
101 Details from Firth, Cromwell’s army, 222–35; and F. Dow, Cromwellian Scotland 1650–1656 (Edinburgh, 1979), 123–35 (and map at p. 116). Monck’s strategy was remarkably similar to that of Alexander the Great, who also used pack-horses instead of carts, and always tried either to campaign close to a sea or river, or else to create forward magazines. Both generals also exploited their superior supply system in order to force their worse-provisioned enemies to attack in unfavourable circumstances. See D. W. Engels, Alexander the Great and the logistics of the Macedonian army (Berkeley, 1978), 12–28, 45–61, and passim.


103 Richelieu, Testament politique, 480; and Parker, Thirty Years War, 163 (Banze) and 175 (Turenne and Gallas).


105 Campan, ed., Bergues sous le Soisson, 219; Parker, Army of Flanders, 176–7 and 178–8. But see the inflated estimates of ‘mouths’ given by some military commanders to those responsible for feeding the troops cited in ibid., 87.

106 Redlich, Military enterprise, 1, 521–2. For further details on the ‘civilian penumbras’ which surrounded every early modern army, see Hale, War and society, chap. 6.

107 Numerous examples of the various methods of lodging troops in early modern times are given by Holmes, Eastern Association, 132–4; Hutton, Royalist war effort, 66–8; Firth, Cromwell’s army, 216–19; Parker, Army of Flanders, 87–93; André, Michel le Tellier, 359–444; and André, Michel le Tellier et Loudon, 318–68.

108 Orrery, Treatise, 86. For examples of armies at this time which certainly marched with tents, see Firth, Cromwell’s army, 247–50.

109 Compare, for example, Mallett, Mercenaries, plates 3a (a detail from Simone Martini’s Fogliano fresco) and 13a (Giovanni Bettini circa 1449); G. A. Parker, European soldiers 1550–1650 (Cambridge, 1977), 28–9 (engravings of camps from 1544 and 1573); and A. Freitag, Architektur militaria nova et antiqua (Leiden, 1669), figs. 111–12.

110 Ellis, called by C. C. Gruevski, quoted by C. G. Cruckshank, Army royal: an account of Henry VIII’s invasion of France, 1513 (Oxford, 1969), 41; Monro, Expedition, ii, 615; Goodrick, Powys, 126. At the other end of the scale, see the luxurious campaign tent of Francis I in 1525, captured at Pavia and currently displayed in the Armeria Real in Madrid, and the prefabricated wooden ‘campaign house’ and tent made of cloth of gold, taken to France by Henry VIII in 1523 and described in Cruckshank, Army royal, 435.

111 Details and further references in Parker, Army of Flanders, 1661.

112 ARG, Secrétariat d’État et de Guerre 97, unfol., ‘Resumen sucinto del pan de municion’ (1678–9). Cfr. ibid., 27 fos. 127–8, quittances for bread supplied by Provedor-General Roberton to ‘troops outside garrisons’ in 1613 and 1614 on average, 350,000 rations of bread were supplied every month. Even in the 1570s and 160s, the army’s contractors had succeeded in delivering heroic quantities of bread to the troops: between 11 October 1577 and 31 March 1580, Adam d’Ormond provided 3,213,628 loaves to the army (AGBB, Chambre des Comptes 25,767). See also Anwerp, Plantijn Archief, no. 1735: accounts concerning the food supplied to the Anwerp garrison during the 1620s, including numerous testimonials from the troops concerning the high quality and commendable reliability of the daily bread provided to them by the local contractor (cfr. fos. 156–68).

113 See Parker, Army of Flanders, chaps. 7 and 8, for further detail.


115 Details from Israel, The Dutch Republic, 109–17, 190–7, and 165–71; Robers, Gustavus Adolphus, ii, 272–304; Guillerm, La pietre et le vient, 151ff.

3 VICTORY AT SEA

1 Choiseul quoted by Paul M. Kennedy, The rise and fall of British naval mastery (London, 1976), 53.


3 See Crowl, ‘Alfred Thayer Mahan’, 454, quoting Captain Mahan’s presidential address to the American Historical Association in 1905 (sic). Mahan was such a passionate disciple of the Swiss military theorist that he even named his favourite dog ‘Jomini’.

4 See Needham, The gunpowder epic, passim (especially pp. xi and 277–341), copiously illustrated.


6 Goodrich and Feng, ‘The early development of firearms’, 121–2; and a personal communication from Dr Clayton Bredt (July 1984).

7 See Needham, Science and civilization, iv, iii, 310, n.6, and sources there quoted for Cheng Ho; for the 1522 incident, see D. Ferguson, Letters from Portuguese captives at Canton (Bombay, 1932), and T. T. Chang, Sino-Portuguese trade from 1514 to 1644 (Leiden, 1934), 51, 57–9. It should be noted, however, that the Chinese themselves recognized that their artillery was far inferior to the Europeans’ weapons. ‘The Franks’, said one, ‘use guns with great skill. The
Chinese, on the other hand, blow off their fingers, their hands and even their arms' quoted by Cipolla, Guns and sails, 126ff.

8 Details in K. W. Soil, Japanese piracy in Ming China during the sixteenth century (Eeac, Lansing, 1977), 123f; and Lea Williams, Notes on Ming policy and shipping as related to early Portuguese activities in the Far East in L. Albuquerque and I. Guerreiro, eds., I Seminario internacional de historia de monarquias (Lisbon, 1985: Memoria, 31v, pp. 134-155; R. Huang, 1247; a year of no significance, The Ming dynasty in decline (New Haven, 1983), 145-147; and L. C. Goodrich and C. Feng, Dictionary of Ming Biography, 1 (New York, 1966), 204-205 (Cheng Jo-tsong, author of the Chou-hai tu pien) and 612-613 (Hu Tsung-hsien). The information and date concerning the Chou-hai tu pien given in Cipolla, Guns and sails, 125f, seem to be incorrect.

9 See the excellent illustrated description of both war-junk and fire-ships by R. Temple, ed., The travels of Peter Mundy, 11 (London, 1919: Hakluyt Society, XLI-LXVI), 203, 228-30, and plate 19 (reproduced here as plate 20). Of course the Europeans also used fire ships to good effect on numerous occasions for example, by the English against the Spanish Armada in 1588, or by the Dutch in the Mediterranean in 1607. Fire-ships were only abandoned in the latter seventeenth century because they could not keep up with the faster, more streamlined ships-of-the-line.

10 Cipolla, Guns and sails, 75, notes 1-3 suggests that naval firearms before the 1580s were probably 'Greek fire' launchers. However the careful discussion of F. C. van Oosten and P. M. Bousche, 'Taktiek: het taktisch gebruik van het zeeleegschip', Marinemblad, XXXV (1970), 201-203, and XXXVI (1971), 383-389, at p. 387, demonstrates that they were indeed proper guns. See also K. De Vries, 'The effectiveness of 15th-century shipboard artillery', Mariner's Mirror, LXXXIV (1988), 389-390, although unfortunately the author fails to distinguish examples that concern galleys from those that concern round ships!

11 See, for example, plate 21 above and the illustrations in G. Asaert, J. van Heesen and H. F. H. Jansen, eds., Mariekronie geschiedenis der Nederlanden, I (Brussels, 1976), 10, 118, 217, 306. See also the references in Contamine, War in the Middle Ages, 206.

12 Jehan de Wavrin, Recueil des chroniques et enchainnes stories of the Grant Bretagne, a son temps Engleterre, V (ed. W. and E. Hardy, London, 1891), 351-357. The account, composed by Wavrin de Wavrin circa 1446, specifically noted that the 'deux canons que chasque galere en poupe' were of uniform breech-block design 'et toutes les cames des canons servirent aussi bien à l'un comme à l'autre' and fired as fast as a crossbow (356). The bombard must have been made of bound iron strips like a barrel because Wavrin reports that first it burst 'deux cecles', and then two more 'cercles et oure douve' (a slave) p. 96.

13 Details from the richly documented article of M. Morin, 'La battaglia di Lepanto: il determinare apposito dell' armigilia Veneziana', Dieta: Ratio, IX, 101 (January, 1975), 14-61; and J. R. Hale, 'Men and weapons: the fighting potential of sixteenth-century Venetian galleys' in B. Bond and I. Roy, eds., War and society. A yearbook of military history, 1 (London, 1975), 1-23. Centreline guns, for use on galleys, able to fire 100- and 120-pound shot are noted in the Venetian records, but none seem to have survived. I have derived great benefit from conversations with both Dr Morin and Sir John Hale on this matter.

14 The standard account of the galley as a naval dinosaur is offered by Guilmartin, Gunpowder and galleys. Although this volume provides much invaluable new information on Spanish galley warfare and artillery, it neglects Ottoman and (to some extent) Venetian sources. Neither confirm Guilmartin's findings. See, for Venice, the articles by Morin and Hale noted above; and, for the Ottoman side, C. J. Heywood, in Bulletin of the School of Oriental and African Studies, XXXVII (1975), 643-6.


16 K. M. Setton, The Papacy and the levante, 1524-1571, IV (Philadelphia, 1954), 1066, quoting the vivid Historia of Gianpietro Contarini, who wrote only a few months after the battle. Various estimates of the size of the opposing fleets, and of their weaponry, are given in M. Lesure, Lepante, la crise de l'empire ottoman (Paris, 1971), 115f.

17 Quotations from the eye-witness account of Girolamo Dio in Lesure, Lepante, 141f. The order of the Council of Ten to execute all prisoners with marine experience is printed in ibid., 116, and the aftermath of the battle in the Ottoman empire is discussed at 179f. It is true that, in spite of all this, Cyprus was lost to the Turks, and some have therefore denied that Lepanto was a major Christian victory. But this is to miss the point. By October 1571, Cyprus was already lost; and had Lepanto not been won, the Turks would certainly have gone on to attack Greece or the Christian ports in Albania. See C. H. Imber, The reconstruction of the Ottoman fleet after the battle of Lepanto, in Imber, Studies on Ottoman history and law (Istanbul, 1966), 85-101.

18 This was certainly the case in the West. In 1570, when it became clear that the Turks were about to attack Venice, began to assemble and launch the galleys stored in the Arsenal at the rate of roughly two per day. In a matter of weeks, the size of the Republic's fleet at sea increased from 45 to 155 galleys (see F. C. Lane, 'Wages and recruitment of Venetian galeotti, 1470-1580', Studi veneziani, now studies vi, 1982, 137-43, at p. 41).

19 Details from Imber, 'Reconstruction'. I am very grateful to Dr Imber for letting me see a copy of his important article in advance of publication. See also the information in M. Czaja, 'Ottomans and the Mediterranean: An analysis of the Ottoman shipbuilding industry as reflected by the Arsenal registers of Istanbul, 1529-1670', in R. Ragosta, ed., I genitori del mar mediteraneo, 11 (Naples, 1981), 775-785; Lesure, Lepante, 233-43; and H. Inaki, 'Lepanto in the Ottoman documents' in G. Lanzoni, ed., I Mediterraneo nella seconda metà del '500 alla luce di Lepanto (Florence, 1974); Civilta veneziana, studi, 79-80, 1975.

20 The same problem afflicted the galleys of the Western powers from the 1560s, and the same solution - to use convicts - was adopted. See details for Spain in Thompson, War and government in Habsburg Spain, chapter 6; for Italy in Lane, 'Wages and recruitment', and M. Aymard, 'Chiencre et galeries dans la Mediterranee du XVIe siecle' in Milanges en honneur de Fernand Braudel: histoire economique du monde mediterranen 1450-1650, i (Paris, 1973), 51-64; and for France, at a slightly later period, in Zysberg, 'Galley and hard labor convicts
in France 1530–1650'. At p. 85, Zysberg notes that between 1680 and 1715, some 35,000 persons were sentenced to the galleys in France, of whom over 18,000 were army deserters.

21 Quoted by Zysberg, 'Galley and hard labor convicts', 96. Forces at Lepanto estimated by Lapéry, 115.


26 Quoted by Glasgow, 'The navy in Philip and Mary's war, 1557–8', Mariner's mirror, lli (1967), 322.


29 For the early evolution of the galleon, see J. da G. Pimentel-Barata, 'The Portuguese galleon (1519–1525)' in Howe, Five hundred years of nautical science, 183–91; for its later history see C. R. Boxer, From Lisbon to Goa, 1500–1770 (London, 1984), chaps. 8 ('Admiral João Pereira Correia-Real and the construction of Portuguese East-Indiamen') and 9 ('The naval and colonial papers of Dom António de Ataíde'). F. C. Lane, Venetian ships and shipbuilders of the Renaissance (Baltimore, 1934), 506, 63, noted galleons in Venetian yards from about 1531; and C. R. Phillips, Six galleons for the king of Spain, Imperial defence in the early seventeenth century (Baltimore, 1985), chap. 1, provides convincing evidence that they emerged in Spain at much the same time (she does not include Portugal in her survey). Her 'six galleons' were built in Vizcaya between 1620 and 1628. For the Armada's lack of impact against the Royal Navy, see the detailed surveys of Elizabeth's ships after the campaign, which record virtually no damage. See the discussion in G. Parker, 'The Dreadnought revolution of Tudor England', Mariner's mirror, lxxxi (1986), 169–301; and C. Martin and G. Parker, The Spanish Armada (revised edn, Manchester, 1999), chap. 11.

30 T. Glasgow, Jr, 'Gorgias' seafight', Mariner's mirror, lxix (1973), 179–88, at pp. 180–1; P. Ber, Veerdelijke der Nederlandse Oorlogen, iii part 2 (Amsterdam, 1662), fos. 10–12; Interrogation of Don Diego Pimentel, taken from the contemporary pamphlet which printed the questions and answers verbatim: Breeder verklaringen van de oorlof van Spagunen (Kruelt Pampile Collection, nos. 847–8).


33 This account is based upon Colin J. M. Martin, 'The equipment and fighting potential of the Spanish Armada' (St Andrews University Ph.D. thesis, 1985), chaps. 3, 4, 5, 7; upon Dr Marlan's underwater excavation of several wrecked Armada vessels; and upon documents concerning the fleet from AGS, Contraduria del Sueldo, sa serie, and Contraduria Mayor de Guantes, 2a and 3a épocas. These sources, and others, form the basis of the new edition of Martin and Parker, The Spanish Armada (Cambridge, 1989).

34 Information from Martin and Parker, The Spanish Armada, chap. 11. It should not be assumed, however, that inboard reloading was hazard-free. Gunnery still faced the risk that a new charge would be ignited prematurely by smouldering remnants from the previous round. See the moving account of Jón Ólafsson, a gunner in Danish service, injured in such an accident in 1623: R. Temple and L. M. Anstey, eds., The life of the Icelander Jón Ólafsson, traveller to india, ii (London, 1932: Hakluyt Society, and series LVIII, 1971).

35 See G. E. Marwaring and G. P. Perrin, eds., The life and works of Sir Henry Mainwaring, ii (London, 1921: Navy Records Society, lvii), 119. See also M. Oppenheim, ed., The naval tracts of Sir William Monson, v (London, 1914: Navy Records Society, xxvii), 117. Monson further noted that the Spaniards 'carry their great ordnance upon field carriages, which make them the more dangerous and unserviceable', for they could not be reloaded, could not be aimed, and could not be properly secured in rough weather. In their detailed consideration of how the English fought in 1588, both L. G. Carr Laughton, 'Gunnersy, frigates and the line of battle', Mariner's mirror, xiv (1928), 330–63, and Padfield, Guns at sea, chap. 12, concluded that inboard loading only became standard practice in the Royal Navy during the 1620s. For example, they note that the 'Fighting Instructions' issued to the fleet sent to Cadiz in 1625 still ordered the ships to close in by threes, fire, and then fall away to reload, rather like a cannonade; which suggests that reloading may have been performed outboard (see J. S. Corbett, Fighting instructions 1530–1816 (London, 1925: Navy Records Society, xxxi), 62). However, Lord Wilmot's fleet in 1627 included only 3 royal warships, as against 24 in 1588, so different procedures would have been appropriate. Most of the examples of outboard loading quoted from this period by Carr Laughton and Padfield concern merchantmen. For the Navy, I am convinced
by the arguments in favour of inboard loading advanced by Martin, 'Equipment and lighting potential', chap. 9, and especially pp. 377-9.

36 Quotations from Cipolla, Guns and Jails, 86 n.2, and A. P. McGowan, ed., The Jacobean commissions of enquiry of 1608 and 1618 (London, 1983) and: The English in the Seventeenth Century. Ten ships built in 1619-23 were still in service in the 1650s and two were still in service in the 1660s! (McGowan, p. xxvi n.4). See also Padfield, Tides of Empire, 116-8.

37 Sir Edward Cecil to Sir John Coke, 27 February 1626, in A. B. Grosart, ed., The voyages of Cadiz in 1625. Being a journal written by Sir John Caneville (London, 1883) Camden Society Publications, New Series, XXXII, xlix. See the similar strategic assessment of the Navy Commissioners in 1618 in McGowan, Jacobean commissions, 286f. Even in Elizabeth's reign, five of her warships were considered too large to operate outside home waters, while both George Waymouth (The Jewels of arms, 1604) and Sir Walter Raleigh ('Observations on the navy', c. 1608) considered that English warships generally tended to be too large and carried too much ordnance for their own good. See the material cited in M. Oppenheim, A History of the administration of the Royal Navy and of merchant shipping in relation to the navy from MDIX to MDCLX (London, 1886), 121f and 186. I am not convinced by the claim of K. R. Andrews, Elizabethan privateering, English privateering during the Spanish war, 1585-1603 (Cambridge, 1964), 18, that, under Elizabeth, 'The greater part of the Queen's navy was transformed from a short-range, Narrow Seas, almost coastal defence, force into a high-seas fleet capable of operating at long range as an ocean-going force.' The Spanish origins of Charles I's 'Ship-Money Fleet', and its initial purpose, are well explained by Simon Adams, 'Spain or the Netherlands? The dilemmas of early Stuart foreign policy' in H. Tomlinson, ed., Before the English Civil War: Essays on early Stuart politics and government (London, 1983), 79-101, at pp. 84f; and J. H. Elliott, The Count-Duke of Olivares. The statesman in an age of decline (New Haven, 1966), 508.

38 The maritime expeditions from Spain are listed in Parker, Army of Flanders, 771 and 278f; the Dunkirk frigates are described by R. Bateens, 'The organization and effects of Flemish privateering in the seventeenth century', Acta Historiae Neerlandicae, 19 (1977), 48-75, at pp. 56-9; and in R. A. Stradling, The Armada of Flanders. Spanish maritime policy and European war, 1608-1668 (Cambridge, 1992).


My thanks to Professor William S. Maleby for bringing several of these items to my attention, and for sharing with me his knowledge of the subject.

41 Details in Oppenheim, History, 253-7. In fact some ships of Charles I's navy approached a ratio of 3:5:1. The Providence and Expedition of 1637 were both 27.5 metres long but only 8 metres wide, and carried 30 guns (ibid., 276f).


45 The change in design is apparent from the dimensions of ships recorded in Oppenheim, History, 300-7, and revised in R. C. Anderson, Lists of men-of-war 1650-1700. Part I: English ships, 1649-1700 (London, 1935: Society for Nautical Research, Occasional Papers vi). The importance of design is also demonstrated by the one and only successful attack of Charles I's navy: the Saltee raid of 1657, which prospered because of the presence of two newly built frigates in the blockading fleet (see the important discussion in Oppenheim, History, 276f). My argument here owes much to discussions with Professor Paul M. Kennedy, to whom I am most grateful.


47 Figures from J. Ehrman, The navy in the war of William III (1689-1697), its state and direction (Cambridge, 1953), chap. 1; C. R. Boxer, The Anglo-Dutch Wars of the seventeenth century (Greenwich, 1974), 4. 6. 47; J. P. Cooper, ed., The new Cambridge modern history, iv (Cambridge, 1970), chap. 7: Sea-power, Quinn and Ryan, England's sea-empire, chap. 8; and F. Fox, Great ships. The battlefleet of King Charles II (Greenwich, 1980), 21 (and passim).

48 Quoted by Ehrman, The navy, 350.

49 Symcox, The crisis of French sea power, 32-4 and 55-71 (Shovel quoted p. 56); A. H. Taylor, 'Galleon into ship of the line: part III', Mariner's mirror, LXXV.
Details from M. Duffy, ‘The foundations of British naval power’ in Duffy, ed., The military revolution and the state, 49-85; and van Cott and Boessenkool, Taktiek, Marineblade, LXXV (1970), 997-1035 and LXXVI (1971), 593-651. Eventually, battleships were also able to operate in Far Eastern waters, but only when they had vastly increased the amount of sail they carried. Thus where the 100-gun Sovereign of the Seas after a refit in 1662 weighed 1,072 tons but could carry only 3,532 yards of sail, an equivalent ship-of-the-line in the 1840s would carry almost 13,000 yards. (See Oppenheim, History, 338f.)


52 The little-known proposal of Medina Sidonia, dated 25 October 1586, is quoted in H. F. Kraus, Sir Francis Drake: A pictorial biography (Amsterdam, 1970), 129f and 186f.

53 Philip II to the vicerey of India, 24 December 1577 (in J. H. de Ceuninck, ed., Archivo Portugués Oriental, III (Nova Gca, 1865), 130-2) (cancelling the Acheh attack); and 146 (abandoning plans for fortifying Mombasa), 137-8 (cancelling the Acheh attack), and 146 (abandoning plans for fortifying Mombasa).

54 L. F. F. Thomaz, Ano da Morte de A Pegu. Viagens de um feitor português (1512-15) (Lisbon, 1967), x-xv, offers a most valuable reinterpretation of the nature of Portuguese power in Asia. A useful up-to-date survey of Portuguese India and its neighbours at this time is offered by K. S. Mathew, Portuguese trade with India in the sixteenth century (New Delhi, 1983).

55 J. J. de Lima Feliner, ed., Subsidios para a historia de India portuguesa (Lisbon, 1868), part III, 11-23. Points a contemporary survey of artillery in India in 1624. A century later, the Portuguese warships which still sought to regulate the coastal trade of western India remained surprisingly lightly armed. According to one source ‘greater pieces of artillery’ than cannon [3-pounders] (cf ibid.) these ships carry not;” see E. Grey, ed., The travels of Petrus de Ville in India, II (London, 1592); Hakluyt Society, LXXV, 389. But the same was also true of both the Dunkirk privateers and the Caribbean buccaneers; see note 69 below.

56 G. Correa, Lendas da India, I. (Lisbon, 1858), 136-8. However, at the battle of Diu in 1539, the Portuguese flagship sank one of her adversaries with a single warlike shot from ‘sua bombarda gosa’; see L. de Albuquerque, ed., Cronica do descobrimento e conquista da India pelos Portugueses (Lisbon, 1974), 181. Other ships were destroyed by fire as well as by bombardment (see various individual encounters narrated in ibid., 180-7).


60 On the assistance offered by the ‘Malabar pirates’ to Surat (and, after 1620, to the English) see W. Foster, ed., The voyage of Nicholas Downton to the East Indies, 1614-1615 (London, 1938), Hakluyt Society, and series LXXVI, 25, 25, 33; and W. Foster, ed., The voyage of John Jourdain (London, 1905), Hakluyt society, and series XVI, 191-2. On their capture in 1735 of the Eastindian Deriby, by keeping assem of her and효 her rigging to pieces, see P. J. Marshall, ‘Western arms in maritime Asia in the early phases of expansion’, Modern Asian Studies, XIV (1980), 13-28, at p. 22. For a similar example, this time of the ship Lion taken by Portuguese gallots in 1633, see Boxer, Portuguese conquest and commerce, chap. 2 (at pp. 204f).

61 See, for example, the criticism of João Ribeiro, Fidelidade historica da Ilha de Célio (1688); ‘From the Cape of Good Hope onwards, we were unwilling to leave anything outside our control. We were anxious to lay hands on everything in that huge stretch of over 5,000 leagues from Sofala to Japan. And what was worse, was that we set about this without calculating our strength, or thinking that even with the natives themselves, this conquest could not last for ever ...’ (translation from C. R. Boxer, ‘Captain João Ribeiro and his history of Ceylon’ in Boxer, Portuguese conquest and commerce, chap. 11, p. 111). See the ingenious and convincing explanation advanced by G. D. Wininns, The fatal history of Portuguese Ceylon (Cambridge, Mass., 1971), 129-70.

62 Details from N. Steenstra, ‘The Dutch East India Company as an institutional innovation’ in M. Aymard, ed., Dutch capitalism and world capitalism (Cambridge, 1982), 244-50; and N. Macleod, Die Ostindische Compagnie als Zeemogendheid in Asia, I (Rijswijk, 1967), 19, 17-19, 57, 80, 294.

63 Dutch totals from T. Schöffer, J. R. Biijn and F. S. Gaasten, eds., Dutch-Asiatic shipping in the 17th and 18th centuries, II (The Hague, 1979), 1-444. Portuguese totals from A. Betelhe da Sousa, Subsidios para a historia militar maritima da India (Lisbon, 1930), 666-7; II (Lisbon, 1941), 655-9; and III (Lisbon, 1953), 638-93.

64 On the Portuguese possess of guns, see C. R. Boxer, ‘The Carreira da India 1675-1750’, Mariner’s mirror, XLVI (1960), 35-54; at pp. 53-4; on the poor gunners see A. Gray and H. C. P. Bell, eds., The voyage of François Pirard of Land (London, 1888), Hakluyt Society, LXXVII, II part 1, 193.

65 See S. Assaratsamu, Dutch power in Ceylon, 1658-85 (Amsterdam, 1958), 118-87. Nonetheless, large forces were committed against Kandy by the Dutch and the annual deficit of the Company’s Ceylon kantoor rose from 200,000 florins in the 1660s to 311,000 in 1673-74. In 1678 the Dutch handed back all the conquests they had made from Kandy since 1659, in return for peace. Dutch shipping losses calculated from Schöffer et al., Dutch-Asiatic shipping, II, 18-23.

66 W. Foster, ed., The voyage of Thomas Best to the East Indies, 1613-1614 (London, 1934), Hakluyt Society, and series LXXVI, 39, 135, 115, 247-74. The Portuguese version of the action notes that the smaller of the English boats lured three Portuguese galleons on to a sandbank by sailing safely across it, thanks to her
shallow waters. It was when the galleons were stuck on the sand that Captain Best closed in for the kill (cf. Bocarro's account, p. 224). At the same time, the Portuguese themselves freely admitted that the northerners could shoot faster. See, for example, the account of the battle between a Dutch and Portuguese squadron of Goa in 1637, which estimated that the former fired three times as often as the latter. A. da Silva Rego, ed., Documentação Ultramarina Portuguesa, I (Lisbon, 1960), 21-8 (at p. 27; Dutch and Portuguese accounts of the action are printed in Temple, ed., Travels of Peter Mundy, iii, 465-74 — one source claimed that the Visslanden fired 355 rounds at the Portuguese). The same figure of ‘three times’ is given in an English account of the naval action off Surat in February 1625; see W. Foster, ed., The English factories in India 1614-1629 (Oxford, 1999), 47 (on p. 51f another patriotic account claimed the English and Dutch ‘were not answered one above one in ten’ by the Portuguese).

68 Several similar engagements between the English and the Portuguese in the Indian Ocean, in almost all of which the English were tactically victorious but strategically thwarted, are chronicled by C. R. Boxer, ‘Anglo-Portuguese rivalry in the Persian Gulf, 1635-1637’, in Boxer, Portuguese conquest and commerce, chap. 1. See, for example, p. 70, where four English ships in January 1623 claimed to have fired no less than 4,022 ‘great shot’ into the opposing Portuguese galleons, but without causing any of them. See also pp. 97 and 99.

69 On the light armament of the buccaneers, see O. H. K. Spate, The Pacific since Magellan. II. Monopolists and freebooters (London, 1983), chap. 6 (especially pp. 111-2) for that of the privateers, see Andrews, Trade, plunder and settlement, 246. See also note 55 above.

70 See Foster, ed., Journal of John Jourdain, 205-18. This was the typical pattern of Indian overseas trade at the time — one or two large prizes or vessels, and a hoard of smaller ones. See A. Das Gupta, ‘Indian merchants and the Western Indian Ocean: the early seventeenth century’, Modern Asian Studies, XX (1988), 481-99. Some European sources estimated the Rabim at 1,000 tons, others at 1,500. According to John Saris, he was 52 metres long and 15 metres broad — a large ship: see A. J. Qaisar, ‘Shipbuilding in the Mughal empire during the seventeenth century’, Indian economic and social history review, V (1968), 249-76. Yet another account of how a large Indian ship might be stopped and searched by the Portuguese on the high seas, see J. Mosquere, Voyages en Afrique, Asie, Indes orientales et occidentales (2nd edn, Rouen, 1643), 280f (an incident from 1609).


72 See Foster, ed., Journal of John Jourdain, 218ff; and Foster, ed., Voyage of Nicholas Doutoun, XXII.

73 See W. Foster, ed., The English factories in India 1634-1636 (Oxford, 1911), 356f; and 353-5. For similar sequences of events somewhat earlier, see ibid., 362f (Oxford, 1909), 17-19; and Grey, ed., The travels of Pietro della Valle in India, 417-19. Also in the 1650s, the Sultan of Biafra retaliated for the Portuguese capture of one of his ships by arresting Portuguese officials, closing his ports to Portuguese shipping, threatening to capture Saieste and flitting with the Dutch: see P. S. S. Issurutenc, ed., Assentos do Conselho do Estado da India, i (Nova Goa, 1953), 233-43. Even in the 1690s, the same technique was employed by Aurangzeb when the English seized one of his ships: see R. Ritchie, Captain Kidd and the war against the pirates (Cambridge, Mass., 1986), 331f.

74 HAG, MS. 1041, Register of Cartazes 1618-1623, regularly notes that the annual ship of the ‘Great Mughal’ was allowed to carry 15 ‘versos e falconete’ — but these were breach-loading weapons of low penetrating power. Dr John Fryer, who visited India during the 1670s, observed that although ‘some of their ships carry 30 or 40 pieces of cannon, they were more for show than service’. (Quoted with other pertinent material by A. J. Qaisar, The Indian response to European technology and culture, AD 1498-1707 (Oxford, 1982), 42-3.) In T. Raychaudhuri and I. Hahbi, eds., The Cambridge economic history of India, i (Cambridge, 1982), 150-1, Dr Simon Digby stressed that the use of firearms was spreading fast around the Indian Ocean shortly before the arrival of the Portuguese; but it should be noted that they were neither used at sea by non-Europeans nor often used effectively ashore by anyone (see pages 118-9 above).


76 During the invasion of Assam in the 1660s, the Mughals used warships built and manned by Portuguese, French, Dutch, English and even Russian renegades (see J. N. Sarkar, The life of Mir Jumla, the general of Aurangzeb (2nd edn, New Delhi, 1979), 279f). But this appears to have been unique. Several explanations have been advanced for the failure of the Mughals (and of other great Indian princes) to create a permanent navy. The best survey of the art by Ear may be found in J. N. Sarkar, The art of war in medieval India (New Delhi, 1983), 265f. Briefly noted by M. N. Pearson, Merchants and rulers in Gujarat. The response to the Portuguese in the sixteenth century (Berkeley, 1976), chap. 6, argued that the land powers were content to let the merchants get on with their overseas trade, since they had no interest in controlling the seas beyond assuring their profits from customs and licences. But the studies of A. Das Gupta, Indian merchants and the decline of Surat 1700-1710 (Wiesbaden, 1979), and H. W. van Santen, De Vereenigde Oost-Indische Compagnie in Gujarat en Hindustan 1626-1660 (Leiden, 1983), argue that in fact the Indian princes showed rather more concern for the protection of local trade and merchants than Pearson believed. Nevertheless, this stopped short of the provision of convoy escorts and confrontations with the Portuguese. I am very grateful to Michael Pearson for discussing these matters with me and for providing much bibliographical assistance.

77 Watanabe Youke, Cho'seneki wo wa ga no hattatsu’ [The invasion of Korea and the development of shipbuilding], Shigaku rakush (XXV) (1935), 574-97. Details on the use of firearms at sea during the Korean War may be gleaned from S. W. Jeon, Science and technology in Korea. Traditional instruments and techniques (Cambridge, Mass., 1974), 315-18; H. H. Underwood, ‘Korean boats
and ships', Journal of the Royal Asiatic Society: Korean branch, XXII (1935), 1-99, at pp. 71-84; A. L. Sadler, 'The naval campaign in the Korean war of Hidetsuyo (1592-8)', Transactions of the Asiatic Society of Japan, 2nd series (1937), 177-208; Needham, Science and civilization, IV, iii, 683-5; Park Yune-Hee, Admiral Yi Sun-Sin and the turtle-boat Armada (2nd edn, Seoul, 1978); and S. R. Turnbull, The samurai: a military history (London, 1977), 161-2. It must be said that none of these works on the subject are definitive. Underwood and Park have interesting illustrations, and Needham and Jeon are clear and incisive, but without question Sadler offers the best synthesis, which was largely repeated by A. J. Marder. From Jimmu Tenno to Perry: sea power in early Japanese history, American historical review, LII (1947), 1-34, at pp. 20-31. The campaign was also recorded in the magnificent Ming foreign invasion 'scroll' of which selections are reproduced in B. Smith and W. G. Weng, China: a history in art (New York, 1972), 234-7.

78 Details of the incident are given in the 'Relation of Philippine affairs in 1669-170 killed by Gregorio López, S.J., to the Jesuit General: see E. H. Blair and J. A. Robertson, The Philippine Islands, 1493-1898, XV (Cleveland, Ohio, 1969), 105-43. He noted that the Japanese ship was searched by the Dutch (to see if any Spaniards were aboard) before being allowed through, but his claim that 300 pesos were exacted from the Japanese was probably wrong, since the Dutch commander had given strict orders for a search only (see Algemenen Rijksarchief, The Hague, fe Adelting, VOC 510, General Orders of Admiral Wittet, 22 March 1610). I am grateful for these references to Mr P. J. N. Willman.

79 Iwao Suzuki, 'Kokusai no kenshi: A study of the trade by Japanese merchant ships licensed by the Shogun' (2nd edn, Tokyo, 1957). Of 325 known licences issued, 38 went to Europeans, 43 to Chinese, and the rest to Japanese merchants. Professor Iwao discovered that, although no documentation exists in Japan on disregard of the shogun, the Algemenen Rijksarchief in The Hague contains translations of now-lost Japanese legal documents on the subject. There is a picture of a Shurman, from a votive plaque dated 1624, donated to the Kiyomiza temple of Kyoto in the hope of a prosperous voyage, in M. Cooper, ed., The southern Barbarians: the first Europeans in Japan (Tokyo, 1971), 191, plate 105. The original, and three more, may still be seen in the Kiyomisera; see plate 30 above.


82 Iwao Seichi, 'Li Tan, chief of the Chinese residents at Hirado, Japan, in the last days of the Ming dynasty', Memoirs of the Research Department of the Toyo Bunko, XVII (1958); and J. D. Spence and J. E. Wills, eds., From Ming to Ch'ing, conquest, region and continuity in seventeenth-century China (New Haven, 1979), 216-28.

83 Quotations from the excellent article of Yamawaki Teijiro, 'The great trading merchants, Cokkimura and his son', Acta Asiatica, XXX (1976), 166-167.

84 Coxinga's father had, in fact, handled the negotiations by which the Dutch were allowed by Ming officials to move from the Pescaadores to Taiwan in 1657 (the year of Coxinga's birth): see Spence and Wills, eds., From Ming to Ch'ing, 216ff. On the final campaign there, see C. R. Boxer, 'The siege of Fort Zeelandia and the capture of Formosa from the Dutch, 1662-2', Transactions and proceedings of the Japan Society of London, XXIV (1662), 16-47; Coxinga's twenty-eight guns included 30- and 50-pounders under the direction of Dutch renegades. My thanks go to Leonard Bussé for this information.


86 There is currently no proper biography of Coxinga in a Western language; see, however, the material in J. E. Wills, Mountains of fame. Portraits in Chinese history (Princeton, 1994), 216-30; A. W. Hummel, ed., Eminent Chinese of the Ch'ing period 1664-1722 (Washington, D. C., 1943), 138-42; and F. W. Kaman, The great enterprise. The Manchu reconstruction of imperial order in seventeenth-century China, I (Berkeley, 1983), 35ff, 400-5; 1049-2. There is a detailed description of Coxinga's campaigns, and of their political setting, in Lynn A. Struve, The southern Ming 1644-1662 (New Haven, 1984), 139-77, 154-66 and 178-91 (the maps on pp. 155 and 194 are particularly useful).

87 On the generally backward state of Taiwan at this time, see R. G. Knapp, ed., China's island frontier: studies in the historical geography of Taiwan (Honolulu, 1980), 3-25, and J. L. Osterhoff, 'Zeelandia: a Dutch colonial city on Formosa (1624-61)' in R. Ross and G. J. Telkamp, eds., Colonial cities: essays on urbanism in a colonial context (Leiden, 1985; Comparative studies in overseas history, vi), 53-63.

88 For a brilliant study of a later phase of the 'traditional' equilibrium see C. N. Parkinson, War in the eastern seas, 1793-1823 (London, 1954).

4 The 'military revolution' abroad


Quotations:

5 Quotations from J. L. Axtell, *The European and the Indian*. Essays in the ethnohistory of colonial North America (Oxford, 1981), 339; and F. Jennings, *The invasion of America* (New York, 1975), 50. Admittedly in some Mesoamerican societies those spared in battle were later slaughtered in religious rituals. The 'Flower Wars' of the later Aztec empire, for example, involved no deaths precisely because all those captured were required for sacrifice. See C. M. Maclellan and J. E. Rodríguez O., *Forging of the cosmic race. A reinterpretation of colonial Mexico* (Berkeley, 1982), 381; and J. C. Lindsey, *The cost of conquest. Mexico 1521-1531* (Berkeley, 1983), 44-59.

6 Edmund Scott, *An exact discourse of the Subtilties of the East Indies* in W. Foster, *The voyage of Sir Henry Middleton to the Maccabeis, 1604-1606* (London, 1643); Hakluyt Society, 2nd series LXXVIII, 144. Of course, all testimony by Europeans on the motives of people from different cultures must be treated with some caution: the Europeans' view of the 'savages' was often insensitive and not infrequently confused. Take, for example, the assertion of the French missionary in seventeenth-century Canada, Louis Hennepin, who claimed that when the Indians went to war 'it is commonly to recovery satisfaction for some injury that they pretend has been done to them. Sometimes they engage in it upon arrival of a drum; and often as Fancy takes'em...' (quoted by C. J. Jaenen, *Friend and foe: aspects of Franco-American cultural contact in the sixteenth and seventeenth centuries* (Ottawa, 1976), 189).

7 W. Rodney, *A history of the Upper Guinea Coast 1457-1800* (Oxford, 1970), 237. The source of this view has continued, 'their Religion affords them an apology for this horrible injustice, by permitting them to destroy all infidels, a term which seems to include all their neighbours'. Dr Rodney concluded (p. 238) that 'although these wars failed to increase the number of believers, they certainly reduced the numbers of unbelievers! Even in the 1660s wars in West Africa were still fought for slaves: see J. F. Ade Ajayi and R. Smith, *Yoruba warfare in the nineteenth century* (Cambridge, 1964), 52-7.


9 Jaenen, *Friend and foe*, 138-41; D. R. Morris, *The washing of the spears. The rise and fall of the great Zulu nation* (London, 1966), 47, 108, 189; and W. H. Scott, *The discovery of the Igorot. Spanish contacts with the peoples of northern Luzon* (Quezon City, 1974), 48-35, 52. A. Reid, *Europe and South-East Asia: the military balance* (James Cocker University of North Queensland, South-East Asian Studies Committee, occasional paper XVI [1982]), xiv-xv, notes that some Indonesian battles ended with a suicidal charge by a few of the defenders; but this practice, known as 'running amok', was merely a token of the neutron of the vanquished before the rest became slaves. It did not herald a mass-slaughter.

10 Whitelocke, *Memorials of the English affairs*, III, 351. The author claimed to have set his Scotsmen free at once.


12 For Benjamin Church, see Axtell, *The European and the Indian*, 246-7; and R. Stockin and J. K. Florom, *ed.*, *So dreadful a judgment. Puritan responses to King Philip's War 1675-7* (Middletown, 1978), 170-470 (which provides a critical edition of Church's *Entertaining passages relating to Philip's War*).


17 Fr. André Richard, *about Canada in 1661-7*, quoted by Jennings, *Invasion*, 155. Cf. section of an account of Alonso González de Nájera concerning the other end of the continent: 'This war in Chile is nothing other than a chase – a great chase for game' (his book, appropriately called *Desengaño – Disillusion* – is quoted with other interesting materials by Jara, *Guerra et Société*, 141).


19 The daring march of the Moroccans (most of them, including their leader, in fact European renegades or mercenaries) is well described by E. W. Bovill, *The golden trade of the Moors* (London, 1918), 145-78. For the Ambauba campaign, see the admirable brief account of D. Birmingham, *The Portuguese conquest of Angola* (London, 1963), chap. 4. The presence of musketeers among the Congolese army should come as no surprise: the Portuguese had been offering military advice to the kings of Congo since the early sixteenth century. See A. Bráão, *Monumenta missionaria Africana. Africa occidental, 1471-1554, 1* (Lisbon, 1951), 23-41, 241 (from the Regimento for Sinão da Silva, 1532).

20 A. W. Lawrence, *Trade castles and forts of West Africa* (Stanford, 1964), part 1, lists forty-three fortified stations maintained in early modern times by nine European nations along the African coast from Arguin to Whydah. The first – São Jorge da Mina, built at Elmina in 1482 – was also the first European building ever constructed in the Tropics.


27 Bras de Albuquerque, *The Commentaries of the great Alfonso Dalboquerque III* (London, 1880: Hakluyt Society, 1890), 129. See also G. Irwin, *Malacca fort*, *Journal of south-east Asian history*, XII (1962), 19–44. The article is reprinted, with some additional material, in K. S. Sandhu and P. Wheatley, eds., *Malaya: The transformation of a Malay capital 1470–1980* (Oxford, 1983), 782–805. This admirable two-volume work contains much else on the subject, although unfortunately there is no chapter on Portuguese Malacca today only one gate (the so-called Porto de Santiago, which is in fact Dutch) and some rubble on the site of A Famosa remains.


29 Excavations of the fort at Cebu and the factory at Ayutthaya reveal a great deal about sixteenth-century European construction techniques in the tropics: see M. Maceo, *Preliminary report on the excavation at Fort San Pedro, in Cebu City, Philippines*, *U.F.S.A. Studies* (Taipei, 1973), 45–59; and *The Portuguese and Ayutthaya* (Exhibition catalogue, Bangkok, Portuguese embassy, 1983). It seems clear that the Iberians intended to create a fourth fortified port-city, at Nagasaki, but the Japanese government refused to allow bastions to be built (see D. Pacheco, *The founding of the port of Nagasaki and its cession to the Society of Jesus*, *Monumenta Nipponica*, XXV (1976), 253–283; and G. Elson, *Deus destroyed*., *The image of Christianity in early modern Japan* (Cambridge, Mass., 1973: Harvard East Asian Series, XXXII, 1981). The Dutch, for their part, created a 'coastal city', at Zeelandia after 1624, with its own town hall, weigh-house, hospital, orphanage and even a house of correction for fallen women, but they only fortified the citadel and one outgoing redoubt. The city itself was not provided with walls, and so it was captured in 1662 by the Chinese warlord Coxinga: see Oosterhoff, *Zeelandia: a Dutch colonial city*, and pp. 113–14 above.

30 Details taken from *Archivo de Indias, Filipinas 6:1* and 12, Legazpi to Prince Carlos, 15 July 1567, and to Philip II, 15 July 1570; Reed, *Colonial Manila*, chap. 5; and Blair and Robertson, eds., *The Philippine Islands, 1565–1898*, III, 141–72 ("Relation of the conquest of ... Lusión"). Not everyone, however, was impressed by Intramuros. One Spanish official in Manila told the king in 1588 that the fortifications then being built were 'a disgrace' and 'a waste of time and money, because they are made with round bulwarks in the old fashion; while the military commandant three years later regretted that, because the Spanish architect who designed them had remained in Europe, the defenses were 'somewhat out of proportion, being made without architect, advice or plan' (Quotations from the excellent study of M. L. Díaz-Trechuelo Spinola, *Arquitectura española en Filipinas* 1565–1800* (Seville, 1959), 41ff.). The walls built in the 1560s however were more formidable.


34 Croce, Slaves on horseback, 79.

35 See the classic account of D. Ayalon, Gunpowder and firearms in the Mamluk Kingdom. A challenge to medieval society (London, 1956). See also the similar situation in North Africa described by A. C. Hess, ‘Firearms and the decline of Ibn Khaldun’s military elite’, Archivum Ottomanicum, IV (1972), 179–99. Ayalon argued that Safavid Iran was defeated by the Turks at Chaldiran because her forces were unfamiliar with firearms; but it has recently been shown that this was not so. Rather, as with the Mamluks, the Persian army sometimes used guns — but only with reluctance, and (even then) only in siege warfare — see R. N. Savory, Iran under the Safavids (Cambridge, 1980), 42–4; and the observations (made in the 1620s) that the Persians long continued to ‘detect the trouble of the cannon, and such field pieces as require carriage’, in T. Herbert, Some years travel divers parts of Asia and Africa (4th edn, London, 1777), 212–9, 298ff. Conversely, parts of the Ottoman army — the sipahis — refused to use the gun at all, or used it unwillingly; see R. C. Jennings, ‘Firearms, bandits and gun control: some evidence on Ottoman policy towards firearms in the possession of Reiseya, from judicial records of Kayseri 1600–24’, Archivum Ottomanicum, VI (1986), 339–80, at p. 340ff.


38 Encyclopaedia Islam, 1 (2nd edn, Leiden and London, 1960), 1055–65 (article on ‘barit’ — gunpowder — by D. Ayalon, V. J. Parry and R. N. Savory) notes, inter alia, that the Turks still had no pistols by the 1590s, were slow to adopt new siege techniques and, even in the 1600s, had no ‘good powder but that which they get from overthrown Christians, or else is brought them out of England’. See also G. Agoston, ‘Ottoman gunpowder production in Hungary in the 16th century’, in G. David and P. Fodor, eds., Hungarian–Ottoman military and diplomatic relations in the age of Suleyman the Magnificent (Budapest, 1994), 149–59.


40 Council of Ten order of 27 November 1572, quoted Mallet and Hale, Military organization of a Renaissance state, 400; and Luis Collado, Manual de artillería (Milan, 1592), fo. 6v. (guns ‘founded by the Turks are usually poor and flawed, even though the alloy is good’). Of course a slight technical inferiority did not normally matter to the Turks: the Ottoman fleet dominated the Mediterranean neither by virtue of superior commanders (most of their admirals were relatively inexperienced graduates of the palace school) nor through superior organization. They won thanks to greater resources. Their empire had more men, more ships and more equipment at its disposal than any enemy, and all were directed by a unified supreme command. Minor defects in individual items scarcely mattered when the Turks could send 150 galleys against Christian adversaries who possessed only 100. See Chapter 3 above.

41 See A. Williams, The metallurgy of muslim armour (Manchester, 1978; Seminar on early Islamic science, monograph 11), 4, 11.

42 On the introduction of ordnance to India see B. Rathgen, ‘Die Pulverwaffen in Indien’, Ostasiatische Zeitschrift, XII (1905), 11–30 and 196–227; I. A. Khan, ‘Early use of cannon and musket in India, AD 1440–1560’, Journal of the economic and social history of the Orient, XXIV (1981), 146–64; and J. A. Khan, ‘Origin and development of gunpowder technology in India, AD 1250–1500’, Indian historical review, XII (1977), 20–9. But the quality was often poor. When, for example, in 1524 the government of Portuguese India was computing the total quantity of ordnance available for defence, they noted: ‘We make little mention of morish guns, because they are no good on our ships; unless the metal is melted down, better guns can be cast’. See Lima Felter, ed., Subdistria para a historia da India portuguesa, part 11, 12. See the admirable general discussion in Sarker, Art of war, 126–60.


44 See references in Boxer, ‘Asian potentates’, 161. On the difficulty of estimating accurately the size of Indian armies, see D. H. A. Kolff, Nuurak, Rejput and Serep. The ethnography of the military labor market in Hindustan 1450–1850 (Cambridge, 1996), 2–17; and R. K. Phil, Armies of the great Moghals (1526–1707) (New Delhi, 1978), 125–34. Phil estimates Akbar’s campaigns in the later sixteenth century at some 50,000 men, and Prince Dara’s in 1653 at 90,000. But with provincial armies and feudal levies, the total manpower available for Akbar’s army in the 1550s was estimated by one man of 1,450,000 cavalry and 4,059,000 infantry (Kolff, 26, at 1).


46 For captured guns see P. Baldeus, Nauweurige Beschrijvinge van Malabar en Chorumandel, 1 (Amsterdam, 1672), 31; for guns given as presents see Cipolla, Guns and sails, 106, and Boxer, ‘Asian potentates’, 160; for munitions supplied by the Portuguese to Indian princes in order to preserve the balance of power between them, see HAG, Livres des Monarchies ex. fo. 52, king to vice-regent, 18 February 1640; for some technique practised by the Dutch, see Bernier, Travels, 51. For the use made by one notable Mughal commander of European technology see Sarkar, The life of Mir Jumla, 96, 275f.
Both Versiegen and Manucci had left interesting accounts of their foreign service see P. H. Pott, 'Willem Versiegen, een extra-ordinaris Raad van Indië, als aventureur in India in 1659, Bijdragen tot de Taal, Land- en Volkenkunde, VIII (1935), 355-82; and N. Manucci, Storia do Mogor, or Mogul India 1653-1708 (4 vols., ed. W. Irvine, London, 1906-8). There are also numerous references to European military experts in Mughal service from Bernier, Travels (e.g. pp. 47-56, 93). On p. 51 Bernier, writing in the 1660s, ventured the opinion that 'I could never see these [Mughal] soldiers, destitute of order, and marching with the irregularity of a herd of animals, without reflecting upon the case with which 25,000 of our veterans from the [French] Army of Flanders, commanded by the Prince of Condé or Marshal Turenne, would overcome these armies, however numerous'. The problem, however, was to get so many Europeans (to say nothing of Condé or Turenne) to India at the same time.

48 Manucci, Storia, 1, 276, 278.

49 Of course, 'street gang' tactics continued to characterize European colonial warfare until the twentieth century; see, for a classic example, R. Meinertzhagen, Kenya Diary 1902-1906 (Edinburgh, 1917), e.g. pp. 74, 143f., 152, and most of Part II. For the introduction of regular European military practice to Portuguese India see, for example, clause 33 of the royal Instructions to Viceroy Redondo, going to India in 1679: "We have tried many times to reorganize our troops in India according to the European manner, since experience has shown that without this we have suffered several important losses, and now that we are at war with the Dutch, who are disciplined soldiers, it is more important than ever" (R. A. Bulhão Pato, ed., Documentos remotos de India e Lisboa das Monarquias, 164 (Lisbon, 1959), 265-9). See also pp. 286-7, (royal letter of 1693) and others in later years on the same subject. An interesting insight into Portuguese military practice in India in the early seventeenth century is offered by G. D. Winius, 'Francisco Rodrigues de Silveira: the forgotten "soldado prático" in Albuquerque and Guerreiro, eds., II seminário internacional de história inda portuguesa, 77-86.

50 For examples, see HAG, Livro das Monções 22 fos. 282-4, victory to king, 7 December 1634; and MS. 1581 fos. 112v, Aseto of the Council of Finance in Goa, 11 September 1630. On the Macao bundy see M. Teixeira, 'Os Bacarros' in Actas do Congresso internacional de Historia dos descobrimentos v.2 (Lisbon, 1961), 355-83.

51 Based on the archaeological and historical evidence presented in R. O. W. Geertz, 'Attack and defence techniques at the siege of Chaul, 1570-1616' in Albuquerque and Guerreiro, II seminário, 255-92. Part of the explanation for the deliverance of Chaul was the failure of the besiegers to cut the town off from the sea, so Portuguese ships were constantly able to land supplies and reinforcements. These warships were also able to use the guns against the besiegers from time to time. The Portuguese were also armed with superior handguns; it was found that their muskets fired a one-ounce shot over 400 metres, while the Indian infantrymen could only send a half-ounce shot for about half that distance.

52 Details from P. E. Persis, Some documents relating to the rise of the Dutch power in Ceylon, 1602-1670 (Colombo, 1929), 57 (Baticaloa) and 67-8 (Colombo); and Baldaeus, Nauuurkeurige Beschrijvinghe, I, 155 (Negapatam) and II, 106 (Colombo). See also the excellent illustrated descriptions in W. A. Nelson, The Dutch forts of Sri Lanka: the military monuments of Ceylon (Edinburgh, 1984). Some Portuguese fortresses in India were more impressive, however, such as Diu, or Fort Aguada at the bar of the Mandovi, below Goa.

53 For details see S. Toy, The strongholds of India (London, 1957), 50-60 (Golconda) and 123 (Delhi); S. Toy, The fortified cities of India (London, 1966), 23, 48-50, and 83-4; Sarkar, Art of war, 143-74; and the magnificent plates in F. Vass, The forts of India (London, 1986).

54 See, in particular, P. J. Marshall, 'Western arms in maritime Asia in the early phases of expansion', Modern Asian Studies, XIV (1980), 13-28. The following part of my argument owes much to discussions with Professor Marshall, whose generous gift I gratefully acknowledge.


56 Coen to Heeren XVII, 27 December 1614 (from Banten in Java), quoted by H. T. Golenbrander, Jan Pieterszoon Coen. Leven en beschrijving (The Hague, 1934), 64. It should be noted, however, the Coen's advice was not always followed. In 1622, he was rebuked by the Director-General for fighting too much. Violence, they told him, should be used only in the service of profit; 'One must avoid and eschew war if it is at all compatible with the preservation and safety of our state... No great attention should be paid to questions of "reputation" for we are mere merchants.' (Quoted by Steensgaard, The Dutch East India Company as an institutional innovation, 235.) The Directors had good reason for concern; many of their forts and factories in the Orient were returning a loss! See M. A. P. Melink-Roelofs, Atlantic trade and European influence in the Indonesian archipelago between 1500 and about 1650 (The Hague, 1962), 386.

57 John Fryer, A new account of East India and Persia, being nine years' travels, 1672-1681, 1 (London, 1699), Hekelry Society, and series XX, 124.

58 Some company officials agreed with the Dutch view, and in the 1680s some of the Directors supported them. Several appropriate quotations will be found in L. B. Watson, Fortifications and the "idea" of force in early English East India Company relations with India, Past and Present, XXXIII (1982), 79-80.

59 Quotations from East India Company records in G. J. Bryant, 'The East India Company and its army, 1660-1778' (London University Ph.D. thesis, 1975), 10, 31, 74 and 138. There was a brief period of belligerence in the 1680s, under the leadership of Josiah Child, but it failed (see Bryant, pp. 32-3; interestingly, it coincided with a similar assertiveness by England in her American colonies -- S. S. Webb, The Governor-General, The English army and the definition of the Empire, 1569-1682 (Chapel Hill, 1979), 447-53).

60 The battle of Adyar river (7 November 1746) was well described by the Tamil factor of Duplex at Pondicherry: J. F. Price, ed., The private diary of Andew Ranga Pillai, III (Madras, 1914), 64-5 and 444-52.

61 See the interesting remarks on this theme by J. A. de Moor, 'Military inter-dependencies between Europe and the derde wereld'. De geschiedenis van "Johnny Gurkh", Internationale spectatore, XXXVII (1984), 45-64; de Iongh, Het krijgswezen, chap. 4; and Marshall, 'Western arms in maritime Asia', 25 ff.
French only in 1746. This contradiction is resolved by the records at Pondichéry, which reveal that two companies of 'cypahes' were raised by the French in January 1742 and were drilled, armed and paid in the European manner. But they were disbanded at the end of the year and so Duplex in 1746 had to start all over again. See H. H. Dodwell, Sepoy recruitment in the Old Mahrásh Army (Calcutta, 1922). Studies in Indian records, 1, 3-77; and S. C. Hill, The old sepoys office, English Historical Review, xxvii (1912), 469-471.


64 Details from Forster, India, 147-59 (Saunders quoted at p. 156); and Forster, John Company at work. A study of European expansion in India in the late eighteenth century (Cambridge, Mass., 1948), 209f. I am more grateful to Professor Blair R. King for these references and for invaluable help in formulating the argument of this paragraph.

65 Figures from Bryant, The East India Company and its army, 1991; M. P. Singh, Indian army under the East India Company (New Delhi, 1976); and P. Mason, A matter of honour: an account of the Indian army, its officers and men (2nd edn, London, 1976), 62ff. I am grateful to Dr Bryant for sending me further material and additional references on this matter.

66 On the Mughal army's strength, see Raychaudhuri and Habib, eds., Cambridge economic history of India, 1, 303f, and the sources cited in note 44 above. There is a tendency to discount native Indian power by land in the earlier eighteenth century, perhaps because of the total collapse of native seaborne trade at the same time. But this is wrong; see Das Gupta, Indian merchants and the decline of Surat, introduction; 'Indian merchants and the western Indian Ocean in the early seventeenth century', Modern Asian Studies, xix (1985), 482-99; 'Indian merchants'; and in The Cambridge economic history of India, 1, 455-53.

67 Reports from Committees of the House of Commons, iv (1804), 60-1. My thanks go to Professor P. J. Marshall for this reference. The figures are all the more striking when it is remembered that the Company lost £1.5 million between 1753 and 1760. The massive new Fort William at Calcutta, built between 1765 and 1771 at a cost of £1 million, is just one example of how the Bengal settlement allowed the Europeans to change the art of defensive warfare in India. See P. J. Marshall, Eighteenth-century Calcutta in Ross and Telkamp, Colonial cities, 90.

68 See Hess and Stahl, 'Western imperialist armies in Asia'; J. P. Lawford, Britain's army in India from its origin to its conquest of Bengal (London, 1978), 72-81; Bryant, 'The East India Company and its army', chaps. 3-5; and R. Callahan, The East India Company and army reform, 1789-98 (Cambridge, Mass., 1972).

69 The Dutch East India Company also began to train their Asian troops to fight like Europeans in the 1740s, under Governor-General van Imhoff: see de Jongh, Het krijgsbezet, 165-8.


71 On the Marathas' failure, see Pemble, Resources and techniques, 186ff. On the sepoys in the Philippines see Mason, A matter of honour, 68-242. On China see L. Demigny, La Chine et l'Occident. Le commerce à Canton au XVIIIe siècle,

719-1833, ii (Paris, 1964), 781. Later in the nineteenth century, sepoys were also sent to conquer East Africa for the Europeans. See also the remarks of Qnatsr, The Indian response to European technology, 45-57, and 144-6.

72 The suggestion that the Turks introduced Western firearms to China before the Europeans was first made by F. Pelliot, Le Hâf et le Suyd d'Asie de l'Histoire des Ming, T'oung Pao, xxviii (1938), 81-292, at pp. 199-207. See also Needham, The gunpowder epic, 44ff.

73 Details from R. Huang, Military expenditures in sixteenth-century Ming China, Orisens extrême, xvii (1979), 39-63; Huang, 1587: a year of no significance, chap. 6; A. Chan, The glory and fall of the Ming dynasty (Norman, 1982), 53-63 and A. Winkler, The Great Wall of China, From history to myth (Cambridge, Mass., 1990), chap. 5.

74 Tai-ts'u shih-lu (facsimile edition, Mukden, 1951; reproduced from an edition of 1740 which seems to be based, in turn, on an illustrated chronicle compiled in 1635 — that is, by and for those who might themselves have seen the events they described).

75 See two new accounts of the fall of the Ming by Wykeman, The great enterprise: and Struve, The southern Ming. See also Spence and Wills, eds., From Ming to Ch'ing, chaps. 21 and 22, and Chan, Glory and fall, chap. 8.

76 Although the efforts of the Jesuits and other Europeans in Macao and Peking to supply first the Ming and then the Manchu with guns usually monopolize the limelight, this is just another case of Eurocentrism. The bulk of Chinese artillery was produced by Chinese craftsmen: see Needham, The gunpowder epic, 392-414, and Chan, Glory and fall, 57-65. The same was true in Japan, where production by local workshops far surpassed European imports, by far the only East Asian country which seems to have been heavily dependent on weapons imported from the West was Vietnam: the figures of the north relied heavily after the 1720s on bronze guns either cast by Westerners living in Hue, or else imported from Macao, in their wars against the Tring of the south, who received (in turn) supplies from the Dutch in Batavia. But even in Vietnam, local production continued: a French visitor to Hue in 1749 saw 800 bronze and 400 iron guns, by no means all of which were of European manufacture. See P. Y. Mengué, Les Portugais sur les côtes de Vietnam et du Campa (Paris, 1972), 206ff; L. Cadère, Le Quartier des Arènes, I, Jean de la Croix et les premiers jésuites, Bulletin des amis du Vieux Hé, xi (1924), 367-368 (La Croix resided in Hue and cast guns for the Nguyen from the 1650s to 1682); and C. R. Boxer, Macao as a religious and commercial entrepôt in the sixteenth and seventeenth centuries, Acta Asiatica, xxxii (1974), 64-90.

77 Matteo Ricci, in his memoirs (referring to the year 1599), noted that, although the Chinese army drilled 'in proper order', they used gunpowder, 'not so much for their arquebuses, of which they have few, nor for bombard and artillery which are also in short supply, but for firework displays'. Quoted by J. D. Spence, The memory palace of Matteo Ricci (London, 1983), 45. It is notable that the very first image in Ricci's 'artificial memory' was war. The exact size of the Ch'ing army was an official secret, but the campaign forces in the seventeenth century apparently numbered around 150,000 men, with up to 40,000 men directly involved in battles. See C. Farg, 'A technique for estimating the numerical strength of the early Manchu military forces', Harvard Journal of Asiatic Studies, xii (1950), 192-215.

78 For the precise manner in which Western guns were introduced into Japan, see the definitive account, together with a German translation of Japanese sources,
in C. Schurhammer, Gesammelte Studien, II. Orientalia (Rome, 1963; Biblioteca
Instituti Historici Societatis Jesu, xxi), 483–579. There is an English translation
of one source – the Teppōki of Nambu Buni (1666) – in Tsonga Rusaku
should be noted that the island of Tanega-shima, where the first Portuguese
guns arrived (which is why early muskets are called in Japanese Tanega-shima),
was an ideal spot for copying them. It was, in 1543, not only an established
centre of trade but also a major centre of sword production; it proved relatively
easy for the sword-smiths to turn out musket-barrels instead, ready for the
merchants to distribute.

In 1549 Oda Nobunaga was apparently asked to provide ‘500 musketeers and
bowmen’, which does not necessarily mean – as many scholars have said – 500
men with muskets (Hara Tomio, Tanega-shima-jô. Donari no sono ekyô [Tokyo,
1918], 157). But in 1555, Takeda Shingen definitely deployed 500 musketeers
at the battle of Shiroina Asahiyama (Nagahara Kenji, Sengoku no adom, Nibon
so rekishi, xiv [Tokyo, 1975], 547; and Hara, Tanega-shima-ju, 144–54).
Nagashino is depicted in a marvellous series of screen paintings, reproduced in
Sengoku kassen-e Byôbu Shinsei, 1. Kawanakajima kassen-zu Nagashino kassen-zu
(Tokyo, 1986). However, since the screens were all painted several decades after
the battle, they may depict later Japanese military practice rather than the actual
techniques employed by Nobunaga at Nagashino.

The general account of N. Perrin, Giving up the gun: Japan’s reaction to the
sword 1544–1579 (New York, 1979), although interesting and provocative, is
based almost entirely on Western sources and misses some of the evidence too
far. Greater research may be placed on D. M. Brown, ‘The impact of firearms
Hara, Tanega-shima, 11–3, shows that firearms, almost certainly imported from
China, were used in Japan before 1543. They were, however, few in number
and limited in effect. The exact nature of early Japanese guns is difficult to
establish, because so few survive – perhaps only ten Tanega-shima from the
sixteenth century are known today [personal communication from Dr Yoshiko
Shin’ichi of Kyoto]. And much the same is true of artillery; very few early
modern pieces survive – although here the culprit (according to Japanese sources)
was the ‘liberation’ of most of the beautiful guns collected in the Kudan Museum
in Tokyo by American forces after 1545. Only a few firearms are to be found
in the military museum attached to the Yasukuni shrine in Tokyo. There is
a coarse discussion of the sources and problems in Needham, The gunpowder
epic, 467–72, which relies (perhaps too heavily) on the utopian vision of Noel
Perrin’s Giving up the gun.

80 Quotations from E. M. Satow, ‘Notes on the intercourse between Japan and
Siamese’, Transactions of the Asiatic Society of Japan, xiii (1884–5), 145; army sizes
in G. B. Sansom, A history of Japan, 1334–1615 (Stanford, 1961), 322. A recent
consideration of the armies commanded by Hideyoshi – which reached a total
strength of 280,000 for the invasion of Korea in 1592 – is provided by B.
Suess, ‘The Toyotomi regime and the daimyô’ in J. P. Mass and W. B. Hauser,
eds., The Bakufu in japanese history (Stanford, 1985), 129–52, at pp. 153f.

81 Kodama Kôta, and others, eds., Nibon jokaku taiseki, xi (Tokyo, 1980), 261–9
on Kannonom ibiza, 254–60 on Azuchi; plus Naitô Akira, ‘Azuchi no senkôki, Kochika, lxxvi (nos 587–8; 1976), with a brief English summary. A
review of Naitô is also helpful: Takayanagi Shun’ichi, ‘The glory that was
Azuchi’, Monumenta nipponica, xxxi (1977), 513–24. See also G. Elison and
B. L. Smith, eds., Warlords, artists and commoners. Japan in the sixteenth century
(Honolulu, 1981), 62–6; and M. Cooper, They came to Japan: an anthology of

82 The verse is quoted by George Elison in Elison and Smith, Warlords, artists and
commoners 66. On the siege of Odawara, see Sansom, A history of Japan
1334–1615, 516–7. Concentrations of troops on this scale caused severe logistical
problems and placed an almost insurmountable strain on the Japanese economy,
weakened by over a century of civil strife. On the link between castle size,
army size and tax demands under Hideyoshi, see the richly documented article
of G. Morechand, ‘“Také kenchô”, le cadastre de Hideyoshi Tokugawa’, Bulletin de
For a modern biography of the remarkable Takó – Japan’s only commoner
ruler before modern times – see M. E. Berry, Hideyoshi (Cambridge, Mass.,
1982).

83 Kodama, Nihon jokaku, xii (1983), 152–82, and Okamoto Ryôichi, Nihon jô
kakushi senki, v (Osaka: Osaka, 1982). Both works are fully illustrated.
See also the plates in K. Hirai, Peasal architecture in Japan (New York,
1973), chap. 4; the account of W. B. Hauser, Osaka castle and Tokugawa
authority in western Japan in Mass and Hauser, The Bakufu, 153–72; and the
description of the Maeda stronghold at Kanazawa in J. McClain, Kazan Iceland:

84 J. W. Hall, ‘The castle town and Japan’s modern urbanization’, Far Eastern
Quarterly, xv (1955); a classic article reprinted in J. W. Hall and M. B. Jansen,
eds., Studies in the institutional history of early modern Japan (Princeton, 1968),
169–80, p. 177. Possibly the Dutch fortifications at Calle, in southern Borneo,
were in fact larger: see Nelson, Dutch forts of south east India, 46–71.

85 Although we know from several sources that military convention was
Nobunaga’s chief passion, the Westerners with whom he conversed were mainly
regular clergy whose knowledge of military architecture would normally not
have extended to the intricacies of defensive architecture. See A. Valigamu,
Sumario de las Cosses de japon (1583; ed. J. L. Alvarez-Taldan, Tokyo, 1954),
155. It is true that some Jesuits in the East became skilled in metal casting,
but this did not necessarily make them into reputable military engineers.

86 Quotations from J. G. Chutcho, The Chinese War (London, 1844), 174–5; and
H. Knollys, Incidents in the China War of 1860 (Edinburgh, 1871), 198–9. See
also Headrick, The tools of empire, 80–1; S. D. Chang, ‘The morphology of
walled capitals’ in G. W. Skinner, ed., The city in late Imperial China (Stanford,
1977), 79–100; H. Franke, Siege and defence of towns in medieval China’ in
F. A. Krigeon and J. F. Painbail, eds., Chinese ways in warfare (Cambridge,
civilization in China. Volume V: Chemistry and chemical technology, part vi:

87 The study of Needham, Science and civilization in China, v. vi and vii, replaces
all earlier accounts as far as China is concerned. But see also C. R. Boxer,
‘Early European military influence in Japan (1543–1815)’, Transactions of the
Asiatic Society of Japan, 2nd series viii (1931), 67–93; C. R. Boxer, ‘Portuguese
military expeditions in aid of the Mings against the Manchus, 1621–1647’,
T’ien Hsia Monthly, vii (August 1918), 24–36; and Cipolla, Guns and sails,
114–17.

88 Perrin, Giving up the gun, 64–5.

89 Data taken from Rô Tasaburo, The book-banning policy of the Tokugawa
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3 See the judicious remarks of Corvisier, Armies and societies, chap. 6. However, attempts to forge too close a connexion between war and the growth of absolutism can be dangerous. See the much criticized theories advanced by R. Bean, 'War and the birth of the Nation State', Journal of Economic history, xxvii (1973), 131-2; followed by the strictures of D. Ringrose and R. Roehl, ibid., 122-33; and by S. E. Finer, 'State and nation-building in Europe: the role of the military' in C. Tilly, ed., The formation of nation-states in Western Europe (Princeton, 1979), 84-163. See also the cautious remarks of Haft, War and society, 136-37. However, the existence of a correlation between militarization and centralization can be clearly demonstrated for certain times and places. See, above all, the essays in Kunisch, ed., Staatsverfassung und Herrschaftsverfassung; and also J. Vicens Vives, ‘Estructura administrativa estatal en los siglos XVI y XVII’ in XIV congrés international des sciences historiques: Rapports, IV (Stockholm, 1960), 1-241; W. Schulze, Landessie?en und Nationbildungen: Studien zum Kriegswesen des innerösterreichischen Territorialstaates (1564-1619) (Vienna, 1973), part 4; V. G. Kiernan, ‘Foreign mercenaries and absolutism’ in T. S. Aston, ed., Crisis in Europe 1560-1660 (London, 1965), 117-40; J. A. Maravall, Estado moderno y mentalidad social (Madrid, 1972), 513-38; the articles of L. Jespersen, J. Lindegren and O. Rian in Scandinavian Journal of History, x (1965), 271-36; and C. Jones, ‘The military revolution and the professionalization of the French army under the Ancien Régime’ in Duffy, ed., The military revolution and the state, 39-48. In his last historical work, the late Fernand Braudel called attention to the crucial role of early modern armies in breaking down local barriers and unifying the subjects of each state: during the eighteenth century, he claimed, ‘Alongside the king’s government, the army became the most active local instrument in the unification of France’ (Braudel, L’identité de la France. I. Espace et histoire [Paris, 1986], 338).


7 Details from C. Duffy, Frederick the Great (Newton Abbot, 1974), chap. 9.

8 Details from W. L. Dorn, Competition for empire 1740-1763 (New York, 1940), chaps. 4, 5, and 6, Duffy, Army, chap. 8, and Duffy, Frederick, chap. 9 (‘Frederick and war’). On the other hand, thanks to all these economies, Frederick did indeed turn the war with a small profit.

9 Preface to Histoire de mon temps quoted by R. R. Palmer, ‘Frederick the Great, Guibert, Bilou’ in Parrett, ed., Makers of modern strategy, 91-119, at p. 105. The king was not so keen on preserving the diplomatic status quo; however: in 1772, he persuaded Russian and Austria to join him in partitioning Poland.


11 Quotation (from Sir Nicholas Wraxall, in Vienna, in 1778) in Kunisch, Der kleine Krieg, 199; an excellent account of the development of the Austrian light infantry. See also G. E. Rothenberg, The military border in Croatia, 1740-1815 (Chicago, 1960), 199-211. See also for a study of an imperial institution (Chicago, 1966), chaps. 2 and 3.


14 The military revolution and the professionalization of the French army under the Ancien Régime’, in Duffy, ed., The military revolution and the state, 39-48. In his last historical work, the late Fernand Braudel called attention to the crucial role of early modern armies in breaking down local barriers and unifying the subjects of each state: during the eighteenth century, he claimed, ‘Alongside the king’s government, the army became the most active local instrument in the unification of France’ (Braudel, L’identité de la France. I. Espace et histoire [Paris, 1986], 338).

15 For the delayed impact of Bouquet, see J. M. Quimby, The background of Napoleonic warfare, 1795-1841; and S. T. Ross, The development of the combat division in eighteenth-century French armies, French historical studies, iv (1965), 84-94. The adoption of the combat division, however, was mainly the product of unwieldy armies after the levée en masse of 1793: a body of men like the Armée du Nord, with 310,000 troops by spring 1794, simply could not operate without divisions. I am grateful for this point, and for much else in this section, to professor John Lynn.)