RECONSTRUCTIONS OF THE GLOBE: A RETROSPECTIVE

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I ought not to have suggested in *The Stage of the Globe*, 356, that the first Globe might have been rectangular.[1]

The Globe playhouse occupies special places in the collective conscious and unconscious of Shakespeare studies and – *where id was, there shall ego be* – the Wanamaker reconstruction has brought important theoretical and practical conflicts into the open. The validity of historical methods and pursuit of authenticity have always been contentious issues, but the act of making a physical reconstruction focuses the minds of supporters and objectors in a way that no hypothetical model can. The Wanamaker project can be credited with the achievement of accelerating research into the design and operation of the Globe so that in the last thirty years the body of published work on the subject has more than doubled. Whether or not the reconstructed building itself aids scholarship, the research underlying its claim to authenticity represents a considerable return on the capital outlay.

The first landmark in the scholarly reconstruction of the Globe is E. K. Chambers's *The Elizabethan Stage* which contained his hypothesized plans for the building.[2] All earlier attempts at reconstruction lacked Chambers's compendious knowledge of early modern drama and cultural history. Chambers argued that the movement of playing companies between different playhouses, especially in the period prior to the construction of the Globe, suggests standardization of design[3] and he found few differences between late sixteenth-century plays and early seventeenth-century plays that might be taken to indicate that the Globe or Fortune differed substantially from their predecessors.[4]

Chambers offered no precise defence of his drawing because it was intended to be schematic rather than architectural, and showed neither the dimensions nor the arrangement of structural members. General features, not unrecoverable particularities, were his concern. It is worth noting that Chambers's octagonal playhouse which was supposed to be Globe-like and typical seems dependent upon J. C. Visscher's engraving of 1616 called *Londinium Florentis-s[i]ma Britanniae Urbs*.[5] When Chambers's book was published in 1923 the Visscher engraving was still considered authoritative and of the several pictures which suggest that the Globe had as few as six or eight sides, it enjoyed the highest status. The belief that the Globe was six sided derived from Hester Thrale who, in 1819, recorded having seen its uncovered foundations some fifty years before.[6] Interest in finding corroboration for Thrale's claim has persisted although most scholars disregard her evidence entirely.[7]

[1] E. K. Chambers, *The Elizabethan Stage*, 4 vols. (Oxford, 1923), vol. 2, p. 434n2.
[2] Chambers, *The Elizabethan Stage*, vol. 3, p. 85.
[3] Ibid., p. 50.
[4] Ibid., p. 103–104
[5] R. A. Foakes, *Illustrations of the English Stage 1580–1642* (London, 1985), pp. 18–19.
[6] Chambers, *The Elizabethan Stage*, vol. 2, p. 428.
[7] Martin Clout, 'Hester Thrale and the Globe Theatre', *The New Rambler*, 9 (1993–4), 34–50.

In 1942 John Cranford Adams published his *The Globe Playhouse: Its Design and Equipment* and in 1950 Adams and Irwin Smith completed a beautiful scale model of the First Globe which was immediately incorporated into a public display at the Folger Library in Washington. Following the Visscher engraving, Adams made his Globe octagonal and from the Fortune and Hope construction contracts Adams deduced that the Globe was '84 feet across between outside walls, 34 feet high to the eaves, and 58 feet across the interior yard'.[8] The Fortune contract specified galleries 12 feet 6 inches deep[9] and Adams assumed that this included 6 inches for the outer wall, so the real centre-to-centre spacing of the posts was 12 feet. The Fortune would have been constructed from regularly shaped units, Adams reasoned, and the simplest arrangement would have been to repeat the 12 feet square bays that formed the corners of the auditorium. Six and a half such bays form a structure 78 feet between centres or 80 feet once the thickness of posts and exterior covering is added.[10] The width of the enclosed yard would be that of four and a half bays, 54 feet between centres, or 55 feet to the furthest edges of the posts. Finding that his arrangements led so easily to the 55 feet and 80 feet specifications of the Fortune contract convinced Adams that he had hit upon the groundplan.

What if the Globe also used 12 feet square bay units? Two such bays could form each of the eight sides of the playhouse. Adams calculated – wrongly, as it happened – that this would give the Globe an external diameter of 84 feet including the six inches of outer covering at either end;[11] the true figure was 83 feet. Adams constructed his Globe's stage from a line connecting 'the middle post of one sector across to the middle post of the next sector but one'[12] which gave a width of 43 feet. The Fortune's stage was 43 feet wide and Adams thought this correspondence could not be coincidence – he must have hit upon the groundplan of the Globe.[13]

Unfortunately, Adams's calculation of the width of his stage was also wrong. The correct figure is the width of one side of the playhouse yard, 24 feet, plus the width of the bases of two right-angled isosceles triangles whose hypotenuses are half the width of one side of the playhouse yard, which comes to very nearly 41 feet. A discrepancy of almost 2 feet – over $4\frac{1}{2}$ per cent – is gross enough to invalidate his postulated correspondence with the Fortune contract and, since this correspondence validated all the assumptions which led to it, the entire reconstruction must be discounted as pure speculation.

Adams spotted the fatal error in his calculations and in 1943 he published a revised text of the book with the offending calculations emended. Although a note was added acknowledging the error,[14] libraries frequently catalogue the 1942 and 1943 printings as a single first edition. Adams excised his insistence that the correspondence between the Fortune stage and his Globe's stage validated the method, but put nothing in its place to substantiate his claim to have discovered the precise dimensions of the Globe. However, it was not the mathematics in Adams's book that drew fire from scholars of original staging, but rather the interior features and facilities of his Globe.

Adams's Globe had a total of six main stage traps and a large recessed alcove discovery space. Suspended above this playing space was a second stage which was fronted with a balustraded balcony ('tarras') and which had another, smaller, recessed alcove discovery space at its rear. At either side of this balcony, and at 45 degrees to it, was a glazed bay

[8] John Cranford Adams, *The Globe Playhouse: Its Design and Equipment* (Cambridge, Mass., 1942), p. 3.
[9] Ibid., pp. 20–1.
[10] Ibid., p. 21.
[11] Ibid., p. 21.
[12] Ibid., pp. 22, 90.
[13] Ibid., p. 22.
[14] Ibid., 2nd printing with corrections (Cambridge, Mass., 1943), p. 90.

window which overhung a correspondingly angled stage door on the platform stage. Extending from the top of the tiring house, and connected to it at the eaves, was a 'heavens' covering the entire stage. At the height of the third auditorium gallery the tiring house had a music room. The upper stage (at the same height as the second auditorium gallery) had a trap door set in its floor which provided communication with the main stage.

Adams's Globe was rich in features to assist theatrical spectacle and to provide a physical referent for almost every scenic structure mentioned in Renaissance drama. If a scene required a 'corner' to hide around, or a 'balcony' from which to be wooed or to be thrown, Adams's Globe could offer a realistic analogue. Supporting his design with dramatic quotations, Adams cared not which playhouse a particular play was written for: the Globe was the finest playhouse and so it must have incorporated at least the major features of all the others.

The history of the scholarship of Globe reconstruction in the fifty years since its publication can broadly be characterized as one of reaction to, and refutation of, Adams's book. Adams shared Chambers's conviction that the playhouses were largely alike and he used a wide range of play texts as evidence for the staging needs which any playhouse might have to satisfy. But as a necessary consequence of this method one is able to reconstruct only an idealized 'typical' playhouse, not any particular playhouse. Chambers implicitly accepted this principle. Adams implicitly rejected it and produced highly detailed plans of the Globe which he misrepresented as reliable scholarly deduction.

Adams's aesthetic judgements were challenged by those who felt that he showed little appreciation of theatrical convention which, contrary to his assumption, would allow a scene set indoors to be played on the front of a thrust stage. But with the mathematical error glossed over, the first part of Adams's Globe to collapse was the octagonal outer wall. In the first volume of *Shakespeare Survey*, I. A. Shapiro proved that Visscher's engraving was derived from the panorama in John Norden's *Civitas Londini* and was therefore entirely without authority.[15] After considering several other pictures and rejecting their authority, Shapiro concluded that the Hollar engraving of 1647[16] was the most reliable view of the Bankside playhouses. In Hollar's picture the Globe and the Hope appear to be round. A different approach was needed to demolish Adams's interior arrangements.

Before publishing his major work on Elizabethan playhouse design, *The Globe Restored*, C. Walter Hodges published two articles concerning the De Witt drawing of the Swan. In the first Hodges insisted that De Witt showed that the Swan was a polygon with sufficient number of sides that it was virtually round ('This to my mind rules out the notion of an octagonal building in favour of, say, a sixteen-sided polygon') and that the 'inner stage' 'was neither a permanent nor an indispensable part of Elizabethan public stage practice'.[17] The following year Hodges published an article with Richard Southern which argued that De Witt's Swan was essentially a Renaissance rather than a Tudor design. In particular the stage posts being, as De Witt stated, painted to resemble marble, their ornate bases and capitals, and their entasis, all point to classical and continental influence upon the indigenous building tradition.[18] Students of Elizabethan playhouse design can be assigned places along a spectrum of 'faith in De Witt' and the reaction to Adams's Globe was a collective move towards the 'greater faith' end

[15] I. A. Shapiro, 'The Bankside Theatres: Early Engravings', *Shakespeare Survey 1* (1948), 25–37.
[16] Foakes, *Illustrations of the English Stage 1580–1642*, pp. 29–31, 36–38.
[17] C. Walter Hodges, 'De Witt again', *Theatre Notebook*, 5 (1951), 32–4, p. 34.
[18] Richard Southern and C. Walter Hodges, 'Colour in the Elizabethan Theatre', *Theatre Notebook*, 6 (1952), 57–60.

of this spectrum. The work of Hodges and Southern helped by showing that the sketch does not necessarily contradict anti-theatrical denunciations of playhouse opulence.

Despite its title, Hodges's *The Globe Restored* contained no representation of the first Globe. Instead Hodges offered a typical playhouse of 1595 and the second Globe of 1614[19] for which Hodges had the authority of the Hollar engraving, validated by Shapiro. Hodges's decision not to reconstruct the first Globe appears to have been a reaction to Adams's over-confidence which went 'far beyond the warrant of evidence'.[20] Hodges attempted to reconcile the De Witt drawing with the needs of the plays and with George Kernodle's work on baroque decoration.[21] Hodges's 'typical playhouse' of 1595 added no major features not present in De Witt. To provide a larger upper stage as well as a discovery space Hodges conjectured the use of a stage booth.[22] Hodges rejected the staging principles of Adams's book and with them the need for a permanent upper stage.

In the same vein as Hodges, A. M. Nagler offered a thorough critique of Adams's Globe as an inappropriate venue for the drama. Nagler considered the only reliable evidence to be 'the stage directions in the quartos and the First Folio of Shakespeare's plays' and the documents of Platter and Henslowe[23] and he poured scorn on Adams's theory that many scenes were played on an inner stage and on a large upper stage. Nagler argued for acceptance of the evidence of the De Witt drawing, which shows a flat wall, and for discoveries and concealments achieved using a portable booth.[24] Instead of Adams's large upper stage Nagler, like Hodges, offered the stage balcony shown by De Witt, augmented at need by the solid upper surface of a stage booth placed against the back wall.[25]

Adams's large upper stage had practical drawbacks too. Warren D. Smith noted that it caused a problem in Adams's reconstruction of the original staging of Shakespeare's *King Lear*.[26] The Folio text has a stage direction for Edgar to come out from his hiding place immediately before Edmund's call 'Brother, a word, discend',[27] which Adams was forced to move down three lines to give Edgar time to descend from the upper stage.[28] Smith argued instead for a booth-like scaffolding serving for 'aloft' scenes. George F. Reynolds concurred and blamed Adams's errors on his misguided convictions about naturalistic staging.[29]

The attack on Adams was sustained in three articles by Richard Hosley.[30] One demolished Adams's upper stage by showing that Shakespeare's use of a raised playing space was less frequent than Adams claimed and that it usually involved engagement with the main stage (for example a conversation or an observation) which kept the players near to the balustraded front of the 'aloft' space. The De Witt drawing of the Swan shows an upper playing space

[19] C. Walter Hodges, *The Globe Restored: A Study of the Elizabethan Theatre* (London, 1953), pp. 174, 177.
[20] Ibid., p. 53.
[21] George R. Kernodle, *From Art to Theatre: Form and Convention in the Renaissance* (Chicago, 1944), pp. 130–53.
[22] Hodges, *The Globe Restored: A Study of the Elizabethan Theatre*, pp. 56–60.
[23] A. M. Nagler, *Shakespeare's Stage* (New Haven, 1958), p. 19.
[24] Ibid., pp. 26–32.
[25] Ibid., pp. 47–51.
[26] Warren D. Smith, 'Evidence of Scaffolding on Shakespeare's Stage', *Review of English Studies*, 2 (1951), 22–9, p. 24.
[27] William Shakespeare, *The Norton Facsimile of The First Folio of Shakespeare*, ed. Charlton Hinman (New York, 1968), TLN 948–9.
[28] John Cranford Adams, 'The Original Staging of *King Lear*', in *Joseph Quincy Adams Memorial Studies*, ed. James G. McManaway, Giles E. Dawson and Edwin E. Willoughby (Washington, 1948), pp. 315–35, p. 319.
[29] George F. Reynolds, 'Was There a "Tarras" in Shakespeare's Globe?', *Shakespeare Survey 4* (1951), 97–100.
[30] Richard Hosley, 'Shakespeare's Use of a Gallery Over the Stage', *Shakespeare Survey 10* (1957), 77–89; Richard Hosley, 'The Discovery-Space in Shakespeare's Globe', *Shakespeare Survey 12* (1959), 35–46; Richard Hosley, 'Was There a Music-Room in Shakespeare's Globe?', *Shakespeare Survey 13* (1960), 113–23.

sufficient, Hosley argued, for the staging needs of all of Shakespeare's plays.[31] In 'The Discovery Space in Shakespeare's Globe' Hosley argued against the inner stage by showing that there is no positive evidence to suggest such a space. The term 'study' appears in the stage directions of a few relevant plays, but Hosley argued that these were 'fictional' stage directions referring to the imagined location and not the playhouse fabric.[32] To establish the body of relevant evidence, Hosley produced a list of thirty plays performed by Shakespeare's company between 1599 and 1608 when their only permanent London venue was the Globe. As George F. Reynolds argued in his work on plays at the Red Bull,[33] if a company had only one playhouse for a certain period of time then any play written for the company during that time ought to assume, and to reflect, the features and practices of that venue. Not least of the problems with this method is its potential for logical circularity: the staging of plays is generally inferred from performance conditions, and here the performance conditions are being inferred from the staging. Nonetheless, most people prefer a method that at least aims to be economical with evidence over one that, Adams-like, makes no distinction between public theatre plays of the 1580s and private theatre plays of the 1610s.

Of the thirty 'Globe plays' claimed by Hosley, twenty-one have no scenes using the discovery space and in the remaining ones the uses are 'few and infrequent', are 'essentially "shows", or disclosures of a player or object invested with some special interest or significance', and 'do not involve any appreciable movement within the discovery-space'.[34] Still, some kind of discovery space is needed and Hosley argued that a discovery 'can be effected without curtains in a tiring-house whose doors open out upon the stage',[35] with perhaps the assistance of a booth-like arrangement of curtains.[36]

In 'Was There a Music-Room in Shakespeare's Globe?' Hosley used his list of Globe plays to show that Adams's third-level music room is contradicted by the evidence of the drama. Most of the Globe plays have stage directions for music, but in only nine of the plays is the location specified. In these nine plays there are a total of seventeen such stage directions and in every case but one the music is described as coming from 'within'. The exception is the direction for 'Musicke of the Hoboyes is vnder the Stage' in *Antony and Cleopatra*.[37] This suggests that there was no elevated music room at the Globe before 1609.

In these three articles Hosley demonstrated by a strict economy of evidence that the De Witt drawing of the Swan shows everything needed to stage all the plays written for the Globe. This was a significant achievement because it placed the subject on what some consider to be the firmest evidential basis available: a contemporary drawing. Later, John B. Gleason provided impressively detailed evidence that we ought to trust the representational skills of De Witt and his copyist Van Buchell and should ignore John Dover Wilson's obscurely racist dismissal of 'one Dutchman's copy of another Dutchman's sketch'.[38]

If the De Witt Swan is capable of staging all the plays written for the Globe then it, together with the Fortune contract, could form the basis of a Globe reconstruction so long as we assume

[31] Hosley, 'Shakespeare's Use of a Gallery Over the Stage'.
[32] Hosley, 'The Discovery-Space in Shakespeare's Globe', p. 35.
[33] George F. Reynolds, *The Staging of Elizabethan Plays at the Red Bull Theater 1605–1625*, MLA General Series, 9 (New York, 1940), pp. 1–29.
[34] Hosley, 'The Discovery-Space in Shakespeare's Globe', pp. 44–5.
[35] Ibid., p. 41.
[36] Ibid., pp. 42–3.
[37] Shakespeare, *The Norton Facsimile of The First Folio of Shakespeare*, TLN 2482; Hosley, 'Was There a Music-Room in Shakespeare's Globe?', p. 118.
[38] John B. Gleason, 'The Dutch Humanist Origins of the De Witt Drawing of the Swan Theatre', *Shakespeare Quarterly*, 32 (1981), 324–38, p. 329.

that the outdoor playhouses of London were essentially alike. Two articles published in *Shakespeare Survey 12* (1959) indicated the range of opinion about the homogeneity of the playhouses. W. F. Rothwell argued that playing conditions were far from standardized and that, at least until 1598, players were required to adapt to the exigencies of a variety of venues.[39] Conditions at court were unlike the conditions on tour – it was 'an era of change and experimentations in matters dramatic and theatrical' – and hence standardization of playhouse design is unlikely.[40] By Rothwell's reasoning the De Witt drawing of the Swan and the Fortune contract are good evidence for the Swan and the Fortune, but not for any other playhouses.

Taking the opposite view about typicality, Richard Southern attempted to adjust the dimensions given in the Fortune contract to make them practicable for a 'round' playhouse with reasonable sight-lines.[41] Because Hollar shows what appears to be a smoothly rounded exterior to the Globe, Southern's model had a sixteen-sided polygonal frame which, from a distance, would look almost circular. Southern's stage cover, stage posts, and *frons scenae* were derived from the De Witt drawing of the Swan with the exception of a small discovery space between the stage doors. This was justified, quite ingeniously, by supposing that on the day De Witt happened to attend the theatre the back-wall curtain was never parted and so the visitor 'supposed it a mere decorative hanging against a solid wall'.[42] Southern's reconstruction used the 80 feet width and the gallery heights of the Fortune contract, displaying precisely the confidence about transference of dimensions from one playhouse to another that Rothwell sought to discredit.

In 1975 Hosley published an extended essay which represented his work on the Globe in the form of a single hypothetical model, and it was the first full reconstruction to be published since Adams's assistant, Irwin Smith, had pointlessly re-iterated their discredited arguments.[43] Having shown that the De Witt Swan has everything necessary to stage the Globe plays, Hosley based his model upon this sketch plus two additions: a trap and a flight machine.[44] From a revised list of twenty-nine Globe plays – one less than before because *A Warning for Fair Women* was inexplicably dropped – Hosley inferred the Globe's fixtures and fittings.[45] Although three stage doors would be convenient for some scenes, Hosley concluded that two would suffice for all the plays. The need for a discovery space of at least 14 square feet could be supplied by one of the stage doors and an arrangement of curtains. The need for an 'aloft' playing space of at least 14 square feet could be satisfied by one or more of the 'boxes' in the gallery over the stage shown by De Witt. There was no need for the music room to be visible or elevated, and hence none is shown by De Witt.

Hosley defended his addition of a trap – De Witt shows none – by reference to four 'Globe plays'. In *A Larum for London* there is a 'vault' into which a character is pushed and then is stoned,[46] and in the graveyard scene in Shakespeare's *Hamlet* a trap seems the logical way to provide a grave into which may descend Ophelia, followed shortly by Laertes and possibly Hamlet.[47] In Shakespeare's *Macbeth*

[39] W. F. Rothwell, 'Was There a Typical Elizabethan Stage?', *Shakespeare Survey 12* (1959), 15–21.
[40] Ibid., p. 20.
[41] Richard Southern, 'On Reconstructing a Practicable Elizabethan Public Playhouse', *Shakespeare Survey 12* (1959), 22–34.
[42] Ibid., p. 32.
[43] Irwin Smith, *Shakespeare's Globe Playhouse: A Modern Reconstruction in Text and Scale Drawings*, Introd. James G. McManaway (New York, 1956).
[44] Richard Hosley, 'The Playhouses', in *The Revels History of Drama in English*, ed. Clifford Leech and T. W. Craik (London, 1975), vol. 3: 1576–1613, pp. 119–235, pp. 165, 172.
[45] Hosley, 'The Playhouses', pp. 182–95.
[46] *A Larum for London, or the Siedge of Antwerpe* (London, 1602), E4v–F1r.
[47] S. P. Zitner, 'Four Feet in the Grave: Some Stage Directions in *Hamlet*, v. i', *Text: Transactions of the Society for Textual Scholarship*, 2 (1985), 139–48.

apparitions must rise and fall and likewise in Barnes's *The Devil's Charter* devils 'ascend' and 'discend'.[48] Hosley's trap was a simple horizontally mounted door, but one of Barnes's devils appears to need assistance in rising: 'Fiery exhalations lightning thunder ascend a King, with a red face crowned imperiall riding upon a Lyon, or dragon'.[49] The player's legs must be visible upon the lion/dragon for him to be riding it, so walking up steps would be difficult. Perhaps the lion property was fitted with false human legs so that the player's legs could manage the ascent, although the effect might be considerably more comic than seems appropriate. This evidence seems to imply an elevator mechanism underneath the Globe's stage-floor trap, although Hosley made no mention of it. In his handbook for Italian theatre architects, published in 1638, Nicola Sabbattini claimed to have managed ascent using four strong-armed men lifting a platform by brute force, and, on another occasion, by arranging a see-saw under the stage with one end supporting the platform which rose into the trap.[50] John Astington considered these methods impractical and concluded that the existing technology of elevator machines would have an obvious application in the understage area of a playhouse.[51]

In support of the existence of a flight machine at the Globe, Hosley cited the torturing of the English Factor by strappado and hanging in *A Larum for London*.[52] Since the torture takes place in a street scene it is difficult to understand Hosley's insistence that a rope descended from the stage superstructure. When flight machinery is used for the descent of supernatural characters the rope is the means to a theatrical end and can be ignored by the spectators. In a scene of public torture, however, the rope exists in the world of the play and may be carried on stage by the torturers. Throwing the rope around the balustrades of the stage balcony seems more natural than Hosley's method which brings an undesirable suggestion of supernatural assistance. The only other use of 'suspension gear' in the Globe plays offered by Hosley was the raising of Antony to the top of Cleopatra's monument in Shakespeare's *Antony and Cleopatra* for which Hosley summarized an argument made at length elsewhere.[53] As with the 'suspension' of the English Factor in *A Larum for London*, the raising of Antony is a feat achieved within the world of the play, so the assistance of a flight machine seems unnecessary.

The evidence does not support Hosley's flight machine, so its inclusion makes him as guilty as Adams of scholarly wish-fulfilment. Indeed, we might wonder if Hosley's odd terminology ('suspension equipment') betrays his realization that no Globe play uses flying. Rigorous application of Hosley's minimalist method which takes the De Witt drawing as the highest authority on the design of Elizabethan playhouses has the inevitable consequence of producing a Globe which is functionally identical to the Swan.

Glynne Wickham posited a radical disjunction between the Swan depicted by De Witt and all later playhouses. Wickham argued that the origins of the playhouses lay in multi-purpose arenas in which 'play' meant a range of entertainments including animal torture and formalized combat.[54] Drama moved out of

[48] Barnabe Barnes, *The Divils Charter; a Tragaedie Conteining the Life and Death of Pope Alexander the Sixt* (London, 1607), A2v.

[49] Ibid., G1v.

[50] Barnard Hewitt, ed., *The Renaissance Stage: Documents of Serlio, Sabbattini and Furttenbach*, trans. Allardyce Nicoll, John H. McDowell, and George R. Kernodle, Books of the Theatre, I (Coral Gables, FLA, 1958), pp. 123–4, 177.

[51] John H. Astington, 'Counterweights in Elizabethan Stage Machinery', *Theatre Notebook*, 41 (1987), 18–24.

[52] *A Larum for London, or the Siedge of Antwerpe*, D4r-D4v, E4r-E4v.

[53] Hosley, 'The Playhouses', pp. 192–3; Richard Hosley, 'The Staging of the Monument Scenes in *Antony and Cleopatra*', *Library Chronicle*, 30 (1964), 62–71.

[54] Glynne Wickham, *Early English Stages 1300 to 1660*, 3 vols. (London, 1963), vol. 2: 1576 to 1660, Part 1, pp. 153–72.

doors and into these arenas in the second half of the sixteenth century, but the structures retained their multi-use capabilities.[55] The privy council order of 1597 which suppressed playing was intended to put the theatrical companies on a new footing: to serve the monarch.[56] We cannot rely on the De Witt drawing of the Swan for information about the Globe because, Wickham reasoned, the 'new deal' made court performance the aim of public playing and so court conditions became the new template for the public theatres.[57]

The foregoing is, very roughly, where scholarship of Globe reconstruction stood at the commencement of the Wanamaker project. Nothing was achieved by the Wanamaker project during the 1970s, but in 1982 the International Shakespeare Globe Centre (ISGC) Trust was formed and Andrew Gurr and John Orrell became formally responsible for the practical scholarship upon which the reconstruction would be based.[58]

Orrell's first published article on the Globe was concerned with the construction practices of its builder, Peter Street.[59] Orrell argued that since Street was illiterate (he signed the Fortune contract with just his mark) his work should be considered within the tradition of medieval and Tudor practice rather than continental innovation. Street was a surveyor, not an architect, and the primary tool of his trade was the $16\frac{1}{2}$ feet 'rod' and the 'three-rod line' marked off in rod lengths.[60] Orrell noted that the 43 feet width of the Fortune stage is approximately the altitude of an equilateral triangle whose sides are each 3 rods in length. Equilateral triangles are the basic unit of division used by surveyors because their area is conveniently half the base multiplied by the height. Using just the three-rod line and the well-known technique of *ad quadratum* geometry, Street could have constructed a groundplan for the foundations of the Fortune which would provide the external and internal dimensions of 80 feet and 55 feet as specified in the contract.[61] *Ad quadratum* geometric progression works by inscribing a circle around a given square and then producing a further square from four tangents of this circle. The ratio of the widths of the two squares is $1{:}\sqrt{2}$. The ratio of the areas of the two squares is 1:2, and this is the ratio of the two squares (one 56 feet 1 inch square, the other 79 feet 2 inches square) which formed the yard and outer wall of the Fortune, once the thicknesses of the wall posts had been allowed for.[62] Like Adams before him, Orrell thought he had found a numerical correspondence which was unlikely to be coincidental, and hence *ad quadratum* was Street's working method.

Because the second Globe was built on the same foundation as the first it must have shared the same groundplan. This allowed Orrell to deduce the size of the first Globe from the preliminary sketch made by Hollar for his 'Long View' of London which shows the second Globe and which is apparently free of the artistic distortions fashionable in the period. The sketch shows a Globe whose overall diameter is 1.397 times that of its yard, if we assume that the upper galleries did not project over the lower ones and hence that the inner circuit of the roof is directly above the yard wall. Orrell thought 1:1.397 close enough to $1{:}\sqrt{2}$ to prove his point about *ad quadratum* construction. Orrell noted that the Hope contract specifies its first gallery as 12 feet high, and that since this is the same as the first gallery at the Fortune, it is reasonable to suppose that the other galleries at the Hope followed those of the Fortune, making the Hope 34 feet high to the plates. In Hollar's sketch the Globe is drawn exactly the same height as the Hope

[55] Ibid., pp. 299–323.
[56] Ibid., Part II, pp. 9–29.
[57] Ibid., pp. 29–30.
[58] Barry Day, *This Wooden 'O': Shakespeare's Globe Reborn* (London, 1996), pp. 82–5.
[59] John Orrell, 'Peter Street at the Fortune and the Globe', *Shakespeare Survey 33* (1980), 139–51.
[60] Ibid., pp. 140–1.
[61] Ibid., pp. 143–4.
[62] Ibid., p. 146.

despite being nearer to the vantage point, and hence it must have been a little shorter. From this approximation of the height of the Globe Orrell got the approximate scale of the drawing, and calculated the width to be 100 feet. This yields a centre-to-centre diameter between opposite main posts of 99 feet. The *ad quadratum* principle would give a yard of 70 feet between centres and a stage 49 feet 6 inches wide, which is exactly the length of Street's three-rod line.[63] Again, coincidence seemed an unlikely source of this correspondence.

At a symposium held at Wayne State University in Detroit to discuss physical reconstruction of the second Globe, Orrell revealed an entirely new way to read the Hollar sketch based upon the hunch that Hollar used a drawing frame which yielded almost photographic accuracy.[64] The proper test of this hypothesis required that Orrell locate at least four landmarks whose real-world intervals at the vantage point, St Saviour's church, were in the same ratio as their intervals in the sketch. In the event Orrell was able to line up five landmarks in this way and he emphasized that this indicated an accuracy far beyond the reach of artistic judgement: Hollar *must* have been using an instrument.[65] Moreover, only at a certain angle relative to north – the angle towards which Hollar's instrument pointed – would these particular intervals occur, and so Orrell's method revealed the exact orientation of the instrument. The distance from each landmark to St Saviour's church is known, so the rule of 'similar triangles' told Orrell just how large a given object in the scene would have been to produce the image of itself in the sketch. After an allowance for anamorphosis – a distortion unique to circular objects – Hollar's sketch tells us that the Hope was 99.29 feet wide and the Globe was 103.35 feet wide.[66] This figure was a little too high to reconcile with his theory about *ad quadratum* layout and the three-rod line, but when the work appeared in book form, Orrell had revised the figure down to 102.35 feet – ±2 per cent – helped by the realization that the sketch is a little wider than he had thought.[67] Now Orrell could say that the Globe and the Hope were probably the same diameter of 'a few inches over a round 100 ft'[68] and that the 'inveterate sightseer' Hollar drew them the same size, despite the Hope being further away, because he wanted to show that they were alike in size.[69]

Knowing the exact angle of Hollar's drawing frame, Orrell was able to deduce that the clearly visible stage-cover fascia board, and hence the Globe stage, faced 48.25 degrees east of north, which is very nearly the bearing on which the sun would have risen at midsummer in Southwark.[70] Whether by design or chance, in the middle of the afternoon the stage would be entirely shaded. With the size, shape, and orientation of the second Globe firmly established, the data were available to design a reconstruction of the first Globe.

Throughout the detailed planning and construction of the Wanamaker Globe, Orrell's arguments held sway despite objections to the size of the building and to the design of the stage cover. Orrell argued that the short cover extending from a chordally ridged stage 'house' shown by De Witt was not copied at the 1599 Globe, which instead had a radially ridged cover projecting from the auditorium roof to the middle of the yard.[71] The first storey of the reconstructed auditorium had to be made at

[63] Ibid., p. 150.
[64] John Orrell, 'Wenceslaus Hollar and the Size of the Globe Theatre', in *The Third Globe: Symposium for the Reconstruction of the Third Globe Playhouse, Wayne State University, 1979*, ed. C. Walter Hodges, S. Schoenbaum and Leonard Leone (Detroit, 1981), pp. 108–16.
[65] Ibid., pp. 110–1.
[66] Ibid., p. 116.
[67] Ibid., 116n9; John Orrell, *The Quest for Shakespeare's Globe* (Cambridge, 1983), pp. 89, 102.
[68] Ibid., p. 104.
[69] Ibid., p. 106.
[70] Ibid., pp. 154–7.
[71] John Orrell, 'The Problems', in *'The Shape of the Globe': Report on the Seminar Held at Pentagram Ltd London By ISGC on 29 March 1983*, ed. Andrew Gurr, John Orrell

least twice the height of a person to make room for an entrance tunnel to the yard and a walkway around the back of the lowest gallery, so the Fortune's 13 feet allowance for the lower storey would not do for modern-sized people.[72] Assuming that we are 10 per cent bigger than the Elizabethans pushed the height of the Globe reconstruction to $36\frac{1}{2}$ feet to the plates, which is 2 feet 6 inches taller than the Fortune and considerably taller than Orrell's approximated measurement from the Hollar sketch.[73] This was the first numerical choice which deviated from the known facts of playhouse design in order to meet modern needs and it marks the moment when mere recovery of historical fact became inadequate to the task in hand.

Two stage posts were to support the stage cover and to be placed far enough forward and far enough apart 'to afford clear views of the tiring house doors'. A useful rejoinder to this comment would have been 'from where?', since the positioning of the posts caused controversy later. Specifying its differences from the Globe, the Fortune contract called for pilastered columns, so the stage posts at the Globe would instead be turned and, to keep them slender, proportioned in the Corinthian order.[74] At this first seminar John Ronayne argued that the interior decoration of the Globe must have been something between 'the English tradition of the ornamented facade, low relief decorating flat surfaces, and the innovation of classical sculptural principles'.[75] Ronayne pointed out that in exterior views the Globe appears white with stone walls, although it must have been timber-framed. The Fortune contract specifies 'all the saide fframe and the Stairecases thereof to be sufficyently enclosed wthoute wth lathe lyme & haire',[76] and Ronayne remarked that for the Globe 'a magpie black and white half-timbering is not acceptable'.[77] Because De Witt praised the sumptuousness of playhouses his apparently stark sketch cannot alone determine the interior of the Globe, and Ronayne offered contemporary examples of lavish decoration which might be copied. As well as marbelization effects on the columns and false painted balustrading on the gallery fronts, the *frons* ought not to be considered a visually neutral surface serving only an acoustic function, but should be 'the centrepiece appropriate to a house of fantasy, imagination and illusion'.[78] The project had moved a long way from Hosley's minimalistic approach to reconstruction as articulated in his 1975 paper.

The Wanamaker project was set to proceed with a design based on Orrell's findings when two archaeological discoveries provided a wealth of new evidence to be absorbed. In early February 1989 the foundations of the Rose were unearthed and non-destructively excavated.[79] These foundations showed both the original configuration of the building and the result of the extensive alterations made in 1592, known from the expenses recorded by Henslowe.[80] Upon first glance the remains of the Rose controverted the most basic assumption about playhouse design: the groundplans of both phases were irregular polygons, and so

and John Ronayne, The Renaissance Drama Newsletter Supplements, 1 (Coventry, 1983), pp. 4–11, p. 10.

[72] Ibid., p. 5.

[73] Andrew Gurr, 'The Conclusions', in *'The Shape of the Globe': Report on the Seminar Held at Pentagram Ltd London By ISGC on 29 March 1983*, ed. Andrew Gurr, John Orrell and John Ronayne, The Renaissance Drama Newsletter Supplements, 1 (Coventry, 1983), pp. 14–21, p. 14.

[74] Ibid., p. 16.

[75] John Ronayne, 'Style', in *'The Shape of the Globe': Report on the Seminar Held at Pentagram Ltd London By ISGC on 29 March 1983*, ed. Andrew Gurr, John Orrell and John Ronayne, The Renaissance Drama Newsletter Supplements, 1 (Coventry, 1983), pp. 22–4, p. 22.

[76] R. A. Foakes and R. T. Rickert, eds., *Henslowe's Diary, Edited with Supplementary Material, Introduction and Notes* (Cambridge, 1961), p. 308.

[77] Ronayne, 'Style', p. 23.

[78] Ibid., p. 24.

[79] Day, *This Wooden 'O': Shakespeare's Globe Reborn*, pp. 192–201.

[80] Foakes & Rickert, eds., *Henslowe's Diary, Edited with Supplementary Material, Introduction and Notes*, pp. 9–13.