

## THE ARTILLERY DEFENCES AT GRAVESEND

By VICTOR T. C. SMITH

### INTRODUCTION

THIS paper, which originally began as a result of individual research carried out by the writer, may be considered as the first report of the Kent Defence Research Group of the Kent Archæological Society, examining the history of artillery fortification in Kent. It traces the history of the artillery defences at Gravesend as an integral part of the defensive arrangements of the Thames estuary to protect against attack by hostile naval forces. The more impressive defences of Tilbury Fort opposite Gravesend in Essex have already been the subject of a paper by Mr. A. D. Saunders, M.A., F.S.A.<sup>1</sup>

Various attempts in the estuary of the Thames had been made since early times to provide for defence against enemies coming into the river. In 1377, the sheriffs of Kent and Essex were ordered to provide a system of early warning against raid or invasion involving the setting up of a number of beacons which could be ignited as a signal of an enemy's approach. One such beacon was built on Roundonhyll (now called Windmill Hill), a high vantage point at Gravesend and the site of later beacons.<sup>2</sup> Whatever arrangements there were in 1380, in that year the French entered the Thames, burnt Gravesend and attacked Tilbury, taking away many prisoners. It was the vulnerability of the Thames to raiding which led to the building of Cooling Castle in the 1380s. It has key-hole-shaped loops for firearms. In 1401, during a period of alarm Gravesend and Tilbury were asked to contribute a fully equipped balinger and forty men towards the needs of defensive preparations.<sup>3</sup> The following year, 1402, saw the riverside hamlet of East Tilbury authorized to construct an earthwork and watch-towers for its own defence against raiders from the sea.<sup>4</sup>

### ARTILLERY FORTIFICATION AND THE TUDOR BLOCKHOUSES

In its comparatively early stage of development, artillery had, in general, little radical effect on the style of English fortifications except that in some cases adaptation, for example in the provision of the key-

<sup>1</sup> *Antiq. Journ.*, xl, 1960, 154-74.

<sup>2</sup> R. F. Cruden, *History of Gravesend and the Port of London*, London, 1843, 115-16.

<sup>3</sup> *Ibid.*, 122.

<sup>4</sup> *Ibid.*, 123.

hole-shaped gun-ports, took place. However, ideas developed in Europe involving the use of low, rounded bastions for the mounting of guns were to have tangible influence on the arrangements adopted by Henry VIII in England.

The political situation between Henry VIII and continental Europe towards the end of the fourth decade of the sixteenth century seemed to raise the possibility that England might be invaded. This, and the adoption in Europe of artillery as a weapon at sea as well as on land, made it essential that England should have coastal defences armed with guns to counter the fire-power of a hostile foreign fleet. Henry decided to embark upon a national scheme of coastal defence linked with a programme for the expansion of the Navy. This scheme involved the construction of blockhouses and forts mounting defensive artillery along the vulnerable coastline from Hull to Milford Haven. In them, the rounded bastion with specially designed positions for artillery and rounded parapet to deflect cannon shot was a dominant feature. In Kent in 1539, five small blockhouses were ordered to be built in the Thames estuary, together with other works to secure the port of Dover and forts at Sandown, Walmer and Deal, to guard the anchorage of the Downs. The fort at Deal known as Deal Castle was the greatest of these works. It was not long after Henry's national programme was completed that the style of fortification adopted in it was replaced by a new system based on the use of the angle-bastion born in Italy, which was more effective.

## THE THAMES BLOCKHOUSES

### LOCATION

The five Thames blockhouses were sited at the first place in the lower river where geographical factors made for easy landing of amphibious forces; below that point large areas of low-water and mud-flats provided natural obstacles. The blockhouses, of course, also defended the maritime approaches to London and protected shipping moored in the river. Two of the blockhouses were located to command with a cross-fire that part of the Thames at the Lower Hope where it bends into Gravesend Reach; one was built on the north bank at East Tilbury and another on the south bank at Higham. The East Tilbury blockhouse was somewhat south of the village of the same name (probably *c.* N.G.R. TQ 691761), but it no longer exists because the site is now under water due to coastal recession, though its remains were visible as late as 1735. The site of the Higham blockhouse is not precisely known, but it was probably located on the west bank of Shorne Creek where it joins the river (possibly *c.* N.G.R. TQ 701754). The field name Blockhouse Piece at this spot appears in the Tithe Commissioners' map

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of Shorne for 1829. There is nothing in the area which can now be readily identified as the remains of the blockhouse.

The remaining three blockhouses were sited well upstream towards the western end of Gravesend Reach where the river narrows to about half a mile. They guarded the important ferry communication between Gravesend and Tilbury, prevented navigation into Northfleet Hope and provided a second line of defence. One was at Tilbury, and two, called the Gravesend and Milton blockhouses (although both were in the parish of Milton) on the south bank opposite. None is visible today. The blockhouse at Tilbury, called 'Thermitage Bulwark', was built on ground now under the south-east curtain of Tilbury Fort (N.G.R. TQ 6 52753). The Gravesend and Milton blockhouses were built on land released to the Crown by William Burston, later to be one of the commanders.<sup>5</sup> The Gravesend blockhouse itself was erected on a piece of ground called La Grene (later known as Sconce Field), and its position is clearly known as that of the riverside car-park of the Clarendon Royal Hotel (N.G.R. TQ 649745). The Milton blockhouse, a mere 550 yards to the east, was built on land called Chappel Field, the name possibly being associated with the lands of the medieval Chantry of Milton. The blockhouse was almost certainly located at the western end of the basin of the defunct Thames and Medway Canal (at N.G.R. TQ 655744). Some building débris was found there in 1826,<sup>6</sup> and the writer has carried out a short excavation, which revealed substantial chalk foundations. The remains of a landward rampart and ditch are also indicated in two maps of the eighteenth century<sup>7</sup> and a manuscript map of 1835 in the Gravesend Public Library.<sup>8</sup> Further excavations are being undertaken to verify identification.

### DESIGN AND CONSTRUCTION

Work began on the construction of the Thames blockhouses according to the designs of Christopher Morice and James Nedham soon after they were ordered to be built in February, 1539.<sup>9</sup> Unfortunately, no original plans seem to have survived, but later ones establish that the blockhouses were D-shaped in plan, comparatively small in size and more simple when compared with Walmer and Deal castles but a product of the same school of defensive thought. The rounded part of the D faced the river. The blockhouses seem to have been of two storeys in height originally and built of brick. There was probably provision for

<sup>5</sup> *Letters and Papers of Henry VIII*, 19 (1544), 244. The land was in two separate parcels totalling 9 acres. Burston was not paid for the land until 1544 when he received £66 13s. 4d. and other lands in compensation.

<sup>6</sup> R. P. Cruden, *op. cit.*, in note 2, 37, 164.

<sup>7</sup> B.M. K. Top. XVII, 16, and P.R.O. MR 1192.

<sup>8</sup> *A Part of the Town of Gravesend and the Site of Blockhouse Fort sold in 1835*.

<sup>9</sup> *Loc. cit.*, note 1, 154.

guns to fire through gun-ports in the curved front and others could be mounted on an embattled roof. A drawing of Tilbury blockhouse in 1588 shows artillery on the roof,<sup>10</sup> and seventeenth-century plans display five gun-ports in the curved front. A seventeenth-century drawing of Gravesend blockhouse by Claude de Jongh,<sup>11</sup> undated but not later than 1663, is at Pl. IA.<sup>11</sup> While perhaps slightly fanciful, it does also show gun-ports on the ground floor together with an embattled roof having the characteristic rounded Henrician parapet. There are no informative illustrations known of the East Tilbury, Higham and Milton blockhouses but, apart from any minor variations in size, it would be surprising if they were not broadly of the same pattern.

Some indication of the construction materials involved is provided by an estimate for the sum of £211 13s. 4d. given in 1539 as the cost of building one blockhouse. This was made up as follows: ashlar, £6 13s. 4d., 150,000 bricks, £45, lime, £20, chalk, 200 tons £6 13s. 4d., timber, £33 6s. 8d., workmanship, £80 and other materials, £20.<sup>12</sup> The nearness of the river, the consequent threat of flooding and marshy nature of the ground emphasized the need to secure firm foundations and a corresponding proportion of the two hundred tons of chalk was no doubt for this purpose. Although the structure of the blockhouses was chiefly of brick, the reference to ashlar indicates that stone probably formed part of the construction as dressing material and for parts where only stone would serve. During the course of construction supplementary estimates were prepared. Among other things, they refer to the building of lime kilns for the production of mortar, Newcastle coal "for to brine the lyme with", lodges for the masons to work in and to store supplies of chalk and timber.<sup>13</sup>

It is reasonably possible that positions for guns outside, though next to, the blockhouses were an original feature. There was probably an earthen rampart for the guns on either side or in front of the blockhouse building, and this may have been extended to the rear to form a defensive enclosure. On a sixteenth-century map of the Thames,<sup>14</sup> the East Tilbury, Higham and Milton blockhouses are shown as having a semi-circular boundary on the landward side, which roughly conforms with the shape of the landward rampart and ditch shown on the late-eighteenth-century and early-nineteenth-century maps on the site of the Milton blockhouse. The drawing of the Tilbury blockhouse in 1588 shows it enclosed by a rampart and ditch, with gun positions at the

<sup>10</sup> R. P. Cruden, *op. cit.*, in note 2, facing 247.

<sup>11</sup> B.M. Royal 6 E.C.M. 6. A drawing by Cornelius Bol. (B.M. L.B.1), who worked in the 1660s shows the blockhouse from the other side.

<sup>12</sup> *Letters and Papers of Henry VIII*, 14 (1539), 29.

<sup>13</sup> *Ibid.*, 29.

<sup>14</sup> B.M. Sloane 3651.

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front by the water's edge,<sup>15</sup> and this was probably substantially the original arrangement. It is unlikely that the Gravesend blockhouse had effective landward defence, because it was looked down onto from rising ground behind.

ARMAMENT

Construction of the blockhouses proceeded rapidly and, to all intents and purposes, they were virtually complete by 1540 and provided with their armament. The following extracts taken from "a survey of Ordnance in all the King's Castles, Forts, and Bulwarks, taken in the thirty-first year of the reign of King Henry VIII"<sup>16</sup> show what the armament of the Gravesend and Milton blockhouses comprised:

"Ordynance beyng in the Bullwarkes besydes Gravesend; and furst at the Bulwark at Gravesend, Mr. Crane beyng Captain there.

Furst in Demy Culveryns of brasse redy stokkyd, and mounted upon unshod whelis .....	II	
Sakars of brasse redy mounted upon unshod whelis oon of them wth a cutte nose .....	III	
A Fawcon of brasse redy mountid, upon whelis .....	I	
A piece of brasse shotyng Fawcon shot .....	I	
A port pece yron wth 2 chambers .....	I	
Dowble bases of yron, wth 2 chambers to every of them .....	VI	
Syngill bases of yron, wth 2 chambers to every of them .....	VI	
A Bumbard of Iron, wth 2 chambers .....	I	
Hakbusshes of Iron, wth necessaryes .....	I	
Shot of iron, lead, and stone, to furnish the above wrytten peces.....	III <sup>c</sup>	LXX
Bowes of yough .....		XX
Bowstrynges .....	III	xx
Levery arrowes .....	XX <sup>o</sup>	sheff
Blak billes .....		XX
Moryssh pykes .....		XX
Dyce of yron .....	II <sup>c</sup>	
Serpentyne powder .....	XII di	barrelles

<sup>15</sup> *Ibid.*, note 10.

<sup>16</sup> P.R.O. E 101/60/3.

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MYLTON

A demy Culveryn of brasse mounted upon unshod whelis, wth ladill and sponge .....	I
Sakers of brasse, redy mounted upon unshod whelis .....	II
A chamber pece of brasse, wth oon chamber .....	I
A fawcon of brasse, mounted upon shod whelis .....	I
Dowble bases of Iron, wth ii chambers .....	IX
Syngill bases of Iron, wth ii chambers a pece .....	VII
Slynges of iron, doble and syngill, wth ii chambers a pece .....	VIII
A Bumbard of Iron, wth ii chambers .....	I
Hakbusshes of Iron .....	VI
Shott of iron, lead and stone, to furnyssh the above namyd peces .....	IIIc      XX
Bowes of yough .....	XX
Sheves of Livery Arrowes .....	XX
Mawryssh pykes .....	XXV
Blak bylles .....	XXV
Bow stringes .....	IIIxx
Serpentyne powder .....	VI barrelles"

The total for the five blockhouses was 108 guns of various types, of which 87 were of iron and the remainder of brass. Many of the guns were breech-loaders, which were in use early in that period. The guns would have been distributed between the casemates of the blockhouses, their roofs and the ancillary earthworks, but were not all necessarily mounted. Most of the guns on the roof and earthworks would have been mounted on carriages of the 'field' type then in an early stage of development. The biggest concentration of fire-power was at the Milton blockhouse, which had 31 iron guns and 5 of brass.

GARRISONS

The permanent garrisons of the blockhouses were quite small and would have needed supplementary manpower when under attack. They were paid out of funds provided by the Exchequer and the Office of Ordnance, and the Master of Ordnance was responsible for organization and training. Details of the size and rates of pay of the garrisons of the Thames blockhouses sometime in 1540 have survived.<sup>17</sup> For the

<sup>17</sup> B.M. Royal M.s.s. Appendix 89, fol. 23.

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Gravesend and Milton blockhouses these are as follows:

Gravesend	Commanding, Captain James Crane	(1s. per day)
	Second in command	(8 <i>d.</i> per day)
	Porter	(6 <i>d.</i> per day)
	6 gunners	(6 <i>d.</i> per day)
	2 soldiers	(6 <i>d.</i> per day)
Milton	Commanding, Captain Sir Edward Cobham	(1s. per day)
	Second in command	(8 <i>d.</i> per day)
	Porter	(6 <i>d.</i> per day)
	7 gunners	(6 <i>d.</i> per day)
	3 soldiers	(6 <i>d.</i> per day)

The garrisons of the Higham, Tilbury and East Tilbury blockhouses were smaller. In keeping with its larger armament, the Milton blockhouse was the largest command. However, it is known that by December, 1540, the gunner complements of the Gravesend and Milton blockhouses had been reduced to five at each, and this is confirmed in a later document of January, 1541.<sup>18</sup> Whatever the length of time on duty of the garrison, it is evident that in later years some of the Gravesend gunners worked part-time at a trade, and in fact usually preferred to live in the town.

### THE POST-CONSTRUCTION PHASE

With the virtual completion of the Thames blockhouses many of the carpenters and masons who had been engaged upon them were released to serve on the King's works in France, but in the few following years there were a number of accounts for 'repairs'. In 1542, a William Gonson was paid £150 and, in 1543, a further £113 15*s.* 4*d.*<sup>19</sup>

In 1545 Captain, Sir Edward Cobham, of the Milton Blockhouse, was replaced by William Burston, from whom the land for the Gravesend and Milton blockhouses had been obtained. The following letter from William Burston to the Earl of Suffolk, probably written in May, 1545, is instructive about the material required for the Gravesend and Milton blockhouses and seems to suggest the need for further construction work at Milton.<sup>20</sup>

"Instructions to my Lord of Suffolkes grace for the blockhouse of Milton, whereof Willym Burston is captayne.

First, Serpentyne powder halff a last, the which must needes be had.  
Item, money for the performance of the platt.

<sup>18</sup> *Letters and Papers of Henry VIII*, 16 (1540-41), 224.

<sup>19</sup> *Ibid.*, 17 (1540), 138.

<sup>20</sup> *Ibid.*, 20 (1545), 556.

Item, to haue a man skylfull to haue the survey of the workees by the avyse of Mr. Lee.

Item, to have a comyssion for the takyn of workmen vp.

Item, for ordnaunce to fornyshe the rampar and ij new towres of earthe.

I beseche your grace in any wyse to remember the powder, and ij gonners more to my house yf it may be.

Willyam Burston

Thes nessarys to be hadde for the Kyniges Maiestes Fortes of Gravesend, whereof Jamys Crane captayne.

Item, a payer truckells for the bumbard.

Item, for x basketts and xiiii hurdles.

Item, for xii bowes.

Item, for x morris pykes.

Item, vj dossen of stynges.

Item, for xij shott of stone for the bumbard of ix inches hye, thys same we great need of."

Referring to this, the Earl of Suffolk, in a letter to Paget, dated 12th July, 1545 complained that there were difficulties in providing the ordnance required and skilful men to carry out the works.<sup>21</sup> An armament list of 28th December, 1547 shows what changes in ordnance had by then occurred since the original list of 1540.<sup>22</sup>

#### DISARMAMENT

Whatever work was carried out, in June 1553 an order was given to disarm the Thames blockhouses and remove the ordnance to the Tower of London.<sup>23</sup> However, it is interesting to note that during the short-lived rebellion of Thomas Wyatt, in 1554, Lord Cobham, who surrendered Cooling Castle to the rebels, partly blamed defeat on the failure of the blockhouses to supply him with ordnance.<sup>24</sup>

The Gravesend and Tilbury blockhouses later continued for three centuries to be part of the defensive arrangements for the river. So far as the remaining three blockhouses are concerned, what precisely happened to them is less clear, but it was not long before they passed into obscurity.

The years leading to 1588 were comparatively uneventful as far as the Thames defences were concerned, although during the period Gravesend increasingly became used as an embarkation port for troops, sometimes encamped in the town for a few days.

<sup>21</sup> *Ibid.*, 573.

<sup>22</sup> *Society of Antiquaries of London*, Brander Manuscript MS. 129.

<sup>23</sup> R. P. Cruden, *op. cit.*, in note 2, 169.

<sup>24</sup> *Ibid.*, 181.



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### THE SPANISH ARMADA AND THE THAMES

The causes and fate of the Spanish Armada in 1588 are well known and need no explanation here. However, the preparations for defence at Gravesend at that time have a particular relevance, for the Duke of Parma had assembled in the Low Countries a large army which posed a threat to the Thames.<sup>25</sup> One of the first acts of the time was a military reconnaissance of the Thames estuary carried out, on 17th July, 1588, by Sir John Norris to decide what defensive measures were necessary to stop an enemy.<sup>26</sup> This was at a time when it was decided to establish a camp for a field army at Tilbury to cover the approach to London, and able, if necessary, to cross the river at Gravesend.

The decision was taken to place a barrier across the Thames between Gravesend and Tilbury to bar the way upstream to navigation. The original proposal was apparently for a scantily supported chain to be drawn across the river and anchored down to the bank on either side. However, this did not have the approval of Mr. Peter Pett, of the Dockyard, at Deptford, who recommended that the chain should be supported by masts driven into the river-bed and by moored lighters, all connected together and strengthened with cables. Mr. Lindsay Boynton refers to a boom defence built at this time by the Italian engineer, Gianibelli 'to close the Thames at Gravesend and which broke with the first flood tide', and to another more successful one devised by Pett.<sup>27</sup>

Little had been done to put the blockhouses at Gravesend and Tilbury in order by 23rd July, 1588. On that day, the Earl of Leicester visited them as local commander and found them to be in a dreadful state.<sup>28</sup> The Gravesend blockhouse had not one platform either on the ground or aloft to bear ordnance and a pair of demi-cannon was required to augment the armament there. The Tilbury blockhouse was generally in rather worse condition. Peter Pett was sent to find materials to make repairs and to provide platforms. Gunpowder to augment existing small supplies was also needed.

The permanent garrisons of the two blockhouses at that time are given as one master gunner and four gunners at Gravesend and one master gunner and eight gunners at Tilbury.<sup>29</sup>

On 24th July, the Earl of Leicester reported that he had put the blockhouses in the best order that time would permit, but that planks were still required for the gun-platforms and vessels and masts were still awaited for the boom defence. At length, the boom defence was

<sup>25</sup> *Richard Hakluyt—Voyages and Documents*, Oxford, 1965, 383.

<sup>26</sup> R. P. Cruden, *op. cit.*, in note 2, 236.

<sup>27</sup> Lindsay Boynton, *The Elizabethan Militia*, London, 1967, 131.

<sup>28</sup> *Cal. S.P. Dom.* 1581-90, 509.

<sup>29</sup> K. W. Maurice-Jones, *History of Coast Artillery in the British Army*, London, 1959, 8.

provided at a cost of £305 19s. 5*d.*, though as Hakluyt put it, 'it were very late first.'<sup>30</sup> The measures taken for the defence of the Thames estuary during the actual period of emergency were of a temporary nature. After the destruction of the Armada and Parma's withdrawal from the Low Countries, the camp at Tilbury was broken up.

Some help with regard to the nature of the work carried out or planned during the Armada period is given by a manuscript map of 1588 by Robert Adams,<sup>31</sup> which shows the plan for batteries on the banks of the river and for boom defences. The map covers the whole of the Thames to London, and the section of a later copy showing the river at Gravesend is at Pl. IB.<sup>32</sup> The map shows the position of the camp at Tilbury and the boom defence. It will be noted that four of the five blockhouses built in 1540 are shown, the Higham one being absent. The boom defence, no doubt, represented schematically, is strung out at one end between the Tilbury blockhouse, which is shown as having defences on the landward side, and what may be taken at the other end as the Gravesend blockhouse, also shown with additional defensive works. Perhaps significantly, in the original Adams map, the East Tilbury blockhouse and what must be the Milton blockhouse were both labelled 'ye olde blockhouse'. Whatever the plans for these two blockhouses during the Armada crisis, the wording of contemporary documents seems to infer that only two, the Gravesend and Tilbury blockhouses, were actually in use.

As for Tilbury blockhouse, there is some evidence that an outer ditch and rampart were actually provided. It is also possible that some additional work was carried out at Gravesend; William Borough's map of the Thames at Gravesend, dated 1598,<sup>33</sup> shows an enclosure behind the blockhouse, with a bastion-type feature at two of the angles. The statement by R. Pocock, published in 1797,<sup>34</sup> that 'the old bricks and rubbish of the town, from the Fire (which destroyed nearly half of Gravesend in 1727) were carried to level the Camps a place so called from the old entrenchments of a Fortification seen there . . . ' refers to an area now called the Terrace on higher ground behind the blockhouse, and this could be significant. Lastly, to revert to a contemporary Armada witness, Hakluyt, he states that 'on *both* sides of the river fortifications were erecyted according to the prescription of Frederike Genebelli . . . '<sup>35</sup>

<sup>30</sup> *Op. cit.*, in note 25, 369.

<sup>31</sup> *Thamesis Descriptio, Anno 1588*, B.M. K6. 17.

<sup>32</sup> From *Arrangements which were made for the Internal Defence of these Kingdoms*, London, 1798, 32.

<sup>33</sup> B.M. Maps 186. h.1. (56).

<sup>34</sup> R. Pocock, *History of Gravesend and Milton*, Gravesend, 1797, 240.

<sup>35</sup> *Ibid.*, note 25.

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### POST-ARMADA INVASION SCARES

There were still fears of a new invasion threat and work on repairing the deficiencies of the Thames blockhouses continued after the immediate danger was over, under the supervision of Thomas Bedwell and Gianibelli.

An estimate dated 25th August, 1588,<sup>36</sup> refers to repairs for 'the platform of the one part of the blockhouse at Gravesend, being utterly decayed and taken down'. It recommends 1,000 ft. of timber, 10 cart-loads of other timber for frames and joists and 300 iron spikes. There was a separate and more extensive estimate for the Tilbury blockhouse. A further estimate dated 3rd October, 1588 formed 'a note of nedful worke done and to be done at the Fortes of Gravesend and West Tilburie, not remembered in the (25th August?) estimate.'<sup>37</sup> It states that the making of the 'utter fosset' and the raising of 'both counter-scarpes' had to be done. Two watch-houses were to be erected, and chalk and gravel were required for a wharf. Among the other items listed was an extra payment to the workmen 'by reason of the watry Colde and Fowlenes of the worke'. Unfortunately, the estimate does not distinguish between the two blockhouses. Also on 3rd October, Gianibelli and Bedwell wrote to the Privy Council and raised the question of arrears of pay due to pioneers for their work at Gravesend and Tilbury. A later letter of 10th May, 1589,<sup>38</sup> from Pett to Lord Burleigh refers to the 'old debt of Gravesend' as still unpaid, and this clearly relates to work carried out in 1588.

For years after 1588, the fear of invasion still lingered. 'Observations for the present time', dated November 1596, during the Captaincy of George Sands, refer to measures to be taken for security against an attack on the Thames estuary.<sup>39</sup> Another invasion scare occurred in 1598 when some Spanish ships had been observed off the South Foreland and plans for defence were again drawn up. The Lord Admiral Nottingham wrote to Lord Burghley on 17th February, 1598, about the situation at Gravesend saying that 'there is nothing here . . . to impeach anything but the two silly forts which can do little.'<sup>40</sup>

Next year, the fear of attack seems to have been more acute, especially when rumours circulated about a Spanish landing on the Isle of Wight. The Earl of Cumberland took command of a small military force for the defence of the capital and the overall responsibility for the Thames defences. As part of the preparations, the City of London provided twenty lighters to act as troop transports between

<sup>36</sup> *Ibid.*, note 28, 536.

<sup>37</sup> R. P. Cruden, *op. cit.*, in note 2, 246.

<sup>38</sup> *Ibid.*, note 28, 598.

<sup>39</sup> *Cal. S.P. Dom.*, 1595-7, 305.

<sup>40</sup> *Ibid.*, 1598-1601, 27.

Gravesend and Tilbury. The city also manned and provisioned more than twenty-five ships for the defence of the river. To prevent enemy navigation of the Thames, the Earl of Cumberland announced that, if necessary, he would construct a boom defence between Gravesend and Tilbury.

The plan finally seems to have been that of sinking hulks in the river.<sup>41</sup> Fortunately, no attack came but, in 1600, the danger still seemed sufficiently real to justify the drawing up of a revised early-warning system for London, involving the co-ordinated use of beacons and a relay of barges and ships.<sup>42</sup>

#### THE EARLY SEVENTEENTH CENTURY SURVEYS

The blockhouses and, more particularly, the outside ramparts and gun-platforms were particularly prone to decay. They required constant upkeep, which they did not always get, and tended to deteriorate badly, especially after a period of emergency had passed. A number of surveys of the blockhouses was carried out in the early seventeenth century, together with estimates and recommendations for repairs, and these are informative in many respects.

'A Survey of the Defects of Gravesend Blockhouse' of 1600<sup>43</sup> paints a dismal picture of the condition of the outside ramparts. The east platform, 100 ft. long and 14 ft. wide, was decayed in sixty places, and materials for repairs amounted to 650 wooden joists, 1,400 ft. of 3-in. planks and 9½ cart-loads of other timber. The west platform required 1,428 ft. of 3-in. planking and 10 cart-loads of other timber. Necessary repairs to brick-walls, plumbing and broken glass are also referred to, but they probably relate to the blockhouse itself or an outbuilding. On armament, the survey lists all the defective ordnance present as: an iron falcon and a brass saker mounted 'in the platform aloft', one iron culverin, one iron demi-culverin and one saker on the east platform and two demi-culverins and three sakers on the west platform. The serviceable guns are not listed. The survey also lists as unserviceable 20 pikes and 24 Brown Bills. In 1602, the Privy Council actually ordered the removal of the ordnance at Gravesend to the Tower of London.<sup>44</sup> There was another survey in 1623, which proposed little beyond the replacement of some rotten gun-carriages whose cost was estimated in 1625.<sup>45</sup>

Under the Stuarts, the nation's coastal defences continued to deteriorate through lack of attention and garrisons went unpaid for many years. Gravesend was no exception to this. In 1629, Captain John

<sup>41</sup> Lindsay Boynton, *op. cit.*, in note 26, 273.

<sup>42</sup> *Ibid.*, note 40, 429.

<sup>43</sup> B.M. Add. Mss. 5752.

<sup>44</sup> *Cal. S.P. Dom.*, 1601-3, 172.

<sup>45</sup> *Ibid.*, 1625-6, 202.

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Smith petitioned jointly with the commander of the Tilbury blockhouse for urgent attention to repairs in their respective works and to the payment of arrears due to the gunners and porters.<sup>46</sup> The Board of Ordnance surveyed the Gravesend blockhouse, and an estimate, dated June, 1630, gave £1,248 16s. 2d. for repairs.<sup>47</sup> Little if any work seems to have been carried out, however, and Captain Smith again petitioned for payment of arrears. Yet another survey took place in 1631, which seems to have been acted upon.<sup>48</sup>

‘The two platforms on the east and west to be timbered and planked 300 ft. in length and 20 ft. in breadth, for standing and reverse of the ordnance. The whole wharf, being 20 rods in length, to be new set; and all along the foot of the wharf, a new foot-bank to be made of piles, and two planks high to be filled. A palisado upon the high bank, behind the east platform 10 rods in length, and a port at every 10 ft. with rails the height of the posts, and a little postern door at the coming down of the stairs, and a gate for a cart to come in, at the lower end of the palisado. A parapet of earth 6 ft. high, and 8 ft. thick at the foot and 6 ft. above, to be turfed inside, and outside, and bound with rice (fagots) and ports for the great ordnance to look through it. A storehouse, in the room of the old stable, 30 ft. long and 15 ft. broad. A watch-house with a chimney, to serve also for a court of guard, over the stairs that go up to the platform of the bulwark, and a new door with a frame of timber to hang the watchbell; the room to be 10 ft. square. A new gate at the west end of the platform, and a porters lodge. A new platform within the bulwark, to be paved with stone, and a water passage out of the floor into the river. Six new ports to be framed of timber, and hanged with cross-garnts, to open and shut. Four posts to support the beams of the roof. Another platform above the leads, for three small pieces of ordnance. A pair of stocks to stand by the porters lodge, upon the lower platform, by the outer gate. Coping and pointing walls and mending the bulwark leads, & c. Total estimate £522 6s. 8d.’

The watch-tower referred to in the survey report is shown in the de Jongh drawing at Pl. IA and elsewhere.

The ordnance then present at the blockhouse was (in brass) 2 demi-culverins and 2 sakers and (in iron) 1 culverin, 6 demi-culverins, 4 sakers and 1 minion, a total of 16 guns. Work on the blockhouse was ordered to commence in 1633.<sup>49</sup> The brass guns were ordered to be removed in March, 1635, for ship service and were to be replaced by guns of iron.<sup>50</sup>

## THE ENGLISH CIVIL WAR AND THE RESTORATION

Although there were some alarms, the Gravesend and Tilbury blockhouses played no significant part during the Civil War, but during

<sup>46</sup> *Ibid.*, Addenda 1625-49, 361.

<sup>47</sup> *Ibid.*, 1629-31, 282.

<sup>48</sup> R. P. Cruden, *op. cit.*, in note 2, 293-4.

<sup>49</sup> *Cal. S.P. Dom.*, 1633-4, 470.

<sup>50</sup> *Ibid.*, note 46, 493-4.

the War and the Commonwealth they became Parliamentary control-points for shipping entering the river. The military governor also had duties in connection with the detention of suspicious persons and enemies of state.

On the Restoration, the command of the Gravesend blockhouse became the subject of petition. Two such petitions for command (one from Robert Armestead and another from Thomas Freebody both during June, 1660) are known, but it was William Leonard who in July was appointed Captain at 4*d.* per day and £20 per year for the Gravesend blockhouse and 2*s.* per day and £20 per year for the Tilbury blockhouse.<sup>51</sup>

An examination of several musters of the Gravesend blockhouse in 1662 found everything in order, but arrears of pay were due and, in 1663, a warrant for payment was issued.<sup>52</sup>

Sir John Griffith took over command of the Gravesend and Tilbury blockhouses in 1664 and, shortly afterwards, new work was commenced at Gravesend; it consisted of alterations and repairs resolved upon by the king himself 'to make it more convenient'.<sup>53</sup> The local tradition that the Gravesend blockhouse was occasionally used by Charles II as a banqueting-hall may reflect this. William Crafter, a local historian of Gravesend, noted in 1834 that on the wall of the blockhouse, then still standing, were the remains of a coat of arms said to have been put there during the reign of Charles II. Certainly, by 1665, a house near and behind the blockhouse was added for the use of the Duke of York as Lord Admiral. The building later became the ordnance store-keepers quarters. R. P. Cruden records that the front of this building was 'appropriately decorated with an anchor, and semisphere above it, with the date 1665, all in brickwork over the door';<sup>54</sup> this building was much later reconstructed and eventually incorporated into the Clarendon Royal Hotel.

#### THE DUTCH RAID, 1667

Soon afterwards the Dutch raid into the Thames and Medway in June, 1667, promoted additional activity in defensive preparations at both Gravesend and Tilbury. On the first appearance of the Dutch, Sir John Griffith was ordered to put his defences into readiness and to mount as many guns as he could.

Whatever the arrangements to make the Gravesend blockhouse 'more convenient', both it and Tilbury blockhouse were then ill-prepared as defensive positions to meet an attack. The Duke of

<sup>51</sup> *Ibid.*, 1660-1, 118.

<sup>52</sup> *Ibid.*, 1663-4, 203.

<sup>53</sup> *Ibid.*, 1665-6, 64.

<sup>54</sup> R. P. Cruden, *op. cit.*, in note 2, 380.

## THE ARTILLERY DEFENCES AT GRAVESEND

Albemarle was present in Gravesend on 10th June, when the Dutch fleet was dangerously close in the estuary and he noted that few guns were mounted and that at Tilbury only two guns were in position. A train of artillery was ordered to Gravesend from the Tower to supplement the blockhouse guns.<sup>55</sup> However, in the event, the Dutch soon made it clear that the Medway was the focus of their attention, though they maintained a blockade of the Thames entrance. While the Dutch concentrated on the Medway the opportunity was taken to consolidate the Thames defences,<sup>56</sup> and by 27th June, 80 guns were positioned on both banks of the Thames with four infantry companies standing by at Gravesend.<sup>57</sup> Work on the defences was still in progress in July and, on 10th July, a letter from Sir Godfrey Lloyd to Lord Arlington gave details of materials required.<sup>58</sup> To help finance the work at Gravesend, £400 was provided as part of a loan of £10,000 from the City of London for various defence works.<sup>59</sup> Fortunately, the timely Peace of Breda on 21st July, 1667, ended hostilities, but the treaty was not concluded before much damage had been wrought by the Dutch in the Medway.

As far as is known, during the period of emergency the Gravesend and Tilbury blockhouses were not brought into action although three attempts were made by Dutch squadrons to advance up-stream; these were not pressed forward for fear of the concentration of fire from the blockhouses. For most of the period of the Dutch blockade, the enemy fleet was able to occupy the stretch of river below Gravesend with impunity, for the old Tudor works at East Tilbury and Higham had long fallen into disuse. Obviously there was a clear need to protect effectively the lower reaches with works. However, it took another war situation almost 150 years later before anything was done. Nevertheless, a concession to defence needs was made when Charles II's Dutch engineer, Sir Bernard de Gomme, was asked to design a new fort on a bastion trace to enclose the Tilbury blockhouse; de Gomme was also concerned with new works in the Medway at Sheerness, Cockham Wood and Gillingham, and elsewhere. The design and construction of the large new work at Tilbury which became known as Tilbury Fort is described by Mr. A. D. Saunders.<sup>60</sup> No radical new building on a comparable scale took place at Gravesend.

In 1687, Sir Henry Sheere was ordered to transfer the larger guns at Gravesend to Tilbury Fort, leaving behind only the smaller pieces.<sup>61</sup> On 2nd December, 1669, the Governor, Sir John Griffith, was ordered

<sup>55</sup> R. P. Cruden, *op. cit.*, in note 2, 348.

<sup>56</sup> *Cal. S.P. Dom.*, 1667, 196.

<sup>57</sup> *Ibid.*, Addenda, 1660-85, 201.

<sup>58</sup> *Ibid.*, note 56, 285.

<sup>59</sup> *Ibid.*, note 56, 310.

<sup>60</sup> *Ibid.*, note 1.

<sup>61</sup> R. P. Cruden, *op. cit.*, in note 2, 373.

to be discharged for his practice of demanding money from certain ships before he would permit them to pass the batteries; he was replaced on 6th December by Sir Francis Leake who took command of the works at Gravesend and Tilbury.<sup>62</sup> The practice of collecting fees seems to have been adopted on various occasions by different governors; it was stopped after complaints, but resumed after the tumult had died down. In the years after 1671, there are frequent references to companies in garrison at Gravesend and Tilbury, and it seems to have been the practice for the governor to be their commander.

A map of 1698, entitled 'An exact mapp of Tilbury Fort and ye principal ground about it with ye river' gives the first clear idea of the plan of the Gravesend blockhouse, albeit at a comparatively late stage. It shows the establishment as comprising the D-shaped blockhouse on the edge of the river, with a small additional structure abutting on to the left side; also, a pier jutting out into the river from the front, with the building erected for the use of the Duke of York behind, and a wharf on either side of the blockhouse flanked by a small dock on the eastern side. A line of gun-positions is shown along the bank of the river on the east side of the blockhouse.

In 1701, the garrison of the Gravesend blockhouse was given as a sergeant and twenty soldiers and a gunner from Tilbury Fort and an armament of 'about 20 guns *planted level with the water*'.<sup>63</sup>

#### THE JOHN ROMER SURVEY

While the 'exact mapp' is useful, a Board of Ordnance plan by John Romer of 1715 is much more detailed.<sup>64</sup> At Fig. 1 is a modern drawn copy with a simplified key. One notable change in rôle is that the blockhouse itself is identified on the original plan as a magazine and, presumably, guns were no longer mounted in or on it, the fire-power having passed to the gun-line on the east side. This situation had probably existed at least since 1701. By 1683, the Tilbury blockhouse had already been turned into a magazine.

The main gun-line at H to H on the plan was aligned mainly for cross-river fire while the smaller battery at G to G was angled more for down-river fire. The seventeen guns actually in position in 1715 were reduced to ten in 1716 as part of a disarmament programme agreed upon after the Peace of Utrecht in 1713; the armament of Tilbury Fort was also reduced.<sup>65</sup> The feature shown in broken line on the eastern side of the blockhouse is in a differing colour on the original plan; it is not shown on the 'exact mapp' and may indicate a proposed development.

<sup>62</sup> *Cal. S.P. Dom.*, 1668-9, 606.

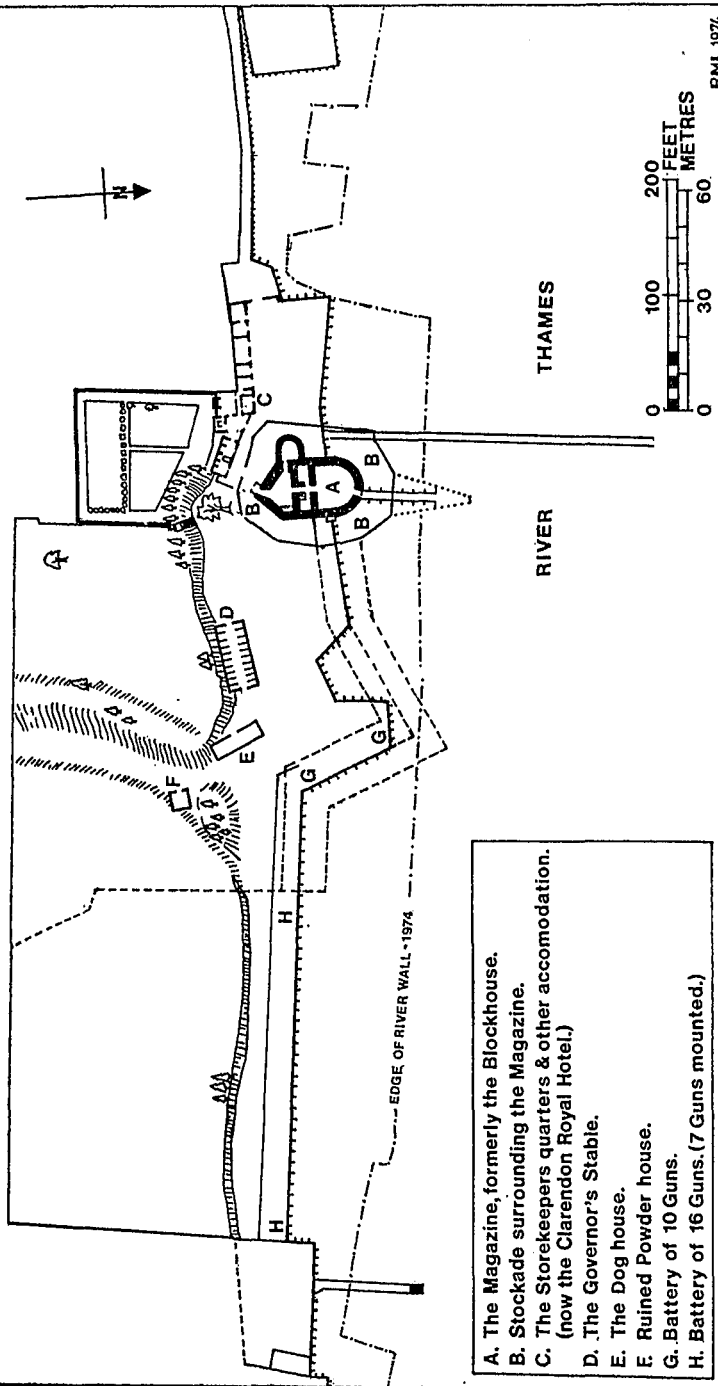
<sup>63</sup> G. Howell, *The Kentish Notebook II*, London, 1894, 61.

<sup>64</sup> P.R.O. MPH 45.

<sup>65</sup> K. W. Maurice-Jones, *op. cit.*, in note 29, 19.



**A PLAN OF GRAVESEND BLOCKHOUSE. 1715**  
 (BASED ON A PLAN BY JOHN ROMER  
 IN THE PUBLIC RECORD OFFICE.)



- A. The Magazine, formerly the Blockhouse.
- B. Stockade surrounding the Magazine.
- C. The Storekeepers quarters & other accommodation.  
(now the Clarendon Royal Hotel.)
- D. The Governor's Stable.
- E. The Dog house.
- F. Ruined Powder house.
- G. Battery of 10 Guns.
- H. Battery of 16 Guns. (7 Guns mounted.)

Fig. 1. A Plan of Gravesend Blockhouse.

RML 1974.

Whether this was put on the plan at the time or later to meet a new need cannot be said with certainty as the writer has been unable to find any supporting documents. The Letter-book of Israel Harrison of the Ordnance Office at Gravesend covering the period 1730-35, which is preserved at the Gravesend Public Library, has an entry of 1730 referring to a great deal of earth and wharfing having been washed away from the fronts of both Tilbury Fort and the Gravesend blockhouse; repairs were urged. A further entry of 1730 states that 'the front wall at the Gravesend Blockhouse and the soldiers boghouse both fell into ye Thames'. It is notable that while a map with an earlier date of 1725<sup>66</sup> seems to show virtually the same riverside outline of wharfing as in the 'exact mapp' and the John Romer plan, Buck's view of Gravesend in 1739 and a map of 1746<sup>67</sup> suggest that at some point most of the riverside gun-line at H to H in Fig. 1 had been abandoned and the small dock on the east side of the blockhouse filled in. The result was that a situation approximating to the development in broken line in Fig. 1 was reached, though the line joining the blockhouse with the ten-gun battery was probably at less of an angle. A revision of the map of 1746 in 1756 confirms the general situation.

'The Report on the State of the forts and garrisons in Great Britain, 1766'<sup>68</sup> states that the batteries, magazines, buildings and wharfing at Gravesend were in good order and that the armament was ten nine-pounders. At least by the second half of the eighteenth century, a pitched roof had been added to the blockhouse, giving it the appearance as shown in various engravings of the period.

#### THE THOMAS HYDE PAGE SURVEY

Beyond the construction of two new powder-magazines at Tilbury Fort in 1716 and various repairs and alterations to the existing structure at Gravesend and Tilbury, little in the way of new structural work was carried out in the Thames estuary in the first three quarters of the eighteenth century. However, against the background of the American War of Independence and the subsequent alliance of France with the Americans, in 1778, the engineer Thomas Hyde Page carried out a survey of the defensive requirements of the Thames.<sup>69</sup> The period was one of mounting fear of possible invasion and orders were issued for a number of new batteries to be built in various parts of England's coasts.

Page's major contribution to the defences of the Thames was to plan an entirely new battery east of the Gravesend blockhouse to give

<sup>66</sup> B.M. K. Top., XIII, 53.

<sup>67</sup> B.M. K. Top. XIII, 54.

<sup>68</sup> P.R.O. S.P.41/39.

<sup>69</sup> B.M. K. Top. XVII.16 b.

## THE ARTILLERY DEFENCES AT GRAVESEND

greater down-river fire and better cross-fire with Tilbury Fort; the new battery became known as New Tavern Fort. Page noted that the guns mounted *en barbette* at the Gravesend blockhouse battery were too closely placed and he considered that the battery should be modernized to meet defence needs; he did not think it necessary to alter radically Tilbury Fort, though he envisaged the construction of a bastion projecting into the river, first mooted in a de Gomme plan of the seventeenth-century, and the forming of a battery for six guns at the south-east corner of the covered way to bear downstream; in the event the former was never provided. Page's ideas were substantially those implemented at Gravesend, but it is perhaps surprising that the opportunity was not taken to commence new works further downstream to fill the gap which had existed since the disappearance of the Tudor blockhouses. The proposals insofar as they related to Gravesend are shown in detail in a plan which accompanied Page's survey.<sup>70</sup>

### NEW TAVERN FORT

The plan envisages New Tavern Fort, a few hundred yards east of the Gravesend blockhouse, to be on an irregular bastion trace with embrasures for eleven guns. The ramparts were to be earthen without revetment; it was to concentrate most of its guns in down-river fire, but a small proportion was to be available for raking fire across river. The fort was to be defended to the front, or east side, by a wide flat-bottomed ditch which, on the approved profile drawings, has a line of 10-ft.-high pointed stakes rising vertically from the junction of the slope of the escarp and the bottom, but the plan does not show any provision for protection of the gorge. The medieval Chantry of Milton within its confines was to be retained.

### THE GRAVESEND BLOCKHOUSE

The plan for the Gravesend blockhouse retained the building itself as a magazine and also the existing ancillary accommodation and buildings. However, the gun-lines on the east of the blockhouse were to be remodelled and extended to take twenty guns firing through embrasures, the construction of the new ramparts and ditch being largely the same as for New Tavern Fort, except that the profile drawing does not contain an illustration of a pointed stake obstacle in the ditch.

The plan provides for little self-defence capability, the intention basically being in the context of the threat of invasion to increase fire-power against ships coming up river as quickly as possible. However, there was a contingency plan for converting Gravesend into a strategic entrenched camp in the event of invasion by the provision of extensive

<sup>70</sup> B.M. K. Top. XIII.55 a.

landward defences to the rear of the town.<sup>71</sup> It was projected that the riverside defences could be extended along to form the base of a defended triangle which had its apex on Windmill Hill, inland, itself envisaged as a defensive position occupying the commanding high ground, and the pivot of the arrangements.

#### THE BUILDING OF NEW TAVERN FORT

Work on the construction of New Tavern Fort and on the new gun-lines at the Gravesend blockhouse began not long after the Page plans were approved. In the case of New Tavern Fort, the land had first to be purchased by Act of Parliament.<sup>72</sup> Steps also had to be taken to ensure that no civilian buildings were in future to be erected nearby so as to block the field of fire of the guns. The ancient Chantry of Milton within the area of the fort was included in the purchase and, in 1780 or shortly after, was encased in brick and used as a barracks.

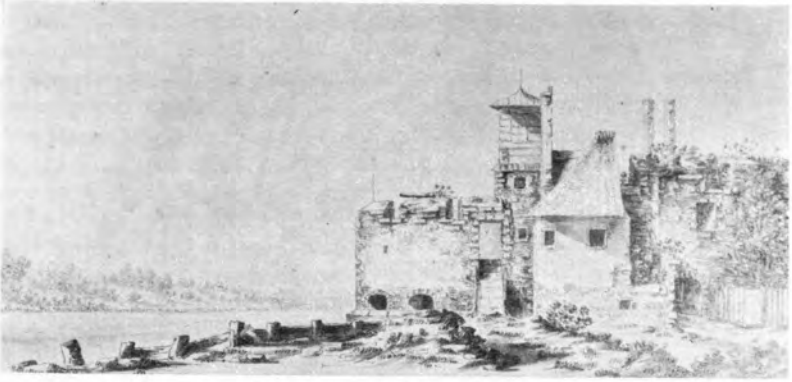
It is certain that, with refinement, the Page plans were substantially adopted for the work carried out, but the writer has not been able to find a plan of the works as constructed before one dated 1795. Nevertheless, the 'Plan of the Works at New Tavern and Blockhouse Forts, Gravesend with the additions and alterations Executed in the year 1795'<sup>73</sup> at Pl. IIA contains useful evidence of Page's original design. The plan shows New Tavern Fort as having embrasures for sixteen guns, mostly aligned for down-river fire and apparently one position for a gun firing *en barbette*. Of interest is the kiln for heating shot to a red heat for setting ships on fire. Such a kiln was also provided for the Gravesend blockhouse. An earth-backed brick-wall with loopholes for gorge defence had evidently been added by 1795 in the spaces not occupied by various buildings, and at the south butt-end of the fort ditch a loopholed gallery was provided. Provision for musketry defence seems to have been extended to the parts of the front rampart not occupied by artillery embrasures.

The gun-positions at the Gravesend blockhouse were extended rather further to the east than anticipated by the Page proposals; there is no provision for musketry defence of the gorge, the rear being quite open. The number of embrasures is sixteen instead of twenty, and the emphasis on down-river fire is from the position of the work much less strong than at New Tavern; the guns mainly fire across-river or slightly down-river. The main value of the blockhouse gun-positions would have been to give fire on the sides of ships passing by and to contribute towards a short-range cross-fire with a proportion of the guns of Tilbury Fort. The offensive striking power on the south bank of the

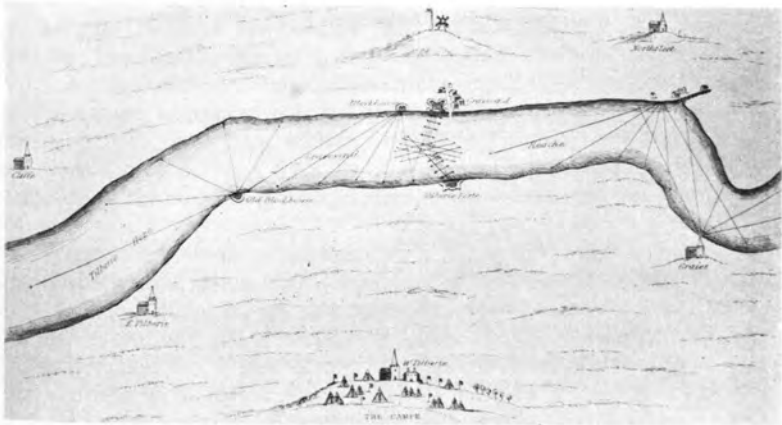
<sup>71</sup> K A.O. U6 P4.

<sup>72</sup> Stat. 20. Geo.III, c.38.

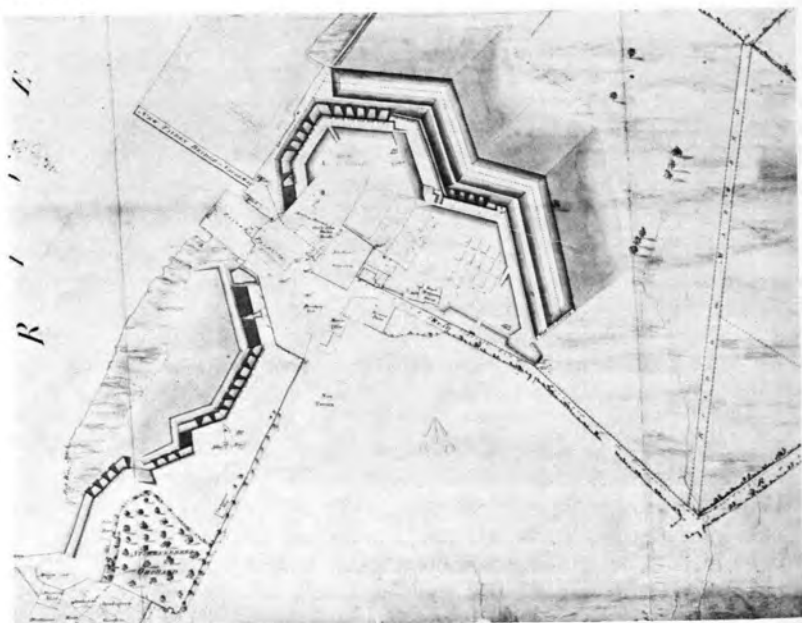
<sup>73</sup> P.R.O. MR 1192.



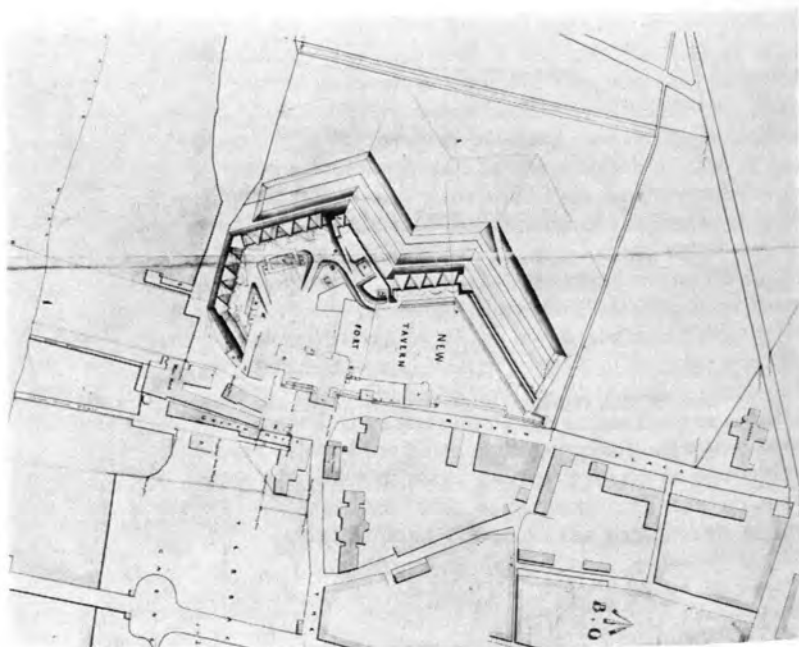
A. Drawing of the Gravesend Blockhouse by Claude de Jongh.



B. The Defences of the Thames at Gravesend in 1588.



A. Plan of Gravesend Blockhouse and New Tavern Fort, 1795



B. Plan of New Tavern Fort, 1849.

## THE ARTILLERY DEFENCES AT GRAVESEND

river rested with New Tavern Fort in co-operation with the down-river facing guns of Tilbury Fort.

In 1794, the inhabitants of Gravesend formed a company of volunteer artillery to serve the guns and this company trained in both forts having the use of one of the blockhouse store-buildings; a second company was formed in 1797.<sup>74</sup> In 1805, the armament of the Gravesend blockhouse was given as nineteen 32-pounders. The figure for New Tavern Fort was two 32-pounders, fourteen 24-pounders and one 9-pounder.<sup>75</sup>

In 1796, as a result of a report on the Thames defences by Lt.-Col. T. Hartcup in 1794,<sup>76</sup> forward batteries at the mouth of the river, which had been lacking, were finally provided. The batteries were quite small and in 1805, their armament was given as four 24-pounders at each.<sup>77</sup> At the conclusion of the Napoleonic Wars the three batteries were abandoned and, at least two of them, were let to local farmers.

### THE END OF THE GRAVESEND BLOCKHOUSE

The inability of the blockhouse gun-positions to provide really effective down-river fire led to their redundancy, all reliance being placed on New Tavern Fort to cross-fire with Tilbury; the land occupied by the gun-positions was sold in 1835 for adaptation as ornamental gardens. The blockhouse itself, capacious enough to hold 2,500 barrels of powder, had ceased to be used as a magazine in 1834 but was retained by the Crown together with the store-keepers' quarters for use as a government store at least as late as 1841.<sup>78</sup> The blockhouse was soon demolished and all that remains of the establishment is part of the structure of the store-keepers' quarters incorporated into the Clarendon Royal Hotel.

A report of 1846, in an unidentified newspaper brought to the attention of the writer, shows that it was intended to modernize New Tavern Fort to take fifteen 32-pounder guns of 56 cwt. on dwarf traversing platforms; similar plans were published for Tilbury Fort. During the excavation for a new magazine near the Chantry in 1846 some inhumations were found from which it may be presumed that the original inhabitants of the medieval building were buried there.

A plan of New Tavern Fort in 1849 (Pl. IIb) shows that, by then, the gun emplacements had indeed been remodelled for guns on traversing platforms, and a large bomb-proof magazine for 250 barrels flanked

<sup>74</sup> R. P. Cruden, *op. cit.*, in note 2, 447-8.

<sup>75</sup> K. W. Maurice-Jones, *op. cit.*, in note 29, 96.

<sup>76</sup> P.R.O. WO 30/60, 63.

<sup>77</sup> *Ibid.*, note 75.

<sup>78</sup> P.R.O. WO 55/2769.

<sup>79</sup> P.R.O. WO 55/2955.

by two side-arm sheds had been added behind the northern rampart. A bomb-proof expense magazine for 50 barrels had also been added nearby; an old and smaller expense magazine stands next to the latter. Other additions include a new wash-house and coal-store next to the main magazine and a guard-room at the western end of the northern rampart. Additional stretches of gorge wall had been built a few yards south of the Chantry across ground formerly called the Rector's Garden. Profile drawings reveal a 7 ft. 6-in. high stake-fence in the ditch and in front of the northern rampart. Land just to the west of the fort is labelled as a baggage-yard and, in front of the fort on the river-side, is the ordnance wharf and store. In total, these developments were only additions and alterations which did not substantially change the plan of the fort.

Between 1846 and 1853, Coalhouse and Shornemead forts were rebuilt to take seventeen and thirteen 32-pounder guns, respectively, on traversing platforms. The latter work was re-built according to the principles of polygonal fortification.<sup>80</sup>

#### THE ROYAL COMMISSION ON THE DEFENCE OF THE UNITED KINGDOM

By the middle of the nineteenth century the development of steam iron-clads and of rifled guns with greatly improved accuracy, range and penetrating power, firing a cylindrical shell of great destructive force, began to produce a new challenge to existing British defensive works. The territorial ambition of France and her construction programme of iron-clads and rifled guns created by the end of the 1850s a state of concern in Britain which produced re-examination of the ability of our existing defences to resist an attack by steam warships armed with the ordnance of the day and, more importantly, with rifled guns, and concluded that our defences were inadequate.

The Royal Commission on the Defence of the United Kingdom was set up in 1859 to consider the defensive requirements of our naval dockyards, anchorages and ports against bombardment and attack from sea and land; its report in 1860<sup>81</sup> considered and made recommendations about a number of strategic locations, including the Thames and the Medway. The Thames defences were said to involve 'interests of vast magnitude; including the security of the great powder magazine establishment at Purfleet, the important Arsenal at Woolwich; the large amount of valuable property extending many miles on either bank of the river; the fleet of merchant shipping moored in the port of London; and lastly the Metropolis itself'.

<sup>80</sup> *Ibid.*, note 1.

<sup>81</sup> *Report of the Commissioners appointed to consider the Defences of the United Kingdom*, London, 1860.



## THE ARTILLERY DEFENCES AT GRAVESEND

The report noted that the existing Thames defences comprised the two forward batteries at Coalhouse Point and Shornemead and, further up, Tilbury and New Tavern Forts. It accepted that, while the existing batteries were well-sited, they were inadequate to resist an attack now likely to be brought against them; because of the increased range of ordnance and anticipated improvements in the future, great emphasis was placed on developing forward defence. The existing batteries at Shornemead and Coalhouse Point were to be replaced with new and more powerful ones and an entirely new work was planned at Cliffe Creek, about  $4\frac{1}{2}$  miles downstream of Shornemead. The forward 'triangle' of fire thus created was to be augmented by a floating barrier in time of war; there was also a contingency plan to flood the marshes on the south side of the river. A new fort was to be built at Slough Point (Allhallows) to prevent a landing in its locality. To protect Chatham dockyard from an attack from the west, a line with interval works between the Thames at Shornemead and the land defences of Chatham, was recommended but the plan was later abandoned, probably on grounds of cost.

The report dealt with the upper defences of the Thames in the following terms:

'In the event of the enemy's ships succeeding in forcing this first line of defence, in effecting which it is probable that he would receive considerable damage, he would then come under fire of the batteries at Tilbury Fort and Gravesend; and we consider this second line so important that we recommend that these works should be put into the most thoroughly efficient state in every respect; their guns would cross their fire, at a distance of 2,000 yards, with those on Coalhouse Point and Shornemead; and a similar obstruction or floating barrier to that above recommended (at the forward batteries) should be prepared, to be moored between Gravesend and Tilbury Fort.'

Because the priority lay with forward defence, to have commenced work on all works at once would have left the Thames virtually defenceless during construction, and so the putting of New Tavern Fort and Tilbury Fort into a 'thoroughly efficient state' was postponed until construction of the forward batteries had sufficiently progressed. Work on the forward batteries proceeded throughout the 1860s, and each took the form of an arc of granite-faced casemates with iron shields and an annexed open battery at the up-river end with the gorge closed by barracks of Kentish rag. The magazines were under the emplacements and lifts were provided to supply ammunition to the latter. The artillery, originally intended to be 68-pounders, comprised 9-in., 11-in., and 12.5-in., Rifled Muzzle-Loading guns (RMLs) the heavier ones being intended for the casemates. The forts were designed by Captain Charles Siborne, R.E., although there were many modifications

during construction. Between 1865 and 1871 Charles Gordon superintended the works, although he seems to have had some reservations about their security.

#### NEW TAVERN FORT

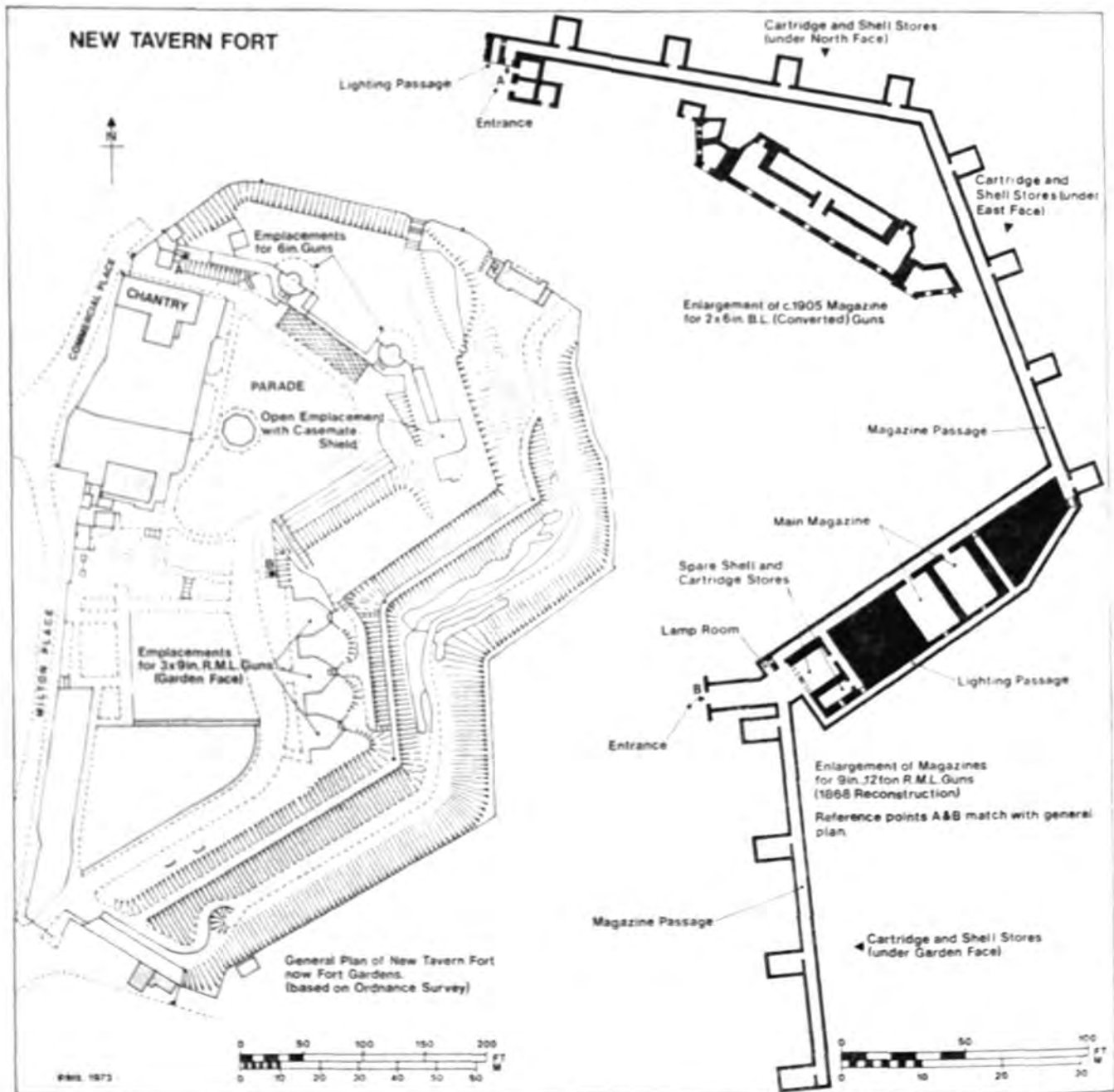
It seems that by the time the Royal Commission reported in 1860, limited new work had already been carried out at New Tavern and Tilbury Forts. This comprised partial up-gunning and the construction of buildings at both works for an 18-pounder field battery forming the 'moveable armament'. Sir Bernard de Gomme's powder magazine in the south-east bastion of Tilbury Fort was probably replaced in 1861 with another to cope with the needs of the ordnance of the day. In 1865, the armament of New Tavern Fort was given as eight 68-pounders, two 10-in. shell guns and one 8-in. shell gun. Tilbury Fort had five 68-pounders, five 32-pounders in the gun-lines and 66 other (probably obsolete) smooth-bore guns, together with eight smooth-bore howitzers elsewhere in the fort.<sup>82</sup>

Work on New Tavern and Tilbury Forts began in 1868 to implement the recommendations of the report. A report of 1869<sup>83</sup> described progress made with the various works recommended in the report of 1860 and while it gives some interesting detail of progress on the forward batteries, of the inner line it says little more than '. . . the works at Tilbury and Gravesend are now being remodelled and adapted for a modern armament . . .' It is clear that the work, which took about four years, involved the making of earthworks approximately on the line of the existing ramparts at New Tavern and the insertion in them of brick emplacements for heavy guns with magazine accommodation underneath. Work of a similar nature was carried out at Tilbury Fort on the north-east bastion, west bastion, and south-east curtain and bastion; substantial parts of this work still survive at both places.

Brick emplacements for ten heavy R.M.L. guns on traversing platforms were provided at New Tavern Fort. Of these, seven emplacements (three on the Garden Face and four on the East Face) were aligned for down-river cross-fire. Four gun emplacements still remain with racers in place; the Garden Face survives intact. The emplacements in the latter face are of the open embrasure type with a concrete faced exterior splay. On either side of each emplacement are hollow traverses of brick, communicating by a hoist shaft inside with a corresponding chamber underneath, alternately stores for cartridge and shell. The arrangement ensured that ammunition could be brought up for the

<sup>82</sup> *Journal of the Society for Army Historical Research*, xli (1963), 194.

<sup>83</sup> *Report of the Committee appointed to Enquire into the Construction and Cost of the Fortifications erected or in Course of Erection under 30th and 31st Vict., and previous Statutes*, London, 1869.



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FIG. 2. Plan of New Tavern Fort.

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supply of the guns under cover during an action, although when the battery was being prepared for action a certain amount of ammunition would be brought up and left ready in the traverse to meet initial needs. One of the traverses still has a plate inside referring to the 9-in. gun it served.

The fourth surviving emplacement on the extreme right flank of the East Face is a hybrid type of open emplacement which combines a substantial iron shield such as used in the casemates of the forward batteries. At least one such emplacement was also provided at Tilbury Fort. The other emplacements on the East and North Faces are buried under later developments, although the rear of two of them can be detected in the line of later brickwork. It is, therefore, unknown at present how far shields were employed in these two faces. So far as the ordnance is concerned, it is known that in 1871-2 ten R.M.L. guns of 7-in., or larger calibre, were mounted at New Tavern.<sup>84</sup> One of these guns was a 12-in., and the others were probably mainly 9-in. The armament was nine 9-in., and one 12-in., in 1887, and it was still the same in 1895. The 12-in. gun was in the East Face. Two gun emplacements with pivots and 5-in. wide racers set into the rampart on the right flank of the Garden Face were built at a date after 1851, yet to be precisely determined. They were aligned to deter a landward attack on the front of the fort from the direction of the south-east.

Fig. 2 contains a plan of the Royal Commission magazines at New Tavern Fort. Of simple brick vaulting, they have two entrances; the main entrance is on the left flank of the Garden Face (see A on the plan) and the secondary one is on the left flank of the North Face (see B). The magazines comprise the shell- and cartridge-stores under the traverses, the spare shell- and cartridge-stores inside the main entrance and a large main magazine of two chambers in the rampart between the East Face and the Garden Face, together with the connecting passages.

Where the chambers and connecting passages had to be illuminated this was done by lamps placed behind glass in a way to ensure that no naked flame was taken through an area containing combustible materials. In the case of the shell- and cartridge-stores, a single lamp-recess fronted by plate-glass in each was served by lowering the illumination down a small tube from the hollow traverse above, the top of the tube being capable of being sealed off by a small metal door. A formal lighting-passage entered from the lobby inside the main entrance had rectangular recesses for the illumination of the two chambers of the main magazine, the spare cartridge-store (the spare shell-store having been lit from a lamp recess in its now-demolished back-wall) and the south end of the East Face magazine-passage; the

<sup>84</sup> *Ibid.*, note 82, 190.

recesses could be opened from the lighting-passage and a lamp placed inside. A side passage leads off the lighting-passage, to a short flight of wooden steps up to the roof-level of the magazine-passage where it passes the doors of the main magazine and, at this point, a lamp trunking goes across the width of the passage. Plate glass on either side of the trunking ensured illumination of the passage in both directions. The south end of the latter passage was lit from a lamp-recess which had its own lamp-room entered from the lobby. Roof-level lighting was present in all the magazine-passages; the Garden Face passage was lit solely by lamps lowered to roof-level down circular tubes, one each in two of the hollow traverses above the shell stores.

In the East Face, to supplement the recess served from the lighting passage there is a similar arrangement but only of a single tube and there is another single tube in the North Face passage. The latter passage also received light from a recess served from a short lighting-passage running parallel to the secondary entrance to the magazines.

Door-frames, one in each case, are present set part of the way along the North and East Face magazine-passages and the magazine-passage running past the main magazine; these may have been connected with fire precautions. The magazines are well ventilated and some of the air-bricks clearly had hinged wooden covers; one in the Garden Face magazine-passage is still in place. Identification plates outside some of the magazine-chambers and passages survive and most, though not all are still legible.

While these magazines for the storing of armour-piercing shot, case-shot and common shell are substantially a product of the 1868-72 period it is open to question whether the main magazine, itself on the site of an earlier one marked on Pl. IIb, is exactly contemporary.

#### LATER DEVELOPMENTS

Continuing developments in rifled guns and in the adoption of breech-loading ordnance (B.L.) with longer range and better fire-power increased the need to emphasize forward defence. This was reflected in the Thames during the last decade of the nineteenth-century when wing batteries for B.L. guns on hydropneumatic carriages were added at Slough Fort and at East Tilbury and in the addition of quick-firing guns (Q.F.) at Coalhouse, Cliffe and Shornemead Forts.<sup>85</sup>

Towards the end of the 1880s, it was suggested that the armament of New Tavern Fort could be reduced,<sup>86</sup> but in 1895 it was still as it had been in 1887 with the addition of two 6-pounders and machine-guns; if the 6-pounders were ever mounted their emplacements are not there now. The suggestion that the armament could be reduced was prophetic

<sup>85</sup> *Ibid.*, 148, 189.

<sup>86</sup> *Ibid.*, 192.

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because by the end of the nineteenth-century it was seen that the heavy and obsolete R.M.L. guns at New Tavern Fort had long outlived their usefulness, and it was decided to remove them.

Even though the value of developing forward defence to the full was accepted, it was still considered sufficiently important to maintain New Tavern Fort as a defensive work by building positions in about 1905, or shortly before, for two 6-in. B.L. (converted Mk. 4) guns on top of the North Face.<sup>87</sup> These surviving positions are of concrete and have a circular central pit (now filled-in) for a *barbette* mounting and there is a low apron to the front; recesses covered with steel doors were provided for a ready-use supply of ammunition. The type of emplacement allowed wide traverse and the two guns could sweep the length of river from Gravesend Reach to the Lower Hope. On the extreme left flank of the North Face, a concrete fire-control position was provided and this still remains. A shallow open-topped passage joins the two emplacements.

The construction of the gun emplacements and of bomb-proof shelters below the level of the crest on either flank involved the filling in of the R.M.L. emplacements in the North Face and almost all of those on the East Face. Magazine and other accommodation was provided under the gun positions (see Fig. 2); the magazine consists of a long vaulted chamber which has a dividing wall along the centre of its length. At either end of the magazine are a pair of cartridge- and shell-lifts for each emplacement; the cartridge-lift rises vertically to a recess on the left side of the emplacement and that for the shells slopes up to emerge under a metal ring-cover on top of the emplacement. A photograph of May, 1906, shows the guns in position with their shields covered with tarpaulins. A skeleton record plan of New Tavern Fort, dated 1909,<sup>88</sup> shows that the defensive fence in the ditch, which had been a feature of earlier years, was perpetuated in the form of a 6 ft. 6-in. high Dacoit fence.

Two emplacements for 6-in. B.L. guns were also provided in the south-east bastion of Tilbury Fort together with four emplacements for 12-pounder Q.F. guns, the intention being to cross-fire with New Tavern. What appear to be concrete emplacements for two fixed-beam Defence Electric Lights on the river wall at Tilbury Fort may belong to this period.

During the period of the building of these emplacements at Gravesend, two 6-in. B.L. guns and four 12-pounders were added to the roof of Coalhouse Fort and four 12-pounders to Cliffe Fort as well. Although most of the R.M.L. guns had been removed from these forts, the 12·5-in.

<sup>87</sup> *Ibid.*, 192.

<sup>88</sup> P.R.O. WO 78/2250.

guns were retained for a time.<sup>89</sup> Shornemead Fort was disarmed completely. New Tavern Fort supported a small R.A./R.E. staff until the First World War when its garrison was no doubt increased. After the war, the fort was run down although a gun was retained in the left-hand B.L. emplacement into the 1930s for the use of a local coastal artillery unit of the Royal Artillery (Territorials) for training. The fort ditch had been leased to the Gravesend Corporation in 1911 for laying out as a garden walk; in 1930, the whole of the fort was purchased for adaptation as a pleasure garden and today it is known as Fort Gardens. During the Second World War, the basement of the Chantry was formed into a gas decontamination centre in anticipation of gas warfare, and there was a plan for bringing in the B.L. magazine into the scheme and forming a communication between it and the Royal Commission magazines. A large number of gas-masks, helmets and canisters still remain in the B.L. magazine where they were dumped at the end of the war. No artillery was mounted at New Tavern Fort during the Second World War, as the emphasis for providing fire-power for defence of the river had passed to more forward batteries. Nevertheless, the original B.L. armament at Tilbury Fort was, for some reason, retained until after 1945.<sup>90</sup> After the War, New Tavern Fort took on much its present form (Fig. 2 shows the present position) and, eventually in 1953, the Chantry became the Gravesend Historical Society's Museum before removal in 1970 to the Market Entrance, Gravesend. The Chantry is at present being restored by the Department of the Environment.

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<sup>89</sup> *Ibid.*, note 82, 189.

<sup>90</sup> I. V. Hogg, *Coast Defences of England and Wales, 1856-1956*, Newton Abbot, 1974, 99.