DISCUSSION

The following discussion expands upon points of interest raised by the excavation. The defences of the southern corner are assessed by comparing them to evidence from previous excavations at Caerleon and, where relevant, from other legionary fortresses. The discussion is concluded with a reconstruction of the fortress defences.

In addition to the 1982 excavations the defences at Caerleon have been investigated at the following sites: the Southern Corner in 1909 (Bosanquet and King 1963; Boon 1963); the Amphitheatre in 1926-7 (Wheeler and Wheeler 1928, 113, pl. 20); Prysg Field in 1927-9 (Nash-Williams 1931; 1932a; 1932b); the Eastern Corner in 1929 (Hawkes 1930); Golledge`s Field in 1932-3 (Nash-Williams 1933); Mill Street in 1937 (Nash-Williams 1937) and 1956 (Murray Threipland 1959); White Hart Lane in 1938 (Nash-Williams 1939); Myrtle Cottage Orchard in 1939 (Fox 1940); Prysg Field II in 1952 (Nash-Williams 1954); Backhall Street in 1956 (Davies 1959); the Hall in 1964 (Murray Threipland 1969); and the `Roman Gates' in 1980-1 (Evans and Metcalf 1992). Zienkewicz (1990, 1999) reviewed the evidence for the Flavian defences with the latter paper presenting some of the results from the 1982 excavations. A full re-evaluation and synthesis of all this work is not appropriate here, but a few critical comments are offered.

With the exception of the `Roman Gates' site the defences were excavated in narrow trenches; a technique which militates against the recognition of ephemeral features, such as internal timber lacing, within the rampart. The problems in using early archaeological reports have been discussed elsewhere (Jarrett 1969, 19; Jones 1975, 6). In particular, the specific meaning of the vocabulary employed to describe stratigraphic and structural relationships is frequently ambiguous. These problems are exacerbated at Caerleon because several sites have only been published in summary form; most notably Golledge`s Field (Nash-Williams 1933); the 1937 excavations at Mill Street (Nash-Williams 1937); White Hart Lane (Nash-Williams 1939); and Prysg Field II (Nash-Williams 1954).

The Earthen Rampart

The form of the rampart uncovered in the southern defences is consistent with that discovered elsewhere at Caerleon. The deturfed ground surface, brushwood platform and apparent absence of timber lacing are all characteristic of the rampart at Caerleon, though this is the first time that the turf revetments front and back of the rampart have been so clearly demonstrated. The rampart was at least 2.82m high and 7.30m wide. This compares with the other contemporary legionary fortresses. At York (Eburacum), the minimum width of the rampart is 5.3m-5.5m, although the original width was probably c. 6.0m and could have been as much as 7.0m, and the original height of the rampart probably varied between c. 2.0m-3.0m (Ottaway 1996, 189-91). At Inchtuthil the surviving width of the rampart behind the wall varied from 3.96-5.18m but is estimated originally to have been 6.02m wide and 3.43m high (Pitts and St. Joseph 1985, 60-1). At Chester the rampart has been shown to vary in width between 5.8 and 6.2m at different points of the circumference, and no significant truncation caused by the insertion of the stone wall was observed (LeQuesne 1999, 74). Shirley has estimated that the total time taken for building the rampart at Inchtuthil was 475,000 man hours (1996, 124)

which is equivalent to a thousand men working for 60 days. The defensive circuits of Caerleon and Inchtuthil are of comparable length (c. 1852m and 1840m respectively) and, although at Caerleon the rampart is slightly wider, it would have taken a similar length of time to build.

An obvious contrast to the other permanent fortresses is the lack of evidence for timber turrets at Caerleon. This is conventionally assumed to be because the later stone turrets were sited in the same place as the timber turrets and their construction destroyed all trace of them (Boon 1972, 23), and while this assumption is not unreasonable, this was demonstrably not the case at either Chester (Deva) (McPeake *et al* 1980, 17-9, figs 2.2 and 3.1) or York (Wenham 1962, 557-62, 565-9, fig 2; Sumpter 1984, 46). Only the excavation of a considerable length of the rampart would eliminate the possibility that the timber and stone turrets were sited in different locations.

Evidence from the 1982 excavations suggested that part of the rampart was extended and the top levelled late in the history of the defences (Phase VI). This, and possibly analogous features elsewhere at Caerleon (Fox 1940, fig. 4; Murray Threipland 1959, 129; Murray Threipland 1969, fig. 6; Evans and Metcalf 1992, 21), although difficult to interpret, are apparently localised and contrast with the more substantial remodelling seen at both Chester and York where the rampart was the focus of alterations late in the structural sequences of those sites (Ottaway 1996, 293; Strickland 1983, 10).

The Rampart Wall and Turrets

In general the strengthening of the earthen and timber defences of Roman fortresses with stone walls and turrets is notoriously difficult to date precisely (Jones 1975, 97-8) and Caerleon is no exception. The best evidence for understanding and dating the conversion at Caerleon is provided by the 1982 excavations. As described above, although the walls of the interval turret (Site D) butted against the rampart wall, the foundations of the turret were apparently continuous with those of the rampart wall. This suggests that the rampart wall and the interval turret belong to a single construction episode, and that the butt joint of the turret with the rampart wall is a product of the method of construction rather than evidence that the interval turret was built substantially later than the rampart wall. Clearly when planned the wall and the turrets were considered to be part of the same campaign.

The evidence for the relationship between the rampart wall and the interval and corner turrets from previous excavations at Caerleon is ambiguous. In the eastern corner both the turret and rampart wall were heavily robbed and only their cobble foundations survived (Hawkes 1930, 152-3). In plan their foundations are shown as continuous while in section the size of their cobble coursing suggests that they are not (Hawkes 1930, fig. 17). Four interval turrets and one corner turret were excavated in the Prysg Field (Nash-Williams 1931; 1932a; 1932b). Nash-Williams records that they were `definitely contemporary' with the wall (1931, 108) and that their walls `bonded' with the stone rampart (1931, 108-15). It is uncertain whether Nash-Williams was stating that only the foundations of the Prysg Field turrets were continuous with that of the rampart wall or that the actual wall of the turrets were keyed into the rampart wall. Two of the turrets (Nash-Williams 1931, nos. 1 and 3) are open for display to the public. Although partly rebuilt after excavation, inspection suggests that the turret walls butted against the rampart wall. At the Mill Street site Nash-Williams noted that the interval turret was `attached'

to the rampart wall (1937, 324) although later sections suggest that no relationship could have been established between the turret and the rampart wall because the rampart wall was completely robbed out (Murray Threipland 1959, fig. 2). More definite evidence is provided by the excavations in Myrtle Cottage Orchard where the cobble foundations of the interval turret and rampart wall were demonstrated to have been laid at the same time (Fox 1940, 106). Despite the ambiguity of some of these early excavation accounts nothing has been previously recorded concerning the relationship between the rampart wall and the turrets which contradicts the observations made in the southern corner.

At the other legionary fortresses the evidence of whether or not the interval and corner turrets were planned as an integral part of the stone defences is patchy. At Inchtuthil the building of the stone wall was not accompanied by the building of stone turrets (Pitts and St. Joseph 1985, 63). Perhaps they would have followed had the legion not withdrawn. Less is known of the structural relationship between the rampart wall and stone turrets at Chester and York where excavations have been less extensive and the constructional sequences are apparently more complicated. At Chester excavation of the south-east corner of the fortress revealed that thethe corner turret walls were `carefully bonded` with the rampart wall suggesting that they were contemporary (Webster 1952, 26-7) but the building technique was not the same as that used at Caerleon. The most recent review of the Chester defences draws attention to the fact that while the interval towers were constructed in *petit appareil*, the rampart wall was made in *grand appareil* so forming a joint would always have been difficult (LeQuesne 1999, 98). The stone interval towers were built in the late first or early second centuries, but the evidence for the extant wall might suggest a protracted period of building (ibid 140, 144). At York the building of stone turrets in the late first to early second century has been observed but the general view has been that the rampart wall might have been considerably later and associated with projecting towers (e.g. Ottaway 1993, 52, 97). This picture may well be subject to some revision given the excavations conducted on the defences at York at St Leonard's Hospital between 2001 and 2004. The analysis of the results is still ongoing but what is known is that alder piles below the Multangular Tower have returned ^{14}C dates which calibrate to AD 5-85 and AD 25-130 at the 95% confidence level (Hunter-Mann 2009). Pottery and small finds associated with the building of stone defences there would also point to a late first century date[1] .

If the not unreasonable assumption is made that the interval turret excavated in 1982 is representative of the other turrets at Caerleon then it follows that the rampart wall and turrets belong to a single construction episode. No evidence from Caerleon has been recovered to suggest that, apart from localised repairs, the rampart wall does not belong to a single episode which the evidence from the 1982 excavations can be used to date. The *terminus post quem* of A.D. 86 provided by the unworn as of Domitian[2] recovered from the foundation trench of the corner turret (A4) in 1982 is the best archaeological evidence for dating the construction of the stone defences at Caerleon. The only other possible, direct archaeological evidence for dating this phase are three sherds recorded as being `embedded` in the footings of the southern wall of the turret in the eastern corner of the fortress (Hawkes 1930, 172, 192, nos. D. 15 and D. 16). These were originally dated to the late first century; however, Boon considered one sherd to be central Gaulish ware of the Trajanic-Hadrianic period, which suggested construction of the stone

1 Ruth Leary and H.E.M. Cool *pers com.*.

2 see p. 49 no. 5.

defences could not be earlier than 105 A.D. and may be as late as 130 A.D. (1972, 38). In a subsequent discussion of the stone defences Boon did not quote this evidence (1987, 29-30), presumably either because he no longer considered the original recording of the context of the sherds to be reliable, or because he had revised his earlier dating of them. This ceramic evidence has been reassessed by Peter Webster who dates one sherd (D.15) to c. A.D. 80-100 and the other (D. 16) as possibly Antonine[1] . The significance of the possible Antonine date is difficult to evaluate and Webster advises against placing too much interpretative value on it.

In the absence of further archaeological evidence it is tempting to date the construction of the stone defences by alternative means such as through inscriptions or by placing the building work within a likely historical context. The stone defences have previously been dated, implicitly as well as explicitly, by an inscribed dedication presumed to record the completion of construction work in the years A.D. 99/100 (RIB I 330). The inscription was recovered from a secondary context where it had been reused as a paving slab in one of the magazines excavated in the School Field (Collingwood and Taylor 1928, 210-1, fig. 71; Nash-Williams 1929a, 142-3, fig. 4; Boon 1972, 33). Occupation of this site continued into the third century (Nash-Williams 1929a, 144) suggesting that the structure which the dedication commemorates must have been demolished, or undergone significant alteration, by this date. The quality of the inscription, made on Tuscan white marble, suggests that it commemorated an important building (Boon 1972, 33) which has been assumed to be a gate-house. Zienkiewicz (1990, 29) has pointed out that importing so fine a stone would certainly indicate that whatever was being commemorated was an important element of the fortress. Whilst there is no evidence to associate it with the defences rather than an intra-mural building, such as the Fortress Baths, f*abrica* or *principia*, the entrance to the fort would certainly be an appropriate place. The internal buildings noted were abandoned, demolished, or significantly altered by the third century which would explain how it came to be re-used if it had adorned one of them. Equally though, the Phase VI levelling noted in Site E which extended the rampart belongs to the early third century or later, and so there was clearly some work on the defences that might have made such an inscription redundant had it been associated with them.

Evaluating the results of the excavations of Roman military sites within an historical framework is a common interpretative device, and at Caerleon the construction and rebuilding of various structures, including the defences, has been considered unlikely during both recorded and inferred absences of substantial parts of the II Augusta. This approach is partially based on the assumption that building programmes would not be undertaken in the absence of a significant proportion of the legion. It has been demonstrated, however, that large construction projects could be completed in a relatively short period of time by a fraction of the total contingent of men nominally garrisoned at a legionary fortress. Shirley has estimated that the amount of time required to build the perimeter wall at Inchtuthil is 4000,000 man-hours (1996, 125) which is equivalent to only 500 men working for a 100 days. Even if the local quarrying, preparation and transportation of the stone took twice as long as Shirley`s estimate (for a further discussion of this subject see Kendal 1996) then the possibility that a vexillation could have built the rampart wall and turrets in a single year must be accepted. Consequently, both the underlying assumption on which attempts to place building phases at Caerleon within historical contexts, and the approach as a whole, must be treated with caution.

1 see p. 95

Given the difficulties in using the evidence of inscriptions and attempts to place the building of the stone defences into an historical context, the dating of the construction of the stone defences can only be reliably based on archaeological evidence; that is the terminus post quem of 86 A.D. provided by the unworn *as* of Domitian[1] . How soon after its minting the coin was deposited is debatable. Boon considered it to be freshly minted and the period between its minting and deposition probably to be minimal (1987, 29). Dating on the basis of the wear on a single coin is problematic but it should be noted that the demolition of the paved floor and the deposition of rubbish within the ground floor room of the interval turret had probably begun by the early years of the second century (see above) and that a date for construction of the stone defences at Caerleon in the last decade of the first century, if not slightly earlier, is most probable.

The conversion of the defences of the legionary fortresses of Caerleon, Chester and York from earth and timber to stone was, for a long time, accepted as dating to the beginning of the second century and considered a consequence of the stabilisation of the province and the concomitant requirement for permanently garrisoning the legions in Britain (Salway 1981, 152, 163). Zienkiewicz has argued (1990, 31-3) that all four of the Flavian legionary fortresses were planned to be permanent stone bases from the early Flavian period with the mixed timber and stone phases being 'a first stage to the realisation of that ideal'. He bases his argument on the fact that on several sites at Caerleon a single phase of timber construction is rapidly followed by the insertion of stone foundations with *terminus post quem* dates of AD 86-87. He further points out that this would fit the early provision of stone defences at Inchtuthil. The early provision of stone defences that can now also be seen at Caerleon, and the new evidence from York noted above would also fit such a plan.

Whatever the initial plan was, the history of the defences at the different sites clearly varied and we are still far from understanding the sequences with the exception of at the abandoned Inchtuthil. When this report was initially written in 1997, the then most recent review of the evidence for the defences at Chester (Strickland 1983, 8-10) suggested that there may possibly have been an early wall built c. 100-125 A.D. with masonry from it being incorporated into levelling deposits of the berm sometime after 150 A.D. A certain, and only possibly secondary, curtain wall was built c. 200 A.D. and subsequently, following a reduction in the height of the earthen rampart, this wall was partially rebuilt so as to be freestanding c. 300 A.D. Drawing on evidence from excavations in 1978-1990 published later LeQuesne (1999, 144-5) proposed that the stone defences were being constructed in the c. AD 90-120 period but remained incomplete through much of the second century, and were only completed in the early to mid third century. Equally in 1997 the evidence from York was viewed as complicated and posing many problems. The sequence for the fortress defences proposed by the Royal Commission on Historical Monuments (R.C.H.M. 1962) had recently been revised (Ottaway 1996). Although construction of one of the interval turrets, the eastern turret and possibly the wall south-west of the eastern corner were accepted as possibly dating to the early second century A.D. the defences were considered to have remained largely timber until the late second or early third century. A.D. (Ottaway 1996, 194-9, 291-2). It was believe that the defences were finally reconstructed in stone in two separate phases of building work dated to the late second or early third century (Ottaway 1996,213-4, 293-4). The duration and reason for the

1 see p. 49 no. 5.

break between these construction phases remained unknown (Ottaway 1996, 294) but it was argued that the reconstruction of the defences should be seen as a cumulative process extending throughout the second century and that single, circuit-wide episodes of construction work are unlikely to have taken place (Ottaway 1996, 194). As noted above, however, the excavations at St Leonard's Hospital have now complicated the picture even more; re-dating what had always been seen as an iconic early fourth century stretch of the defences to a period two centuries earlier.

The variation in both the character and date of the conversion of the defences at the permanent fortresses suggest that the influence of local conditions, the individual occupying legions and those individuals responsible for decision making on fortress building programmes was more important than has hitherto been widely acknowledged. The view that the rebuilding of the defences in stone at Caerleon, Chester and York was an early second century response to the decision to maintain these sites permanently must now be considered overly simplistic. Recent work emphasises the potential limitations in interpreting episodes of construction in terms of policy decisions made by emperors and also illustrates the dangers inherent in over reliance on analogy with other sites to interpret the evidence from limited excavations at legionary fortresses.

The Appearance of the Fortress

In addition to their date, the external appearance of the stone defences at Caerleon is of interest. An area of white, lime-washed, plaster rendering in which the joints of the underlying course work were picked out in red paint was recorded in situ on the north wall of the corner turret. In the Phase IV deposits associated with the rebuilding of the perimeter wall 39 fragments of similar plaster were recovered (Bosanquet and King 1963, 49). These fragments were deposited in the constructional backfill of the rebuilt walling probably derived from the front of the original rampart wall. This suggests that the stone rampart wall, and its associated turrets, were rendered with a white, lime-washed plaster and that the joints of the course work were outlined with red paint. This phenomenon was also noticed in the amphitheatre (Wheeler and Wheeler 1928, 118, pl. XXIV. 1-2; Wheeler and Nash-Williams 1970, 9). Such treatment of masonry has also been noted on the German limes and on a Roman structure at New Weir, Swainshill (Bidwell 1996, 19). Bidwell also notes false jointing where the red paint, if present, did not survive at Denton on Hadrian's Wall (Bidwell 1996, 22). False-joints in a section of the stonework of the fortress wall at York have been interpreted as possible keying to hold plaster although in the absence of more definite evidence this interpretation is somewhat tentative (Hall *et al*. 1996, 263). The effect of a white wall with red false jointing must have been striking as can be seen on a reconstruction of the effect at the Saalburg (Bidwell 1996, fig. 3.2 – see also Knight 1988, 40-1 for a graphic reconstruction of the effect at Caerleon). The evidence from the corner turret only has the plaster on the edges of the stones and not in the centre and so a uniform white surface cannot be proved, but it does seem likely that the whole surface would originally have been white. Bidwell (1996, 28) has pointed out the need not to impose our own aesthetic preferences on the past. We appreciate the hues of stone, but there is good evidence that the Roman eye preferred a brilliant white effect.

It is difficult to reconcile the neat external appearance of the rendered rampart wall and turrets with the use of the ground floor rooms of the turrets for rubbish disposal. The deposition of

waste material derived from cooking ovens in these ground floor rooms was also recognised in the Prysg Field (see Nash-Williams 1931, 110-5). That these ground level rooms were not originally intended to be used for dumping is suggested by the dismantling of the paved floor (D7) in the interval turret prior to deposition. Presumably the paved floor was necessary for the original function of the ground floor room but what that function was, and the reason for its abandonment so shortly after construction, is uncertain. They could have provided access to the rampart walkway by means of a ladder leading into the first floor of the turret; however, such a method would appear unduly cumbersome when steps attached to the back of the rampart would provide an efficient method of reaching it. Equally the absence of ground floor rooms in the interval towers at places such as Chester (Le Quesne 1999, 98) suggests ground floor access was not generally seen as necessary. At Caerleon it is probable that these rooms were designed as storerooms, and that when the lack of light and the damp conditions resultant from their being built into the rampart, made such a function impractical they were abandoned and subsequently used for rubbish disposal. Deposition was made through the doorway in the rear wall of the turret and excavation revealed that the rubbish slumped back out of the doorway towards the via sagularis. It is uncertain whether at the time of deposition the area immediately to the rear of the turret contained a rampart building with its foundations below the excavated levels, or if the rubbish spread out into the open. If the latter, then the use of the turrets for dumping could not have been illicit.

The Localised Rebuilding of the Rampart Wall

With the possible exception of the northern corner (see Boon 1963, 7; Boon 1969, 32; Boon 1972, 54), the southern corner is unusual in comparison to the rest of the defensive circuit because the rampart wall there was twice subject to localised, but extensive, repairs (Phase VI). Dating these is as difficult as dating the construction of the original stone rampart wall. Evidence from both the 1909 and 1982 excavations suggests that at least one, if not both, of the rebuilds was no earlier than the end of the second century (see Phase IV above and Boon 1963, 9). It is not possible to determine which of the rebuilt sections is the earliest, or the length of the interval between their construction. That rebuilding of the southern corner was considered necessary is interesting because elsewhere at Caerleon excavation indicates that by the end of the second century sections of the rampart wall had collapsed and not been repaired (Davies 1959, 136, 148), and that some of the turrets had been demolished and not replaced (Nash-Williams 1931, 111, 114-5; Nash-Williams 1937, 324; Murray Threipland 1959, 128, 130; Boon 1972, 38; Boon 1987, 59). The reason for this inconsistency is not obvious.

It was suggested by Boon that these repairs were necessitated by damage caused by a native uprising while Britain was denuded of troops during the civil war between Albinus and Severus in the mid 190`s (1963, 9; 1969, 31-2). However, in the absence of corroborating historical evidence for native rebellions at this date the interpretation was not maintained (cf. Boon 1972, 54; Boon 1987, 59). The 1982 excavations suggest rather that the rebuilding was probably due to subsidence. The fortress is built on a slight promontory which projects towards the south-east. The southern and eastern corners of the fortress come closest to the drop between this relatively level platform and the river Usk. The drop is greatest at the southern corner where the ground surface begins to fall noticeably, from a point some 85 metres to the north-west of the corner, towards the Usk at a gradient of 3.2%. In the eastern

corner the slighter, but comparable, slope was compensated for by localised levelling deposits and the construction of the corner turret foundations on a series of steps (Hawkes 1930, 172, 175, fig. 17), and although elsewhere topographic features were filled in during the initial preparation of the site for construction (Murray Threipland 1969, 90), no evidence of levelling in the southern corner was observed in either the 1909 (Bosanquet and King 1963) or 1982 excavations. This failure to level the site prior to construction is difficult to explain in the light of the localised levelling which occurs elsewhere at Caerleon; however, sites chosen for Roman fortification in Britain are frequently uneven and, in general, there is little evidence for levelling (Jones 1975, 29). In addition to failing to level the ground surface of the southern corner prior to building the earthen rampart, no evidence for timber lacing within the rampart was recognised during excavation. Presumably, this was because the builders of the rampart thought that the cohesive properties of the clay used in the rampart were sufficient to prevent subsidence. The absence of timber lacing is consistent with the findings of excavations elsewhere on the defences at Caerleon, although the possibility that lacing was present but not recognised during the machine cutting of the rampart (Sites B and C) can not be dismissed (see Jones 1975, 89). The gradient and the absence of internal lacing combined would render the rampart potentially unstable and subject to movement down the slope towards the corner. Such subsidence may have been exacerbated by the removal of the rampart's turf revetment during the construction of the stone defences (Phase II) and/or the early rampart buildings (nominally Phase V). A further problem was probably introduced by the drainage system of the fortress. The main drain passed through the wall close to the corner (see Fig. 2) and the outfall from what must have been a considerable amount of water, may have rendered the area even less stable.

That subsidence and instability of the rampart had either become a problem, or was anticipated, by the time the stone defences were constructed is suggested by the character of the corner turret. As described above the corner turret was built using piles, incorporated deep footings and its ground floor room was deliberately backfilled, apparently immediately after construction, with redeposited rampart material and rubble, presumably in order to stabilise the structure. These particular characteristics of the corner turret have not been recorded in any of the other turrets excavated at Caerleon. In light of the subsidence problem already outlined, i.e the cracks that appeared in the north-south turret walls and the subsequent need to rebuild the rampart wall twice, it is more probable they were a response to problems of stability.

The rebuilt sections of wall differed from the original rampart wall in having wider and internally projecting footings which would have significantly increased the stability of the wall. The footings were particularly massive for Rebuild I, this section centred on the corner, and although it is not possible to definitely demonstrate which of the rebuilt sections is earliest it is not unreasonable to assume that Rebuild II with its slighter footings represents an earlier and only partially successful attempt to stabilise the corner which was superseded, presumably after more localised subsidence, by Rebuild I with its more massive footings. There is no evidence that the corner turret was altered during the rebuilding of the rampart wall or that the earthen rampart itself was reconstructed as was possibly the case around interval turret NE6 at York in response to subsidence (Ottaway 1996, 108). The rebuilt sections of wall were, by and large, successful in preventing further damage caused by subsidence and the preservation of the rampart wall in the southern corner is the best at Caerleon (fig. 29). Although the rebuilt walling is later, it is not unreasonable to assume that the features recognisable in it are representative

of the original rampart wall. Study of these features provides an opportunity to reconstruct the stone phase of the fortress defences.

Fig. 29: View of the corner tower and curtain wall from the west

The Reconstruction of the Fortress Defences

Three reconstructions of the fortress defences are offered: the first two are sections of the Phase I and Phase II rampart (fig. 30) and the third is a more detailed reconstruction of a Phase II interval turret, rampart and ditch (fig. 31). The reconstructions are based on the findings of the excavation, and where relevant previous excavations at Caerleon including Boon`s unpublished 1962 cutting of the ditch in the southern corner. Although based on empirical observation a certain amount of conjecture has been necessary to complete the reconstructions. Consequently, they should be considered as provisional models to be revised and improved in the light of future work. In addition to metric units the reconstructions are also drawn with scales in Roman feet (*pedes monetales (PM)*).

As described above, the best evidence for the original rampart width was recovered from Site B. If it is assumed that the front of the Phase I earthern rampart corresponds to the front of the Phase II rampart wall then the maximum recovered width of the rampart is 7.30m (fig. 6). However, the rear of the rampart in Site B was cut back to insert a Phase V feature (B2) suggesting that originally it was slightly wider. For the purposes of the reconstruction the original width is estimated to be *c* 7.37m (*25 PM*). The dimensions of the berm and ditch are based on previous excavations where the recorded dimensions vary, presumably as a result of re-cutting and maintenance. The estimated width of the berm (1.5m; *5 PM*) and the angle of the inner cut of the ditch is based on Boon's unpublished 1962 cutting of the ditch; the estimated width of the ditch (*c.* 8.85m; *30 PM*) falls within the range known from all the previous cuttings of the ditch, even though it is exceptionally large compared with other contemporary fort ditches (Pitts and St. Joseph 1985, 76).

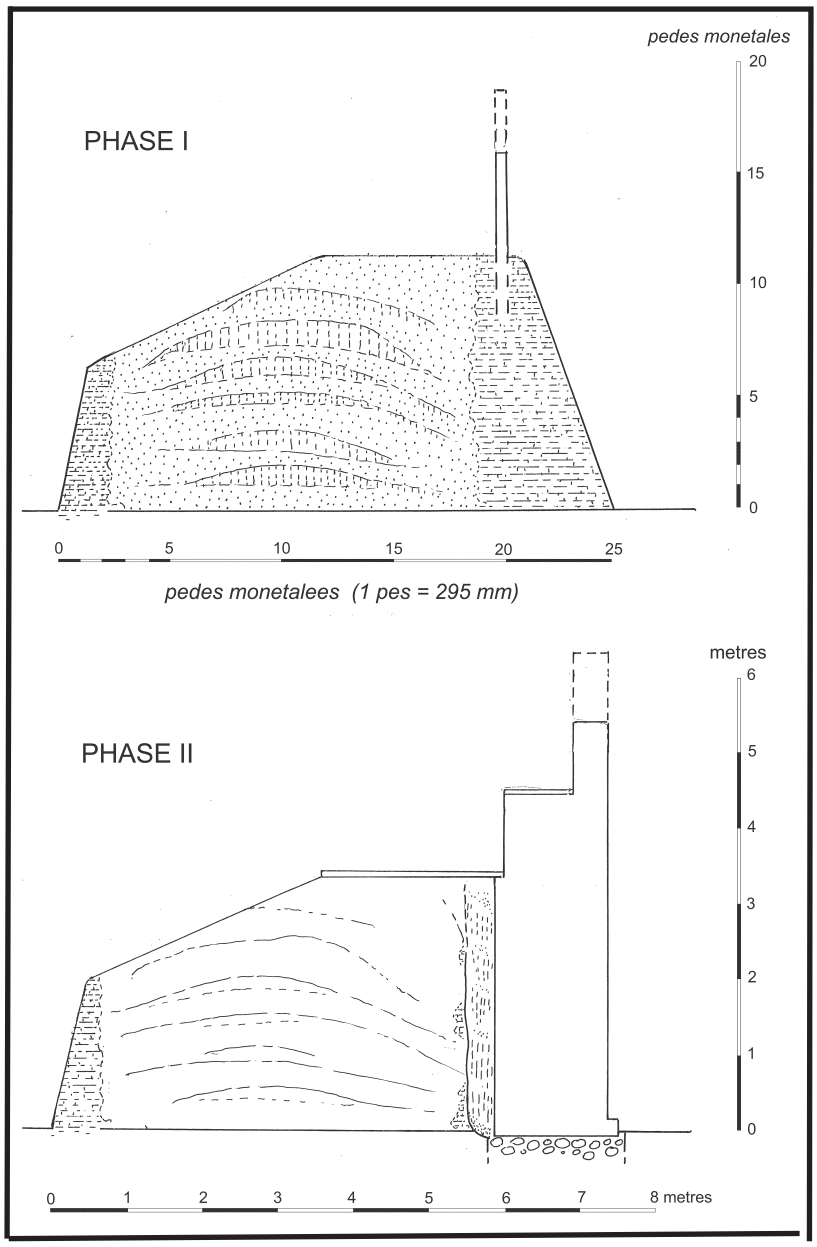

Fig. 30: Reconstruction of the Phase I and Phase II ramparts

It is generally accepted that fortress ramparts had a steeply sloped face and a back which initially rose near vertically and then changed angle and sloped gently towards the top of the rampart (Manning 1981a, 70). The front of the Phase I rampart is difficult to reconstruct because of its destruction during the building of the Phase II rampart wall. The reconstruction of this face (fig. 30) is based on the assumption that the front of the Phase I earthen rampart corresponds to the front of the Phase II rampart wall. More evidence exists for the form of the back of the rampart. The remains of the rampart recovered in Site B (figs. 5-6), in conjunction with the evidence for the original height of the rampart (see below), have been used to reconstruct the profile.

The maximum recorded height of the rampart above the ancient ground surface was 2.82 m (see above); however, this does not represent the original height of the earthen rampart. As described above, an off-set (width c. 0.17-0.20 m) was recorded in the internal face of the Rebuild I section (Phase IV) of the rampart wall between the corner turret walls and to the west of the corner turret (fig. 22). Above the off-set the masonry was carefully coursed suggesting that it was visible in antiquity and that both the earthen rampart and the ground floor of the turret would have extended up to this level covering the less well finished masonry below. The mean vertical distance between the off-set and the top of the plinth course on the external face of the rampart wall was 3.09 m inside the corner turret and 3.17 m outside it. The plinth course is c. 0.24-0.26m in height and presumably was partially buried in the ancient ground surface. This provides the evidence used to estimate that the original height of the earthen rampart above the ancient ground surface was c. 3.30 m (*11.19 PM*).

No evidence for the presumed timber walkway, palisade or turrets of the Phase I defences has been recognised at Caerleon and, consequently, details of these in the Phase I reconstruction have been kept to a minimum. No direct evidence for the Phase II rampart wall walkway was recovered either; but the rampart wall extended, at full width, for at least c. 0.75-0.80 m above the Rebuild I off-set discussed above suggesting that the walkway, and adjacent parapet, formed by a reduction in the width of the wall, must have been above this level. The reconstructions show the minimum height above the ancient ground surface (c. 4.05-4.10 m) at which the walkway could have been set. Access to the walkway from the top of the rampart would have required the use of steps. No evidence for an external cornice at the level of the walkway similar to that at Chester (Strickland 1982, 31; figs. 1-2; 1983, 7, fig. 1) has been recognised at Caerleon.

The reconstruction of the interval turret (fig. 31) is based, in part, on the excavation of Site D (fig. 27). The turret extended 4.1 m (*13.9 PM)* back from the rear of the rampart wall, which was itself c. 1.5 m (*5 PM*) thick, giving a total distance of 5.6 m (*18.9 PM*) back from the front of the rampart wall. The vertical height of the first floor is based on the off-set, discussed above, recorded in the internal face of Rebuild I. This off-set, which presumably accommodated the beams of the turret's first floor, had a mean vertical distance above the top of the external plinth course of 3.09 m and this height has been extrapolated to reconstruct the level of the first floor of the interval turret. If this height is accepted then the walkway must have been at least c. 0.75-0.80 m above the first floor of the turret. Assuming that access to the first floor of the turret was from a door in the centre of the turret's side wall then steps must have led down from the walkway on to the earthen rampart and to the door (fig. 31). Alternatively, it is possible that access into the turret was through a door located at the end of the walkway and that the first floor of the turret was built at this height. If this was the case then the off-set would have accommodated structural timbers which supported a floor at the higher level of the walkway (cf. Welsby 1988, fig. 3.4). The remaining vertical heights of the turret and the dimensions of both its merlons and embrasures and those of the rampart walkway parapet are entirely speculative. They have been reconstructed in units of pedes monetales because this is the fundamental unit of measurement whose use has been recognised in the design of the fortress defences.

The use of a standard unit of measurement in the design of Roman military sites in Britain was first recognised by Ward (1903, 22-3, fig. 2). Metrological analyses of the fortress layouts at York (Ottaway 1996, 202-9, 281-4), Inchtuthil (Walthew 1988) and Colchester (Camulodunum) (Crummy 1985; 1992, 7-10), and of the granaries at Usk (Manning 1981a, 174-5) and the Fortress Baths at Caerleon (Zienkiewicz 1986a, 96-101), have demonstrated the use of the Roman foot, or *pes monetalis*, in the planning of legionary fortresses. Examples of the *pes monetalis* in use in antiquity varied in length by up to 6-7 mm (Walthew 1978, 335; Duncan-Jones 1980, 127); however, following Zienkiewicz (1986a, 96), the value for the unit used here is 295mm. Measurements observed during excavation were noted to be equivalent to integral number of *pedes monetales*: the original distance from the front of the rampart wall to the rear of the rampart is estimated to be 7.37m (*25 PM)*; the width of the rampart wall is *c.* 1.5m (*5 PM*); and the external dimensions of the interval turret are 5.60 x c.4.50m (19 x c. *15 PM*). The overall width of the defensive system, incorporating rampart, berm and ditch, is estimated to be 60 *pedes monetales* (17.70m); this compares with a distance of 45 *pedes monetales* (13.25m) at York (Ottaway 1996, 209). Although minor discrepancies occur in the conversion of metric measurements to *pedes monetales*, when inaccuracies in both the ancient and modern surveying are considered (Ottaway 1996, 202), the values arrived at suggest that the defences of the Roman Caerleon were built to a careful plan based on units of *pedes monetales.*

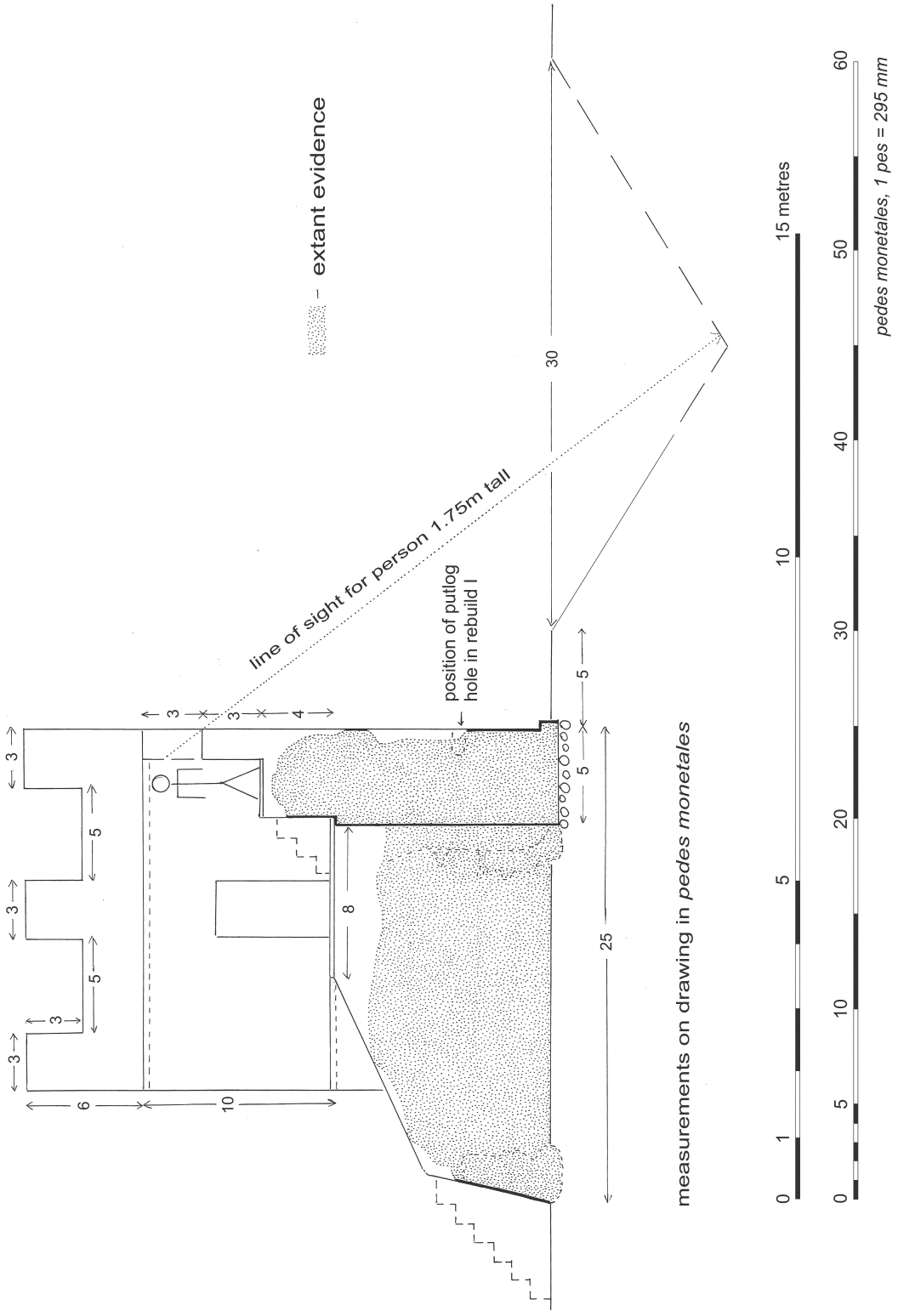

Fig. 31: Reconstruction of interval turret, rampart and ditch with suggested dimensions in Roman feet (*pedes monetales*)