



‘Real’ wages? Contractors, workers, and pay in London building trades, 1650–1800[†]

JUDY Z. STEPHENSON*

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Existing series suggest wages in London were higher than in other European cities from 1650 to 1800. This article presents new evidence from the construction sites that supplied the underlying wage data, and uncovers the contractual and organizational context in which they were recorded. Institutional records of wages were profoundly affected by structural changes in the seventeenth century, particularly the emergence of large-scale building contractors. The actual wages paid to London building workers were substantially below current estimates.

The level and form of early modern wages has long been a controversial topic in economic history. Most European wage data were collected when historians wanted to know if the industrial revolution improved or damaged the living standards of the working class.¹ However, in the last few years wages have been given a critical role in *causing* industrialization. Allen argues that Britain was a ‘high wage economy’ in the late seventeenth and early eighteenth centuries, which, together with cheap energy, created an incentive for labour-saving mechanization.² Other accounts suggest that high wages created higher human capital and innovation through nutrition, education, and accumulation.³ The high wage argument and evidence has provoked some challenges, but, as Humphries recently noted, no one has challenged the veracity of the sources.⁴

This article re-examines the core wage series used to establish the ‘high wage’ argument for England: builders’ wages in London. It examines the organizational arrangements under which the work was done, and shows that the bills that have

*Author’s Affiliation: University of Oxford, Wadham College.

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¹ For original data, see Rogers, *History of agriculture*; Bowley, *Wages*; Gilboy, *Wages*; Beveridge, *Prices and wages*; Schwarz, ‘Standard of living’; Boulton ‘Wage labour’. For wages and the living standards debate more generally prior to 2001, see Feinstein, ‘Pessimism perpetuated’.

² For Britain as a high wage economy, see van Zanden, ‘Wages and the standard of living’; Broadberry and Gupta, ‘Early modern great divergence’; Allen, *British industrial revolution*; idem, ‘Industrial revolution in miniature’; idem, ‘High wage economy’; idem, ‘Why the industrial revolution was British’.

³ See Gilboy, ‘Demand as a factor’; Mokyr, *Enlightened economy*; Kelly and Ó Gráda, ‘Ready for revolution?’.

⁴ Humphries, ‘Lure of aggregates’, p. 697.

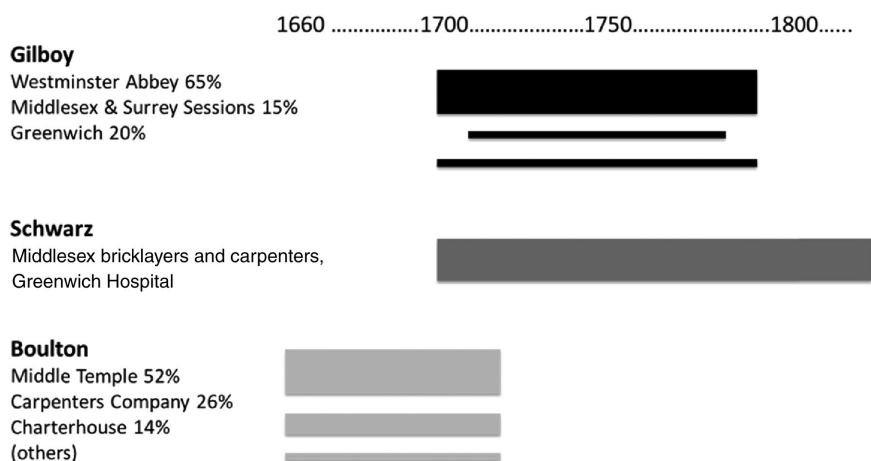


Figure 1. *Summary of eighteenth-century London compiled wage data sources*

Note: The length of the bars indicates the period to which each author's series refers and their depth is the proportion from each source.

Sources: Gilbooy, *Wages*; Schwarz, 'Standard of living'; Boulton, 'Wage labour'. All subsequent authors draw on these. The sources used by subsequent authors are as follows: Allen, 'Great divergence', for London, uses Gilbooy, *Wages*; Schwarz, 'Standard of living'; Boulton, 'Wage labour'; and for south-east England, uses Phelps Brown and Hopkins, 'Seven centuries'. Botham and Hunt, 'Wages in Britain', use Gilbooy, *Wages*, and refer to Schwarz, 'Standard of living'. Broadberry and Gupta, 'Early modern great divergence', use Gilbooy, *Wages*, and Allen, 'Great divergence'. Phelps Brown and Hopkins use Gilbooy, *Wages*, and Rogers, *History of agriculture*. Deane and Cole, *British economic growth*, use Gilbooy, *Wages*. Feinstein, 'Pessimism perpetuated', uses Gilbooy, *Wages*, and Schwarz, 'Standard of living', Lindert and Williamson, 'English worker's living standards', use Gilbooy, *Wages*. Van Zanden, 'Wages and the standard of living', uses Chartres, 'Food consumption', which is a moving average of series in Gilbooy, *Wages*.

been interpreted in the past as reports of wages received by labourers and craftsmen did not, in fact, state the pay of workers, but the rates charged by major building contractors to clients for types of service. Using records from London's largest building sites, it shows that the 'day wages' that historians have used extensively were no such thing. Once contractors' margins are taken into account, the actual wage in London construction was significantly below the levels reported in the series that have been used by Allen and others.⁵

I

Eighteenth-century wage series for London rely on a very small dataset, as can be seen in figure 1. The evidence for England's 'high wages' can be traced largely to the work of Elizabeth Gilbooy, who spent two years in the early 1930s transcribing wage rates found in estates and institutions in England. Her London sources were drawn from the archives of Westminster Abbey, Greenwich Hospital, and the Middlesex and Surrey (Southwark) sessions papers.⁶ The resulting series indicated

⁵ Clark, 'Condition of the working class', p. 1321, acknowledges that wages prior to 1815 should have some overhead removed but he only discounts 10%. His main agricultural source records a mixture of direct and contracted prices for labour throughout this period (W. Beveridge, 'Prices and wages in England', LSE Archive, Beveridge Price History D:3/4/5, E:7b/8/9/10/24a/25 F:1/8/9).

⁶ Gilbooy, *Wages*.

that English building craftsmen were well paid, but the uniformity of the data was a marked feature.⁷

Subsequent substantive work on London wages was contributed by Schwarz, who reiterated Gilboy's wage series through to the early nineteenth century, using the Middlesex sessions papers, and Boulton, whose seventeenth-century wage series runs to 1721.⁸ Boulton's sources were drawn from institutions in the City of London, and indicated slightly lower wages than Gilboy's original study. In fact, Boulton noted in associated seventeenth-century sources many complaints from craftsmen about low wages and the difficulty of making ends meet; nevertheless, his conclusions largely supported London's wage premium. Boulton's work was preceded chronologically by that of Rappaport, whose wage series to 1609 suggested a good standard of living among London craftsmen, and also included data on the wages of semi-skilled men alongside those of craftsmen.⁹

It is these series, and these only, that provide the data on London for Allen's international wage comparisons.¹⁰ London's wages, based on the figures of Boulton, Gilboy, and Schwarz, appear to have been higher than those paid in other cities, especially relative to those in the Low Countries. The accuracy of Gilboy, Boulton, and Schwarz's archival work is not in question here. However, to interpret their data correctly, these data need to be located in their organizational, institutional, and technological context, rather than taken as a straightforward statement of wages.

From Bowley's early studies onwards, wage data have been collected on the assumption that the institution was paying for labour directly, and that a recorded 'day rate' was the wage received by a craftsman or labourer for a day's work.¹¹ Neither assumption holds for these London series. The accounts and records used were predominantly *lead contractors'* bills submitted to large institutions. The 'day rates' they contain were *not* the wages that workers actually received—those were lower by a margin that was wide enough to wipe out the 'London premium'.

II

The bills of large contractors in archival sources reflect developments in the London construction sector over the seventeenth century. Architectural historians agree that direct labour hiring was no longer commonplace by the early seventeenth century, and finally died out in the building boom that followed the Great Fire of London in 1666.¹² There were approximately 13,000 houses destroyed by the Great Fire.¹³ Although the rate of population growth of the city as a whole was slowing after 1650, reconstruction and the development of the West End required

⁷ Ibid., note on p. 13 and appendices. This uniformity has been interpreted as customary wage practices; Schwarz, *London in the age of industrialisation*, p. 151.

⁸ Boulton, 'Wage labour'; Schwarz, 'Standard of living'.

⁹ Rappaport, *Worlds within worlds*.

¹⁰ A series published by B. Hutchins in 1900 using data from the Office of the King's Works clerk at the Tower of London has never been widely used; Hutchins, 'Notes' (1900). It showed more variation in day rates than Gilboy. A series created by Chartres in 1996 to study consumption in London was constructed as a moving average of Gilboy's figures after 1700 and used Rogers's data for years prior to 1700; Chartres, 'Food consumption'.

¹¹ Bowley, *Wages*, pp. 58–9.

¹² Knoop and Jones, *London mason*, p. 19.

¹³ Ibid., p. 5.

high levels of new building. Brett-James reckoned that approximately 35,000 new houses may have been erected in London in the 40 years to 1708, bringing the total to between 67,000 and 78,000, and total buildings to over 100,000.¹⁴ This implies about 1,000 new houses per annum. Deeds registered from 1709 show a steady increase from below 1,000 to approximately 2,000 per annum, peaking at 3,200 per annum in 1725.¹⁵ Thus, the largest portion of building work on housing in London in the later part of the seventeenth century and early eighteenth was new construction rather than repair, and, as McKellar has shown, it was carried out by large-scale developers who contracted and subcontracted with multiple trades and crafts, used prefabricated elements within buildings, and constructed complex credit arrangements to fund their enterprises.¹⁶

The huge demand for construction in the aftermath of the Fire finally broke any remaining governance that the Carpenters' and Masons' Livery Companies (guilds) had over labour supply and firm size in the building sector in London.¹⁷ Regulations passed to avoid hold-ups in rebuilding lifted the ban on non-guild members working in London. Highly skilled men and large-scale contractors who worked on major projects such as the City churches or St Paul's still became freemen of the city and members of a relevant guild. For example, Edward Strong and Christopher Kempster, two of Christopher Wren's most trusted large-scale mason contractors, took their freedom in London by redemption in the 1670s.¹⁸ However, the more ordinary jobbing mason was unlikely to have been a member of the guild.¹⁹ Only some of the individual workers sometimes named in project accounts can be identified as having been members of any of the relevant guilds.²⁰ The building trades were unusually open to migrant labour and free of institutional barriers, even as the labour market in the city in general became more competitive.²¹

While the building of private housing was the largest element in the construction sector, it is *not* the part for which wage data survive.²² Instead, the sources for London builders' wages tended to be drawn from the records of institutions that constructed public or state buildings (as shown in figure 1). This work was big business, and by the 1670s institutions' reliance on large building contractors was probably even more advanced than in residential building.²³

¹⁴ Brett-James, *Growth of Stuart London*, p. 501.

¹⁵ Sheppard, Belcher, and Cottrell, 'Middlesex and Yorkshire deeds registries', pp. 179, 182.

¹⁶ McKellar, *Birth*, pp. 81–110; Summerson, *Georgian London*, pp. 62–5.

¹⁷ Reddaway, *Rebuilding*, pp. 112–15.

¹⁸ Knoop and Jones, *London mason*, p. 45. Both were from Oxfordshire. Strong built Greenwich Hospital, Kempster built Tom Tower at Oxford, they partnered on St Stephen's Walbrook, and both were major contractors at St Paul's.

¹⁹ Knoop and Jones, *London Masons' Company*.

²⁰ Campbell, 'Finances of the carpenter', p. 322, n. 54; Knoop and Jones, *London mason*, apps. A, B, and C.

²¹ George, *London life*, pp. 10, 120; Rudé, *Hanoverian London*, pp. 20–36, 82–99, 222–5; Schwarz, *London in the age of industrialisation*, pp. 171–207. Also see Dobson, *Masters and journeymen*.

²² A very rough estimate suggests that housing was around 50–60% of the construction sector before 1710. Estimates of the cost of building houses can be found in McKellar, *Birth*, pp. 81–110. Institutional expenditure on churches includes the total expenditure on the 50 churches and St Paul's to 1710 (£1.2m), and perhaps of £0.3m for other large projects with conflicting or no recorded cost (for example, the Custom House, Bethlem, the Fleet ditch, Montague House, and so on).

²³ Knoop and Jones, *London mason*, p. 4, were of the opinion that the building of the Banqueting House at Whitehall was the last significant incidence of the practice.

It is impossible to be precise about exactly when large-scale contractors became wholly responsible for major works commissioned by institutions. At Middle Temple, where there are excellent accounts from the late sixteenth century, the last evidence of direct labour hiring is from April 1614. The day rates are as recorded in Boulton's series: 20d. per day for craftsmen, and 14d. per day for labourers.²⁴ From this date on, all building 'wage' records at the Temple seem to be total sums paid to contractors in abstracts of accounts or builders' bills preserved in the paymasters' accounts. Other staff and workers are listed and paid wages directly on a quarterly basis. At the Office of the King's Works, the Tower and Whitehall accounts for 1660 still listed named masons and carpenters. Their day rates ranged from 24d. to 30d., as Hutchins found, and the labourers' rate was 16d.²⁵ Thereafter, however, even these records increasingly report billing from contractors.²⁶ The middle of the century would thus seem to be the latest date for a transition to reliance on contractors for labour management.

Institutions' use of contractors reflected the organizational effects of the metropolitan building boom which had started even before the Great Fire, with developments in architecture, and technical and stylistic shifts in construction.²⁷ Most of the projects that institutions commissioned were designed in a classical style, popularized by Inigo Jones and his disciples from 1615 onwards. Building styles to the Tudor period had allowed design modifications to be incorporated easily during construction. It was common for new buildings to be copied from existing ones; bricklayers and carpenters would quote for work based on observed measurements and quantities and renegotiate if these changed.²⁸ In contrast, the classical style could only be designed and executed by a skilled architect, with a working knowledge of mathematical and engineering concepts, some of which were new and experimental.²⁹ Once building commenced the design could not be changed if it was to keep to its correct proportions, so costs were sunk.³⁰ While the technical challenges they faced on institutional projects were greater, most of the contractors who undertook large city and Crown projects were also active in private building, which suggests that their working practices were not confined to one sector.

Most economic historians examining wage series have assumed that the main craftsmen employed on the building projects for which records survive were small or artisan masters operating in a largely unchanging industry, with a small number of journeymen and apprentices working for them. Indeed, Woodward showed that this remained true of the organization of construction in northern towns to 1750.³¹ However, the surviving London records belie the idea of artisan organization.

Account books show that the persons hired to carry out large building schemes were contracting for work that would in reality be supplied by other craftsmen in

²⁴ It records the attendance of a team of bricklayers building a 'garden wall'. The day rates are exactly as recorded in the Boulton series. Middle Temple Archive, London (hereafter MTA), MT2/TOT/3/2.

²⁵ Hutchins, 'Notes' (1899 and 1900).

²⁶ TNA, WORK 5/1. Contracts from 1668: TNA, WORK 5/11.

²⁷ Summerson, *Georgian London*, ch. 1.

²⁸ Colvin, *Biographical dictionary*, introduction.

²⁹ The experimentation of Wren and Robert Hooke's work is widely documented; see Addis, *Building*, ch. 4, particularly pp. 198–209.

³⁰ Colvin, *Biographical dictionary*, introduction.

³¹ Woodward, *Men at work*.

their employ, frequently forming partnerships and subcontracts.³² They did not perform work on sites themselves. Indeed, sometimes they were paid extra just to supervise and actually be in attendance.³³ Prominent contractors often held a web of concurrent roles. For example, in the 1670s, Thomas Knight was the City mason, the agent for St Paul's Cathedral on the Isle of Portland, and a contractor to the King's Works. It seems safe to say he was not laying stones himself. The Office of the King's Works owed money to approximately 85 such contractors through the period 1709–25. The total sums outstanding ranged from £6,000 to £11,000. Single contractors were owed as much as £1,200.³⁴ To put this in context, the average annual value of timber imported into London between 1699 and 1701 was £96,000.³⁵ Perhaps unsurprisingly, the master masons contracting to work on St Paul's Cathedral met Grassby's 1970 scale for extreme wealth in London.³⁶ Campbell estimated lifetime 'earnings' of individual mason contractors, suggesting that Edward Strong earned in excess of £77,000 just for his work on St Paul's and the City Churches.³⁷

Some sense of the scale of contractors' businesses can be gained from the sums major contractors billed their clients. Table 1 gives annual figures for specific projects that relate to the sources in figure 1 only.³⁸ It is the bills and accounts of these projects that Gilboy and others mined for "artisans" or journeymen's wages. As we will see, the contracting system meant that actual labour costs were buried in piece rates and hidden behind different types of pricing and accounting systems in contractors' bills.

III

How did the contracting system for major projects work? In brief, for 'extraordinary' work or new building, the client and the surveyor or clerk of the works agreed the requirements for the job. In the case of the City or other major institutions this requirement was then posted at gates or submitted for publication to the *London Gazette*.³⁹ Contractors would submit their tenders or estimates and the surveyor would meet with those that could fulfil the requirements. Meetings and presentations with commissioners or boards also sometimes took place depending on the scope of the work.⁴⁰

³² Campbell, *Building St Paul's*, pp. 75–9.

³³ For example, Edward Tufnell's (mason) bills to Westminster Abbey 1712 include 'for my own attendance at 16d a day', for a small or fixed number of days; Westminster Abbey Muniments (hereafter WAM), 34153.

³⁴ TNA, WORK 5/56, abstracts of accounts 1709–26. The full annual expenditure summaries for St Paul's Cathedral for comparison are in Wren Society, *vol. XIII*, p. 11.

³⁵ Davis, 'English foreign trade', app. tabs.

³⁶ Grassby, 'Personal wealth', quoted in Campbell, *Building St Paul's*, ch. 9, pp. 72–8. See also Colvin, *Biographical dictionary*, p. 4; Campbell, 'Finances of stonemasons'.

³⁷ Campbell, 'Building a fortune', tab. 3. Campbell's figures are lifetime earnings estimates, not turnover, nor profit earned. If Strong had earned £77,000 profit in his lifetime his margin would have been greater than discussed here.

³⁸ A fuller list of contractors and turnover for this period is being compiled.

³⁹ Descriptions of the process survive in TNA, ADM 67/4 (description of the Greenwich Hospital Commission's instructions to Nicholas Hawksmoor for the procurement of mason's services, 1696). This is not to say that contracts were not handed directly on occasion to specific contractors.

⁴⁰ Records of deliberations include TNA, ADM 67/4; WAM, 34516.

Table 1. Some major contractors in existing and present London wage sources

<i>Contractor</i>	<i>Site; dates</i>	<i>Approximate total contract value</i>	<i>Contract values estimated p.a.</i>
Edward Tuffnell, mason	Westminster Abbey; 1712–19	£19,000	£1,800
William Kempster, mason	St Paul's Cathedral; 1700–8 ^a	£9,000	£1,800
Andrews Jefe, mason	Westminster Bridge; 1738–48	£155,000	£15,000
Thomas and Edward Strong, masons	Greenwich Hospital 1696–1708	£55,000	£5,000
Edward Stanton, mason	St Paul's Cathedral; 1675–c. 1705	£54,000	£4,500
	Middle Temple; ???–1734		£500
	Westminster Abbey; 1720–34		£1,500
William Gray, carpenter	City churches, St Clement East Cheap		£500
	Bridge House; 1685–1706		£3,000
Thomas Wise senior	St Paul's Cathedral, Bridge House	£5,500	
		(£24,500 with Thomas Hill)	
Thomas Wise junior	St Paul's Cathedral (Portland stone) Bridge House; 1685–1710s	£37,000	£500

Notes: ^a Total paid to master masons for masons' work at St Paul's Cathedral to 1710 approximately was £185,196. See Wren Society, *vol. XV*, 'Introduction', pp. xiii–xiv, for details. Those listed here relate directly to sources or persons referred to in the text of this article.

Sources: See text and app. I. No information indicates unknown amounts.

Contracts for several parts of a project might be written, specifying the contractor's duties to supply work at specific prices, under one or a number of three ways of working: by the day, by the great, and by the measure.⁴¹ Contracts gave clients the right to monitor work, to appoint an external inspector of work, and to discount or not pay agreed amounts if the quality they had stipulated was not met.⁴² It was not unusual for a contractor to enter a bond to secure a contract, particularly if it were his first contract with a client.⁴³ Once an estimate was agreed and work had started the contractor submitted bills quarterly or biannually as agreed. The paymaster or treasurer would receive the bill and pass it to the surveyor or the clerk of the works for approval. To approve or 'pass' it, the clerk had to ensure the work met the specification by appointing a surveyor to measure and evaluate the work done.⁴⁴ Once assessed, the bill was passed or discounted and went to the treasurer to be signed and eventually to the paymaster to be paid. In this system, the responsibility for hiring and managing labour rested solely with contractors.⁴⁵ The contractors' bills and the institution's accounts of works that were generated by this process are the sources for all London wage data.⁴⁶ However, these are not records of payments to workers. They are the prices that the contractors charged the client.

In 'ordinary' work the process was similar, but payment more regular. Bridge House, the institution that maintained and administered London Bridge throughout the centuries, appointed individuals as head mason, carpenter, and so on. These official craftsmen were also contractors at other sites. For example, the Bridge's mason, Thomas Wise, was also stone and masonry contractor at St Paul's, while William Gray, the Bridge's carpenter, also contracted for work on the City churches.⁴⁷ They paid substantial sums for their places at the Bridge, and the small stipends or salaries they were paid did not cover their interest or costs.⁴⁸ They submitted weekly bills for labour but awaited longer payment for materials, and submitted to a bi-annual audit. Latham has shown the extent to which materials may have been marked up at the Bridge.⁴⁹ Certain firms at the Bridge persist in the accounts for over a century.

To complicate matters further, labour costs were priced and presented differently in each of the contracting methods. The 'wages' that Gilboy and other historians report in their series are transcribed 'day rates' for masons, bricklayers, labourers, and so on. In practice, however, most bills did *not contain* day rates: contracts

⁴¹ See also Lang, *Rebuilding*, p. 81. For combinations of day, measure, and task, see Wren Society, *vol. XVI*, pt. I, 'Contract Book', pp. 1–31.

⁴² For a surviving contract, see London Metropolitan Archives (hereafter LMA), CLC/B/227-175.

⁴³ Edward Stanton, one of the city's most well-known masons, secured the contract at Westminster Abbey in 1719 after the death of Tufnell. He refers to his bond of £2,000 in meeting minutes of Dec. 1722; WAM, 34517.

⁴⁴ Or measure it himself, if he were so qualified, such as Hawksmoor at Greenwich. The final account usually states a number of dates: the rough dates the work was completed; the date the work was measured by the Clerk; the dates the work was approved and the bill passed by Committee; and the date the sum was paid. See WAM, 34513, for dates of Dickinson's measurement and later dates for passing of bills.

⁴⁵ Campbell, 'Seventeenth-century bricklayers' contracts'.

⁴⁶ Even smaller contractors and craftsmen billing individual churchwardens or parishes, or bricklayers repairing Middle Temple walls, leave the same type of bills, and such smaller contractors would also have had overhead.

⁴⁷ See Wren Society, *vol. X*, 'Table of the fifty-four churches with trades and costs', pp. 45–53.

⁴⁸ See Latham, 'Institutional corruption', p. 1044, for figures. The salary for mason and carpenter place holders was £4 p.a.; the positions bought for hundreds of pounds.

⁴⁹ Latham, 'Institutional corruption', pp. 1050–1.

'by the day' were only one kind used, and not the most common. The other two types of contract that were generally used were measured work, where prices were agreed per length or unit of work, and work 'by the great' or 'task' (where a contractor quoted one price for an entire job at the outset). In both these types of contracts labour costs were built into the unit price of worked stone, timber, or brick quoted. Unfortunately for historians interested in wages, most construction work seems to have been priced 'by the measure'. A typical 'measured' bill included no information on the cost of the labour employed on the job.

Christopher Wren, responsible for so much of London's institutional construction in this period, regarded work 'by the measure' as best value, only using day bills for exceptionally skilled work or where safety was at stake.⁵⁰ Prices for labour appear in bills for work 'by the day', when time was needed for workers to take greater care, or to perform more intricate or difficult operations that required extra skill or strength. A day bill from Edward Strong at Greenwich Hospital offers a typical example of a bill for 'day work':

December 1700

Days work by Edward Strong pulling down the scaffolding made to raise the pedestals and trophies upon the pediment of the B[...], in cutting way into the brickwork for the corridor frames chimney pieces corner stows, windows, soyles and window stones and taking out the iron bars of the cellar windows in the KC his building aforesaid and cutting way for the top of four staircases descending from the first floor of the B[...] the cellars or vaults of the same.

Wm. Loggans 20 days at 2s 6d.	02:10:00
Jb. Adams 25 days at 2s 6d.	03:02:06
Richard Nailor 8 days –	01:00:00
Edward James 20 days at 20d.	01:13:04
Wm. Derry 10 —	00:16:08
Wm. Hosslet 1 day	00:01:08
J How 1 day	00:01:08
Matt Allen 2 and half days	00:04:02
Wm. Macon 1 [day]	00:01:08
	09:11:04 ⁵¹

Day bills of this kind have three characteristics that need to be understood if the wages they report are to be interpreted correctly. First, they only indicate *some* of the labour employed on a project, and possibly the most skilled or expensive part. For example, Edward Tufnell's bills to Westminster Abbey in 1712 amounted to £1,917. Yet they only listed 600 'days' worked, enough for three masons for a year, and equating to less than 5 per cent of the total.⁵² Day bills make up a small amount of the work at Westminster Abbey and the Office of the King's Works. At Greenwich Hospital they represent approximately 15 per cent of the bills.⁵³ Second, day bills show the price the contractor charged the client for a person's work for a day. They are not a record of what the worker actually received. The day

⁵⁰ Campbell, 'Finances of the carpenter', pp. 330–5.

⁵¹ LMA, CLC/B/227-175. The calculations seem to be incorrect by 4d.; in the books there are a number of corrections.

⁵² WAM, 34513, Christopher Wren fabric book.

⁵³ Based on an analysis of all bills in Edward Strong's account book, LMA, CLC/B/227-175.

rates they list were not in fact received by the named mason or carpenter. Day rates were frequently set by institutions across multiple contracts. For instance, St Paul's allowable day rates were set at 2s. 6d. for carpenters, bricklayers, and masons in 1675. The rates were not increased until after 1711, or later, despite the fact that we know that other institutions and contracts were paying more. If the underlying labour market for the skills that the contractor hired tightened during the period of a contract, their margin would be squeezed. Likewise, if they could procure labour and materials at rates below what they quoted at, they would profit.⁵⁴ Third, day bills contain no separate line for the contractor's own overheads and profit, so those are built into the prices billed.

Appreciating the specific role of day bills helps explain the puzzling uniformity of wage rates found in account books and bills.⁵⁵ The contracting and pricing context suggests that the persistence of the rate is more likely to have been a product of contractors in competition with each other utilizing a 'going rate' or acknowledged trade price. Institutions may have given guidance after comparing rates.⁵⁶ In fact, surviving records of direct payments show little sign of a customary wage for craftsmen; rather there is much variation, presumably for skill and productivity.

IV

If our existing 'wage' series report the prices at which highly skilled work was charged out at, what were the actual wages that building craftsmen and labourers received? To establish this, we need either to find contractors' actual pay records, or in their absence, estimate their operating margin on wages. Luckily, in a rare case the contractor's own books have survived. In order to put the figures in context, this section first provides a discussion of margins, before presenting the direct evidence on wages.

The size of the contractor's margin should be approached by looking at three sets of costs: the cost of giving credit to customers; the risk of retrospective discounting to bills; and the contractor's own management or operational costs. Together these amount to the overhead or operating margin that the contractor added to the costs of goods and services (including labour) that he billed, to which he would also have added some allowance for profit. Grassby estimated that an acceptable profit margin to seventeenth-century merchants was 13–20 per cent.⁵⁷ Campbell ascribed the whole of the contractor's margin of 20 to 40 per cent to profit in his analysis.⁵⁸ However, it is argued here that contractors had considerable operating costs, even before the question of profit is considered.

Credit for customers was one of the major costs faced by eighteenth-century building contractors.⁵⁹ At Westminster and Greenwich, for example, payments

⁵⁴ Data on charge out rates in Boulton, 'Wage labour', p. 277, show that the range of rates charged out increased from 24d. to 36d. per day in 1670 to 30d. to 42d. per day in 1710. For labourers the range moved from 14d. to 24d. in 1670 to 21d. to 26d. in 1720. As Boulton gave only modal rates in his series a median cannot be calculated, but the range and trend of both series increase.

⁵⁵ For instance, see Gilboy, *Wages*, p. 13, n. 1, and pp. 254–7.

⁵⁶ For evidence of institutions bargaining with suppliers, see TNA, ADM 67/2.

⁵⁷ Grassby, 'Rate of profit'.

⁵⁸ Campbell, 'Finances of the carpenter', pp. 332–9.

⁵⁹ Mobus, 'Surviving late payments'. It is recognized as a cost for all commercial operators in the early modern period; Hudson, *Industrial revolution*, p. 104.

were typically made 15 to 30 months after the work was carried out. At St Paul's, payment became so late that Wren was forced to convert the money owed to contractors into a bond.⁶⁰ Colvin wrote of a similar system for other major supplying creditors to the King's Works. Apparently, no works account was ever audited (and final sums paid) within less than two years of finalization of work and delays of 10 years were not uncommon: 'It was the artificers who bore the problem'.⁶¹ Contractors' records show that masons working at St Paul's borrowed family capital or drew on financial support from other sponsors to pay their weekly wage bills and keep their team working.⁶² The price they paid for this line of working capital is unknown. Annual interest rates or discounts on trade bills of exchange were commonly between 6 per cent and 15 per cent in the period, suggesting that a moderate 18-month delay in payments cost a contractor at least 10 per cent of his bill.⁶³ Suppliers further down the supply chain may have shared some of the pressure, but building contractors could not hire workers on credit. Experienced contractors would have known the risk and priced work accordingly.

Contractors received only token relief for the costs of credit they faced. Small advances or imprests were commonly given to key contractors. The maximum imprest at Westminster Abbey in any quarter seems to have been £50 whereas contracts in progress in the same period could be worth thousands.⁶⁴ It is also worth noting that credit was not offset by perquisites. Institutions offset the value of everything taken off site against contractors' bills. Plumbers were charged for old lead taken off site, and bricklayers for old tiles, at 25–35 per cent discount to the cost of new.⁶⁵

Contractors' second major risk that would have been priced into their margin was the likelihood that their bills would be discounted before payment. The account book of the mason Edward Strong for work at Greenwich from 1698 to 1708 shows that his bills were regularly discounted; in other words the commissioners found reasons not to pay the full bill. Day bills were discounted by an average of 13 per cent, his measured bills by 5 per cent.⁶⁶ At Middle Temple, Christopher Wren discounted the plasterer's bill by 30 per cent in 1682.⁶⁷ Clients wrote this right to discount unsatisfactory work into construction agreements, as can be seen

⁶⁰ Campbell, *Building St Paul's*, p. 67. See remittance records at LMA, CLC/313/I/B/014/MS25483/001. St Paul's paid interest on late payment after a delay of more than 24 months.

⁶¹ See Colvin, Mordaunt Crook, and Downes, eds., *History*, vol. V, 'Financial stress', p. 44. In 1670, to deal with the problem and maintain credit, officers of works were allowed 6% interest on works outstanding which were traded as a loan but only if they loaned a further sum. In 1692, the same deal was offered to contractors who would advance double the amount outstanding to him by way of a loan to the works. In other words, late payment was so bad that the Office of Works was forced into paying interest to maintain credit—but the interest rate was only available to those who would put in more capital.

⁶² TNA, C106/145.

⁶³ The estimate of 10% is based on a 6% interest rate. Usury limits were 6% falling to 5%, in this period, but a rate of return nearer 8% annually has been established for two contemporaneous private lenders. See Quinn, 'Glorious Revolution's effect'; Temin and Voth, *Prometheus shackled*, pp. 73–80.

⁶⁴ WAM, 34513, 34514, 34518

⁶⁵ WAM, 34513. Office of the King's Works at TNA, WORK 5/146-166. Similarly, at Bridge House the off-cuts of wood for certain jobs are accounted and entered in the books; LMA, CLA/007/FN/03/25.

⁶⁶ LMA, CLC/B/227-175.

⁶⁷ MTA, MT.6/RBW.

in a surviving mason's contract for Greenwich Hospital.⁶⁸ The contract did not give reciprocal rights to the contractor.⁶⁹

The third and most important type of cost that affected contractors' margins was their own operating costs. As is attested by the size of these projects, the contractors were not small masters. They were employing tens or hundreds of staff, some working on site, some off site prefabricating and preparing. In the years 1698–1710, for example, the Strong's had operations and teams of persons on at least three large sites continuously. Contractors paid for the carriage of supplies, negotiated with suppliers, and used their own surveyors and estimators to verify lengths and work done.⁷⁰ Management was not cheap. At Westminster Abbey, William Dickinson's pay was £50 for measuring approximately £3,500 of work.⁷¹ Measurers were paid from 10s. to a guinea a day.⁷² Overseers are not included independently in day or measured bills, yet they were paid at the higher end of journeymen's charge out rates. At St Paul's, William Kempster's foreman Joshua Fletcher appears in his daybooks in 1706–8 as being paid 20s. a week.⁷³ The detailed sawing records kept by Kempster and Strong from St Paul's imply that there was a full-time monitor present to record the amounts sawn and the distribution of the load and to account for any wastage.⁷⁴ On top of the costs of operating on site, large contractors maintained separate premises for off-site works and administration.⁷⁵

The letter book of Andrews Jelfe, one of the mason contractors at Westminster Bridge in the 1740s, sheds some small light on the issue of margin.⁷⁶ His book details bi-weekly accounts for a project, possibly sited outside London, throughout 1734–5. As well as day rates for men, it shows that approximately 2 to 3 per cent of the costs on this small project were made up of messenger, stationery, and transport costs. It also shows that he was paying one man, John Ogle, probably foreman of his yard, 50d. per day. Copies of bills do not include Ogle's wage, nor the administrative costs. Later letters show that he retained an agent, one Mr Roper, to procure the stone for Westminster Bridge. Again, Roper's costs are not in his bills, which are largely measured.⁷⁷ Jelfe's book shows that he gave his men a drink one night when they had worked all day and then had to travel to Cambridge.⁷⁸ His lack of *regular* food or drink bills is typical of records for those who worked at Greenwich, Westminster Bridge, or Bridge House. Drink, or even breakfast, is found sporadically in some bills during winter months or in relation

⁶⁸ LMA, CLC/B/227-175.

⁶⁹ A copy of the contract is in Strong's account book; LMA, CLC/B/227-175.

⁷⁰ Nisbet, *Proper price*, p. 26.

⁷¹ WAM, 34517.

⁷² LMA, CLA/007/FN/04/001.

⁷³ TNA, C106/145; also see Wren Society, *vol. XVI*, p. 167. Fletcher is only present from 1706/7.

⁷⁴ TNA, C106/145, sawing records for Nov. and Dec. 1704; Wren Society, *vol. XV*, pp. 26, 144, 174; marble sawing records at LMA, CLC/313/I/B/003/MS25473/041.

⁷⁵ Edward Stanton maintained premises near St Andrew Holborn from the late 1690s (possibly before) to the 1720s; Joshua Marshall had premises nearby before 1700. We do not know the exact locations of other masons' yards. The role of a yard would have been to accept and store goods prior to delivery to site, to facilitate carving and other work performed off site for task or measured orders, and to be a centre for administration and so on. Kempster is believed to have had premises on Garlick Hill.

⁷⁶ BL, Add. MS 27,587, pp. 4–5, 13, 20 onwards.

⁷⁷ TNA, WORK 6/46, for example.

⁷⁸ BL, Add. MS 27587, p. 5.

Table 2. *Calculation of contractor's operating margin for day work*

<i>Type of cost</i>	<i>% share of bills</i>
Credit	6–9
Discounting	3.5–7
Measurement, estimation, agency, overseeing	5
Accountancy	2
Rent ^a	2
Tools ^b	1
Total before profit	19.5–26
With profit of 10%	29.5–36

Notes: ^a The figure of 2% is an estimate based on Barbon, *Apology*, who quotes houses in Bishopsgate at £30 p.a. and Charing Cross at £60 p.a. in 1685. Based on a conservative estimate of turnover at £2,500 for a mason such as Stanton with rent at £25 p.a. and another percentage for tools and supplies. For some contracting and speculative masons and carpenters, rent would have been a higher figure; for those with more permanent types of work contracts at Bridge House, they may have been less.

^b Based on calculations of ironmongers' bills, rope, and the portion of joiners' bills for moulds on extraordinary projects only at the Office of the King's Works, St Paul's. These costs are not presented separately on all work at these sites, and not at Greenwich or Westminster; thus the contractors would seem to be absorbing them. The Kempster notebooks also show payments for tools and for tool maintenance, but as they are notes rather than accounts they cannot be used to calculate the percentage of turnover this represented.

Sources: See app. I.

to unusual work—those sinking caissons at Westminster Bridge in February 1744 were offered gin—but men working on London sites were not offered food or drink in order to sustain them in normal work. The Jelfe evidence is too fragmented to put together a complete operating budget or profit and loss for his projects, but they do show that he, like others, had substantial operating costs that did not appear in bills to clients. He also took a substantial income for himself: he left £30,000 on his death.⁷⁹ Using the varied accounts that survive, we can estimate at least some of the associated costs involved in running a building project in early modern London. The calculation is set out in table 2. Although these figures are based on evidence from large projects (which are those from which day bills are derived), smaller contractors such as those found in individual parish records would also have faced overhead costs for carriage, accounting, management, tools, and rent, even if they did not work by the measure.

The above calculation agrees with the higher end of Campbell's estimate of between 20 and 40 per cent.⁸⁰ Contractors would only have been able to recoup the administrative, finance, and operating cost of their business, and anticipate discounting, if there was a margin between day rates charged to institutions and pay to workers. Depending on the project, its length of contract, and the rates set on it, the margin on individual inputs would have varied.

V

Although rare, there is evidence of what contractors actually paid craftsmen and labourers. One instance, long known about by historians, has been disputed. In 1711 Richard Jenings, Wren's carpenter contractor at St Paul's, told a Commissioners' Committee tasked with evaluating whether he should be tried

⁷⁹ Colvin, *Biographical dictionary*, p. 11.

⁸⁰ Campbell, 'Finances of the carpenter', pp. 334–9.

for fraud, that the Cathedral Commission paid him 15s. a week for his carpenters, but he paid them on average only 11s.⁸¹ Jenings's average mark-up on skilled craftsmen's wages was approximately 27 per cent. However, the correspondence says he was paying varying rates to different men, the more skilled or valuable getting 12s., the lesser 7s. The Jenings case has been cited by authors to both support and deny the idea that contractors marked up the pay rates they indicated in bills. Gilboy herself examined the account in the Portman papers, as did Knoop and Jones. They arrived at opposite conclusions. Gilboy thought a master might 'shave a penny or two off wages' but thought it unlikely.⁸² Most subsequent architectural historians have instead agreed with Knoop and Jones's conclusion: Jenings willingly offered the fact that he took a margin on wages, and he insisted this is standard practice.⁸³ No evidence was sought to the contrary, and he was not prosecuted. Until now, no other evidence of direct payments has been uncovered with which to compare the Jenings evidence.

However, William Kempster, mason contractor at St Paul's Cathedral from 1700 to 1711, kept some day books recording the wages he paid to the masons he employed on the project.⁸⁴ During this period his team were working on some of the most demanding and beautiful parts of the structure, including the West Front and the geometric staircase. The books are in a bundle of probate papers of his and his father's at the National Archives. They are qualitatively different to those kept by institutions: they are mostly in his hand, and as well as recording the weekly pay given to his masons, they include memoranda about cash owed, skill requirements, call records for masons for 1700–4 and 1706–8, and sawing records. The numbers of men on call correspond directly with the cathedral's accounts for his day bills. The books also show that he was borrowing money from his father and subsequently his 'sponsor' to pay his men and keep them on site.⁸⁵ Although these records appear unique, there is no reason to think that Kempster was operating in an unusual manner. He was the son of another mason contractor, Christopher Kempster, who had been working on St Paul's until the 1690s, and the team and contracts for which his records survive were partly inherited from another contractor, John Thompson, whose team were present from 1694 to 1700. He was also involved in a number of other major projects of the kind that have supplied us with day rates for wage series. For economic historians the books have considerable significance. They are the only known example of a building contractor's own call and pay records for the late seventeenth or early eighteenth century.

The rates Kempster paid his masons varied greatly. He noted their wages alongside a tally of the days (measured by the half day) that they worked each week. Kempster's team began work in October 1700, and worked through to the end of December. There was then no work recorded in the daybook until 4

⁸¹ The accusation of fraud is part of a complex conflict over Wren's role. Jenings was accused of not paying his workmen properly, but the commissioners later accepted this was standard practice; see HMC, *Portland papers*, vol. X, p. 104; Campbell, *Building St Paul's*, p. 159; Wren Society, vol. XVI, pt. III, 'Frauds and abuses', pp. 109–13, 158. Jenings's men are in the St Paul's account books at 2s. 6d. per man per day for the period to 1710.

⁸² Gilboy, *Wages*, p. 17.

⁸³ Knoop and Jones, *London mason*, pp. 61–2.

⁸⁴ Kempster's books are in TNA, C106/145.

⁸⁵ While the royal dockyards were able to pay wages in arrears, passing credit costs on to employees, independent building contractors lacked the same capacity. Also see Schwarz, *London in the age of industrialisation*, p. 249; Muldrew, 'Wages and the problem of monetary scarcity'.

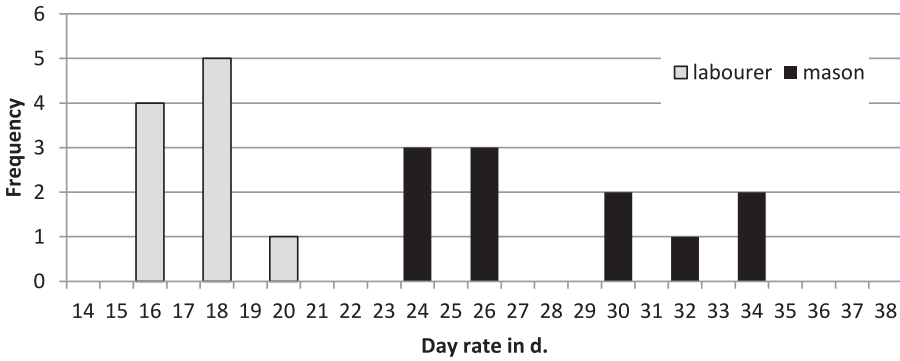


Figure 2. *Day rate distribution, week ending 7 December 1700, Kempster’s masons and labourers*

Note: Based on 166 observations, in weekly pay groups as paid, Nov. 1700, Dec. 1700, March 1701, Nov. 1701, June 1702, July 1702.

Source: TNA, C 106/145.

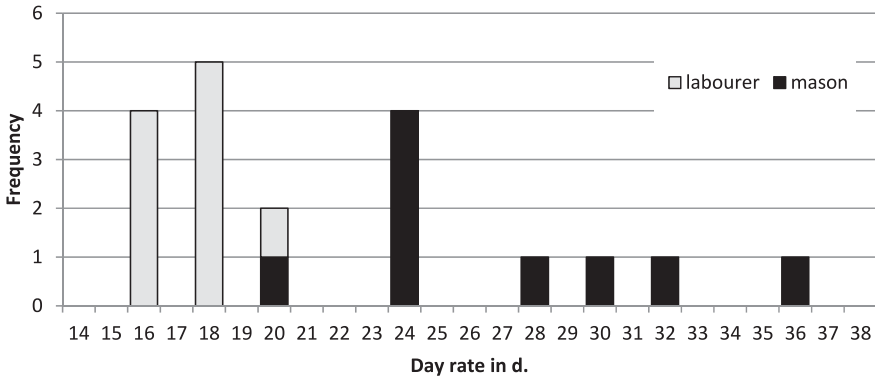


Figure 3. *Day rate distribution, week ending 7 June 1701, Kempster’s masons and labourers*

Source: As for fig. 2.

February 1701, when a small team returned. At this point, three masons who had been receiving 26d. per day until December 1701 reappeared, but they took a significant cut in pay, to 24d. per day; they continued at that rate until December 1702. In the latter part of 1708, when the number of workers reached over 40 on most days, Kempster divided the list by category, with ‘Masons on call’, ‘Ruff layers and their labour’, and ‘Labourers’ each listed separately; the highest wages were given to a small unlabelled group placed at the head of the list, however. To give a sense of the form of Kempster’s wage payments, figures 2 and 3 report the distribution of rates for two representative weeks, 7 December 1700 and 7 June 1701 (note that the summer and winter day rates were the same). In December, 11 masons on wages between 24d. and 34d. per day worked alongside 10 labourers, who received 16d. to 20d. per day. In June, the distribution was similar, although the range of pay for the masons was more widely distributed.

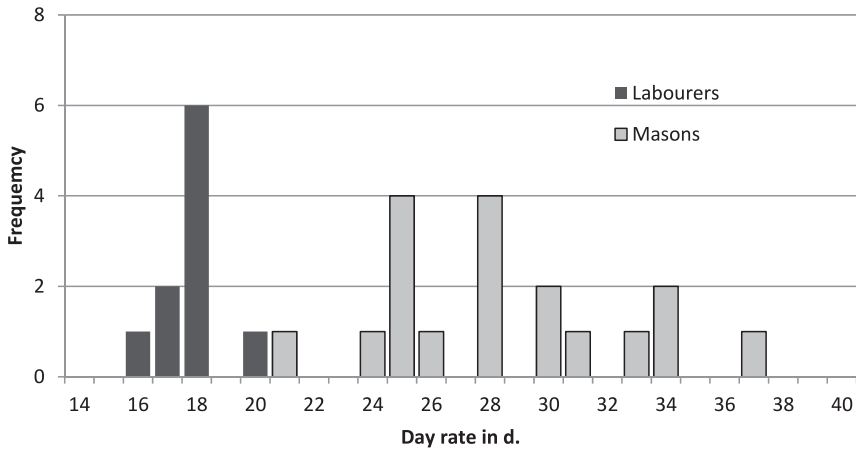


Figure 4. *Distribution of day rates paid to Kempster's masons and labourers, Oct. 1700–Oct. 1701, St Paul's Cathedral (n=28)*

Source: As for fig. 2.

The overall pattern of pay for the 46 weeks for which Kempster had men on site between October 1700 and October 1701 can be seen in figure 4, which reports the average day rate that each named worker received during this period.⁸⁶ The mean wages of the 18 masons ranged from 21d. to 37d.; the overall mean wage was 27.3d., the median wage was 26d., while the modal wage was 24d. As noted above, the wages of his labourers were between 16d. and 18d. Overall, the mean, median, and modal rate Kempster paid his 10 labourers was 18d. per day, while the cathedral also hired large numbers at 16d. This suggests the mean labourer's day rate overall at St Paul's was approximately 17d.

The number of weeks each mason worked varied, but they roughly fall into two groups: those who only appeared for short periods, as little as one week; and those who were hired very regularly, including two masons who were present on 45 of the 46 recorded weeks. If we look at how the 378 payments to masons and 362 payments to labourers that Kempster made were distributed across the different daily rates that he paid (figure 5), we can see that he mainly hired masons at two pay levels: 35 per cent of his payments were at 24d. per day; while another large cluster of payments, 23 per cent, were at 30d. per day. He had regular employees at both levels; churn was no higher among the lower-paid than the higher-paid masons. Nor, as is clear, were these pay rates tightly fixed by convention; other masons were paid wages that were scattered around these two modal peaks. The implication is that Kempster's workforce of masons fell into two loosely defined levels, with tiered pay that reflected different levels of skill.

We can trace a few of the workers listed in Kempster's books, and the better paid among them were very experienced. Richard Richards, who headed the list of 'Masons on Call' in the July 1708 accounts, was a freeman of the Masons' Company, and had been working at St Paul's 14 years before, in September 1694,

⁸⁶ As the rate each individual earned could varied between weeks, I report the mean of all the recorded weekly day rates they received.

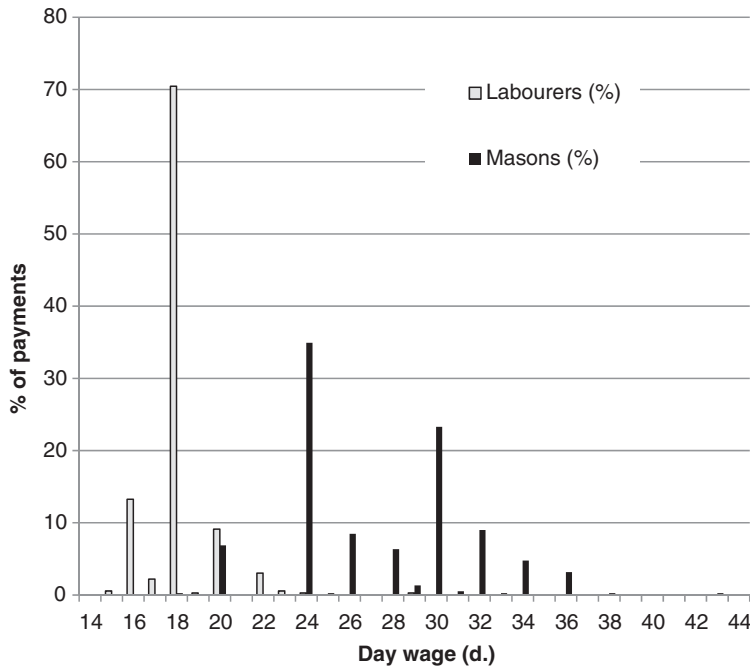


Figure 5. *Day rates paid by Kempster as percentage of total pay, Oct. 1700–Oct. 1701*

Source: As for fig. 2.

as part of the team of Christopher Kempster, William's father. Joseph Smith, whose name came after Richards on Kempster's July list of masons, had also been working on the site in 1694, as had Thomas Allen. Richards and Smith earned 30d. a day throughout the 1708 accounts, but Allen never received more than 28d. At least three of the masons working for Kempster in 1701 (one the highest-paid employee listed, on 36d. a week, the other two on 32d. and 28d. respectively) were recorded in the Masons' Company search of 1694, and so had accumulated at least a reasonable amount of experience. By contrast Will Stonhouse, also free of the Masons, was paid 20d. per day.⁸⁷

The work that Kempster's men carried out at St Paul's was exceptionally highly skilled. It is not very likely that men doing more commonplace work around London were paid the same. Figure 6 gives the day rates of the men who carved the columns of the West Front that we still see today. The contract was shared between Kempster and Samuel Fulkes, another mason contractor favoured by Wren. The work was thought of as prestigious, and Kempster's account of the rates on a separate sheet marked carefully 'an account of the masons time it was on the columns'. The

⁸⁷ The men are John Barker, William Cooper, and J. Magnus. Barker is recorded in Kempster's other pay records as a carver, substantiated by the fact he was apprenticed to a joiner, according to Knoop and Jones, *London mason*, app. C. Several other men who appear in Kempster's books appear in masons company records; Michael Growden, Peter and Nic' Abraham, Will' Ash, and others. However, not all men can be traced. It remains a slight possibility that large-scale contractors used mobile gang labour paid at cheaper rates than normally paid in London, but it should be stressed that a significant number of the Kempster team are found in London records, and it should also be noted that many of them are found consistently over the period 1700–8 at St Paul's.

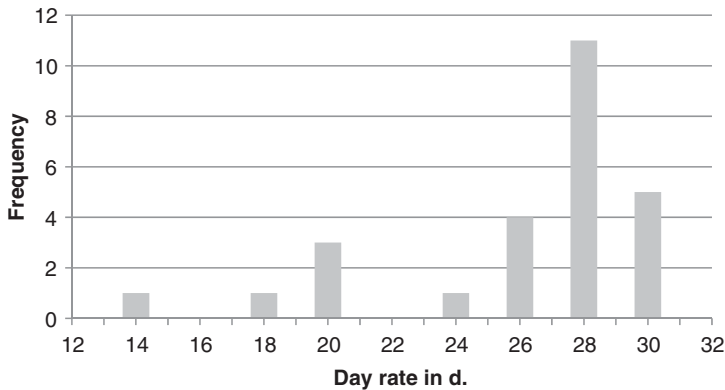


Figure 6. *Day rate distribution, Kempster's 'masons time as it was on the columns' (1708)*

Source: As for fig. 2.

distribution of rates shows that the mean day rates for masons on site was in the region of 26d. per day. This, of course was entirely dependent on the level of skill present on site each day. It should be noted that the mason contractors provided most of the stone carving at St Paul's, so these higher rates (30d. to 36d. per day) include carvers, foremen, and the most skilled men who fitted the staircase.

We know from the records of St Paul's that Kempster was charging the men out 'on call'—when they were on day work—at 2s. 6d. or 30d. per day (which is the rate taken for that period in the Gilboy series), and which the commissioners at the cathedral had kept fixed since 1675.⁸⁸ However, we also know from the Boulton series that many charge out rates in London at that time were much higher. Boulton's shows charge out rates for the period 1700 to 1710 of 30d. to 42d. (mostly 36d.). There are no observations in the Boulton data after 1691 below 30d. a day for a craftsman. Likewise, for labourers after 1700 there is only one observation under 21d. per day. Yet the St Paul's rate—which we know as the clerk of the works kept records of the labourers' payments—was 16d. and 18d. per day. Between 1670 and 1720 there is an upward trend in the day rate of labourers and craftsmen in Boulton's data; for craftsmen, for instance, there is a rise in the lowest rate of 18d. to 32d. The St Paul's charge out rates were steadily 30d. throughout this whole time. However, as the Kempster books show, the rates actually paid to men were lower.

There is other evidence that challenges the existing series. Bridge House or London Bridge is the only site where there are ample records of both directly paid and contracted labour continuously to the mid-nineteenth century.⁸⁹ The wages recorded there are a complex combination of day rates and tide rates, but pay was

⁸⁸ Wren Society, *vol. XV*, pp. 69, 169, show Kempster charging 2s. 6d. for masons 'on the call' to St Paul's in the same period. His margin on masons on day rates was 10% (9.98), and on the columns 13% compared to day rates, suggesting the commissioners had indeed squeezed his profits. His margin overall on measured work cannot be determined, however, as we do not have his materials or piece rate bills, nor costs. See Wren Society, *vol. XV*, p. 123, for details of Kempster's carving and geometric staircase work.

⁸⁹ Bridge House refers to the institution and estates that held and managed London Bridge and buildings at the Southwark end of London Bridge owned by the City.

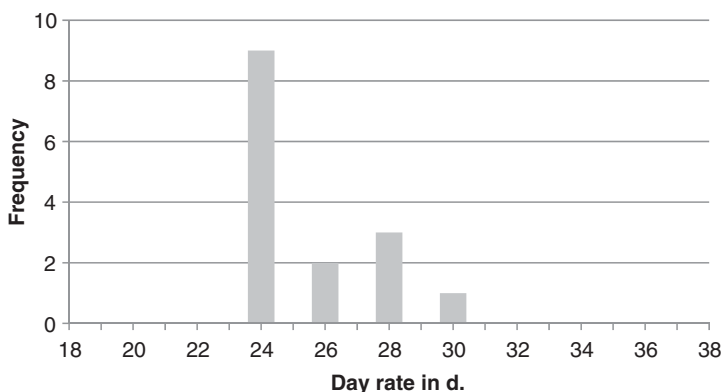


Figure 7. *Distribution of craftsmen's pay (carpenters, bricklayers, masons) at London Bridge, Oct. 1661, including tides (n=24)*

Source: LMA, CLA/007/FN/03/19.

significantly lower than Gilboy or Schwarz recorded. Figure 7 shows a distribution of only craftsmen's pay in 1661, including pay for six tides a week. The mean was 25.37d. for well over a day's work. Without the tides mean pay per day would have been 19.78d. per day for craftsmen. Tides worked were unpredictable. Labourers were paid 7s. a week for a six-day week in this period. In the decades up to 1737 many carpenters and labourers were paid only by the tide. Carpenters earned 18d. a tide, and with an average of nearly seven tides a week their equivalent day pay was 21d. Labourers earned half this rate. Low pay at the Bridge persisted. William Wilmor, Master Land Carpenter, was still paid 16s. a week, or 32d. per day in 1788.⁹⁰ Labourers' average pay per day throughout the 1750s and 1760s was between 11d. and 12d.⁹¹

Previous historians' sources and contemporary printed guides to the wages paid to building labour in private house building also give lower rates than existing series. George cited a figure of 30d. a day for masons in 1775.⁹² William Pain's *Builder's companion* of 1761, a guide for the gentlemen builder's client, reports a few day rates, but those given that match Gilboy's rates are described as the highest estimate. The rest are 20 per cent below that rate.⁹³ Campbell's 1747 guide to different careers open to young persons suggested that rates for building journeymen were a half crown a day, again lower than Gilboy's figure.⁹⁴ The evidence firmly indicates that a rate significantly below the charge out rates that make up existing series for craftsmen and labourers was that which was actually paid to men in the period. Authors who have examined the building trades in the nineteenth century have shown that a 20 per cent mark-up applied to all wage

⁹⁰ LMA, Bridge House Estates, CLA/07/FN/03/27-29. As noted earlier (section I), Boulton highlighted lower pay at Bridge House throughout the seventeenth century.

⁹¹ See LMA, CLA /007/FN/04/005, tide carpenters' bills.

⁹² George, *London life*, p. 166.

⁹³ Pain, *Builder's companion*, pp.*1-3. The highest rate for a bricklayer is 3s. per day in 1761. Masons and carpenters are given in measured rates only.

⁹⁴ Campbell, *London tradesman*.

rates.⁹⁵ It should not surprise us that the eighteenth century worked on a similar basis.

VI

Was the contracting model established elsewhere at this time? While Woodward's study of northern England suggest a building trade dramatically different in scale and scope to London, what of southern English building wages? That series is a composite of data drawn from sources that are highly similar to the London series. It was derived by Phelps Brown and Hopkins from Thorold Rogers's data up to 1700 and extrapolated from Gilboy's Maidstone data for 1730 to 1810. They themselves highlighted that Rogers took the highest wages found and that his series was based on a very limited number of observations.⁹⁶ Most of Thorold Rogers's provincial data are from a limited number of Oxford and Cambridge colleges, whose building projects were of a similar scale and complexity to those in London. Indeed, many of the people involved were the same: Christopher Wren was responsible for much of the work reported in Thorold Rogers's college sources and he used some of the same contractors in Oxford as in London.⁹⁷ Examinations of the building and vouchers archives at New College, which is the longest and most consistent series given by Thorold Rogers for wages, confirm that direct labour was not employed at Oxford after 1600. Rather the vouchers show that the contracting system being used in large- and small-scale construction in Oxford was virtually the same as that in London.

By way of example, throughout the 1690s John Doude, mason, appears in the vouchers at New College. His bills are in the same format as the examples from London given above. Masons or 'his man' are charged out at 1s. 6d. per day in 1690, and labourers or others at 1s.⁹⁸ Similarly, in 1707 a bill for masons and labourers pulling down and replacing the walls in the garden and levelling the yards was charged at 18s. for 16 days.⁹⁹ Many bills give no day rates at all, merely a price for whole contracts. In 1740 the college was charged £25 for 'building a summer house and laying paving'.¹⁰⁰ Building accounts in the Blenheim papers show a mix of retained directly paid workmen, paid as little as 16d. per day for a mason in 1721, and bills from major contractors which detail measured and task rates rather than days.¹⁰¹ As in London, the bills have no allowance for carriage, tools, or the other constituents of overhead mentioned above. Building craftsmen's recorded day wages across southern England were shaped by the same contracting system that was in use in London. The southern English wage data should be deflated by a similar amount to that of London. This would preserve the capital's wage premium, but at a markedly lower real level.

⁹⁵ Powell, *Economic history*, p. 33.

⁹⁶ Phelps Brown and Hopkins, 'Seven centuries', p. 195.

⁹⁷ For a list of his projects at the universities, see Beard, 'Work of Christopher Wren', pp. 58–76. On Kempster in Oxford, see n. 18 above.

⁹⁸ New College Oxford Archives (hereafter NCOA), vouchers 11367 and 11368 (1690–2).

⁹⁹ NCOA, voucher 11372.

¹⁰⁰ NCOA, vouchers 11367–11399

¹⁰¹ See BL, Add. MS 61354, pp. 22, 23. Edward Strong was the main mason contractor and Matthew Bankes was one of the carpenter contractors; both were London-based. Detail of John Kerwood, local mason's days, Dec. 1721, BL, Add. MS 61354, pp. 95–6.

Britain's wages have not always been viewed as 'high'; in fact, as Wallis recently noted, economic historians have long held widely diverging beliefs about the nature of labour in Britain.¹⁰² Until the late 1990s, many theories about Britain's development centred on low wages and a flexible labour force, and it was posited that high wages in the Low Countries had been the reason why the Golden Age in Holland did not bring about industrialization.¹⁰³ Moreover, there has been dissent about the interpretation of pre-industrial Britain as characterized by high wages. Methodological, theoretical, and historical challenges to the 'high wage' thesis have questioned how high wages fitted with the large amount of qualitative evidence for low living standards, the relevance of the male breadwinner family on which its welfare calculations are based, and the mechanism of business owners' decision to substitute new machinery for labour.¹⁰⁴

It is crucial to ask if the issue of contractors' margins affects wage series from elsewhere in Europe, as in light of the new evidence of wages the 'historical problem' of why technological development happened in Britain in the eighteenth century may re-present itself.¹⁰⁵ Perhaps we simply need to lower our estimate of wages across the board in all cities, which would affect our understanding of welfare, but not of the importance of relative factor prices. Initial research suggests that contracts and employment may not have been entirely the same as in London, and that comparisons will be difficult. For instance, comparisons use 'Amsterdam' wage rates from de Vries and van der Woude's 1997 data for the whole of western Dutch Republic, not just the city.¹⁰⁶ Those data were drawn from ship wharves, rope works, drainage authorities charged with maintaining dykes, and public works bodies of hinterland towns responsible for fabric repairs, not prestigious ecclesiastical projects in the centre of the city.¹⁰⁷ Men received drink and sometimes food on a more regular basis.¹⁰⁸ Amsterdam was still directly employing craftspeople and labourers as late as the 1760s, whereas all works were contracted out a century earlier in England.¹⁰⁹ Further archival research of the type carried out here for London would be needed to understand fully the differences.¹¹⁰

For other cities, sources have similar comparison issues. Malanima has shown that Italian wages have been underestimated.¹¹¹ The Strasbourg wage series is not based on city wages, but comes from a nineteenth-century source which details figures from Mulhouse—a rural area 103 kilometres south of the city.¹¹² Other series for France are higher.¹¹³ The question of whether English monetary

¹⁰² Wallis, 'Labour markets and training', p. 189.

¹⁰³ For a theoretical perspective, see Lewis, 'Economic development'; Mokyr, 'Dear labor'; McCloskey, *Bourgeois dignity*, ch. 22; Humphries, 'Lure of aggregates' esp. pp. 709–10.

¹⁰⁴ Mokyr, *Enlightened economy*, pp. 268–72; see also Humphries, 'Lure of aggregates', pp. 709–10. The factor of cheap coal, of course, remains, notwithstanding that many have made the point that the Dutch could also have accessed the coal, such as McCloskey, *Bourgeois dignity*, ch. 22. See Nef, *Rise of the British coal industry*.

¹⁰⁵ Allen, *British industrial revolution*, p. 1.

¹⁰⁶ de Vries, 'Inquiry'; van der Wee, 'Prices and wages'.

¹⁰⁷ The Amsterdam figures that contributed to it were from Nusteling, *Welvaart en Werkgelegenheid*, pp. 252–4. They are higher than the composite.

¹⁰⁸ de Vries, 'Labor markets'; idem, 'Employer's guide'.

¹⁰⁹ Archief van het Stadsfabriekambt en Stadswerken en Stadsge bouwen, Amsterdam, inventory no. 4.

¹¹⁰ de Vries, 'Inquiry', p. 82, notes that in the first quarter of the eighteenth century Dutch sailors and British sailors out of the two ports were paid the same. See also van Lottum, 'Labour migration'.

¹¹¹ Malanima, 'When did England overtake Italy?'.

¹¹² Hanauer, *Études économiques*.

¹¹³ Global Price and Income History Group, 'Prices, wages and rents'; idem, 'Prices and wages'.

policy inflated silver wage levels has been raised.¹¹⁴ Further work on contract and employment systems is needed. If all wages in all other cities remained unchanged but we used the St Paul's data as a guideline to discount the London series, the cost of labourers in London would only have exceeded those in the western Dutch Republic in the later part of the eighteenth century, when the innovation and invention of mechanized production methods had already begun to be adopted in Britain.¹¹⁵ However, even if English silver wages were a third lower than was previously thought, they were still substantially higher than wages in many European centres, but they no longer stand out against those in Amsterdam, Paris, or Antwerp.

In long-run studies of wages, the effects of organizations and agents or services have not been sufficiently taken into account. In the case of the building industry in England, a failure to understand the contracting system and how it apportioned financial risk on large projects has given a false impression of the relationship between capital and labour in the building industry. This has led to an overstatement of workers' earnings, and thus a distorted view of their welfare and the market for labour, and the incentives for capital investment in the economy as a whole. The wages that men received in the building industry were a product of the bargaining between contractors and institutions and the pricing of risk, more than they were bargaining of men and employers. Given that so many sectors and industries in eighteenth-century London were managed in a system of subcontracts and positions, further research should be directed to understanding the difference between London wage structures and those elsewhere.¹¹⁶

This article has shown that previous series of early modern wages were records of the institutions, business cycles, and bargaining costs in construction trades, and has shown new evidence that received pay for men in the building industry was substantially lower than previously thought. It has also shown that real pay received by workers varied widely by skill level. The findings call for new research on means and levels of earning in other areas of England, and other regions of Europe. If we want to use wages as a measure of output, living standards, or anything else, we must understand the organizations and institutions that paid those wages, as much as we do those who received them.

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¹¹⁴ Mayhew, 'Money in England'.

¹¹⁵ Based on discounting the labourers' silver wage in Allen's series for London by 20%, which is the lowest difference between the rate for labourers at St Paul's (17d.) and the Allen series (22d.) in the period 1700–8. The average difference over the eight years is 29%. As the work done at St Paul's is not directly comparable to the 'Amsterdam' data, it is harder to work out what the craftsmen's discount should be. Even with a 10% discount the difference between London and Amsterdam in silver wage terms is wiped out for most of the eighteenth century. It should be noted that from 1700 Allen's 2001 series uses Schwarz's figures, not Boulton's. Schwarz's figures were lower than Boulton's but his sources seem to have been solely Greenwich Hospital for those years.

¹¹⁶ Pollard, *Genesis of modern management*, pp. 38–9, 47.

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Appendix I

Sources and records of building works used, 1660–1785

<i>Institution/site</i>	<i>Dates</i>	<i>Types of work</i>	<i>Types of records</i>	<i>Where held</i>
St Paul's Cathedral	1660s to 1720s	Extraordinary: rebuilding of cathedral under Christopher Wren	Abstracts of accounts, acquittance books, day and call books, meetings of commission, and minute books	LMA, CLC/313/I/B/003/MSS25473/19-43 CLC/313/I/E/005/MS25485/003,8,9
St James' Garlick Hill, St Paul's	1700–8	Extraordinary: rebuilding of cathedral under Christopher Wren	Private day books of Christopher Kempster, mason contractor	TNA, C 106/145
Greenwich Hospital	1698–1709	Extraordinary: construction of Naval Hospital	Minutes and account abstracts	TNA, ADM 67/2 and 4
Greenwich Hospital		Extraordinary: construction of Naval Hospital	Bill book of Edward Strong, mason contractor	LMA, CLC/B/227/MS00 233
Westminster Abbey	1700–80s	1712–22, extraordinary works to Abbey under direction of Christopher Wren; after 1722, ordinary work	Contractors' bills; Fabric Committee accounts, 1712–22	WAM, 34513, 35417, 35418
Middle Temple	1600–1780s	Ordinary work and modification to chambers and buildings	Treasurers' accounts, abstracts and bills	MTA, ACCVOUBI, MT.2/TUT MT2 / TRB/ No 5. MT2/TOT/3/2 and like
Office of the King's Works (OKW)	1660s–1800	Ordinary and extraordinary	Abstracts, and monthly accounts detailing contractors' bills for all palace sites	TNA, WORK 5/9 to 88
Bridge House	1660s–1800	Ordinary		LMA, CLA/007/FN/04/09-21 CLA/007/FN/03/021-29
Westminster Bridge	1739–44	Extraordinary	Contracts and contractors bills and some abstracts; letter books	TNA, WORKS 5/194,5, 6, 7,8 BL, Add MS27587
City of London various sites	1660s to 1780s	Ordinary and extraordinary		LMA, COL/SJ/09/02, 3, 4, 5, 6, 10. COL/SJ/OF/05/173 COL/SP/05/073

<i>Institution/site</i>	<i>Dates</i>	<i>Types of work</i>	<i>Types of records</i>	<i>Where held</i>
Churchwardens' accounts	1660s to 1750s	Ordinary	Piece rates recorded in wardens' accounts; rare day rates	St Botolph Aldgate, St Clement Danes, Account books, 1690s–1770s sampled online. Tim Hitchcock, Robert Shoemaker, Sharon Howard and Jamie McLaughlin, <i>et al.</i> , <i>London Lives, 1690-1800</i> (www.londonlives.org, version 1.1, 24 April 2012).
City churches	1670s	Extraordinary		LMA, CLC/313/J/018/MS 25541/003,4
Blenheim Estate	1670–1730	Estate	Bills, depositions, HH accounts	BL, Add MS61354
New College, Oxford	1680–1750	Ordinary and extraordinary	Bills	NCOA, vouchers 11367, 11368, 11372

Note: Also consulted: LSE Archive, Beveridge Price History D:3/4/5; E:7b/8/9/10/24a/25; F:1/8/9.