIRATOR HOUSE, VIEW FROM SOUTH WEST	B&W
BB99/09883	INTERIOR, SILO BUILDING, TOP FLOOR SHOWING WOODEN CAPS ON TOP OF SILOS, GENERAL VIEW FROM SOUTH EAST	B&W
BB99/09884	INTERIOR, SILO BUILDING, TOP FLOOR SHOWING WOODEN CAPS ON TOP OF SILOS, WEST SIDE VIEW FROM NORTH	B&W
BB99/09885	INTERIOR, SILO BUILDING, TOP FLOOR, VIEW DOWN INTO A SILO	B&W
BB99/09886	INTERIOR, SILO BUILDING, TOP FLOOR, SOUTH SIDE, VIEW FROM EAST SHOWING TOP OF SILOS	B&W
BB99/09887	INTERIOR, SILO BUILDING, TOP FLOOR, SOUTH SIDE, VIEW FROM EAST SHOWING TOP OF SILOS, COLOUR	Colour
BB99/09888	INTERIOR, SILO BUILDING, TOP FLOOR, SOUTH EAST CORNER SHOWING LOCATION OF CIRCULAR IRON STAIRCASE TO LOWER FLOORS, FROM WEST	B&W
BB99/09889	INTERIOR, SILO BUILDING, TOP FLOOR, STAIRCASE AREA, VIEW FROM SOUTH WEST	B&W
BB99/09890	INTERIOR, SILO BUILDING, TOP FLOOR, STAIRCASE AREA, VIEW OF FLOOR FROM NORTH EAST	B&W
BB99/09891	INTERIOR, SILO BUILDING, TOP FLOOR, STAIRCASE AREA, VIEW OF CEILING FROM NORTH WEST	B&W
BB99/09892	INTERIOR, SILO BUILDING, TOP FLOOR, STAIRCASE AREA, OPENING IN FLOOR, SOUTH WEST CORNER	B&W
BB99/09893	INTERIOR, SILO BUILDING, 2ND FLOOR, SOUTH SIDE SHOWING WOODEN CONSTRUCTION OF OLDER SILOS, VIEW FROM SOUTH EAST	B&W
BB99/09894	INTERIOR, SILO BUILDING, 2ND FLOOR, SOUTH SIDE, VIEW FROM NORTH EAST	B&W
BB99/09895	INTERIOR, SILO BUILDING, 1ST FLOOR, SOUTH SIDE, BASE OF OLD SILOS, VIEW FROM SOUTH	B&W
BB99/09896	INTERIOR, SILO BUILDING, 1ST FLOOR, SOUTH SIDE, BASE OF OLD SILOS, VIEW FROM NORTH WEST	B&W
BB99/09897	INTERIOR, SILO BUILDING, 1ST FLOOR, STAIRCASE TO UPPER FLOORS VIEW FROM SOUTH	B&W
BB99/09898	INTERIOR, SILO BUILDING, 1ST FLOOR, NORTH SIDE, VIEW FROM SOUTH EAST SHOWING BASE OF SILOS	B&W
BB99/09899	INTERIOR, SILO BUILDING, 1ST FLOOR, NORTH SIDE, VIEW FROM NORTH EAST SHOWING BASE OF SILOS	B&W
BB99/09900	INTERIOR, SILO BUILDING, 1ST FLOOR, NORTH SIDE, CEILING SHOWING BASE OF SILOS, VIEW FROM WEST	B&W
BB99/09901	INTERIOR, SILO BUILDING, GROUND FLOOR, WEST SIDE, VIEW FROM SOUTH	B&W
BB99/09902	INTERIOR, SILO BUILDING, BASEMENT, VIEW FROM SOUTH	B&W
BB99/09903	INTERIOR, SILO BUILDING, BASEMENT, VIEW FROM SOUTH EAST	B&W
BB99/09904	INTERIOR, SILO BUILDING, LOWER BASEMENT, VIEW FROM SOUTH	B&W

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DATE TAKEN 24/09/99 PHOTOGRAPHER SB
ADDRESS MUMFORDS SILO
23 GREENWICH HIGH ROAD

GREENWICH

NEGS TAKEN 4

BB99/10974	INTERIOR, CENTRAL BLOCK, BASEMENT, VIEW TO GROUND FLOOR LEVEL FROM SOUTH EAST	B&W
BB99/10975	INTERIOR, CENTRAL BLOCK, BASEMENT, VIEW FROM SOUTH SHOWING COLUMNS	B&W
BB99/10976	INTERIOR, CENTRAL BLOCK, BASEMENT, VIEW FROM NORTH EAST	B&W
BB99/10977	INTERIOR, CENTRAL BLOCK, BASEMENT, VIEW FROM NORTH WEST	B&W