THE DISCOVERY OF BASTION 4A IN THE CITY OF LONDON AND ITS IMPLICATIONS

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From September 1979 until March 1980 the Department of Urban Archaeology carried out excavations at 8-10 Crosswall, E.C.3 (TQ3366 8056), a site situated immediately outside the city wall between Aldgate and the Tower. Part of the western boundary of the site was known to have followed the course of the Roman city wall: in 1906, during building operations on an adjacent site, a 12m (40ft) length of its internal face was discovered and in part was subsequently preserved in the new building ('Roman Wall House', 1 Crutched Friars).[1] At Crosswall, the external face of this stretch was found incorporated within the basement wall of a 19-century warehouse, concealed by a whitewashed mortar surface. A 9m (30ft) length of the Roman wall standing 3m (10ft) high above the plinth had been re-used. The associated V-shaped ditch discovered during excavation was 2m (6ft 6in) deep and some 4.8m (15ft 9in) wide, leaving a berm of about 2.7m (8ft 9in).

At the north end of this stretch of the Roman wall the foundation of a previously unrecorded bastion—designated 4A[2]—was discovered (Pl.1). It was rectangular in shape, 6.7m (22ft) wide and projected 5.4m (17ft 9in) from the wall. The whole depth of the foundation was recorded and it had apparently been carefully constructed (Fig.1). A trench had been dug from the contemporaneous ground surface, presumably at the level of the plinth, but the foundation was only constructed within the natural gravel which commenced some 0.4m (1ft 3in) below the plinth. In addition, since the foundation trench cut through the backfill of the V-shaped ditch, the foundation was stepped down in two stages into the bottom of the ditch to ensure maximum stability. The foundation consisted of ragstone rubble, flints and lumps of chalk and *opus signinum,* set in a layer of gravel or crushed chalk which was capped with rammed chalk. Within the V-shaped ditch this layered method of construction was repeated six times giving a total depth of foundation of 1.45m (4ft 9in). A fragment of worked stone from the foundation bears part of a Roman inscription (Pl.2), and another two survived *in situ* on top of the foundation. Imprints of other large stones at this level suggest that immediately above the foundation the superstructure was solid rather than hollow. The face of the Roman wall alongside the foundation showed no signs that the bastion had been bonded into it. The layers sealing the remains of the bastion contained 13th century pottery and the outer edge of the foundation had apparently been cut away during the digging of a medieval ditch.[3]

Excavations at the south end of the site, in the only other area of single basement, revealed the location of Bastion 4, known to have been nearby from

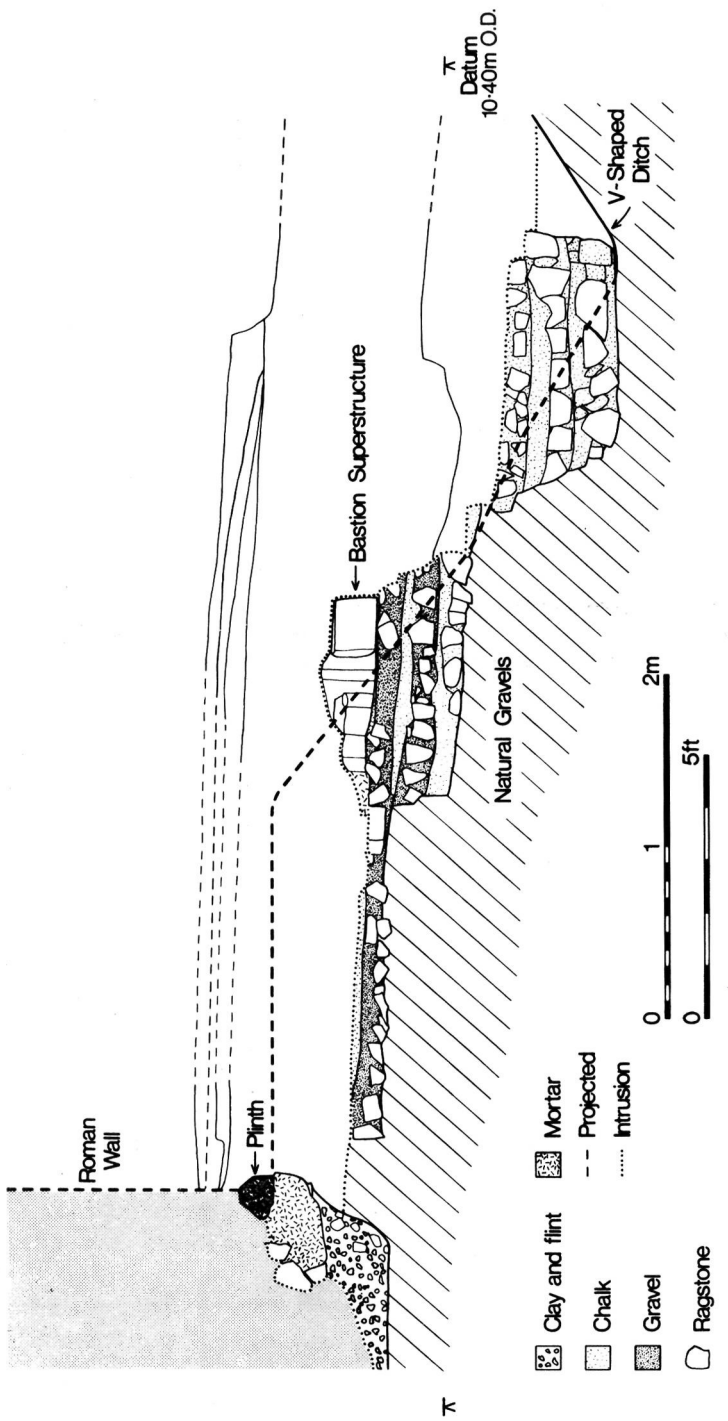

Fig. 1 Bastion 4A: Composite section showing the Roman wall and remains of bastion.

Ogilby and Morgan's survey of 1676.[4] A small part of the foundation survived (Fig.2), which indicated its dimensions—at least 5.6m (18ft 4in) wide and projecting 4.6m (15ft) from the assumed line of the Roman city wall—and its relationship to the V-shaped ditch appeared to be very similar to that of Bastion 4A[5].

DISCUSSION

The bastions in London are all evidently later additions to the Roman city wall, but can be regarded as two groups both geographically and in their method of construction. The eastern group are solid above their foundations (with the exception of B1 and B11) and contain Roman monumental stones re-used as building material. The western group are hollow (except B17) and, as far as is known , did not incorporate stones from Roman monuments. The dating evidence for both groups is limited: the eastern group are considered to be Roman[6] and coin evidence has indicated that one of these (B6) was late Roman and may have been erected *c.* AD 341–375;[7] it is certain that at least B11A of the western group is of medieval date.[8] Between the two groups is a 230m (750ft) stretch of wall along which no bastions are known.

Bastion 4A is not closely dated but, in common with the rest of the eastern group, circumstantial evidence suggests that it is Roman. Its stepped foundation was evidently developed to compensate for the unstable backfill of the V-shaped ditch, implying that the builders were acquainted with that feature.[9] The re-use of Roman monumental stones in the fabric of B4A and the indications that it was solid above its foundation are details particularly associated with the bastions of the eastern group. The possibility that the bastion was medieval is reduced by the evidence of its demolition not later than the 13th century, since the early 13th century is the likeliest date for the construction of the medieval bastions.[10]

In 1965, Ralph Merrifield suggested that in both groups there may have been additional bastions of which no trace or record survives, and that they may originally have been more evenly spaced, though perhaps not completely regularly.[11] The discovery of Bastion 11A in the same year and more recently the identification of a new addition to the eastern group—Bastion 10A—from cartographic and documentary evidence,[12] confirmed the first part of this suggestion. The identification of B10A led to further speculation about the regular spacing of the eastern series and suggested the possibility of an unknown bastion mid-way between B4 and B5.[13] The discovery of B4A in precisely this position calls for a re-examination of the original proposal, which pointed out that the bastions between B9 and Aldgate are quite regulary spaced and that a 'rough module' of about 200ft, if applied to the intervals between the known eastern bastions, might indicate the sites of other, unrecorded, bastions (Fig.3). The excavations at Crosswall, for the first time, made it possible for a measurement to be taken directly between two bastions of the eastern group: the distance separating the foundations of B4 and B4A is 177ft, or from centre to centre 198ft.[14] The measurements from B4 and B4A to the bastions on either side—B3 and B5—are 188ft and 179ft respectively,[15] and the other eastern

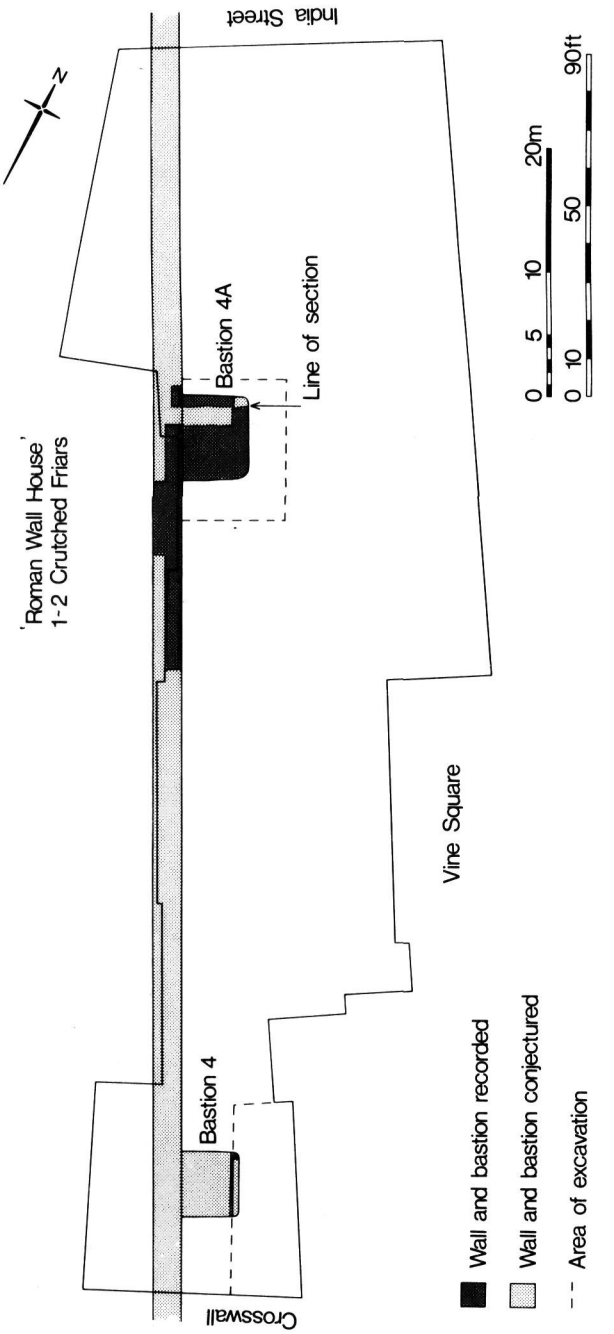

Fig. 2 Bastion 4A: Plan showing location of the Roman wall, Bastion 4 and Bastion 4A.

bastions are consistently separated by intervals or multiples of approximately 180ft (55m) when measuring the shortest distance between them and reckoning an average width of 20ft for a conjectured bastion. Thus from the south-east corner of the Roman city,[16] the distance to B1 is 181ft. Between B1 and B2 there is a gap of 776ft which could have accommmodated three bastions of usual width[17] at intervals of 178ft. However, a gateway or postern may have existed along this stretch of wall,[18] and two rather than three bastions might therefore be more likely. Bastions 2 and 3 are 383ft apart which might represent two intervals of 181ft separated by an unknown bastion. The spacings between B3 and B5 follow the pattern, however, it is at least 215ft from B5 to Aldgate which is markedly greater than the usual interval. The position of B6 has been established at about 180ft north of Aldgate and the same distance divides B6 from B7.[19] According to the original record of its location, B8 is apparently separated from B7 and B9 by intervals of 179ft.[20] Since B9 is 371ft from B10, a bastion occurring mid-way between the two would give spacings of 175ft.[21] From B10 to Bishopsgate there is an interval of about 215ft, an irregularity comparable with that between B5 and Aldgate. However, the suggested location of B10A—the next bastion west of the gate—would produce a more normal interval of about 177ft. Between Bishopsgate and B11 there is a gap of some 580ft which suggests that as well as B10A, there may have been another bastion also located at 177ft from its neighbours.

While the regularity with which the known eastern bastions are separated by intervals or multiples of 180ft is remarkable, the contrasting intervals of about 215ft from B5 to Aldgate and B10 to Bishopsgate also require comment. The wall was effectively divided into lengths relative to the fixed positions of the gates, and this factor must have influenced the planning of the bastions. Since bastions were not positioned equidistantly along each length of wall—ie. from the riverside to Aldgate,and Aldgate to Bishopsgate—their spacing was perhaps based on a unit of measurement determined by the range of the weapons employed.[22] The interval governing the proposed regular spacing on average is equivalent to approximately 186 Roman feet, or from centre to centre 206 Roman feet, neither of which definitely equate with standard units of Roman measurement.[23] This is also true of the distances between regularly spaced bastions elsewhere in Britain, although generally the intervals are significantly shorter.[24] Nevertheless, if the planning of the eastern series in London was based on a unit of measurement, it follows that the siting of the bastions along each length of wall was calculated from east to west thus causing the distance from the westernmost bastion to the adjacent gate to be irregular in both instances. Assuming that the bastions were constructed to provide covering fire along the face of the wall, then 175–215ft would be within the effective range of firepower.

William Fitzstephen, writing before 1183 about the City of London, observed: 'there runs continuously a great wall and high, with seven double gates, and with towers along the North at intervals. On the South, London was once walled and towered in like fashion, but the Thames, that mighty river, teeming with fish, which runs on that side with the sea's ebb and flow, has in

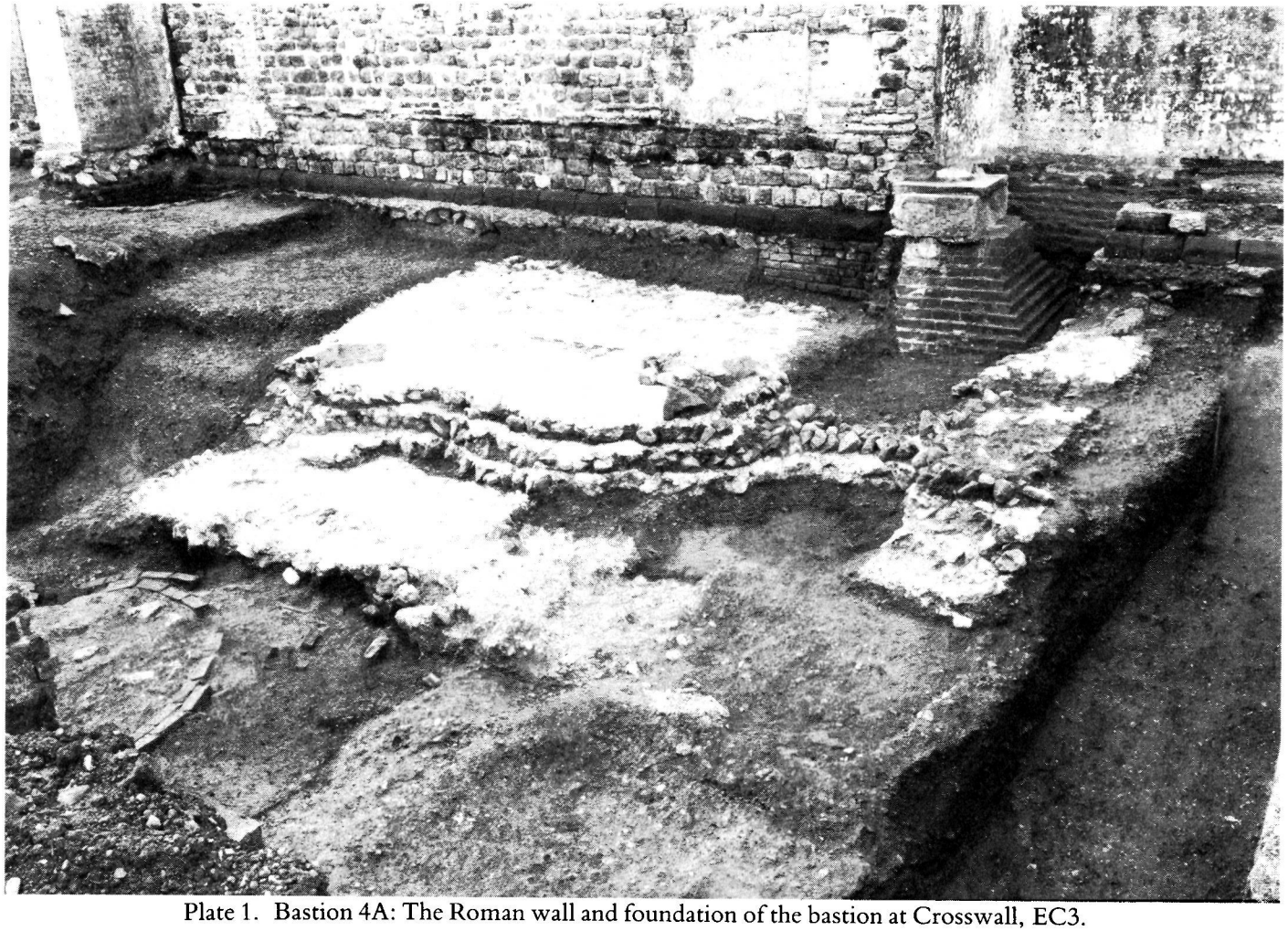

Plate 1. Bastion 4A: The Roman wall and foundation of the bastion at Crosswall, EC3.

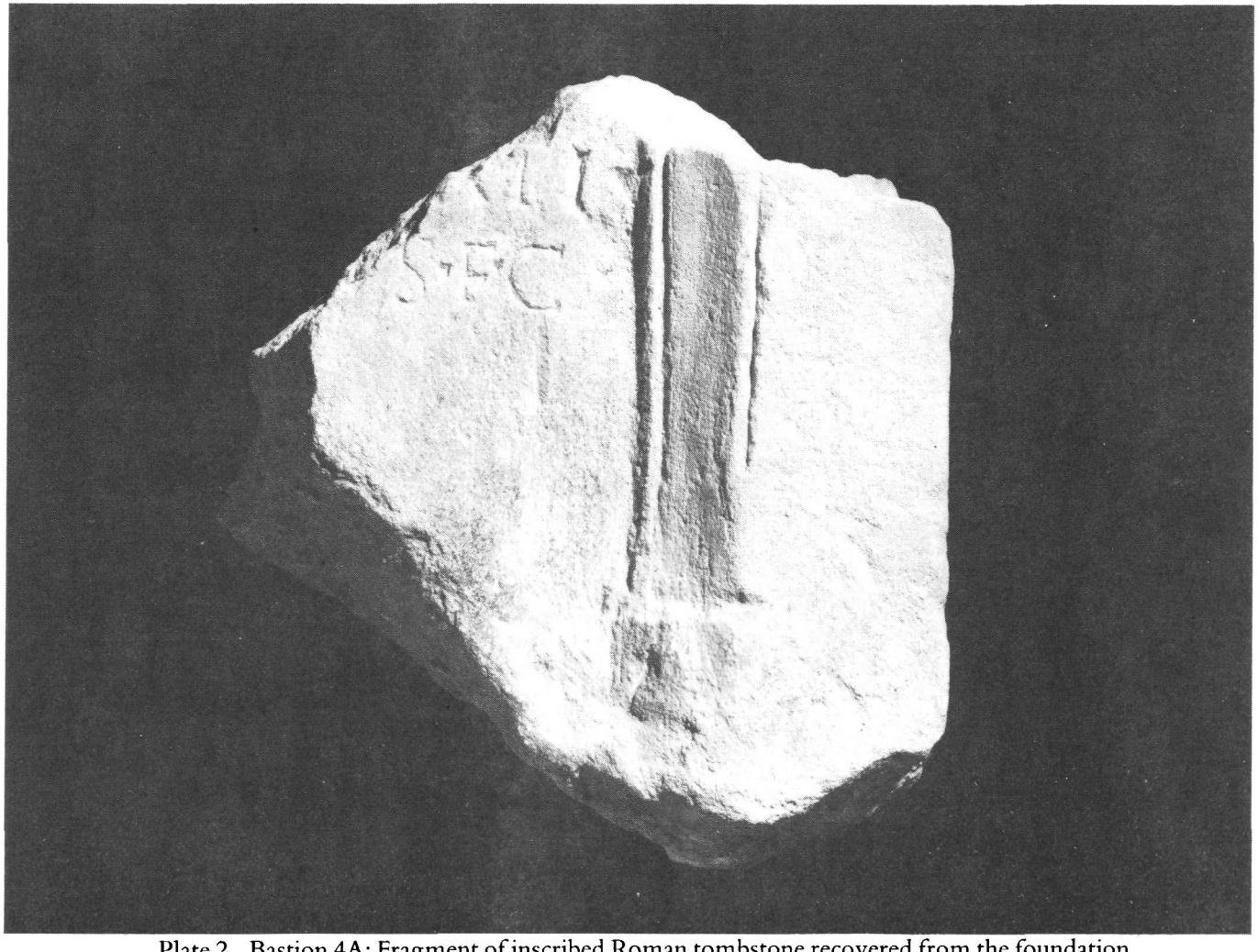

Plate 2. Bastion 4A: Fragment of inscribed Roman tombstone recovered from the foundation of bastion.

the course of time washed away those bulwarks, undermined and cast them down'.[25] His observation that there were 'towers at intervals' is of some importance, especially in consideration of the accuracy of his statement concerning the riverside wall,[26] but there is no indication in the text as to whether the intervals were regular or not. Although Fitzstephen claimed that there were bastions along 'the North'—before the building of the medieval bastions—none have yet been found along the long stretch between B11 and B11A (Fig.3), and it is quite possible that the marshy headwaters of the Walbrook outside the wall at this point rendered the provision of bastions unnecessary.[27] No evidence for specifically Roman bastions has been found on the west side of the City, and although some of the western group appear to be regularly spaced, the intervals are different from those here demonstrated on the east.[28] However, the Roman wall on the west for much of its length followed the top of a ridge which descended steeply down to the River Fleet, providing the western flank with the advantage of a natural barrier.[29] It may be therefore that the Romans had to be content with confining their activites to the east side of the landward wall, erecting bastions where the topography did not afford natural advantages, in an area which was particularly vulnerable to attack by Germanic invaders.[30]

Fitzstephen is unequivocal in his assertion that the riverside wall had also been provided with bastions, 'in like manner' to the landward wall. At the Tower of London, the distance between the Wardrobe Tower (built on the base of B1) and the Lanthorn Tower (which stands over the south-east corner of the

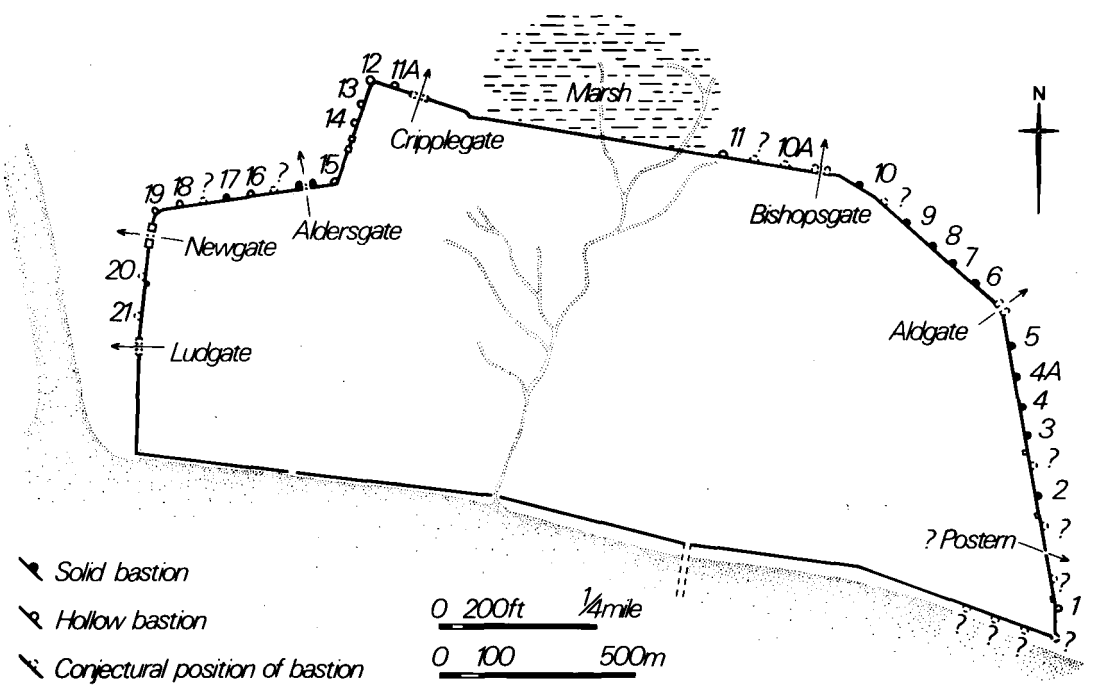

Fig. 3 Bastion 4A: Plan showing the known and predicted locations of bastions in London.

Roman city), is similar to the intervals separating the Lanthorn, Bell, Wakefield and Middle Towers[31] which face the riverside: they are all between 170–185ft apart. On the basis of this observation, it was suggested more than 50 years ago that the early medieval Tower curtain wall had followed the course of a Roman riverside wall, and that the four towers on this alignment were constructed on the foundations of Roman bastions.[32] Recent excavations at the Tower in confirming the former suggestion, allow the possibility that the medieval Lanthorn, Bell, Wakefield and Middle Towers were indeed located on the sites of Roman bastions set at regular intervals—similar to the spacing of the eastern group—along the riverside wall.[33]

CONCLUSION

The discovery of a previously unrecorded bastion, B4A, at Crosswall supports the argument that the bastions on the east side of the city wall were regularly spaced, at intervals of approximately 180ft. An implication of this conclusion is that the eastern bastions are contemporary and belong to a single system of defence. The dating of the eastern group is not secure, but details of construction point to Roman origin and coin evidence has indicated that B6 may have been erected *c.* AD 341–375. The extent to which the western group of bastions may have been part of the same defensive system is uncertain, but historical and topographical evidence suggests there was a related series of bastions along the riverside wall. The case for a major reorganization of London's defences in the late Roman period is argued in detail elsewhere.[34]

ACKNOWLEDGEMENTS

Thanks are due to all those who took part in the Crosswall excavations, in particular, Geoff Egan, Catharine Maloney, Ian Blair and Gillian Hutchinson. Comments made by Hugh Chapman, Tony Dyson and Geoff Egan greatly improved the text. It is a pleasure to acknowledge the outstanding contribution of the developers, European Ferries Ltd., and their architects, Joseph & Partners, to the preservation and eventual display of the Roman wall and bastion.

NOTES

1. P. Norman and F. W. Reader 'Recent Discoveries in connexion with Roman London' *Archaeologia* 60 (1906) 191–6.
2. The bastions were numbered by R. E. M. Wheeler R. C. H. M. *Roman London* (London 1928) 99–106, and this scheme was followed by R. Merrifield *The Roman City of London* (London 1965) 320–5: since the sequence starts at the south-east corner of the city, newly discovered bastions have been assigned the number of the neighbouring bastion nearest the point of origin but differentiated by the addition of 'A'.
3. The fills contained pottery of 13th century date and it is presumably the ditch dug in 1213, H. R. Ward ed. *Annals Monastici* (1866) III 34. However, elsewhere this ditch did not appear to have survived in the vicinity of the city wall due to the digging of another ditch later in the medieval period, J. Maloney and C. Harding 'Dukes Place and Houndsditch: The Medieval Defences' *'London Archaeol* 3 No 13 (1979) 353–4.
4. John Ogilby and William Morgan *A Large and Accurate Map of the City of London* (1676) Sheet 15.
5. A full description and discussion is contained in the Crosswall Archive Report (XWL79) available from the Department of Urban Archaeology, Museum of London.
6. Merrifield *op. cit.* in note 2, 68–72 and 111–3.
7. J. Maloney 'Excavations at Dukes Place: The Roman Defences' *London Archaeol.* 3 No 11 (1979) 297.
8. W. F. Grimes *The Excavation of Roman and Medieval London* (London 1968) 71–8.
9. Bastion 11 was considerd to have been built while the V-shaped ditch was still open, P. Norman and F. W. Reader 'Further Discoveries relating to Roman London, 1906–12' *Archaeologia* 63 (1912) 271–4. But some doubt has been cast on this conclusion, R. Merrifield *Roman London* (London 1969) 126–7.
10. Grimes, *loc. cit.* See also H. L. Turner, *Town Defences* (London 1970) 58.
11. Merrifield *op. cit.* in note 2, 112.

12. J. Schofield with A. J. Clark 'Bastion 10A: A newly identified bastion in the City of London' *Trans. London Middlesex Archaeol. Soc.* 29 (1978) 91–8.
13. Schofield *ibid,* 97.
14. Schofield's proposed module of about 200ft applies to the distance between bastions from centre to centre (pers. comm.): but in this article the measurements refer to the distances actually separating known or postulated bastions—unless otherwise stated—since it is possible that these intervals may be as significant eg 'The distance between the towers are so to be made that one is not further from another than a bowshot. . . .' Vitruvius *De Architectura* (Loeb edition by F. Granger, London 1931) I Ch.5.49.
15. Using the map accompanying Merrifield (*op. cit.* in note 2) it is possible to measure to an accuracy of within 2ft.
16. G. Parnell 'An Earlier Roman Riverside Wall at the Tower of London' *London Archaeol.* 3 No 7 (1978) 171–6.
17. On average 20ft; see B3, B9, B10 and B11 in Merrifield *op. cit.* in note 2, 320–3.
18. Merrifield *ibid.* 101; and consider the eastward projection of the Roman road underneath the east end of Lombard Street, 118–9.
19. Bastion 6 is some 5ft further south-east than plotted on Merrifield's map (see note 15)—its position was checked in 1977, J. Maloney *op. cit* in note 7, Fig.1. For the position of the gate at Aldgate see P. Norman and F. W. Reader *op. cit.* in note 9, 266, and P. Marsden 'Archaeological Finds in the City of London, 1966–8' *Trans. London Middlesex Archaeol. Soc.* 22 (1969) Pt.2 20–26.
20. Merrifield *(ibid.)* appears to place B8 some 20ft too far south-east, as is demonstrated by comparison with the original drawing showing its location (H. Hodge in 1881) and the O.S. map of 1875. I am indebted to Hugh Chapman for bringing the Hodge drawing to my attention.
21. If a bastion did exist between B9 and B10, according to the proposed intervals it would have been on the site of 71 St. Mary Axe, E.C.3—approximately 13m north of the Camomile Street frontage and 7m west of the St. Mary Axe frontage. The building here has only a single basement and this area offers the best possibility of discovering the remains of another unknown bastion, as far as can be determined.
22. It has been assumed that Roman bastions served as platforms for artillery and perhaps the solid construction of the eastern series is indicative of this function, Merrifield *op. cit.* in note 2, 68. However, bastions could also be used to bring more men forward, with archers or slingers providing covering fire along the face of the wall, D. Baatz 'Town Walls and Defensive Weapons' in B. Hobley and J. Maloney eds. *Town Defences of the Roman Empire* (forthcoming).
23. The basic unit of Roman measurement was the foot (pes monetalis), normally equivalent to 11.6in/ 29.57cm (which was used for converting the imperial measurements in the text), O. A. W. Dilke *The Roman Land Surveyors* (Newton Abbot 1971) 82. However, it has recently been pointed out that extant measures of the *pes monetalis* vary as least within the range 29.1–29.7cm, R. P. Duncan-Jones 'Length-units in Roman Town Planning: The Pes Monetalis and the Pes Drusianus' *Britannia* 11 (1980) 127–133. especially note 3. In towns, the foot was commonly used for measuring buildings and distances but land surveyors used the *actus,* a unit of 120 Roman feet. Military surveyors reckoned to a large extent in paces *(passus,* 5 Roman feet) unless acting as land surveyors. It is not known who built the eastern bastions but if supervised by military surveyors the proposed regular spacing is likely to have been based on a unit of 100 feet. In this case the usual interval between bastions (approximately 186 feet) can be discounted but the average distance from centre to centre, 207 feet, has to be condidered. But even if the known distance from B4 to B4A (204 feet) is converted according to equation 29.7cm = 1 Roman foot, the result—203¼ feet—has a rather high margin of error of 1.6% given a target of 200 feet (R. P. Duncan-Jones *loc. cit.*). Although usually associated with land measurement, it has been suggested that the *actus* was the basis on which the 1st–early 2nd century street grid of London was laid out, P. Marsden *Roman London* (London 1980) 47. Moreover, since the bastions were effectively outside the official urban boundary it could be argued that the unit of measurement which determined their spacing may well have been that used by the land surveyors (pers. comm. O. A. W. Dilke). In respect of the *actus,* the distance between bastions from centre to centre has no apparent significance, but if the 29.7cm equation is used to convert the interval between B4 and B4A (177ft), the result is 181.7ft which has a more acceptable error of 0.9% if the target was 1½ *actus* (180 feet).

    I am grateful to Professor O. A. W. Dilke for much of the above information about Roman surveying—any errors will undoubtedly be my own.
24. Since in other towns groups of bastions are seemingly incomplete or irregular, it is difficult to assess the range of intervals used. However, most are within 110–165 ft (imperial) e.g. Caerwent; and this is consistently the case with the bastions of the Saxon Shore Forts, S. Johnson *The Roman Forts of the Saxon Shore* (London 1976) 34–62. The closest parallel for the eastern series in London is found at Cirencester: from the east gate to Bastion 1 is 210ft; Bastion 1 to Bastion 2 is 192ft; Bastion 2 to Bastion 3 is approximately 170ft; but Bastion 3 to Bastion 4 is approximately 75ft—J. S. Wacher 'Cirencester, 1960, First Interim Report' *Antiq. J.* 41 (1961) 68, and see J. S. Wacher *The Towns of Roman Britain* (London 1974) 290–1, Fig. 66.
25. H. E. Butler (trans.) 'William Fitz Stephen's Description' in F. M. Stenton *Norman London* (London 1932) 27.
26. C. Hill, M. Millet and T. Blagg *The Roman Riverside Wall and Monumental Arch in London* London Middlesex Archaeol. Soc. Special Paper No. 3 (1980) 2.
27. The construction of the Roman wall would have impeded the natural drainage of this area, despite the provision of culverts for the Walbrook and its tributaries, Grimes *op. cit.* in note 8, 89. See also P. Marsden 'Mapping the birth of Londinium' *Geographical Magazine* (Sept. 1972) 844.
28. The choice of locations for the western bastions—regardless of date(s)—will have been complicated by the awkward positions of the gates on this side of London. Although, generally, the spacing of the

western bastions is evidently less consistent than that indicated for the eastern group, between Aldersgate and Newgate B16 to B19 appear to be set at regular intervals of 148ft (if an unknown bastion between B17 and B18 is assumed). See Fig. 3, and note 24.

29. P. Marsden *op. cit.* in note 27, 842–3 and 844.
30. J. Maloney 'The Roman Defences of London' *Current Archaeol.* 73 (1980) 55–60. The probable number of Roman bastions would therefore be 18.
31. i.e. the northern gate-tower of the Middle Tower.
32. A. W. Clapham and W. H. Godfrey *Some Famous Buildings and their story* (London 1913) 32-35.
33. G. Parnell *op. cit.* in note 16, 175 and Fig.2.
34. J. Maloney 'Recent Work on London's Defences' in B. Hobley and J. Maloney (eds.) *op. cit.* in note 22.