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THE TRANSFORMATION OF BRICKMAKING IN 17TH CENTURY LONDON (JÖRN JANSSEN)

(Author's note: This article was written in 1984 as a chapter of a wider unpublished study '*On the Formation of Wage Labour in Building Production'* and only marginally edited for this publication. I am grateful to James Campbell for making me aware of more recent work on brick construction that I was unable to include in the footnotes, e.g. James Campbell, 'The Manufacture and Dating of English Brickwork', *Archaeological Journal*, Vol. 159 (2002), pp. 170–193. It should also be mentioned that a most significant turning point in 17th century development of brickmaking is only touched upon. This episode is analysed in another unpublished article from 1985, 'On the Historical Relevance of the Dispute about the Westminster Corporation of Brickmakers 1636–1939').

Brickmaking under different social relations

In England brick-building virtually disappeared after the demise of the Roman Empire. Burning of clay was either for pottery or for plain tiles applied to floor and roof.[1] Only very rarely were tiles burnt for structural work. The term brick was not known in England until the 15th century when it was reintroduced from the continent. The small quantities produced sporadically in some places were usually burnt in tile kilns. As soon as larger quantities, batches of about 20,000 and more bricks, were regularly needed they were burnt in open clamps erected where the clay was found and dug. Bricks became a common building material in the course of the 16th century to replace stone in areas where this was rare. Their most frequent application, besides in the building of mansions and palaces,[2] was for chimneys as a necessary part of houses with an upper floor developing during this century.[3] Because of an almost ubiquity of clay and the bad conditions for heavy bulky land transport bricks were burnt preferably in the immediate vicinity of building sites, villages, towns, and urban building processes.

The brickmaker appeared in legislation in 'An Acte touchinge Victualers and Handicrafts men'[4] in 1548 distinguishing him from the 'bricklayer' as well as from the 'tylemaker'. Whereas sizes, types and ways of making tiles were regulated by statute from 1477–78,[5] no legal restrictions existed for brickmaking. The London 'Company of Tylers and Bricklayers' claimed control over brickmaking according to its ordinance and on the basis of its chartered powers of search within 15 miles around the City. Nevertheless, the Tylers and Bricklayers acknowledge in a petition for 'An Act for the true making and assizing of Brick, Tile and Lime'[6] by 1636 "that the said Masters Keepers and Governors have not sufficient power and authority … as by the said Letters Patent and Ordinances was intended".[7] Brickmaking was, therefore, an occupation outside any regulations of chartered trades and statutes.

The material process of brickmaking did not change much since the 'act for making tile' from 1477–78. The Statute describes in detail the "digging, casting, turning, parting, making, whiting, and annealing" of tiles, which is, up to moulding, identical with the production of bricks:[8]

> *Persons which hereafter shall use the occupation of making any such Tile … shall make it good seasonable, able and sufficient, and well whited and annealed; And that the earth whereof any such Tile shall be made, shall be digged and cast up before the*

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First Day of November next before that they shall be made, and that the same Earth be stirred and turned before the First of February then next following the same digging and casting up, and not wrought before the First Day of March next following; And that the same Earth before it be put to making of Tile, be truly wrought and tried from Stones; and also that the Veins called Malm or Marle, and Chalk, lying commonly in the Ground near to the [earth] convenient to make Tile of, after the digging of the said Earth whereof any such Tile shall be made, shall be well, lawfully and truly severed and cast from the said Earth whereof any such Tile shall be made. And that every such plain Tile so to be made, shall contain in Length Ten Inches and half, and in Breadth Six Inches and a Quarter of an Inch, and in Thickness Half an Inch and Half a Quarter at the least, with convenient Deepness according.

An attempt to regulate brickmaking in London, made by Royal Proclamation in 1625, is not very dissimilar to its predecessor for tiles about one and a half centuries earlier:[9]

The first digging thereof to bee betweene the Feasts of St. Michael the Archangel [29 September], and St. Thomas the Apostle [21 December]; and the second digging, casting, or turning up of the sayd earth, to be at, or before the last day of February, then following. … And that the Bricke makers cause no Earth to be moulded for Bricke, but only betweene the feast of Annunciation of the blessed Virgine Mary [25 March], and the last day of August yearly, … That in the moulding of the said Brickes, the moulds be throughly and well filled, and not set in the moulds, in the laying downe; And that they be sufficiently and well dried before they be put into the Kilne, and then carefully and throughly burned; so as for the assize, every Bricke being burned, conteine in length, nine inches, in breadth, four inches one quarter of an inch, and in thicknesse, two inches and one quarter of an inch. That the price of Brickes … shall not exceede the rate of eight shillings the thousand at the Kilne.

The periods for digging up and turning clay as well as for moulding are slightly later and more exactly defined than in the earlier statute. The size of bricks is virtually the same as laid down in the ordinance of the Company of Tylers and Bricklayers,[10] the breadth being only half a quarter inch smaller. Fixing a price was authoritarian abuse violating common practice in an established market. This abuse, however, only contributed to devaluing the proclamation, which was anyway not enforceable as it was not backed up by an act of the House of Commons. In formulating and publicising the standards of production with royal authority, the Proclamation simply leant support to establishing a functioning market for brick production.

The peculiarity of brickmaking came to be the burning in open stacks, or 'clamps', instead of permanent kilns necessary for the more delicate tiles. Bricks could, therefore, be burnt at places where the soil contained appropriate clay and on the site where building was intended, preferably where both these conditions came together. This was the case almost everywhere in and around London. The few tools, "a scoop, a spade, moulds, a table, barrows, a lute, a jeat, a bear scooper, rakes, a sand tub, a trapping-board, a ledder, coal scuttles",[11] could easily be taken to any place on a cart. Almost every combustible material could be used as fuel for clamp burning, wood, peat, faggots, thresh, straw, sweep, rubbish, coal dust, coal, etc. Furthermore, clay itself contains saltpetre in varying quantities as an additional fuel. Part of the fuel might be mixed into the clay, part strewn or laid between the courses of bricks when setting up the clamp, part under the arches formed at the bottom to provide space for a bigger quantity of faggots for the initial ignition after which the clamp slowly burns for several days up to two weeks until all the combustible material is consumed. Only particular kinds of bricks needed burning in kilns.

While the material process remained almost the same, social relations of production changed fundamentally. These are the subjects of this study. The change is epitomised in the meaning of the word brickmaker. In the late middle ages it denoted the maker of bricks who would have carried out all the operations from digging to moulding, to burning and selling. But in the 17th century a brickmaker came to be considered to be an employer, as in the wording of the 1625 Proclamation "that the Bricke makers cause [!] no earth to be moulded for Bricke". And this change entails also changes in the form of the labour process in brick production, carried out by the 'makers of brick' in the metropolis of the emerging British Empire.

Four different forms of social relations in the production of bricks will be distinguished in this paper: brickmaking at task, by measure, for sale, and for wages. Though all four exist side by side during the whole of the 17th century, a shift can be observed towards brickmaking for wages. As these forms are not exclusive of each other, various combinations were applied to accommodate the process to particular conditions of building projects and local situations in the transition from feudalism to capitalism.

Brickmaking at Task

Bricks were hardly ever made at 'task' in the original sense of the word,[12] that is as unpaid duty to the feudal Lord, because when bricks were reintroduced in England feudal service was almost extinct.[13] However, the making of bricks by tenant peasants as task work in a more recent sense of the word, that is as a service paid by an agreed lump sum, was common at least in the late 14th and early 15th centuries at the initial stage of the emergence of building with bricks in England. The numbers of bricks in the accounts quoted by James E. Thorold Rogers indicate that at this stage it was rarely for structural work.[14] 2000 to 4000 bricks, the most frequent among the few entries, just sufficient to build a chimney stack, do not allow for burning on clamps as single batches. The innumerable varieties of bricks found in early brickwork suggest that they were mostly, 'tailor-made', burnt at sizes and qualities demanded by individual builders. These bricks must have been burnt in tile-kilns where different kinds of ceramic products were burnt together.[15]

About the turn of the 15th century roof tiles were widely used and tile-kilns existed within the reach of one day's carriage in almost every part of England where slate was not available. And most of the production will have been carried out by specialised craftsmen who may have been small landholders but whose prime occupation for earning money was tile-making. This does not exclude, of course, that on larger estates brickmaking, like lime-burning, was carried out for the use of the estate as well as for external customers, either by skilled servants of the landholders or by hired craftsmen. There is plenty of evidence about kilns in the ownership of lay or ecclesiastical landowners or of corporations, who either produced all kind of ceramic products themselves or let these kilns at a rent to different tile-makers. The overlapping of husbandry and craft production is a common feature of this period and not attributable only to the seasonal rhythm of the work of making bricks and tiles. The dominant form, as it emerges after the so-called 'Peasants Revolt', is a craft, carried out by a skilled handicraft labourer, either owner or leaseholder of a kiln, perhaps together with an apprentice and, occasionally, day labourers to match with seasonal peaks. The absence of a special designation in medieval accounts and legislation of this time supposes that in fact the layers and sellers of 'thack tiles' (roof tiles), 'tegulatores or tylers', may have moulded and burnt their own materials. This system would then have been the rule also for bricks which, at this time were generally called 'wall-tiles' and laid by 'tegulatores'.[19]

It is worth trying to allocate in this historical outline the evidence of the 'tylery' (tegularia) of the Corporation of Hull[20] which seems to

have produced only 'wall-tiles'. Brooks asserts that "it is perfectly clear then that by the fifteenth century brickmaking was practiced apart from tile making".[21] Unfortunately, the records cover only the period between 1395 and 1440. It has also to be taken into account that Kingston upon Hull was one of the biggest towns in England. Nevertheless, "the average output was 92,000 tiles per annum, or perhaps a little more",[22] which was two kilnfulls and the recorded maximum was three kilnfulls, 135,000 tiles in 1433. "The accounts show in an unmistakable fashion the development of a contract system. In fact the chamberlains tried every method of working the brick-yard from direct employment of their own work people to the employment of a subcontractor…".[23] At the same time, the Corporation of Beverley let its tilery for rent. The annual turnover of the kiln in Kingston upon Hull was between 20 and 30 pounds, just enough to support one or two workmen on a permanent basis, digging clay in the autumn, turning it in the winter, tempering, moulding and setting up for drying between spring and early summer, burning the first charge while the second was still drying in hacks in July, the rest in August, which leaves just time enough for repairs of the kiln and tools as well as tidying up the place before casting up clay for the next season. "The bricks … sold throughout the period at 5s. per thousand."[24] This form of production became obsolete in Kingston upon Hull when "In 1440 the chamberlains bought bricks at 3s. per thousand."[25] This example does not exhibit the characteristics of pure task work. Sundry services are paid at day rates. Part of the production may have been on stock. But the prevailing features of the production process stem from the concept of paid task work, notably the production of varying numbers according to order and the provision of the ground, premises, raw materials, and tools by the 'Lords' of the town.

Making bricks at task became obsolete in the second half of the fifteenth century, when up and down the country 'wall-tiles became virtually ubiquitously available under their new trade name, brick – 'brekke' or numerous other spellings. It became a residual category as a mode of production at a period when brick-building became more than a very rarely applied technique in England. When the tile-makers began producing 'wall-tiles' in larger quantities this new product may have been introduced less in response to the demand of builders than as an innovation by the producers themselves. Nevertheless, brickmaking at task continued to exist, in particular in rural areas, long after more recent modes had become dominant.

Brickmaking by measure

"I very well remember an Instance …, that was told me by an ancient experienced maker of Bricks and Tiles; one that used to make Bricks about the Country (in *Kent* and *Sussex*) for Gentlemen: this Man was sent for to *Rumford* in *Essex* to make 100,000 of Bricks there for a Gentleman; he having procur'd his Materials and Utensils, went to Work …"[26] according to an agreement which was probably similar to that of John Hawkes reported from the Sion House manuscript records:

> *An agreement between Christopher Ingram [Clerk of Works to Henry Percy, Ninth Earl of Northumberland] and John Hawkes, a brickmaker of Hunslow [neighbouring parish to the Manor of Sion House in the Hundred of Istleworth], has survived which is dated November 17th 1614; Hawkes was to be paid £5/- towards digging the earth, £3 every week 'when it comes to working', £5/15 at the end of the working half a million bricks, and s.6/8 for every 10,000 bricks 'well and sufficiently burnt and delivered out of the kiln'.*

This agreement is worth analysing because it contains different measures for different operations, which is characteristic for production by measure. Digging earth, which includes removing top earth, 'casting up' the clay and turning it, is paid at a lump sum, because the quantity can anyway not be estimated too exactly and it is up to the brickmaker to decide how much he should dig in excess to be sure not to run short. The agreed sum of £5/- is a fraction less than 2½d. per thousand of the final output of 500,000 or 2d. per thousand to mould 600,000 bricks allowing for about 17% 'samel' and 'clinker', that is insufficiently or over-burnt bricks.

'Working' the bricks which includes tempering, moulding, bearing off and setting on hacks to dry, is paid by the week. An average daily output of one stool with at least a temperer, an up-striker, an off-bearer and an up-ganger would have been 8000, adding up to 75 days or 13 weeks to produce 600 thousand 'green bricks'. This operation is paid for partly by weekly sums of £3, partly as a lump sum of £5/15 due after completion. It is worth noting that this part of the agreement again does not relate to the number of bricks which is left to the risk and discretion of the brickmaker to decide. We do not know whether a certain number of weeks were settled. On the basis of our 13 weeks estimate, the whole work would have been paid for at £44/15, which is about 1s. 9d. per thousand intended output, or 1s. 6d. per thousand for 600 thousand 'green bricks'.

'Well and sufficiently burnt and delivered out of the kiln' the bricks are measured and paid for at s. 6 /8 every 10 thousand or 8d. per thousand, according to the success rate up to 500 thousand, that is at a maximum of £14/11/8. On the basis of these figures the whole work would provide a turnover of £64/6/8 or about s. 2/6 per thousand bricks which presupposes that, at standards of the time, all materials and the kiln were provided by the Earl.

Many other modes of payment were possible, for instance according to the Kent assessment of wages in 1563: "For the Digging, making, stryking, burning, all other things being brought unto him [the brickmaker] for the thousand 2 s. without meate."[28]

A breakdown of the prices per thousand in 1703, when wages were about twice those before the Revolution, is given in Neve's Builder's Dictionary:[29]

> *In the country, their usual Price is 6d. per 1000 for the Molder, the Bearer off hath 4d. and he that tempers the Earth ready for Use, hath 4d. per thousand; and he that digs hath 6d. per thousand; for making the Earth ready (after it is digged, the digging being not reckon'd into the making) moulding bearing off, &c. and burning, their usual price is 5s. per thousand.*

Dependant on the size of the agreement the brickmaker would have to hire more or less labourers or, as it may often have been the case, boys. All the raw material was usually from the estate or plot of the builder. The brickmaker would particularly bring those tools which were special to brickmaking like the stool, moulds, the scooper for the earth maker, a wheelbarrow for the off-bearer etc., all in all worth more than one or two pounds and largely used up with one year's work. From this form of brickmaking there existed, of course, innumerable variations according to particular local conditions. One or more labourers might have been servants from the estate. The brickmaker might have provided material which was not available to the builder who anyway may have preferred to make the brickmaker then responsible for the quality.

The brickmaker, in turn, who had to find his labour, would usually hire it at piece rates for short contracts. Skilled service he wanted to keep over longer periods would be employed at day rates or even annual covenant. In the fist place this would apply to the temperer, on whom the quality of the bricks and his own work as the moulder largely depended. The advance expenditure on labour was not exceedingly high, as the agreement for Sion House shows, because payment from the builder was usually in short intervals as work progressed, with only a guarantee retained, about equivalent to the profit or the rate of the brickmaker, to make sure that the contract was carried out completely.
The working capital of such a bricklayer was, therefore, very small as compared to a brickmaker producing for sale, who had to advance

almost the whole cost of an annual production. A comparison between the two in figures would presuppose an equal annual production, which was the exception rather than the rule. The difference is more fundamental; it concerns the whole social form of production.

Brickmaking by measure was the usual form in building greater mansions for the gentry and nobility built in the middle of the 15th century and increasingly fashionable in the 16th century. Quantitatively it certainly remained the dominant form throughout the 16th century. Its importance must have declined significantly around London in the first half of the 17th century. This is apparent from the remarks of Gerbier[30] and Pratt[31] and from the format of brickmakers emerging in the 1630s. Malcolm Airs deals with the process of this category of aristocratic building between 1500 and 1640: "The large quantities of bricks required to build a country house were almost invariably made on the site or within a very short distance of it."[32] Airs seems almost to depict the two brickmakers introduced in this section, Neve's 'ancient' expert and John Hawkes, to whom we owe the material of the impressive brickwork of Sion House, now in the Borough of Hounslow: "There were specialised brick-makers who travelled some distance for employment, but on the whole brick-makers tended to be local men who could be called upon … when services were necessary."[33]

Brickmaking by measure did not die out at a definite date and simultaneously at every place:[34]
In 1749 the owner of Winkburn Hall, Notts., agreed with "John Hobson of Sheffield for to make 200,000 of bricks in the paddock at 4s. 6p. per thousand. He to find all the tools etc. to work with. I to find coal sand and water for 2 months and nothing else, all to be well burnt and full 10 inches long when burnt, five broad and 2½ inches thick."

This is an example of the extravagance of individual taste as exhibited by the excessive size of the bricks. An appreciation of Tudor values revived under Hanoverian reign, whilst the standard size of bricks for ordinary building was twice reduced by Act of Parliament.

Brickmaking for sale

Contemporaries of the 15th and 16th centuries regarded bricks as a luxury material, superior to stone because of its resistance to weathering. The appreciation of brick as the most valuable building material at this stage of development is conspicuously documented by the royal palace of Hampton Court, the most prestigious residence built in 16th century northern Europe. Conversely, brick was far too expensive for common house building which generally remained based on timber frame until the last third of the 16th century when brick began to be used for erecting chimney stacks within timber structures and for building farmhouses of the more well-to-do yeomen and gentry.

The early development of brickmaking is the history of the handicraft and trade of tilers, from which it was gradually to break away.[35] The social relations in the production of bricks were, therefore, identical with or, after the breakaway, inherited from the tilers. Hence the initial stages of brickmaking for sale have to be traced with the trade of tilers who produced their own material.

Tiles were a commodity in regular demand in London, at least from the Great Fire of 2nd July 1212 when the 'Consilium proborum virorum', the City Council, decided to prohibit roofing with reed, thatch, any kind of straw or stubble, and to impose either tiles, shingles, boards, and lead or 'estra de torchiato', a kind of daub.[36] And this was only confirming the preceding recommendation of the Fritz-Elewine's Assise for building from 1189: "In memory that the greatest part of the city was burnt by that fire, many citizens will build a house of stone, covered with thick tiles …",[37] and building with stone was ordered on a voluntary basis. Except for the less frequent case of new building, the demand for roof tiles is often as unpredictable as it is urgent and stocks have to be kept for sale. This is illustrated by the following royal ordinance of 28 March 1362, resulting from a catastrophic tempest and revealing features of the tilers' trade:[38]

> *"… those who have tiles to sell … do sell the same, entirely at their own pleasure, at a much higher price then heretofore they were wont to do … by reason thereof … we have ordered that tiles and other things requisite for the roofing of buildings shall be sold at the same price at which they used to be sold before the Feast of our Lord's Nativity [X-mas] last past, … and that the makers of tiles and other things requisite for the roofing of buildings, shall make from day to day tiles and other things …, and shall expose the same for public sale, when so made, … without any withholding or concealing thereof, …".*[39]

In 1350 the price of tiles had been regulated for London at 5 s. per thousand, whereas now (1362) 7 s. per thousand were proclaimed to the tilers and tile sellers ("tegulars et tegulars venditors").[40] The ambiguity with respect to the distinction between tilers, tile-makers, and tile-sellers may be attributable to the fact that all combinations were possible. It was obviously assumed that tile-makers themselves put their tiles up for sale. It is also clear from the wages, which on this occasion were assessed at a maximum of 6 d. a day[41] – no doubt without food – that laying tiles was accounted separately, whether this was done by separate labour or not. The important point to notice is that in the late 14th century it seems to have been common that the tile-makers sold their tiles themselves, and also that the work of laying tiles remained wage labour.

When in 1477 a Statute on making tiles was passed brickmaking had assumed the status of a trade in its own right. This is evident from the specification of tiles "called Plain Tile, otherwise called Thak-tile, Roof-tile, or Crest-tile, Corner-tile, and Gutter-tile"[42] in order to avoid confusion with other ceramic products, namely wall-tiles.

That making tiles for sale was the dominant form in the 15th century is borne out by another ordinance in the same Statute: "And if any Person or Persons set to Sale to any Person or Persons any such Tile above specified, made or to be made contrary to the said Ordinance, then the Seller thereof shall forfeit to the Buyer of the same the Double Value of the same Tile …". Significantly, no provisions are made at all to making tiles 'at task' or 'by agreement'.

Brickmaking, on the contrary, remained one-off production much longer and was still widely used in the 17th century after the Revolution. Balthasar Gerbier in his pocket manual for builders from 1662 points out that bricks made in the garden "all the materials being provided to the brickmakers hand" at 5s. per thousand are 4d. cheaper than from a kiln "near at hand". But, taking into account all the aspects, he recommends buying bricks ready made.[43] On the same question Roger Pratt, surveyor and architect, made an entry in his note book: "When my Lord began his building [Clarendon House], bricks were preferred to be delivered to him of his own ground for 8/6 per thousand, but after some few naughty ones made there, he bought most of the rest of Sir Nicholas Crisp [Cripps] at Hammersmith for about 12/- per 1000, nay I believe carriage and all they may well be counted at 15/- per 1000."[44] The Cripps were a prominent family of brickmakers with brickfields at different places around London. They were also represented by Adam Cripps as Warden of the ephemeral Corporation of Brickmakers in Westminster.[45]

This was the situation in London, but it was similar in other places: "In 1615 the Nottinghamshire justices made orders under the Cottage Act of 1589[46] to erect a cottage at Swinton for John Griffin, who the

Court was informed 'is an expert in the art of making Bricks and Tile'. They wished to facilitate his settling on the outskirts of Nottingham, where brickmaking seems to have begun at this time."[47] And one William Occarbie of Crowle, Lincs. was presented to the manor court in 1649 'for making bricks on the common and selling them out of the manor'." Had he sold them within the manor,[48] it obviously would not have been an offence. This is a legal situation which was similar in the manors of Stepney and Hackney at the eastern gates of the City of London: "Copyholders may breake and digge their grounds, fell downe timber & woods … and also may digge gravel, sand, and loam upon the said waste grounds to build … without any license."[49]

Typically brickmakers secured the supply of their raw material by becoming cottagers on enclosures of the common waste, as it became statutory through the respective 'Acte concerning the ymprovement of Comons and Waste Groundes' from 1549–50.[50] They produced bricks as manorial tenants under county justice and enjoyed exactly the same rights of production as any tenant husbandman, paying annual rent, the relative value of which deteriorated rapidly in the course of the 16th century when the prices of bricks rose in pace with the price of grains. Thorold Rogers' statement that "in the later part, i.e. the last thirty years [of the century] the price of bricks is about double that of the earlier average",[51] is an under-evaluation compared with the figures he provides. In London and Greenwich one thousand bricks were bought at about 5s. till the middle of the century. Then prices literally shot up to 9/6 (1567), 11/- (1583–84), and 15/-s. (1600–1),[52] that is they trebled during half a century. Taking into account the fact that new building was carried out almost exclusively outside the precincts of town and city liberties, brickmakers were entitled to sell on their own account free from any chartered trading control. The annual rent bought virtually all the raw materials – clay, water, sand, straw, faggots, some wood – with the tenancy of the obligatory 4 acres attached to the cottage and the customary access to the common waste.

Another necessary concomitant of production for sale to anonymous customers is the standardisation of the commodity. The most various sizes were used in the 14th–15th centuries, even for the same building like Holy Trinity Church in Kingston upon Hull: 9 × 4¾ × 2¼ inches for the South Transept (1315–20), 10¼ × 5 × 2⅜ inches for the Chancel (1340); or at another place, Thornton Abbey, Lincs.: 11 × 5½ × 2 inches (1380).[53] The dispute about the size of the standard brick was superseded by the dispute about the monopoly of production, attempted in London first by the Company of Tylers and Bricklayers with Royal Charter from 1568[54] claiming the standard of 9 × 4¼ × 2¼ inches within 15 miles around the City. York decreed the assize of bricks in 1590 at 10 × 5 × 2½ inches.[55] The 'finale furioso' for the restoration of an assize at the City Company's standard for the whole country ended, after an interim success, in 1726 with a handy 9 × 4¼ × 2½ inches 'statute brick',[56] which was further reduced by another statute in 1769 to 8½ × 4 × 2½ inches.[57]

Bricks for sale were the work of labour, free of guild and feudal restrictions. The quantitative limits were the size of the 'messuage', 4 acres minimum according to the 'Cottage Act' from 1588–89, superseding the 3 acres maximum of the 'Act Concerning the ymprovements of Comon Waste Grounds' from 1549–50, as well as the capacity of one brickmaker as the moulder. Leases in Hoxton Middlesex to brickmakers have exactly this size, e.g. Henry Hempson's lease of "4 acres of land at Millfield near Hogsden" 20 March 1639 for 21 years,[58] John Waxham "4 acres of land adjoining Balmes Lane and 4 acres abutting on the King's High Way leading from London to Ware eastwards and upon Whitmore's ground to the north" 10 April 1660 for 21 years,[59] and Ralph Harwood's lease of "4 acres of land adjoining on Balmes Lane" 24 December 1670 for 11 years.[60] The brickfield had to be large enough beside the clay pit for piling up top earth, turning and tempering clay, drying an annual contingent of bricks on hacks, for setting up the one or two clamps, for house garden and sheds. The estimates about moulders' daily output vary between two and three thousand with a "temperer and a boy", or one thousand working alone. Assuming that three months, 25 days each from April to June, would be spent entirely for moulding, he might have produced between 75 and, with two helpers, 200 thousand bricks per year, which was at 5s. per thousand between £18 and £50 turnover. According to contemporary literature, this quantity represented one or two clamps.[62] In the London area, one acre yielded clay for an average of 4 million bricks; the clay of a four acre plot ('messuage'), raw material for about 16 million bricks, would have been exhausted within 99 years, exactly the customary time of a lease with an annual production of 160 thousand bricks.

Considering that one clamp of 100 thousand bricks was the average quantity to build between 4 and 8 houses or cottages, or about 30 to 50 chimney stacks, it can be concluded from the archaeological evidence about the amount of brick building that this form cannot have become established as a special trade earlier than the 16th century. The building process around London in the last third of the 16th century would, however, correspond with the establishment of this form of production, to begin with in the larger towns.

Records from the City Company of Tylers and Bricklayers' searches confirm that 'brickmaking for sale' was firmly established around London in the 17th century:

August 1616

Name	*Number of Bricks*
Edward Padgett	60,000
Garrett	500,000
Streachy	800,000
John Russel	40,000
Gwalter	1,300,000
Proby	800,000
John Petchy	60,000
Geffes	100,000
Garrett	400,000
John Shunke	50,000
Youngs	20,000
Young	350,000
Thomas Brittane	60,000
Jackson	50,000
Robinson	250,000
Knight/Coops	50,000
Morrice	100,000
Bancks	200,000
Jefferey Pomphlett	60,000
William Weatherley	50,000
William Adshead	200,000
John Benn	400,000
Churchman	30,000
John Mosier	200,000
Cooks	60,000
Richard Coleman	40,000
William Lloyd	30,000
Nicolas Waxham	100,000
Σ	1,490,000

November 1630

Name	*Number of Bricks*
Garrett	500,000
Gwalter	1,300,000
Geffes	100,000
Youngs	20,000
Jackson	50,000
Morrice	100,000
Σ	2,070,000

November 1633

Name	*Number of Bricks*
Streachy	800,000
Proby	800,000
Garrett	400,000
Young	350,000
Robinson	250,000
Bancks	200,000
Σ	2,800,000

It emerges also from these figures of the searches that by the 1630s larger firms had begun to develop around London. From 28 November 1633 the searchers record bricks below size made by Streachy 800,000, Proby 800,000, Garrett 400,000, Young 350,000, and from September 1636 Baber 800,000,[64] three of these brickmakers members of the short-lived Westminster Corporation of Brickmakers. Their form of production, which was to supersede 'brickmaking for sale' at a rapid pace during the Restoration, will be dealt with in the following section. The brick searches of October 1727 show that about 50% of the brickmakers, covering about 14% of the market and producing on average 260,000 bricks per year each, were by then marginalized.

Brickmaking for wages and brickmaker's profit

Working for wages in the form that money is the equivalent of labour only bought on the market at a settled or customary rate as a price per unit of labour time is qualitatively different from selling labour 'by the great', that is incorporated in a commodity at a price per unit of production. In contrast to payment 'by the great', the payment of day labour is not directly related to output. As a result, if labour is paid at day rates, rising labour productivity raises the employer's profits. Day rates for the 'makers of Brick and Tile' were assessed by the Essex Justices in 1651[65] (see Table 1).

Table 1: Maximum wage rates for "makers of Brick and Tile, Essex assessment 1651

Mid-March to Mid-September	
With meal and drink	8 d./day
Without meal and drink	16 d./day
Their servants and labourers:	
With meal and drink	6 d./day
Without meal and drink	11 d.day
Mid-September to Mid-March	
With meal and drink	6 d./day
Without meal and drink	12 d./day
Their servants and labourers:	
With meal and drink	5 d./day
Without meal and drink	10 d./day

The division of the return from brickmaking into wages on the one hand and profits on capital investment on the hand implies the division between the brickmaker and those who make bricks. It is significant that 17th century literature on brickmaking is very detailed about the rates relating to the various operations constituting the process. In fact, under the Stuarts this production sector or 'trade' became an aggregate of at least 6 occupations constituting the making of bricks, according to Houghton: the earth maker, the carter, the up-striker, the moulder, the off-bearer, and the up-ganger. For setting the brick "in the clamp for burning, they all help. The moulder with the off-bearer and up-striker his assistants [at the stool] are upon the clamp, and set the bricks, the rest wheel, and bring the bricks. The off-bearer hath the special care of even strowing of the coals."[66] Other authors describe the same process of 'making bricks' divided into 7 (Pratt) or even 8 (Worlidge) simultaneous operations. The different rates indicate the hierarchy of skills, the moulder at the top and the up-striker at the bottom (Table 1). In addition to the labourers, Houghton reckons, "there must be a clerk to each stool, who takes account of what comes in and goes out. He dries the sand and sifts the rubbish, and has nine shillings the week."[67]

Table 2: Division of labour in brickmaking by the end of the 17th century

for sale	For wages and brickmaker's profit, d/1000				
	Pratt 1665 d.		*Houghton 1683 d.*		*Worlidge 1704*
digging a casting up	digging the earth	3	digging the earth	3	casting the clay
brickmaker:					
temperer	making the earth	4	earth-maker	4	temperer
	carter	3	carter	4	wheeler
brickmaker	up-striker	3	up-striker	2	staker
	striker	6	moulder	6	moulder
boy	layer-off	3	off-bearer	3	breaker-off
	upganger	4	upganger	4	taker-up
	crowding	4			walling
	setting	4	setting	3½	setting
					burning
			clerk		

According to an "Information of Parents, and Instruction of Youth in their choice of businesss" in 1747, "The Brick-Maker's Business is by some not reckoned a very reputable Employment. … It is a very laborious Business, and though they take no Apprentices, they hire boys by the Week, who learn the Business as they grow up. The best Hands make good wages for such a mean Employment in dry Weather; and for the Master it turns out a very profitable [sic] branch."[67] The wording needs reading with care: 'business' is working by the week or by the day, the 'best hands' perhaps at piece rates, and the 'Branch' belongs to the 'Master'. Our booklet tells us also that "the sums necessary to set up as Master" are between £100 and £500.[69] Another guide of the same kind from 1747 confirms that the Brick-Maker masters "seldom employ less than £500 each".[70] And in the boom years of 1786 'Kearley's Table of Trades for the Assistance of Parents and Guardians and for the Benefit of those Young Men, Who wish to prosper in the World, and become respectable Members of Society' sets the "sum required to set up in business" as a Brick-Maker at between 400 and £5000.[71]

Table 3: Turnover, productivity, capital in brickmaking by the end of the 17th century

Social relations of brickmaking			
For sale		*For wages and profit*	
		Pratt	*Houghton*
Persons employed:			
1	2	7	6
Output of bricks per day:			
1,000	3,000	6,000–7,000	8,000–9,000
Labour productivity: bricks per day:			
1,000	1,000	900–1,000	1,300–1,500
Output of bricks per year:			
75,000	200,000	–	800,000–900,000
Cost in making 1,000 bricks, s./1000:			
–	–	2s. 10d.	2s. 6d.
Wage cost of an annual production:			
–	–	–	£100–113
Value of on e year's poduction output[72]:			
19	50	–	£200–225

But by the end of the 17th century according to our estimation (Table 3) and contemporary sources a brickmaker could still set up business at £200– equivalent to £300 by 1750 – necessary to advance an

annual production of the smallest size, the capacity of a single stool and moulder, before returns could be made. It is obvious that this investment could not be saved even by the 'best hands', moulders who earned twice as much as their mates and 50% more than a skilled temperer or up-ganger. 'Brickmakers' and 'makers of brick' had come to represent two classes of people.

If the makers of brick found employment every day except Sundays and holidays, 150 days at summer rates and 150 days at winter rates, they would earn about £17 without food, their servants about £13. However, neither was full employment the rule, nor was the rate always paid at the maximum level. The minimum initial investment of a brickmaker represented, therefore, about 10 to 20 times the annual earning of a maker of bricks, almost a working life if these starving rates maintained the men's lives at least about 40 years of age in their 'laborious Business'.

For 1727 we have records about brickmakers in the suburbs of London, namely Fish and Waxham in Hoxton, who held about 3 million bricks in stock which, represented a capital of £750 at production prices of 1660, or £6,000 at the selling price of 1725 (Table 4). From whence and how did this class of capitalists emerge?7[3] What happened in social relations that gave birth to the division between labour and capital in brickmaking?

Language demonstrates that the capitalist brickmaker developed from the maker of bricks and it appears that his rise occurred in the vicinity of London between the beginning and the end of the 17th century. At the same time, as we gather from literature, accounts, court minutes, legislation etc, the production process came to rest on a category of wage labour whose rates were related to the space of time employed and the evaluation of the respective occupation. How did this happen?

The brickmaker who worked with his tools by measure always remained a landless labourer. This social condition is not fundamentally altered by occasionally becoming an employer of labour. The raw material he had to work upon was in every instance provided by the respective builder. The brickmaker who produced bricks for sale, by comparison, was by the middle of the 16th century a customary tenant. He shared the social advance of the agricultural tenant who grew out of feudal bondage and substantially improved his economic situation under the late Tudors. From the end of the 16th century small brickmakers earned a surplus sufficient to gradually increase output and raise productivity with hired labour. Whether this labour was also sometimes bought 'by the great' or piece rates is irrelevant with respect to the basic dependence of landless labour, from which brickmakers, once they had become proprietors of their means of production, could take advantage. This first stage was based on the statutory minimum 4 acres under late feudal conditions outside corporate town control, typically on manorial common land. This laid the foundations for the accumulation of capital which took place in the 17th century.

Capital accumulation in brickmaking

The process of early capital accumulation will be shown in this single sector of construction, though many elements of what can be considered as constituents of capital can hardly be assessed with much certainty and the divisions between sectors within building are fairly blurred. Figures and estimates have the sole purpose to illustrate qualitative change in the initial phase of capitalist development. The period is the span from the Early Stuarts until the Hanoverians.

We have estimated an average annual production of houses in the London area rising – with ups and downs – in the course of the century from 300 to 1,500. Most of these houses were much smaller than those which have survived down to the present. Each may therefore have consisted of no more than 20,000 bricks on average, making for a total of 6 or 30 million bricks per year for house building. The same amount may have been consumed in building wharfs, walls, sewers, churches, mansions, etc. As bricks were locally produced by local brickmakers, perhaps a certain contingent also of itinerant seasonal labourers, within a radius of carriage of three miles and more – somehow extended along the Thames – capital concentration was predominantly confined to the compass of the metropolitan area. What was the working capital involved in the production of those 6 or 30 million bricks per year? How did it accumulate over a period of about 120 years? What was its distribution between individual owners and companies?

Table 4: Minimum working capital in brickmaking by 1700, calculated at prices by 1693[74]

About 30 brickyards of an average size of 2 stools, 5 acres of land, fence, sheds, stable, horse, cart, tools, etc. £50		£1,500
Labour to be advanced for at least one annual production, average 1½ years: 60,000 × s.2/6		£7,500
Materials for 1½ years' production		
– coal, 1 chaldron per 10,000: 6,000 × £1/-	£6,000	
– sand, 1 load per 6,000: 10,000 × s.3/1	£5,000	
– faggots, 264 ft. per 200,000: 300 × s.45/1	£675	
– straw etc., d. per 1000	£750	
Σ		~£9,000
Total		£18,000
Total per average brick yard		£600

The stage of capital accumulation estimated in Table 4 was probably not achieved before the beginning of the 18th century. There is no point in evaluating an annual accumulation rate on the assumption of an initial capital per brickyard of £50 at the turn of the 16th century. The development was very uneven, especially through the disruption caused by the Revolution and the impact of the Great Fire. However, if we assume that this was a process spanning about three or four generations, we gain an impression of how much each roughly added to the working capital. Within three generations the fictitious average brickmaker would have increased his capital at a rate of 230% from the initial £50,- to £115,- to £269,- and £600,-, adding £65,-, £145,-, and £240,- respectively every 30 odd years.

Our fictitious brickyard, of course, is projected from the final stage back to the previous ones. The period we are looking at witnessed an acceleration of production and a concentration of brickmaking. Whereas in Jacobean times there was a large number of small brickmakers of comparable size, in the 1720s a few very large brickmakers and joint stock companies emerged out of a multitude of small traders and a discernable number of firms about the size of our fictitious yard. A realistic picture of the structure can be obtained from the search records of the Company of Tilers and Bricklayers from 1724 to 1728.[75] 64 brickmakers are noted altogether from diverse searches. Some of these certainly only existed ephemerally to supply the bricks for a single project. But it is uncertain if all brickmakers, who existed during these years, were notified. There is no point, however, in knowing the exact absolute number of brickmakers at a certain time. From the search report presented on 16th October 1727 to the Court of Assistants of the Company of Tilers and Bricklayers, we can gather a structure of the brickmaking industry, which displays the typical distribution of ownership under capitalist relations of production.

Table 5: Brick Searches by the London Company of Tylers and Bricklayers, 16 October 1727[76]

Brickmakers	*No. of bricks found in stock,*	*% of total*	*Stocks of large, medium & small sized brickmakers*	*% of total*
Thomas Waxham	2,990	13.8	large	
Mary Fish & Co	2,690	12.4		
James Barret, jun.	2,400	11.0	12,326	56.7
Stephan Whitaker	2,210	10.2		
James Whitaker	2,036	9.4		
Thomas Malland	1,210	5.6	medium	
Arthur Bilbye	1,110	5.1		
Thomas Fox & Co	920	4.2		
Giles Holley	900	4.1	6,250	28.8
Daniel Harrison	830	3.8		
Henry Cook & Co	680	3.1		
Augustine Woollastone	600	2.8		
Σ 12 other brickmakers	average 262	1.2	small 3,144	14.5
Total			21,720	100.0

The entire stock of bricks in the search hardly represents either the whole annual production – a part may already have been sold – or the whole stock existing in the metropolitan area 15 miles around London. Over 22 million, however, is a major proportion of the annual production in this area, enough to build 1,000 houses. It includes 24 brickmakers. If there existed 30 odd more in the area with an average production of 100 thousand each and 3 million bricks altogether, the respective stock of say 2 million bricks would not significantly alter our results with respect to the concentration. The figures obtained from the searches tell us that the five largest firms commanded 56.7% of the production recorded, the following eight 28,8%. The remaining 14.5% were shared by firms having stocks smaller than 600 thousand bricks.

The value of the stock of bricks of the largest brickmaker, commanding 13.8% of the market, 2,990 thousand at a price at the kiln of 20s. per thousand, amounted to no less than £3,000 and the working capital may have been up to twice this sum. The stock of a medium sized brickmaker like Augustine Woollastone would have represented a value of £600. This demonstrates the state at the end of the initial stage of capital accumulation and urban growth, as described by Daniel Defoe, which was followed by a sustained depression and probably decomposition of capital lasting for about 50 years to the 1780s, by when a new stage in the process of urbanisation set in.

Concluding note

Brickmaking as a skill sector employed by far the most building workers, about twice as many as bricklayers. Yet, typically, a recent study of wage rates in 17th century London, focussing on building workers and labourers, ignores brickmakers completely.79 This can only be explained by the fact that brickmaking was not incorporated as a trade and therefore ignored by historians as it was despised as a 'mean Employment' by contemporaries. But it was precisely because the brickmakers operated outside the privileges of incorporation that a new form of relationship could develop in this industry, giving London its distinctive shape.

References

1. For an historical account see P. J. Drury, The production of brick and tile in medieval England, in D. W. Crossley (ed.) *Medieval Industry*, Council for British Archaeology, Research Report No. 40, 1981, pp. 126–142.
2. The most prominent example, Hampton Court, begun under Henry VIII in 1515.
3. "It was towards the close of the sixteenth century, when chimneys began to be fitted more widely not only to new but older cottages, that brick first found a permanent way into the village." Harry Batsford and Charles Fry (1938) The English Cottage, Batsford, London, p. 31. Historically more reliably John Thomas Smith dates the "replacement of the open hearth by a chimney stack" and that "the upper storey is no mere attic but a storey of full height" already in the second quarter of the 16th century; see "The evolution of the English peasant house in the late seventeenth century', in *The Journal of the British Archaeological Association*, 3rd series, Vol. XXXIII, 1970, p. 136.
4. 2&3 Edward VI (1549–50), c. 15, para. III .
5. 17 Edward IV (1477–78), c. 4, 'An act for making tile'.
6. A copy of the Bill in the records of the Company of Tilers and Bricklayers, Guildhall Library, MS. 4318, p. 71-80.
7. Ibid.
8. 17 Edward IV (1477–78), c. 4.
9. 'A Proclamation concerning Buildings, and Inmates, within the Citie of London, and Confines of the same', Charles I, 2 May 1625, Whitehall, in James F. Larkin (ed.) (1983) *Stuart Royal Proclamations, Vol. II, 1625–1646*, Clarendon Press, Oxford, pp. 23f.
10. 'The Book of Ordinances belonging to the Company of Tylers and Bricklayers Incorporated with the City pf London', Guildhall Library, Ms. 4859, p. 1.
11. John Houghton (1727/8) *A Collection for the Improvement of Husbandry and Trade*, London, edited by R. Bradley.
12. From Latin 'tasca', in Middle English "the work imposed on or exacted from a person" (The Shorter Oxford English Dictionary 1980).
13. See James Edwin Thorold Rogers (1891) 'A History of Agriculture and Prices in England', 7 Vols, Clarendon Press, Oxford. He already concluded from his studies of accounts from the middle of the thirteenth century: "Our forefathers do not seem to have made bricks up to the close of the fourteenth century" (Vol. I, p. 486). "It is however in the fourth quarter of the fifteenth century that they became common"(Vol. III, p. 434). For a more recent summary on this subject with an excellent bibliography see P. J. Drury, 'The production of brick and tile in medieval England', in D. W. Crossley (ed.) (1981) *Medieval Industry*, Council for British Archaeology, Research Report No. 40, pp. 126-142.
14. James E. Thorold Rogers, op. cit. Vol. III, pp. 427-439.
15. See P. J. Drury, op. cit., p. 132.
16. Ibid.
17. An example of rent accounts concerning a tile-kiln in P. J. Drury, op. cit., p. 134.
18. Rodney Hilton suggests (in 'Bond Men Made Free', Methuen, London 1973) that the name of one of the great leaders of the 1389 revolt, Whyatt Tyler, indicates his trade.
19. The North Bar in Beverly from 1409, consisting entirely of bricks sized $10\frac{1}{2} \times 5\frac{1}{4} \times 2$ inches, was built by 'tegulatores' and their material was 'tegulae' or 'waltill'. See the account rolls in Arthur F. Leach (1896) 'The Building of Beverley Bar', Transactions of the East Riding Antiquarian Society, Vol. 4, pp. 26–37.
20. F. W. Brooks (1939) 'A medieval Brick-yard at Hull', *The Journal of the British Archaeological Association*, 3rd Series, Vol. IV, pp. 151–174.
21. Ibid. p. 158.
22. Ibid. p. 157.
23. Ibid. p. 161. It is questionable, though, whether 'direct employment' and 'subcontracting' are adequate terms to describe those relations.

24. Ibid. p. 160.
25. Ibid. p. 163.
26. Richard Neve (1726) 'The City and Country Purchaser and Builder's Dictionary', London, p. 44.
27. G. R. Batho (1956) 'Henry, Ninth Earl of Northumberland, and Sion House, Middlesex, 1594–1632,' *Transactions of the Ancient Monument Society*, New Series IV, pp. 107f.
28. British Museum, Manuscripts, Add.41.137.f.171. Almost the same formula in the Essex Wage Assessment 1651, Victoria County History, Essex, Vol. II, London 1907, p. 456.
29. Richard Neve, op. cit., p. 45f.
30. Balthasar Gerbier (1663) 'The First and Second Part of Counsel and Advice to all Builders for the choice of their Surveyors, Clerks of their Works, Bricklayers, Masons and other Workmen therein concerned, as also in respect of their Works, Materials, and Rates thereof. London.
31 Roger Pratts Notebooks (1664): "… if water remains too much in any part of the clay it will upon burning cause the brick to crack, swell, twist etc." R. T. Gunther (ed.) (1928) 'The Architecture of Sir Roger Pratt', University Press, Oxford, p. 229.
32. Malcolm Airs (1975) 'The Making of the English Country House 1500-1640', *Architectural Press*, London, p. 104.
33. Ibid. p. 106.
34. From Pegge Burnell's Diary, in William Morris Barley (1961) 'The English Farmhouse and Cottage', Routledge & Kegan Paul, London, p. 207.
35. David Michael Palliser reports that "by 1592 the brickmakers were trying to break away from the tiler's guild", 'The Trade Guilds of Tudor York', in Peter Clark and Paul Slack (eds) (1972) *Crisis and Order in English Towns 1500–1700*, Routledge & Kegan Paul, London, p. 94. – Against fierce opposition of the London Company of Tylers and Bricklayers a short lived Company of Brickmakers was eventually incorporated in Westminster in 1636. But these disputes were only late manifestations in corporate towns of what had practically been achieved at least one hundred years earlier by the makers of bricks under county justice, producing and selling without any interference by corporations.
36. "Quicumque aedificare voluerit, videat, sicut se at sua diligit, quod non cooperiat de arundine, nec de junco nec de aliquomodo straminis, neque stipula; nisi tegula, vel cingula, vel bordo, vel, si cintinget, de plumbo aut estra de torchiato, infra civitatem rel Portsokne." In *Liber Custumarum, Part I*, edited by Thomal Riley (1860) Longman, London, p. 87.
37. "Memorandum … quod maxima pars civitatis al illo igno fuit combusta … multi cives .. aedificaverunt … unam domum lapideam, spissis tegulis coopertam …", Copy in *Liber. Albus (1419)*, edited by Henry Thomas Riley (1839 Longman, London, p. 278. *Transl. J.J.*
38. Transcript in Henry Thomas Riley (1968) 'Memorials of London and London Life in the XIIIth, XIVth, and XVth Centuries', Longmans Greene & Co., London, pp. 308f.
39. Ibid., p. 254.
40. Calendar of Letterbooks, edited by Reginald Sharpe (1905) (Letter-Book G., fo. 99b), London, p. 138.
41. Ibid., Letter-Book G., fo. 100: "Ordinance to the effect that no tiler undertake to cover any house or manor except by day work, the master taking 6 d. a day and the man 4 d., and no more, on pain of imprisonment for a year and a day and forfeiture to the King."
42. 17 Edward IV (1477-8), c. 4, 'An act for making tile'.
43. Balthasar Gerbier (1662) 'A Brief Discourse Concerning the Three chief Principles of Magnificent Building, viz. Solidity, Conveniency, and Ornament', London, p. 51f.
44. Roger Pratt, op. cit., p. 163.
45. Letters Patent 12 Charles I, 12 May 1636, P.R.O., C. 66/2731/5.
46. 31 Elizabeth (1588-9), c. 7, 'An Acte againste erectinge and maytayninge of Cottages'.
47. H. H. Copnall (ed.) (1915) 'Nottinghamshire County Records', p. 125; quoted from Morris Willmore Barley, op. cit., p. 205.
48. Ibid.
49. 'The Free Customs, Benefits and Privileges of the Copyhold Tenants, of the Manors of Stepney and Hackney in the Countie of Middlesex within this composition, London, 1617, §§ 46–7. A similar agreement was made between the Earl of Northumberland and the tenants of Sion House in the 'Istleworth-Sions Peace', decree by the High Court of Chancery, 20 May 1656.
50. 3&4 Edward VI (1549–50), c. 3.
51. James E. Thorold Rogers, op. cit., Vol. IV, p. 441.
52. Ibid., Vol. V, pp. 538–545; at annual averages in East England and the London District.
53. John Bilson (1908) 'Mediaeval Bricks', in Journal of the R.I.B.A., Vol. XV, 3rd series, London, p. 46f.
54. Copy in the Charter and Ordinance Book of the Company of Tylers' and Bricklayers', London, Guildhall Library, MS. 4859, 23–48.
55. John Bilson, op. cit., p. 47.
56. 12 George I (1725), c. 35.
57. 9 George III (1769), c. 37
58. GCL Record Office, E/BVR/22.
59. GLC Record Office, E/BVR/23.
60. GLC Record Office, E/BVR/24.
61. John Houghton, op. cit., Nov. 24, 1693, LXVII, p. 186.
62. Roger Pratt, op. cit., p 229.
63. Records of the Company of Tylers and Bricklayers, Search Book 1605–1650, Guildhall Library, MS. 3047, 1.
64. Ibid.
65. Essex Justices, Quarter Session 8th April 1651, in Victoria History of the Counties of England, Essex (1907), Vol. II, p. 456.
66. John Houghton, op. cit., December 1st, 1693, No. LXVIII, 'Brickmaking six to a stool's work', p. 193.
67. John Houghton, op. cit., p. 196f.
68. Robert Campbell, (1747) 'The London Tradesman', Gardner, London, p. 169.
69. Ibid., p. 332.
70. Anonymous (1747) 'A General Description of all Trades, London, p. 38f.
71. Published London 1786.
72. This is calculated on the basis that the full capacity of a stool is used for the annual production and that the cost of production including wages, material, and rent is 5 s. per thousand bricks. The cost of an annual production is the minimum capital to set up as a brickmaker.
73. Question raised by the historians of the so-called 'Transition Debate': (1954) 'The Transition from Feudalism to Capitalism – a Symposium by Paul M. Sweezy, Maurice Dobb, H. K. Takahashi, Rodney Hilton, Christopher Hill', Fore Publications, London. This issue was resumed in the 'Brenner Debate': T.H. Aston and C.H.E. Philpin (eds.) (1985) *The Brenner Debate, Agrarian Class Structure and Economic Development in Pre-Industrial Europe*, Cambridge University Press.
74. Prices and quantities from John Houghton, op. cit., pp. 191-196.
75. Court Minute Books of the 'Company of Tylers' and Bricklayers', London, Guildhall Library, MS. 3943.5, entries between 1724 and 1728.
76. Court Minute Books op. cit., pp. 375–384.
77. According to Thorold Rogers, op. cit., Vol. 4, p. 545.
78. Daniel Defoe (1724–26, 3 vols), 'A Tour through the Whole Island of Great Britain'.
79. Jeremy Bolton (1996) 'Wage labour in the seventeenth-century London', in *Economic History Review*, XLIX, 2, pp. 269–290.

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CONSTRUCTION HISTORY: RESEARCH PERSPECTIVES IN EUROPE. A SYMPOSIUM HOSTED JOINTLY BY THE ASSOCIAZIONE EDOARDO BENVENUTO AND THE DEPARTMENT OF ARCHITECTURE, GENOA UNIVERSITY. GENOA 17TH – 18TH DECEMBER 2004 (HENTIE LOUW)

This meeting had several objectives: it marked the publication of a survey on the current 'state of the art of' construction history in Europe, produced by Kim Williams Books and commissioned by the *Associazione* (the sixth volume of their series of publications entitled, *Between Mechanics and Architecture*); it commemorated Salvatore Di Pasquale (1931–2004), one of the pioneers of the subject in Italy, who died earlier this year; it formed part of the European City of Culture celebrations for the City of Genoa.

Eight countries were covered in this survey and the reports formed a natural focus for the two-day event: Bill Addis from Buro Happold reported on the situation in the UK, Riccardo Gulli from the University of Bologna, covered Italy, Santiago Huerta from ETSA Madrid, Spain, Karl-Eugen Kurrer from Wilhelm Ernst & Sohn, Berlin, reported on Germany, Austria and Switzerland, Anne Coste from the School of Architecture St Etienne covered France and Dirk van de Vijver, Catholic University of Leuven, Belgium. Patricia Radelet-de-Grave placed this endeavour in the context of the Association's longstanding project, initiated by herself and Benvenuto in 1995, namely, to explore the interactive relationship between architecture and mechanics in historic structures. Since Malcolm Dunkeld has analysed the contents of these reports elsewhere in this Newsletter I shall concentrate on the rest of the proceedings.

The meeting started with tributes from ex-students and collaborators to the life and work of Salvatore di Pasquale who, together with Edoardo Benvenuto, set the course for research into construction history in Italy. Apart from the abovementioned national reports the other presentations ranged from prize giving to book discussions, exhibition videos and reports on current research projects by individual scholars and institutes. There was also on display a series of books on construction history, mainly in Italian and Spanish – the majority of which were unfamiliar to me – that seemed a useful addition to a bibliography for the subject. As far as could be determined the proceedings offered a good reflection of the general range of activities of the *Associazione Edoardo Benvenuto* and as such were of special interest to a first-time visitor to one of their meetings.

The *Eduardo Benvenuto Prize* is awarded annually since 2002 to young scholars for outstanding writings on the art and science of historic building. The 2004 prize, for which there were 11 applicants, was awarded jointly to Joaquin Antuna Bernardo of Madrid for a doctoral thesis on the contribution of the Spanish structural engineer/architect, Eduardo Torroja (1899–1961), and Chiara Calderini of Genoa for her thesis on 'The identification of the influence of masonry patterns on the global behaviour of masonry structures'.

From Naples Professors Buccaro and D'Agostino presented an overview of the collections of the Faculty of Engineering, University of Naples. This consisted of a video of the drawings, books and models in their archives, and a jointly authored book, published recently, tracing the development of engineering science, practice and teaching in the city and its institutions from the early 19th century to this day. Professor Santiago Huerta from Madrid presented a new book published by the Instituto Juan de Herrera on the traditional vaults, arches and domes of Catalonia. It is based around a manuscript prepared by Angel Truno during the 1950s and demonstrates both the importance of recording traditional building techniques for posterity as well as serving as a good example of the kind of methodology required for establishing a precise relationship between technique and architecture – something lacking in most architectural histories. Bill Addis offered a critique of Antonio Becchi's latest book, on Bernardino Baldi (1553–1617) and Aristotle's sixteenth question regarding mechanics, *QXVI. Leonardo, Galileo e il caso Baldi: Magonza, 26 Marzo 1621* (2004).

Beatrice Betazzi, from the University of Bologna introduced OSA (Officina di Storia dell'Architettura), which runs a masters degree that seeks to combine architecture, archaeology and art history. Rolf Gerhardt of Aachen University spoke about how his department uses historical precedent, graphical analysis and experimental modeling techniques to teach architectural students structural design from the standpoint that you need to understand something first before you can appreciate fully its qualities. My own paper, 'Construction History in Britain Today, Singular and Plural', was essentially a review of the CHS approach to research into construction history by reference to its publications, especially *Construction History*. Professor Poretti of the University of Rome ('Tor Vergata') reported on his work on the pre-World War II urban design projects in Rome, and the architects' and engineers' attempts to reconcile the official demand for monumentality and classical reference with modern structural theory and the structural and expressive capabilities of new materials like concrete and glass. Finally, Luigi Sorrentino from the University of Rome ('La Sapienza') talked about the research that he and Alessia Moretti have been doing on the history of designing earthquake resistant structures in Southern Italy from the 13th century onwards.

The final discussion covered much the same territory as the proceedings of the previous two days that have revealed many variations in approach and circumstance amongst the delegates. Everyone seems agreed that there is much scope for research in the field and the need for greater cooperation and contact amongst construction historians of all kinds across national and linguistic boundaries was self-evident to all present. Kim Williams, the publisher of the European survey of current practice in the field usefully identified three further obstacles to better international communication:

- A lack of agreement on the basic terminology for the subject amongst countries.
- Different roles for the architect/engineer in different societies arising from different training, responsibilities and outlook.
- Different levels of institutional support.

While this meeting may perhaps not have succeeded in making significant breakthroughs for any of the major issues in this regard it demonstrated once again the potential for growth and collaboration that already exists for the subject, as well as the store of goodwill amongst the international scholarly community. Some of the problems we face are obviously generic and may take a long time to resolve; others are more accessible and can be tackled to good effect in the short to medium term. Three such were raised:

- Establishing an international electronic network to facilitate easy contact.
- Producing a comprehensive bibliography for the subject.
- Setting up an international body of sorts to act as a rallying point for the various individual scholars and national groupings.

One senses that a momentum has been steadily building ever since the Madrid Congress in 2003 and the organizers of this symposium

are to be congratulated for their imaginative intervention in support of this movement. Everything worked out well. The simultaneous translation was a great assistance for those short on linguistic skills. The conference programme was well structured and efficiently run; the food was good and the hospitality excellent. The City of Genoa, basking in the final moments of its European cultural status did them proud, as did the weather, making for a most enjoyable few days at the end of a long teaching term! I came away from the meeting convinced that we are on the right track in seeking to develop the subject on an international basis. The British construction historians have much to learn from their Continental counterparts, but they also have some things of value to offer. The Second International Congress, to be held in Cambridge in March/April 2006, will be our opportunity to return the hospitality and to help steer the subject towards disciplinary status and international recognition.

(Replies to: Dr. Hentie Louw Email: H.J.Louw@newcastle.ac.uk)

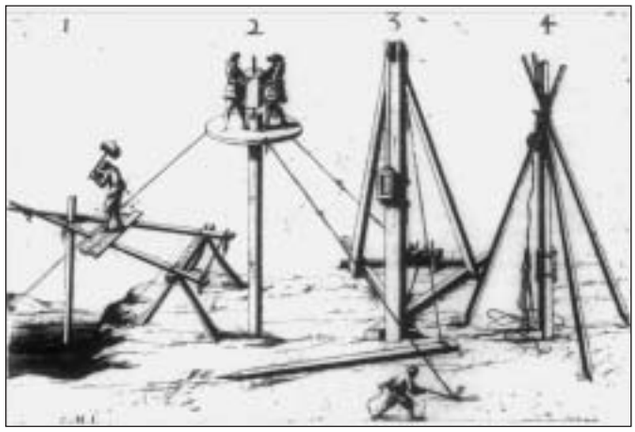

Fig.1 From the article "mazzabecco"; Cornelio Meyer: L'arte di restituire a Roma la tralasciata navigazione del suo Tevere, Roma 1683 / 1685, plate 24.

AN ONLINE GLOSSARY OF HISTORICAL ITALIAN BUILDING TERMS (HERMANN SCHLIMME)

Whoever studies Architectural and Construction History will repeatedly stumble over unfamiliar terminology in sources. Terms are often in disuse for centuries or describe forgotten techniques. Most of the terminology were moreover never explicitly explained in treatises: Planning systematics, construction technology, preparation and transport of material and building site logistics remained largely unwritten well into the nineteenth century and were passed on through learning by doing and oral transmission. The language varies regionally and over time, the single words often belong to local dialects. That's why many terms used in account books or contracts would not appear in contemporary dictionaries either. In order to capture the sources in all their implications it is necessary to well understand the applied building terminology. That's why we propose to join the forces of scholars concerned with these issues and to create, with the Glossary, a long awaited instrument for History of Building issues. Beyond accelerating the understanding of sources for monographic studies in the History of Architecture or the preparation of restoration measures, the constantly growing Glossary, with the contribution of all scholars who like to share their results, will go a long way towards a more general History of Building Knowledge.

The Glossary e.g. considers expressions from building contracts like "a tutta roba" or "a manifattura", which would be misleading at first sight. The former specification means that the contractor had to care for the building materials, the latter obliges the client to do so. Other terms describe forgotten materials and techniques: "Acqua di colla" means the mixing of lime and milk in plaster. "Colla di carbone" contained charcoal and served as the darker plaster layer for "sgraffito". "Piede" (foot) on the other hand did not only stand for the unit of measurement but also denoted the larger end of a wooden beam. Other terms are part of common speech or vernacular language: "Mazzabecco" indicates a device to drive against pales, but literally means to beat on one's mouth (Fig.1).

The word "orso" (bear) would not easily lead the present-day reader to a large roller made of stone, which was used to finish brick pavements. When sources mention the finishing of inside and outside surfaces, this may be extremely helpful for historians, as from this they may deduce the state of the building process. Knowing what the result of a specific surface treatment looks like, monument conservators may on the other hand be able to identify original surfaces.

The Glossary is a joint initiative of Claudia Conforti, Chair of Architectural History, Department of Civil Engineering at the Università degli Studi di Roma Tor Vergata, and her team (Maria Grazia D'Amelio, Nicoletta Marconi, Micaela Antonucci), of Elisabeth Kieven, Director of the Bibliotheca Hertziana, Max Planck Institute for Art History in Rome, and of the author of this article, who codirects with Elisabeth Kieven the research programme "Epistemic History of Architecture". This programme deals with the technical and logistical knowledge of building practitioners, its evolution, tradition and discontinuities.

The Glossary has already started to work (Fig.2), is freely accessible online and contains at the moment more than 550 entries, of which

Fig.2 The online Glossary

about 160 are illustrated.
The Glossary follows three principles:

(1) The system is based on free and open source software and uses ZOPE (Z Object Publishing Environment), a preconfigured web-publishing tool, which can host specific databases like the Glossary. By using open source software we avoid to depend on a private commercial company, which would as a rule retain the source-code. Instead we ourselves can develop the programme, which matures best hand in hand with the input of the content.

(2) The Glossary is to be kept very simple. The address (see below) gives immediate access without channelling visitors through various introduction pages. The Glossary works with a sober alphabetic list of articles and interlinkings. There are just two levels of access: The anonymous visitor can read everything. Scholars in possession of a password, however, have the

possibility to contribute directly to the Glossary from their workplaces. Prerequisite is just a computer with internet-access without need to install any software.

(3) The Glossary refers to well-proven edition principles for dictionaries and offers the possibility to insert citations from sources, treatises, secondary literature and image legends.

The Glossary incorporates at the moment two printed glossaries and a long series of entries concerning hoists and machinery for the building site (Nicoletta Marconi). A major part of the articles inserted within the last few months derives from the accurate analysis of about twenty service descriptions ("capitolati") from 17th century Rome (Micaela Antonucci). On November 19th 2004 the initiators of the Glossary organised the workshop "Le parole del cantiere", where scholars from all over Italy spoke about building terminology from their fields of interest. A broad series of articles about architects' drawing and surveying instruments were subsequently added to the Glossary (Filippo Camerota). Other groups of articles will follow. One of the outcomes of the workshop was the introduction of indications regarding the region of prevalent use of a term and the possibility to order the articles according to this criterion. By doing so, we get distinguishable regional word lists within one single glossary.

The Glossary has the following web address:
http://wissensgeschichte.biblhertz.it:8080/Glossario

The research programme Epistemic History of Architecture has a web site at:
http://www.biblhertz.it/deutsch/forschung/wissensgeschichte.htm

The programme of the workshop "Le parole del cantiere" can be found at:
http://wissensgeschichte.biblhertz.it:8080/WdA/WdA/WdA_coll/workshops/rome2004.html

(Replies to: Hermann Schlimme Email: schlimme@biblhertz.it)

SECOND INTERNATIONAL CONGRESS ON CONSTRUCTION HISTORY, CAMBRIDGE UNIVERSITY 2006: UPDATE (MALCOLM DUNKELD)

The Call for Papers associated with the Second International Congress on Construction History to be held at Cambridge University in 2006 has now closed. The Congress Organising Committee (Hentie Louw, Michael Tutton, James Campbell, Simon Pepper and myself) is pleased to announce that over 400 abstracts have been received. This is an astonishing number of potential papers and is a testament to the rise of construction history as a historical specialism and to the globalisation of the subject. We have received abstracts from China, Russia, Indonesia, the Philippines, Italy, France, Spain, North America, the United Kingdom, the Netherlands, Germany etc. Currently the Scientific Committee (chaired by Professor Jacques Heyman) is hard at work reviewing the abstracts. The Congress promises to be one of the largest, most exciting and eclectic events of its kind ever held and will be a showcase for the latest research and scholarly activity on construction history.

The Congress will be a public event: taking into account the facilities at Queens' College Cambridge, this means that only the best papers will be heard at Cambridge (approximately 260). Construction History Society members are advised to book early to ensure a place at the Congress. This can be done by registering online at the Congress web site (www.chs-cambridge.co.uk)

The Organising Committee is keen to attract sponsorship for the event. Potential sponsors will receive a number of benefits including a dinner in one of the beautiful dinning rooms at Queens' College, details of their organisation on the Congress web site, possible exhibition space and other preferential benefits. Sponsors will have their name associated with a successful and exciting event. For more details please contact James Campbell on email: jwpc2@cam.ac.uk

Home Page of the Congress Web Site (www.chs-cambridge.co.uk)

Finally, all the papers given at the Congress will appear in a 2/3 volume Proceedings, which will be issued to delegates as part of the Congress fee. If you are unable to attend the Congress, but would like to reserve a copy(s) of the Proceeding, please email Malcolm Dunkeld (malcolm.dunkeld@btopenworld.com).

The Second International Congress on Construction History at Cambridge University is the largest event the Construction History Society has ever mounted. Your full support for the event will be most welcome.

(Replies to: Malcolm Dunkeld Email:
malcolm.dunkeld@btopenworld.com)

CONCRETE FILMS AND THE C&A FILM LIBRARY (EDWIN TROUT)

Introduction

The Cement & Concrete Association was established in 1935 to provide the British cement companies with a central organisation to develop the market for concrete as a construction material, and thereby create increasing demand for Portland cement, their core product. The C&CA rose to the task through a range of activities: advocacy, information, advice, training, research and publishing. The head office in Victoria was supplemented over the years by a network of regional offices; a research station at Wexham Springs near Stoke Poges; and a residential training centre next door at Fulmer Grange.

From its early days the C&CA was committed to disseminating information, through publishing, its library, and presentations – either to the public or through its own training courses. Film, in due course, became a natural extension of these activities. Film-making became a parallel to the publishing and printing process; films, along with photographs, slides and eventually video, were maintained in the C&CA's library; and film became a central medium in presenting concrete to audiences.

Film production has long since ceased and the use of film as an audio-visual aid to lecturers has been surpassed by other media, but examples of the C&CA's output remain as a collection at Concrete Information Ltd – the successor to the C&CA's library.

Film-making

The C&CA's hey day was the 1960s and '70s and these two decades coincided with the Association's involvement with film production. The Annual Report for 1961 had this to say of the start of film-making:

> The Association included the making of 16 mm films among its activities for the first time in 1961. A 40-minute film, *The Hammersmith Flyover*, was completed in December. This film gives a technical account of the design and construction of this important prestressed concrete structure, and is intended principally for engineers and engineering students. A similar film is being made on the construction of the Medway Bridge, and should be completed by the summer of 1963.
>
> A ten-minute technical film, *Standard bridges sections for prestressed concrete bridges*, has been made in conjunction with the Prestressed Concrete Development Group on the design and use of the Groups standard beams. The commentary is spoken by the President of the Group.

Once underway the programme of film-making acquired a momentum as noted in the *Chronicle*: "The film-making continued and three were issued, one for farmers, one on concrete paving and one on pre-stressed concrete" (1965); "Three films were made for training purposes" 1970); and "New films included one on the Gateshead Viaduct as well as further training one" (1971).

From the foregoing it will be seen that the Association pursued a twin approach of making promotional feature films and technical training films. Of the former some were sponsored by the firms whose work was featured, such as *Concrete Islands* by MacAlpine, while others were made for third parties. Notably, in 1972, the C&CA made *City* for the European cement federation, Cembureau, and this was viewed widely throughout the Continent.

Another significant film, on the building of the London Bridge, was produced in 1973 and in 1974 *A Heritage to build on* was made to coincide with the Architectural Heritage year with the aim of promoting a better legacy from good concrete structures. During the year the series of slide sets that has proved to be so invaluable to the lecturers around the country both at colleges and within companies was introduced.

Many of the films were made to a very high standard, and some were shown in public cinemas. Several of the films deservedly received important awards at film festivals. Most of the 'case study' films were accompanied by a slim booklet that gave drawings and further details of the projects featured.

In about 1980 a manager was appointed to the photographic staff and the Photographic Unit at Wexham Springs was formed. In addition to his managerial role he was responsible for the production of education films, videos and slide sets. Though the photographic work was to expand under the new department, film-making was drawing to a close. The final prestigious film *Concrete is …* was made in 1981 and "provided an excellent perspective of the nature of concrete and showed how attractive it can be in many everyday applications and uses."

1981 was also a turning point in the economic fortunes of the Association and the industry it served. Cuts had to be made, the commercial publishing arm was sold off, and the establishment of staff was reduced. The C&CA entered a long period of decline and metamorphosed into the British Cement Association in 1987. During these years too, video became the more accessible medium and most of the C&CA's titles were transferred to both Betamax and VHS formats, in tandem with the earlier 16 mm. Since then, various videos have been made but on an *ad hoc* basis, and usually with an explicit 'propaganda' purpose in mind.

The Film Library

Just as films were first made in 1961, the *Report for the year* also notes that "both films are available on loan from the Association." By 1965, a leaflet entitled *C&CA Library Services* was able to offer:

> Both 16 mm films and 35 mm filmstrips on concrete work are available in this country, a number of them being held by the Association. These cover varied aspects of both reinforced and prestressed concrete work, from the highly technical to the quite simple … and may be borrowed.

Seven years later the Association was handling over 3000 film bookings each year "thereby providing sound technical information as well as showing excellent examples of good concrete applications." (*Chronicle*, 1972). A full catalogue, Films available on loan, was issued in June 1976.

Though 1981 saw the culmination of film production, the Film Library was evidently thriving:

> Films in the Association's Film Library continue to be in great demand. They are all offered on free loan to borrowers in this country … In all there are 40 titles covering various aspects of concrete design and construction including 15 instructional films. During the year there were 3042 bookings for films and the most popular titles continue to be *An introduction to prestressed concrete* and those in the Concrete Practice series. (Ref: Report for the year 1981)
>
> As mentioned above, the Association's new film *Concrete is …* was launched during the early part of the year and a series of showings arranged around the country for selected audiences. It is available from the Association's Film Library but, to satisfy a wider demand further copies, together with video cassettes, are being distributed by a film library which caters for a broader spectrum of audiences.

For most of its time, the Film Library was located at the C&CA's head office, 52 Grosvenor Gardens in Victoria, London. At the time the British Cement Association was established, however, in 1987, the Film Library was transferred to premises on a business park in southeast London: Park Hall Rd Trading Estate, though the Films and Photographs Manager was based at Wexham Springs.

The film library it seems had concentrated on distributing the C&CA's own films, for both sale and loan or hire. These had ceased to be made in the 1980s and with the new emphasis on video, steps were taken to ensure that videos from external sources were collected and made available through the main Library. This was done, though the small scale of the exercise (19 videos held by staff; 23 from the Film Library) shows how things had declined in the 1980s and points to the final withdrawal of C&CA-produced material.

The end came not much later. In a memo of 14 January 1991 it was announced: "All BCA films and videos with the exception of *Concrete is …* have been withdrawn, and the film library closed. This is due to their datedness and low demand." Much of the stock was disposed of, some of it to Amberley Museum. With the establishment of the BCA's self-sufficient 'Centre for Concrete Information' in 1993, now Concrete Information Ltd, the remaining film stock was

transferred to join the video collection in the Library, principally for archival purposes.

The Film Catalogue

The following list is a composite taken from various sources. Indentation indicates the 1981 Catalogue (the first separate film section); * the 1986/87 Catalogue (the last from C&CA). Fuller details of the films are given in each of the sales catalogues.

Civil Engineering

1961	The Hammersmith Flyover *	(booklet)
1963	The Medway Bridge *	(booklet)
1965	Elements facing elements *	
1965	North from Preston	
1967	Mancunian Way *	(booklet)
1968	Sydney Opera House	
1969	Build yourself a world *	
1971	Western Avenue Extension *	(booklet)
1972	The Gateshead Highway *	
1973	London Bridge *	(booklet)
1973	Paving the way	
1973	Safety by design	
1976	Concrete Islands *	(promotional flyer available)
1976	A matter of span *	(promotional flyer available)
1982	Bridging the 80s *	

ND	Over the top
ND	Fire tests on structural concrete beams
ND	Prestressed concrete quay construction

(These three available in 1976)

Building

1966	This is Marina City *
1968	Hilton-Palacio del Rio *
1969	Barbican
1970	Grandstand *
1971	Education in building *
1972	City
1975	A heritage to build on *
1975	Made in Britain – built in Gibraltar *
1981	Concrete is … *

ND	The new Chicago
ND	Concrete pays

C&CA activities

1967	Training in concrete
1969	Research at Wexham Springs

Instructional

1964	Concrete practice: formwork *
1967	An introduction to concrete technology *
1969	An introduction to concrete practice *
1970	Concrete practice: placing and compacting *
1970	Concrete practice: mixing *
1970	Concrete practice: batching *
1970	Concrete practice: placing and compacting
1971	Concrete practice: fair-faced blockwork
1971	Concrete practice: testing concrete
1973	Concrete practice: transporting *
1974	Concrete practice: ground floor construction *
1975	Concrete practice: preparations for ready-mixed *
1975	Concrete block paving *
1976	Rapid Analysis Machine
1977	Finishes in concrete *
1978	An introduction to prestressed concrete *

ND	An introduction to concrete practice
ND	Constructing a concrete garage drive

Additional Booklets

These are held at CIL and were apparently published in advance of the associated films

1961	No.1 Quay Tees Dock
1962	The Millbank Development
1964	Heads of the Valleys Road
1966	Greyfriars Bridge, Hereford
1966	M1 southern extension
1968	Kingston Bridge, Glasgow

ND	The Preston-Lancaster section of M6 motorway
ND	M2 Motorway
ND	Leeds inner ring road

(Replies to: Edwin Trout Email: e.trout@concreteinfo.org)

THE GREAT CONSTRUCTORS: THOMAS BRASSEY CONFERENCE, 7TH NOVEMBER 2005

The ICE, Construction History Society and Victorian Society are organising a one day conference to commemorate the 200th anniversary of the birth of Thomas Brassey, the greatest of the Victorian contractors, responsible in his lifetime for one eighth of the world's railway mileage.

The conference will look at how building and civil engineering developed before the age of Brassey. Speakers will cover some of the great names of Victorian contracting and its development in Victorian Britain.

Programme

Chair – Hermione Hobhouse
Andrew Saint – Keynote address
James Ayers – Georgian Building Contractors
Peter Guillery – Changes in Building Contracting 1780-1825
Peter Cross-Rudkin – Civil Engineering Contracting 1760-1835

Chair for the afternoon session – Robert Thorne

David Brooke – Thomas Brassey
Adrian Vaughan – Samuel Morton Peto
Patricia Spencer-Silver – Sir John Jackson
Chris Powell – Cometh the Hour, Cometh the Man

Conference cost £40 (coffee, lunch and tea). Payable in advance only. Contact The Victorian Society, 1 Priory Gardens, London w4 1TT. Tel: 020 8747 5895, Email: events@victoriansociety.org.uk The conference will be held at the Institution of Civil Engineers, One Great George Street, London SW1P 3AA.

INTERNATIONAL CONFERENCE OF LOG HOME BUILDERS AND WOOD CONSTRUCTION SPECIALIS TS, 4TH – 9TH OCTOBER 2005, RIGA, LATIVIA (JURIS VERNERS)

The Builders Union of Latvian Chamber of Crafts (LCC) together with International Log Builders Association (ILBA) of North America are organizing an all-encompassing International Log Home Builders and Wood Construction Specialists conference to take place in Riga, the capital of the Republic of Latvia, from October 4 through 9, 2005. The president of LCC, Karlis Apinis, commented that the initiative to hold a week long session with the participation of worlds top experts came from ILBA in view of Latvia s long tradition in wood building construction. Within the short period of Latvia s independence not only the craft of builders of wooden buildings has been restored, but also objects, which have attracted worldwide attention, have been built and supplied to buyers, both in domestic and in export markets. For most part these have been exclusive dwellings, recreation centers, hotels, just to mention a few. Also some intricately and qualitatively restored older wood structures both in city and rural settings have been returned to use and have received wide acclaim.

Conference will be a joint undertaking of LCC, Builders Union of LCC, Center of Craftsmanship and Design of Riga Technical University (RTU), and Latvian University of Agriculture (LUA), which in turn will draw on the expertise of the learning institutions and professional organizations in Latvia as well as on those worldwide. The Conference agenda has been planned to be uniquely creative, diversified, – encouraging active attendees' participation.

It will consist of theoretical sessions within which the most prominent researchers of building problems will meet and discuss solutions. Most experienced craftsmen and successful business entrepreneurs will clarify the inherent advantages offered by wooden buildings, such as maximum feeling of comfort, health and safety guaranteed by appropriate planning, safe construction – designers and craftsmen combining their experience to satisfy the most demanding wishes of the client.

The practical sessions of the conference will be as interesting and educational as those of the theoretical sessions. Prior to the conference, organizers with the help of modern communication methods, will engage experts in countries in different parts of the world who will supply to the students of RTU designs and illustrations of typical wooden constructions existing on different continents and built to withstand wide diversity of climactic conditions. The students at RTU, in turn, will build precise maquettes of these examples . After the conference, the Center of Craftsmanship and Design of RTU will inherit this collection. These and some already completed livable structures located in nearby staging areas in Latvia will be video filmed and will offer a wide selection of design concepts to be transmitted to interested parties through the use of latest video conferencing techniques.

The broader special interest program of the conference will include visiting Latvian Ethnographic Open Air Museum as well as some unique and several-century-old wooden buildings in the area. Likewise visits to old homesteads and examining traditions and myths of ancient Latvians will be optional in the program.

For more complete information visit our website: www.lak.lv

(Juris Verners, Riga Technical University, Latvia)

LONDON OPEN HOUSE

In addition to the annual Open House London event, the organisation Open House has some year-round initiatives. These include:-

Architecture Bulletin

Subscribe to Open House Architecture Bulletin which brings you monthly details of London's architecture events, exhibitions, tours and talks at the discounted rate of £12.50 for 1 year's subscription (plus a free copy of the Open House London Annual Event buildings guide). Tel 020 7267 7644 or post cheque (payable to London Open House) or payment details to Open House, PO Box 25361, London NW5 1GY, mentioning "Societies Offer"

London Architecture Tours

Discover London with these Saturday morning architecture tours, led by experts, exploring Docklands, the Square Mile, West End or Bankside. TOUR DATES: Tel. 020 7267 7644 or visit website www.openhouselondon.org MEETING PLACE: Directly outside the gates of the Royal Academy of Arts on Piccadilly, W1. TIME/DAY: Saturdays, 10.05am for 10.15 am departure. Tours last 3 hours. COST: £18.50/£13 (students), including coach & guide BOOKING ESSENTIAL: Tel. 020 7267 7644 or email loh3@londonopenhouse.org

If you have any queries, please contact Hiromi Sasaki: LOH3@londonopenhouse.org. Open House, 1st Floor (Unit C1) Linton House, 39-51 Highgate Road, London NW5 1RS, Tel 020 7267 2070 Fax 020 7267 2822.

Open House is a registered charity whose aim is to broaden public awareness by welcoming a diverse audience to distinctive examples of architecture, engineering and design; to educate and inspire discussions of issues of excellence in architecture and to showcase outstanding new work as well as London's architectural legacy.

Trustees: Eva Jiricna CBE RIBA, Fred Manson Hon OBE, Jane Priestman OBE, Lady Vaizey Registered Charity No. 1072104 VAT 718 7878 76

COURSES IN BUILDING CONSERVATION AND THE USE OF TRADITIONAL MATERIALS AND PROCESSES – WEALD AND DOWNLAND OPEN AIR MUSEUM

A wide range of practical workshops and seminars for surveyors, architects, craftsmen and anyone else with a keen interest in building conservation to include the following. All courses suitable for CPD (each day seven hours).

Flint Walling: A Practical Course
A two day course covering the sorting, selection, preparation and knapping of flints. Experience of different styles of laying flints and the use of lime mortars.
Leader: Chris Rosier
5 – 6 September 2005
£160

Timber framing from scratch

A superb opportunity to gain hands-on experience of timber framing. A 5 day practical course introducing students to the historic use of structural oak framing, tools and techniques. The posts, cills, plates and tie beams of a 10' square timber frame are prefabricated during the course using only traditional tools and technique, and the frame is erected on the last afternoon.
Leader: Joe Thompson
26 Sep 2005 – 30 Sep 2005
17 Oct 2005 – 21 Oct 2005
£450

Timber Repair Workshop
A day of demonstrations and practical, hands-on sessions showing the development of repair methods at the Museum over the past 30 years. The day covers traditional methods and contemporary systems using epoxy resin.
Leader: Roger Champion
24 May 2005
£90

Strengthening Timber with Steel
A day school examining the principles, applications and problems involved in the use of steel to strengthen timber structures including the fire risks and illustrated with case studies.
Leader: Peter Ross
25 May 2005
£90

Repair of timber framed buildings
Day school including a lecture on the repair of timber framed buildings by Richard Harris, a workshop session with Roger Champion and a critical examination of repairs executed at the Museum over 30 years.
26 May 2005
£90

Cob walling – history, theory and practice
The day school will explore the various types and methods of cob wall construction in the region. It will also examine causes of failure, repair strategies and problems relating to alterations to cob structures. Some hands-on practice.
Leader: Kevin Stubbs
8 June 2005
£90

An introduction to conservation of historic ironwork
Study the history and development of ironwork using examples from the Brooking Collection. Case studies from Dorothea Restorations and practical demonstrations in the Museum forge.
Leaders: Geoff Wallis, Charles Brooking & Andrew Breese
10 June 2005
£90

Flint buildings, their history, repair and restoration
A day school which will explore this plentiful but difficult to use local building material, will aim to encourage sensitive and authentic repairs using local craft skills. Lectures and demonstration.
Leaders: Brian Dawson & Chris Rosier
13 June 2005
£90

Timber frame repairs and reconstructions
A day of case studies on a wide variety of interesting projects including the Globe Theatre, Chatham Dockyard, Harmondsworth Barn, Barley Hall, York and Long Crendon Courthouse and smaller church porches and industrial buildings.
Leader: Peter McCurdy
15 June 2005
£90

Timber: Identification of species
An introduction to the identification of timber species through examination of anatomical features, demonstrations and practical work using hand lenses and microscopes.
Leader: David Woodbridge.
16 June 2005
£90

Repair of traditionally constructed brickwork
Causes of failure and decay and selection of methods of repair. Practical sessions including cutting out bricks, taking out defective joints, stitch repairs and re-inforcement and patch pointing using lime mortars.
Leader: Gerard Lynch
20 – 22 June 2005
£270

Three day advanced leadwork course
For those who wish to progress their leadworking skills. This course is three days of practical work where students will make patterns for a planter or hopper-head to their own design including decorative embellishments
22 June – 24 June 2005
£250

Lime mortars for traditional brickwork
Lectures and practical demonstrations on the traditional preparation and uses of limes and lime mortars and the modern misconceptions about them.
Leaders: Gerard Lynch & Douglas Johnston.
23 June 2005
£90

Traditional lime plasters & renders
A practically based two day course covering the fundamentals of lime plastering from the simplest renders to the finest ornamental work. Lectures followed by practical demonstrations, hands-on experience and opportunity for discussion.
Leaders: Ian Constantinides & Jeff Orton
27 – 28 June 2005
£180

Traditional roofing methods
Five linked days exploring the traditions, methods and materials used in the roofing industries.

Day one**:** The Roofing square, theory and practice of 'cut & pitch' roofing.
Leader: Joe Thompson
Day two: Thatch, lectures and practical demonstrations.
Leaders: David Brock & Chris Tomkins.
Day three: Tile, the history of hand-made clay peg tiles and their refinements. Leaders: Peter Minter & Michael Fildes.
Day four: Slate, conservation and repair of slate roofs and regional variations. Stone, conservation, repair and the use of new local stone slabs. Leaders: Terry Hughes & Michael Fildes.
Day five: Leadwork, theory, repair & replication. Leader: Nigel Johnston.

11 – 15 July 2005
£90 per day

Jointing and pointing of historic brickwork
The development of jointing and pointing from the Tudor period to 20th century. Practical sessions to include selecting materials and tools, preparation of joints for re-pointing, mortar mixes and preparation and after care of joints.
Leader: Gerard Lynch.
12 – 13 September 2005
£180

English brickwork: Tudor to Edwardian
An introduction to the historical development, the causes of failure and the conservative repair relevant to Tudor, Jacobean, Georgian, Victorian and Edwardian periods in the history of English brick. Lectures and demonstrations.
Leader: Gerard Lynch.
14 September 2005
£90

The Victorian Village Carpenter
An introduction to and demonstrations of the carpentry and joinery involved in the construction of Whittakers Cottages, a pair of 1865 semi-detached cottages on the Museum site.
Leader: Joe Thompson
7 Oct 2005
£90

Intermediate timber framing – wall framing
A 5 day practical course for students who have attended the Timber framing from scratch course. The studs and braces of wall frames are marked, cut and fitted into a timber frame, that was made on a Timber framing from scratch course. The completed work is erected on the last afternoon.
Leader: Joe Thompson
7 –11 Nov 2005
£450

Enquiries about these, and other courses yet to be announced, to Diana Rowsell, Head of Learning, Weald & Downland Open Air Museum, Singleton, Chichester, West Sussex on 01243 811464. Email: courses@wealddown.co.uk

Also see our website www.wealddown.co.uk. We are very receptive to the needs of the conservation industry and set up bespoke courses for small groups of surveyors, architects and conservation officers on request.

BOOK REVIEWS

SUZY NELSON

L. Clarke, E. Frydendal Pedersen, E. Michielsens, B. Susman, C. Wall (Editors) **WOMEN IN CONSTRUCTION** 224pp (22 photos and 28 figures), Reed International/CLR Studies 2004 ISBN 90-5901303-4. Retail price 32 Euros. Available at special price of £17 from clarkel@wmin.ac.uk.

This book is a diverse collection celebrating women's work in manual jobs in the construction industry. It brings together a wide range of material, including original research by an international group of writers and academics, and personal accounts of women working in the industry. It documents the participation of women in construction in a range of different geographic and historic contexts.

The primary focus of the book is on North Western Europe, but it also includes chapters on the experience of women labourers in India, of women housebuilders in Southern African and of tradeswomen in the USA. Many of the chapters include an historical perspective. Linda Clarke and Christine Wall discuss the role played by women in construction in Britain from the late middle ages to the present. Faustin Kalabamu contrasts the role of women in contemporary construction in Botwana with their traditional role as builders of houses. Elsebet Frydendal Pedersen looks at women in the painter's trade in Denmark from the late nineteenth century to the present. Jörn Janssen compares female participation in construction in West and East Germany in the years following the Second World War. Christine Wall, Susan Eisenberg and Vivian Price assess the impact of campaigns in recent decades to increase women's access to employment in construction in Britain and the USA. The heavy work undertaken by women, such as those building traditional houses in Botswana and working as labourers in India, provides evidence that it is not the physically demanding nature of the work which results in the exclusion of women from employment in construction. What emerges from the different accounts of women in construction is that the gendered division of labour is the product of specific social, political and economic conditions.

Policy issues are also addressed in many of the contributions; the central issue is the promotion of women's employment in construction. Elisabeth Michielsens, Elsebet Frydendal Pedersen and Barbara Susman present findings of research, which investigated where in Western and Eastern Europe women were working as skilled operatives, and assessed the extent to which employers and trade unions prioritised the promotion of gender equality. The dominant picture was of a low level of female participation in skilled trades with little change in the last decade. Despite some commitment to the principle of gender equality social partners generally had little impact on the inclusion of women in the industry. Anneke Westerhuis assesses the extent to which the education system is a barrier to women's employment in construction in the Netherlands and concludes that it is a significant barrier in relation to employment in vocational trades. She contrasts the continuing importance given to traditional notions of craftsmanship in the construction trades with changing ideas about the skills required for other traditionally male occupations such as the police. She reports that the construction industry is having difficulties in attracting men as well as women, and suggests that the industry needs to change its conception of work, and consider the implications for the organisation of work and education in order to improve recruitment to the industry of both men and women. Barbara Olofsson draws similar conclusions about the need for change in Sweden; she argues that for women to work successfully in the industry, demands for changes to the organisation of work and working conditions must be met. Lone Thrane suggests that in Denmark the unequivocal male

culture of the industry is a barrier not only to women's employment in the industry, but also to greater efficiency and improved quality construction.

The personal accounts of women's experience of working in the industry were for me the highlight of the book. Women's pride and sense of achievement in their work, and the self confidence that this has given them, shine through. Mmasentle Rantshadi, a bricklayer in Botswana, speaks of how she is treated with respect by her colleagues. Jacky Clarke talks of the pleasure she gets from her work as a carpenter maintaining social housing in East London. Jo Devenish, an Australian electrician, describes how her 'ability to think logically has tripled'. However, from many of the accounts it is clear that women working in construction have to struggle to survive in a male dominated environment. Julianna Bethlen, working as a trainee plumber in Britain, was initially given the least demanding jobs and no opportunities to develop her skills. Two Finnish painters, Tarja Lorhonen and Anna Kyystönen, found that women had to be more skilled than men and able to assert themselves in a male environment in order to survive. Some women chose to leave their trade because of the physically demanding nature of the work. Bibi Larsen gave up working as a bricklayer in Denmark to train as a civil engineer. Christine Wall suggest that heavy manual work is not something anyone would want to do past middle age. Some women were able to successfully combine manual work with other types of work. Sandrine Lesage, working for her family firm in France, divides her time between roofing work, working in the office on estimating, measuring and invoicing, and visiting clients. Rossi Stohr hopes to continue working as a carpenter whilst teaching environmental building.

The book will be a useful resource to any one interested in women in construction. It whetted my appetite for more. I hope that it will stimulate more literature on the historical role played by women in the construction industry and on the changes needed to make employment in the industry accessible to women and to improve the working environment for all. I also hope that more of the personal experiences of women working in the industry will be recorded and provide inspiration to others.

(Replies to: Suzy Nelson, Senior Lecturer in Urban Studies, University of Westminster, 35 Marylebone Road, London NW1 5LS Email: nelsonsu@westminster.ac.uk)

RALPH F. BURKINSHAW

RIVINGTON'S BUILDING CONSTRUCTION 2004 Re-print of the original 1904 edition, published by Donhead Publishing Limited, January 2004. ISBN 1 873394 66 7 £99.50

Rivington's Building Construction sits amongst an impressive portfolio of works published by Donhead Publishing on the subject of design, repair and surveying of our traditional building stock. The Rivington family of printers, publishers and lawyers were prominent through three centuries – c. 1710 to 1960. The family's connection with the book trade dates back from late 17th Century. Charles Rivington, was born in 1688 in Chesterfield, Derbyshire. The family had a background in the leather trade, and Charles was apprenticed in 1703 to a London bookbinder. Charles moved from bookbinding to bookselling. He became a leading publisher of theological works. Successive generations of Rivingtons helped the publishing business to continue and thrive until the time of its sale to Longmans in 1890. Even after the publishing business was taken over by Longmans, successive further editions of the construction textbook were still entitled *Rivington's Notes on Building Construction.* Several early editions of the text are lodged in the British Architectural Library, for example an edition of the *Materials* volume, published in 1892 by Longman, Green and Co.

Rivington's '*Notes on Building Construction*' were probably the first really comprehensive volumes on building construction published in Britain.

Before publication of the original edition of Part 1 in 1875, students and practitioners relied mainly on construction works such as Tredgold's 1870 carpentry text, or various editions of Nicholson's work. The emphasis in these texts was on timber rather than masonry construction. Other notable works from that era include the fabulously illustrated '*New Technical Educator'* published in 1893 by Cassell & Company. The '*New Technical Educator',* in three bound volumes covers a wide range of industrial technologies, from building construction, photography, steam engines, civil engineering, woollen and worsted spinning, mechanics, watch and clock making and even boot making!

In 1888 – some 13 years after publication of Part I of *Rivington's Notes on Building Construction* – another dynasty of mainstream construction writing began when the first edition on construction by Charles.F.Mitchell was published. The work, entitled *Building Construction and Drawing,* was published by B.T.Batsford for the Polytechnic Institute. In that first edition Charles Mitchell pays due respect to the earlier Rivington textbook, by an acknowledgement under a 'List of Works, etc referred to' placed just before the contents page. I have so far found no acknowledgement of Mitchell in the Rivington volumes!

Both the Rivington's and Mitchell's texts were aimed primarily at educating students to pass examinations in construction. Rivington's *Notes* were arranged to meet the requirements of the Syllabus of the Science and Art Department of the Committee of Council on Education, South Kensington. The lead author of *Rivington's Notes on Building Construction* was not actually named in the original work, but he is identified by Lawrance Hurst, in the introduction to the 2004 re-print, as Major Percy Guillemard Lewellin Smith.

The original 1875 edition of *Rivington's Notes on Building Construction* is reviewed in the May 21st issue of 'The Building News' of that year. The Notes were divided up into 'Parts' rather than 'volumes' as per the 2004 re-print.

The review of Part I is extremely positive :

> *'The compiler of this work has produced one of the most sensible and really reliable aids to students of construction we have seen for a long time. Mainly designed to assist students preparing for the Science and Art Department's annual examination in building construction, it will be found useful by all engaged in designing or erecting buildings. The best authorities on the various subjects have been freely made use of and honestly acknowledged, and if Parts II and III are up to the standard successfully aimed at in Part I., the work cannot fail to become the standard textbook for students, and a most useful aid to all engaged in the building trades who may not in the past have had opportunities for acquiring a thorough technical training.'*

The original 1904 edition is reviewed in the October 14th issue of 'The Building News'. By 1904 the text had extended to a leviathan four volumes, with the final volume devoted to calculations needed for building structures – but not re-printed as part of the current 2004 edition.

The 1904 review opens very positively as follows:

> *'The first edition appeared in 1875, since which time several revised editions have been published. For students preparing for the examinations on this subject, held annually at South Kensington, these volumes hold a high place.'*

and …

'Chimney construction and flue-bond are well described and illustrated, and show in each case two courses of the chimney before it emerges from the roof and those above …'

followed by:

'The sections on carpentry occupy over 100 pages and will be found to be a very complete elementary treatise of the subject. Timber and composite roofs are very fully dealt with and illustrated, the diagrams, plans and sections being to a good scale.'

Various other sections received good review – for example the section on floors, or more particularly fireproof floors. Drawings for steel or iron roofs are well praised.

In Part II joinery and foundations were considered well covered, and the chapters on plumbing and sanitation well received. Joinery was described as 'well done'. Drawings showing the parts of a door were 'useful'. Sections on heating are considered 'complete' and the general principles 'clearly explained'. Lighting was considered comprehensively covered, and ' the definitions and laws of electric light installations were explained fully, with a key diagram of the wiring required'.

The review concluded on a positive note :

'For students preparing for any of the professional examinations these volumes are of great value, as they form a compendium of the science of construction applied to building, and for general reference the architect will find them of service'.

The re-print comprises three 'volumes' referred to in the original edition as 'parts'.

Volume 1 – *Walling, Brickwork, Masonry, Carpentry, Plumber's Work, Roofing, Roof Coverings.* Each volume is very accessible – with its own index and chapter summary.

The eighteen chapters include much of the main structure of a building – from walls of brick or stone, floors, carpentry, roofs and roof coverings. Advice on good and bad practice runs as an important theme through the volumes. For example we are warned of the dangers of poor brick bonding – sketches show 'inferior forms of English Bond'. Many of the diagrams in this and the other volumes could be better understood to a larger scale, and many are annotated by letters cross referenced from the text. We have been spoiled by the McKay series on Building construction, dating back to 1938 – renowned for its excellent large-scale details of joinery or structural element. Where *Rivington's Building Construction* really excels is in its explanatory text. The author has taken the trouble to incorporate good advice from skilled craftsmen of the day. For example, in chapter three there is an in-depth treatise on good and bad practice in laying high quality ashlar work

I was pleased to find quite a substantial section entitled 'Prevention of Damp in Walls'. I was at first impressed by the sheer practicality of the writing – where calculations are set out explaining exactly how much water common bricks can hold. We find too good advice on how ground under a dwelling should be covered by a layer of concrete or asphalt – 'in order to prevent the damp and bad air out of the ground from rising into the building'. The next section entitled 'Air –Drains' is extremely relevant as a principle to apply to today's damp problems, where, for example, ground level has been raised over the years to create low level damp. There is a most useful sectional drawing where high ground levels to one side could create damp conditions if not for the 'air drain'. It is interesting to note that 'air gap technology' is becoming more common in the design of waterproofing today for basement space. We can always learn something useful to feed into today's good practice from re-visiting early handbooks on construction and surveying.

Curiosity led me to look into the way the construction of raised timber ground floors and hearths would be explained and illustrated. I found the same shortcomings in other similar construction texts: plenty of drawings showing first or upper floor construction, but limited illustration of the ground floor, and first floor but not ground floor hearth construction. I was a little suspicious of the validity of one sectional detail, depicting a floor joist notched on to a wallplate – again this could be idealised rather than typical construction found in 1904. In general terms this volume contains useful sections on the main structural elements of a buildings of the time

Volume 2 – *Foundations, Excavations, Plumbing, Sanitation, Joinery, Fireproof Floors, Plasterer's Work, Painting and Paperhanging, Heating and Ventilation, Electric and Gas Lighting, Materials Introduction.* Under 'Note to Part II' there is a list of works consulted, which serves as a useful starting point for those seeking out textbooks of the era. A useful summary of chapters in volumes 1, II and IV is set out, but strangely does not include the Materials volume III.

Frustratingly, after already having being introduced to walls and roofs, the reader is now introduced to foundations in the second volume! So perhaps Victorian builders constructed the walls first with foundations to follow? Modern construction textbooks such as *'The Construction of Buildings'* first published in 1958 by Crosby, Lockwood & Son Ltd (author R. Barry), offer todays construction students a much clearer visual interpretation of how buildings are put together, with isometric sketches that bring together associated elements of construction. Older textbooks such as Rivington's tend to split up construction into trades, and so isolate the elements and components, making full understanding of constructional form from the drawings difficult.

The first chapter contains basic principles of soils and an intriguing wooden contraption for pile driving. Chapter three is very useful for building surveyors. They are shown cross sections through early drain traps – and explanations of good and bad design practice – as well as many well-illustrated examples of stoneware drain pipe failures. I found the written commentary on drains particularly informative – and all house surveyors should consult chapter two before embarking on inspections.

There are quite a few textbooks available on joinery from that era, but I consider Chapter eight on Fireproof Floors to be uniquely useful for those inspecting historic buildings such as warehouses. Chapter nine is quite informative on early plaster mixes, and how lath and plaster ceilings are installed. Many of the sections in *Rivington's* give a considerable insight into how work was carried out on site: there are more than two pages of description alone on how to fix plaster lathing. I enjoyed thumbing through the old illustrations of early radiators or telephone installations. There are many period examples shown that could be helpful for those restoring a Victorian or Edwardian house.

Volume 3 – *Materials.* This is the most voluminous of the works and is dedicated to building materials. Under 'Notes to part II' is a mammoth three page list of references consulted by the authors. We can at once see the rigorous approach of the author in putting together this work, and his indebtedness to others :

'On all sides, – from scientific and professional men, from quarry owners, manufacturers and merchants'.

I could not possibly do justice to the sheer expanse of subject matter contained in this volume, but for your interest I would like to note just some of the areas covered:

- Stone, including its preservation.
- Brick – moulding techniques, various kiln procedures, how to evaluate quality – bricks available on the market.

- How to distinguish clamp-burnt, kiln burnt or machine made bricks.
- Mortars, cements, plasters, asphaltes.
- Metals, cast-iron, wrought iron.
- Steel, limit of elasticity, corrosion and preservation.
- Timber, seasoning, preservation, usefulness for different purposes.
- Paints and Varnishes, colouring pigments, ingredients for mixing, recipes for varnishes.
- Glass, paperhanging, pastes, nails, screws, threads, glues.

I would recommend consultation of Volume 3 on *Materials* very strongly to all those involved in the conservation of older buildings. An engineer assessing the potential strength of old ironwork might usefully refer to the extensive table giving the 'Tensile Strength and Ductility of various Descriptions of Malleable Iron – From Mr.Kilkaldy's Experiments'. There is a long list of regional makers of various sections of rolled or round bar, and strength characteristics for each type.

Rivington's Building Construction is a truly extensive work: there is not a surveyor or architect in the land that would not find something in the textbook of direct use or interest. The book – detailed and informative in itself – also links to other textbooks of the time to aid research into particular aspects of construction.

I must admit that for me holding and turning the pages of a new 2004 re-print does not have the earthy appeal of actually thumbing through a musty old original copy! But original copies of the 1904 edition must be few and far between – so a modern re-print is the practical answer for most of us.

A close analysis of recommended reading lists for mainstream construction courses in UK universities and colleges might be quite revealing. Early construction texts would probably rarely feature – perhaps because the texts are not available in sufficient numbers for students to loan or purchase, or because they are not sufficiently valued or even known about.

But it is important to remember that 21% of our existing houses were built before 1919, and 39% before 1939. So clearly texts that help give an insight into their original construction are vital for all those involved in repair and/or restoration work. I would like to see many more original construction textbooks re-printed and accessible for today's student and practitioner. For these reasons I would not hesitate to recommend this work, to students of construction or working surveyors, engineers and architects. The recommended price of £99.50 offers tremendous value for money considering the collected wisdom contained in the more than 1300 pages.

(Replies to: Ralph F Burkinshaw Email: rf.burkinshaw2@ukonline.co.uk)

PAST CHS NEWSLETTERS

If you require past copies of the CHS Newsletter (in Xerox format), please send details to Malcolm Dunkeld (CHS Newsletter Editor), enclosing a payment of £1 per copy.

FUTURE EVENTS

The following lectures are due to take place at The Gallery, 77 Cowcross Street, London EC1. Please contact Stephen Coley, Alan Baxter and Associates, Tel: 020 7250 1555 or Fax: 020 7250 3022

27th May Seven Deadly Sins Service Stations: Art and Architecture. Sculpture Nicholas Pope considers the Motorway Service Station and explores the concepts, artworks and images behind his collaborative project, with architect Peter Vaugh of Broadway Malyan. Start 6.30 p.m.

15th June New Urban Futures. Urban Design Group. In this Kevin Lynch Memorial Lecture Hank Dittmar, Chief Executive, Prince's Foundation, discusses New Urban Futures and asks whether design coding can work here. Start 6.30 p.m.

23rd June Rick Mather: Art and Architecture. Rick Mather leads an international architectural, masterplanning and urban design practice and will be talking about new and completed arts projects within the office. Current projects include the major expansion of The Virginia Museum of Fine Arts in Richmond VA while completed projects such as the redevelopment of the Wallace Collection, and the extension and renovation of Sir John Soane's Picture Gallery at Dulwich, demonstrating Rich Mather's wealth of experience of working with existing buildings and sensitive buildings. Start 6.30 p.m.

21–23rd Sept. INTERNATIONAL ENGINEERING HERITAGE CONFERENCE: The conference will be the 2nd international and the 13th national conference and will be based on the topic Sustaining Heritage. It is to take place at the Powerhouse Museum, Sydney. This year the conference has been aimed at heritage professionals as well as heritage minded engineers. Consequently, a wide range of professionals will benefit from attendance such as engineers, heritage practitioners, architects, archaeologists, conservators, planners, surveyors, archivists, historians, heritage managers, tour guides and interpretation professionals, as well as government officers.

One paper will present the planning and management of redundant defence sites around Sydney Harbour including the old shipbuilding and repair facility on Cockatoo Island ; that paper will be followed by an interesting afternoon tour of the island on the second day.

In relation to 'future directions' papers are being planned from not only Australia, but the United Kingdom, United States and Japan. The conference will be held at the Powerhouse Museum, Darling Harbour and the conference dinner will be at the *Watersedge* restaurant on Pier One, Walsh Bay, which has excellent views of the Harbour Bridge, the north shore and of course Sydney Harbour.

There will be partners tours & plenty to do & see. For more information Email: meetings@tmm.com.au

The Courtauld Institute of Art is offering the following study tours. For more information please contact Short Courses, Courtauld Institute of Art, Somerset House, Strand, London WC2R 0RN, UK; Email: short.courses@courtauld.ac.uk; telephone +44(0)20 7848 2678; fax +44(0)20 7848 2589.

19th–22nd Nov. **The Mosques of Medieval Cairo.** Peter Draper – £460. The old city of Cairo contains the world's highest concentration of medieval mosques and minarets and, despite some insensitive restoration, retains much of its bustling medieval character with most of them in regular use. We focus on mosques such as Ibn Tulun, Qala'un and Sultan Hasan, ranging in date from the early ninth to the fifteenth century and offering an outstanding range of building types and a great variety of decorative forms. We also visit the remarkable early churches in the Coptic quarter.

15–18th Sept. **Early Medieval Rome**. Dr Cecily Hennessy – £400. From the period between Classicism and Renaissance, there is a varied and fascinating range of material in Rome including a range of churches with rare wall paintings and brilliant mosaics, unrivalled catacombs, fine sculpture and metalwork and several early icons. This four-day trip traces the development of Christian art through sculpture, mosaic and panel painting as well as of Christian places of worship from small churches to huge basilicas, the influences of the eastern empire on the city, the extent of papal patronage and the formation of Rome's particular imagery. Visits include St Peter's and its necropolis, the Lateran, Sta Costanza, Sta Sabina, Sta Maria Maggiore, S Clemente and SS Cosmas and Damian. We hope also for it to be possible to visit certain sites that are normally closed to the public.

13th–16th Oct. **Ottoman Istanbul**. Dr Barry Wood – £440 After its capture by the Ottoman Turks in 1453, Istanbul quickly became one of the world's great Islamic cities. This tour introduces some of the most important and beautiful monuments of the city, windows onto the splendour of classical Ottoman culture. Visits include sites of both secular and religious significance, including the Topkapi Palace, the Covered Bazaar, and the famous Blue Mosque, as well as the superb Turkish and Islamic Arts Museum.

Gallery talks at the Courtauld Institute include:-

4th June Bloomsbury Interiors. Stephen Barrett

16th June Medieval Work in Progress Seminar – The monastery that emerged from the flower beds: making sense of Felley Priory. Speaker Dr. Jenny Alexander (Warwick and Nottingham Universities).

The Design Museum, Shad Thames, London SE1 2YD is organising the following events. Tel: 0870 833 9955 or Email: info@designmuseum.org.

To 27th Nov. Designing Modern Life – A History of Modern Design. From the radical simplicity of an apartment designed by Charlotte Perriand and Le Corbusier in 1920s Paris, to the 1960s vision of the future depicted in Stanley Kubrick's film 2001: A Space Odyssey, the Design Museum is exploring how design has transformed daily life in the past century in Designing Modern Life to be presented for a year from 6 November 2004. By reconstructing innovative design projects which dominated future developments in design, this exhibition will show how ingenious designers have harnessed advances in materials and technologies, as well as cultural, social and behavioral changes, to modernise how we work, rest and play.

Designing Modern Life will include reconstructions of Perriand and Le Corbusier's model apartment created for the 1929 Salon d'Automne in Paris, a London Underground platform in the late 1930s, one of the rooms designed by the Danish architect Arne Jacobsen for his showpiece SAS Royal Hotel in Copenhagen during the 1950s and a 1960s office equipped by Dieter Rams. Drawn from the Design Museum Collection and other important archives, this exhibition will also deconstruct the design histories of specific objects including the book – from Penguin's pioneering 1930s paperbacks and Bruce Mau's influential work for Zone Books during the late 1980s, to the exquisite books designed and made by Irma Boom today – the chair and the website.

The exhibition will end with an installation of the work of the provocative Spanish designer Martí Guixé. Serious in intent but wickedly humorous, the objects and pieces of furniture designed by Guixé have a dual function as commentaries on modern design. This specially commissioned installation created by Martí Guixé for the Design Museum will feature the Statement Chairs he has created by customising cheap plastic garden furniture.

25th June–9th Oct. Cedric Price – Doubt, Delight and Change. The visionary ideas of Cedric Price, one of the most innovative architects and architectural thinkers of the late 20th century and an enduring inspiration for artists and architects today, will be celebrated by the Design Museum in Cedric Price – Doubt Delight and Change from 25 June to 9 October 2005. Constantly challenging and questioning, Price (1934-2003) overturned the notion of what architecture is by suggesting radical ideas of what it might be in witty and irreverent projects, drawings, lectures and essays. He saw the role of an architect as being that of asking the right questions and the role of architecture as being "to enable people to think the unthinkable".

This exhibition, organised by the Design Museum in collaboration with the Canadian Centre for Architecture in Montreal, will present his vision to a new generation. Cedric Price was born at Stone in Staffordshire in 1934 to an architect father, AJ Price, who worked for the firm which built the Odeon cinema chain. After graduating from Cambridge University and the Architectural Association, Price lectured at the AA and worked for the architects Maxwell Fry and Denys Lasdun before founding his own practise in 1960 with a commission to design an Aviary for London Zoo together with Lord Snowdon and Frank Newby.

As well as presenting Price's most important projects together for the first time, this exhibition will deconstruct their development. It will focus on the early 1960s projects – the Aviary, Fun Palace, Robert Fraser Gallery and Potteries Thinkbelt – as well as the 1971 Inter-Action Centre in north London, the 1976 Generator in Florida and 1984 South Bank project in which Price anticipated the location of the London Eye culminating in the 1997 Magnet scheme. Cedric Price built so little that his reputation – and influence – is chiefly based on the radicalism of his un-built ideas. This exhibition will bring them to life, by exploring the thinking and working practise that imbued Price's architecture with what he defined as the essential qualities of "doubt, delight and change".

17th Sept. to 8th Jan. 2006

Eileen Gray. The Design Museum is to celebrate the achievements of Eileen Gray, one of the most influential and best loved architects and designers of the 20th century whose work influenced both the modern movement and Art Deco styles, in a landmark retrospective from 17 September 2005 to 8 January 2006. Arguably the most important woman to have worked in the male-dominated fields of design and architecture, Eileen Gray was responsible for many of the most enduring examples of early 20th century furniture design, and her houses continue to influence architects. She infused the geometric forms and industrial materials beloved of Le Corbusier and fellow modernist pioneers with opulence and sensuality, while insisting on "building for the human being". Her circular E-1027 table was originally designed for her sister to enjoy breakfast in bed.

Despite her fame today, Gray's work was neglected for most of her life (1879 to 1976) and only rediscovered at the end of the 1960s when she was in her nineties. As a woman and an expatriate, who left her wealthy Irish family in the early 1900s to live in Paris, Gray was isolated at a time when most designers and architects were male and attached to movements. Self-taught in design and architecture, the introspective Gray remained staunchly independent. Born in County Wexford, Ireland in 1878, Gray spent her childhood there and in London, where she studied painting at the Slade School before moving to Paris in 1900. Intrigued by the intricacy of lacquer work, she opened a studio to study it and, in the 1910s, created lacquer panels in a then-radical geometric style.

Gray went on to design a succession of sparse, yet luxurious Paris interiors and, in the mid-1920s, started to practise architecture as well as design. Gray's early houses in the south of France, E-1027 and Tempe à Pailla, were strikingly innovative in their treatment of light and space, and she devoted herself to architecture until her death in 1976, yet she is now remembered principally as a furniture designer. This Design Museum exhibition will survey Eileen Gray's work in both architecture and design contextualised by sketches, letters, models, photographs and other archive documentation to paint a rich and inspiring picture of this remarkable woman and her achievements.

The Museum of Domestic Design and Architecture (at Middlesex University) is organizing the following study day – Tel 020 8411 4394:-

24th Sept.

Colour in the Home Study Day. 10.30am-4pm. This Study Day will examine the historical use of colour in the domestic environment, from the rich reds traditionally associated with the dining room to the plain white walls of the minimalist interior. How has colour been used historically to symbolise a particular room's function? To what extent have notions of gender dictated colour preferences? These themes and others will be amongst those discussed in a series of lively presentations given by our guest speakers. £20, £12 concessions. Optional buffet lunch £6.50

19–21st Aug.

2nd International Alvar Aalto Conference on the Research of Modern Architecture, Jyväskylä. A new generation of art critics and historians have become increasingly interested in the work of artists and architects of the post-war era. The rich web of actual collaborations between architects and artists, shared representational techniques, program manifestoes, political positions to perceptual paradigms, art and architecture working within the period share a common terrain. The organizers want to enrich and support the shared research project by generating discussion around, but not exclusively, the following topics:

- Avant garde group formations consisting of artists and architects during the postwar era (e.g. Situationist International, Archigram, Independent Group, Cobra, Archizoom, etc.)
- Collaborations of architects and artists (e.g. Eero Saarinen and Harry Bertoia)
- Links between aesthetic and social formulations (e.g. New Monumentality, Mass Aesthetics)
- New Strategies/Intellectual Exchanges (e.g. film and architecture)
- Artistic/architectural movements (e.g. minimalism in art/minimalism in architecture)
- New technologies enhancing collaboration between artists and architects (e.g. AEC software, CAM programs)

The symposium is chaired by Eeva-Liisa Pelkonen, Ph.D. of Yale University. Invited Speakers include Caroline Bos (Holland), Romy Golan (Italy/Israel), Brendan Joseph (U.S.), Joan Ockman (U.S.), Juhani Pallasmaa (Finland), and Felicity Scott (Australia).

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The Georgian Group is organising the following event (The Georgian Group, 6 Fitzroy Square, London W1T 5DX Telephone 020 7529 8920 info@georgiangroup.org.uk):-

Current

London Past and Present – The Georgian Group Pardoe Collection Exhibition 2005. The Pardoe Collection of drawings, watercolours and prints was assembled by the late Bernard Pardoe, the Georgian Group's former Treasurer, and was given to the Group in 2000. There have been two previous exhibitions of images from the collection, for which catalogues are available from the Georgian Group, and this year the theme is specifically London buildings.

An original watercolour, drawing or print of at least one building from each London borough has been selected from the collection and, following research of the site, a photograph has been taken of what is there today, following, as far as has been possible, the orientation of the original image.

A brief history of each site, within the context of its surrounding area, accompanies these images, along with early and current location maps and some other images of the building during its evolution and, sadly, in many cases, demise. This assemblage of images is a poignant comment on the often ruthless pursuit of housing development in and around London and also serves, in part, to demonstrate how the great metropolis of London has developed during the last four centuries.

A full catalogue accompanies the exhibition which will be available at a cost of £12 (ex. P & P).

CHS GENERAL CORRESPONDANCE

Please note that all other correspondence not relating to the *Newsletter* should be addressed to The Secretary, Construction History Society, c/o Library and Information Services Manager, The Chartered Institute of Building, Englemere, Kings Ride, Ascot, Berkshire SL5 7TB e-mail: michael.tutton@virgin.net

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