

Ships' Fastenings

From Sewn Boat to Steamship

Michael McCarthy



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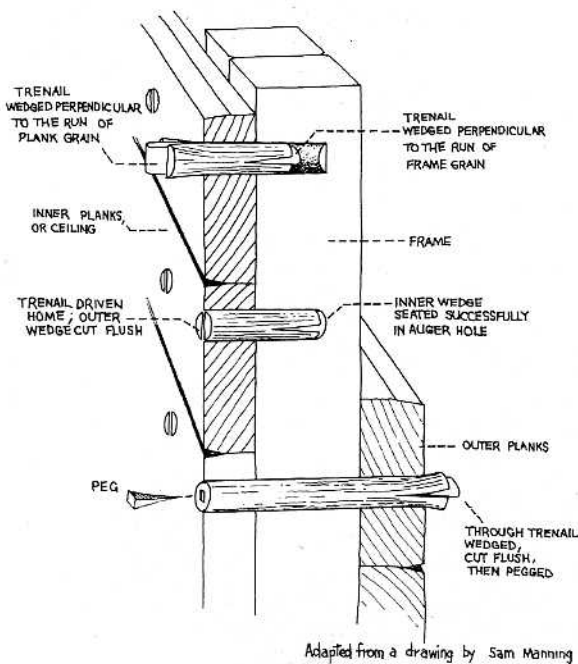
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worse, split, necessitating the head being trimmed, or far worse, the removal of the treenail. Herein also lies the reason that Ollivier notes that the treenail starts off a foot or so (about 30 cm) longer than the hole into which it is driven, and why Alec Barlow advises that in the repairs his team of shipwrights undertook on HMS *Victory* iron caps were placed over the treenail before driving.

This is also a pertinent time to contemplate one opinion that “treenail drivers—often the most worthless men in the yards—sometimes slight their portion of the work” by driving the fasteners slack. Then where they experience difficulty the treenails were “pegged,” the complainant observed derisively. Here they were driven only a short distance into the timbers, rather than passing right through to finish wedged on each end, as he believed was best practice.²⁹

Alternatively, “short” or “blind” treenails—provided there is sufficient drift—can prove most efficient and were not necessarily inferior to “through treenails,” as inferred. Dana A. Story remembers

“growing up” in an American shipyard in the 1930s and starting work there driving what he called “long trunnels.” These, he said, differed from a “regular trunnel” in that they were driven all the way through plank frame and ceiling (the inside plank-ing) instead of just the plank and frame. As indicated, these types could be described as through treenails and as short, or blind, treenails respectively.³⁰ Sometimes short or blind treenails had a wedge or peg left protruding from the internal end as they were inserted into the parent timbers. When they contacted the bottom of the hole this internal treenail wedge or peg was pushed back into the treenail, serving to expand the end in the hole. Here, depending on its form, the terms blind peg or “blind wedge,” as used by S. S. Rabl in his 1947 treatise on boat building, could apply.³¹



Adapted from a drawing by Sam Manning

Figure 40. Short and through treenails, showing treenail wedges and a treenail peg. By Chris Buha-giar, after Manning.

Regardless of their form, the extent of the drift applied to the hole, and whether they were through, blind, wedged, pegged, or un-wedged, the acceptance of the treenails became such that by the time L. C. Everard came to write an article in the early twentieth century titled “Treenails: An Interesting and Not Unimportant Detail of the Revived American Industry of Wooden Ship-Construction,” large vessels were requiring 20,000 to 50,000 treenails.³² Finally, it needs be observed at this juncture that, like their metallic counterparts, treenails are not always circular, and can appear multi-

spikes, bolts, bondes” were being made in the royal forge at Southampton.⁴⁷ “Spyking nails” also appear among a list of carpenter’s nails used in Bristol dating from 1492.⁴⁸ Finally, the list of fastenings prescribed in 1627 as part of a carpenter’s spares in Captain John Smith’s *A Sea Grammar* includes “nailes, clinches, roove and clinch naile, spikes, plates.”⁴⁹

Spikes were also used to fasten deck planks to the deck beams and these deck spikes are invariably found countersunk into an approximately 50 mm diameter by approximately 50 mm deep hole produced with a dowelling auger or counterbore. After the fastening was driven below the surface, to prevent water lying in the recess and damaging the timbers, the holes were covered with tar, pitch, or similar over short wooden “plugs.”⁵⁰ Hence the term

“counterbored and plugged.”⁵¹ John Horsley calls these covers “dowel plugs” and others use the terms “spiles” or “dowels.” While normally cylindrical, they can also be square or diamond-shaped, however, as were those on the deck of the former India ship, the hulk *Jhelum* in the Falkland Islands. Here Michael Stammers and J. Kearon have noted that the “spike heads were covered in diamond-shaped wooden plugs set in pitch.”⁵² The problem

that arises when self-evident terminology is not used is again evident in these instances, especially where terms have number of meanings (e.g. spile, dowel and so on), and thus the term deck plug could be used in this instance to avoid any confusion. Where they appear in other locations (for example, covering through fastenings inserted into knees as in the *Mary Rose*) the term fastening plug could best apply.

As elsewhere in European-tradition shipbuilding, a variety of methods and fastening combinations were used over place and time, sometimes according to vessel size. A comparison of the fastenings used in the transom, wing and port transoms, and fashion pieces on the late-eighteenth-century French “74 Gun Ship” with fastenings on a much smaller vessel provides some useful insights. One of the first observations to be had is that the fastenings used there are similar to those found elsewhere in the ship. In the “74” case there appears through bolts of the clenched and forelocked type, short or blind bolts, some of which are ragged bolts, and then spikes. Also evident are temporary fastenings such as “treenails” that Boudriot advises are later “replaced or supplemented by bolts.”⁵³ As a contrast, in Peter Hedderwick’s *Treatise on Marine Architecture* that was published in 1830, we note that only two types of fastenings are used in the transoms: bolts and treenails. “The transoms are now to be fastened to the post, with one bolt in each; and if the vessel is large, the wing and port-transoms are commonly fastened with two bolts in each, $\frac{1}{8}$ th of an inch less in diameter

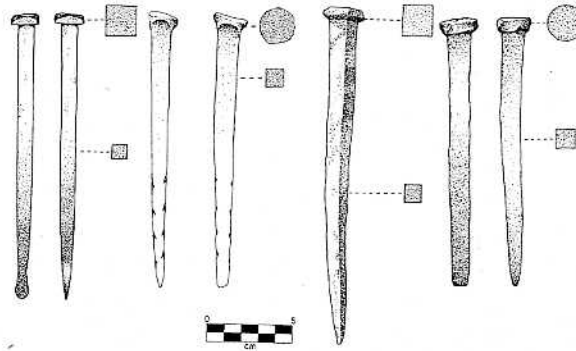


Figure 46.
A range of spikes. One is
ragged. By Chris Buhagiar.

crosswise to the nails length. Called “cross-grained nails,” they tended to break along lines of slag inclusions, and the shipwright continued to require what Tom Wells, in his study titled *Nail Chronology*, calls “hand forged . . . grain-in-line” nails. Thus the hand-forged wrought nail survived in wooden shipbuilding, continuing well into the nineteenth century, partly because the difficulties in perfecting a “clenchable” “grain-in-line” cut nail were not solved until the advent of large diameter wide rollers driven by steam power. By the 1820s, the plates had grown from eight to ten inches wide and the rollers ten to twelve inches in diameter up to three feet or more wide and two feet in diameter respectively.

This allowed nails to be cut from the end of the “cross-grained nail plates” such that the grain ran from point to head, allowing them to be “successfully clinched” (bent) without fracture. Finally, while only 5 percent of all cut nails were made of steel in 1886, four years later the figure had risen to 75 percent and by the end of the century all, bar a small fraction, were made of steel.¹⁵

Within a few years the machine-pressed, round-shanked, clenchable, “wire-nail” (or “French nail”) was also being introduced to Britain and America from Germany and France. The type revolutionized the market and served to drive the cut nail out of the industry in America.¹⁶ Again, it had a long gestation, beginning with “wire drawing,” a technique that appears in the Frenchman Denis Diderot’s *Pictorial Encyclopedia of Trades and Industry*, first published in 1751.¹⁷ Apparently, this development was also furthered by Cort’s system of grooved rollers in 1783.¹⁸ By the 1890s the iron wire nail overtook the cut nail in production with the advent of a steel wire-cutting machine capable of producing 300 nails a minute. Here, cutting and pointing occurred simultaneously, and heading was performed as the machine ejected the nail. These efficiencies saw the predominance of that form in America; but elsewhere, especially in Britain, there was initially a “general disinterest in wire [or French] nails.”¹⁹ Notwithstanding the claims made in the

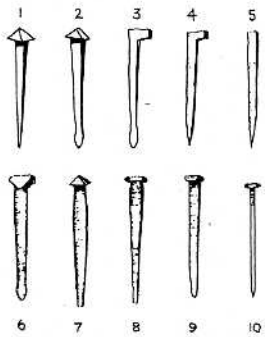


Figure 64.

A sequence of square-sectioned hand wrought and “cut” nails or spikes. By Chris Buhagiar, after Mercer 1960, 253. 1–6 are wrought; 7–9 are cut; 10 is a wire nail. They are arranged in sequence dating from the eighteenth century (1–6); from 1790 to 1820 (7), ca. 1820 on (8, 9); up to mid-nineteenth century (10).

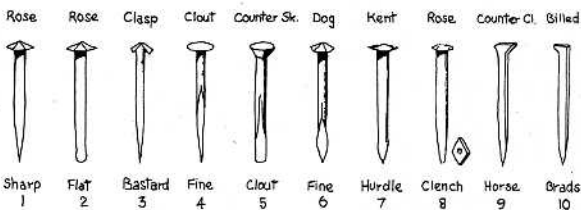


Figure 65.

Another sequence of hand-forged nails with descriptions at the heads and ends. By Chris Buhagiar, after Varman.

following advertisement, the wire nail is rarely found in the maritime trades outside of “ship’s joinery,” or the construction of non-structural components such as deck houses, internal carpentry, and the like. The type appears here in recognition of the fact that they can appear on shipwreck sites. Readers will also be interested in the claims made about the perceived disadvantages of the tapering square section nail (or spike) appearing in the advertisement under the heading “French and English Nails compared”:

A writer, asserting the superiority of French over English nails, says: “The fault of the English nails is their being made in the shape of a wedge, which detracts from their holding power and makes them more likely to split the wood. The French nails are the same thick-

None of these three categories are hull fastenings, however, but they are mentioned here as the larger forms can be mistaken for plank spikes.⁴

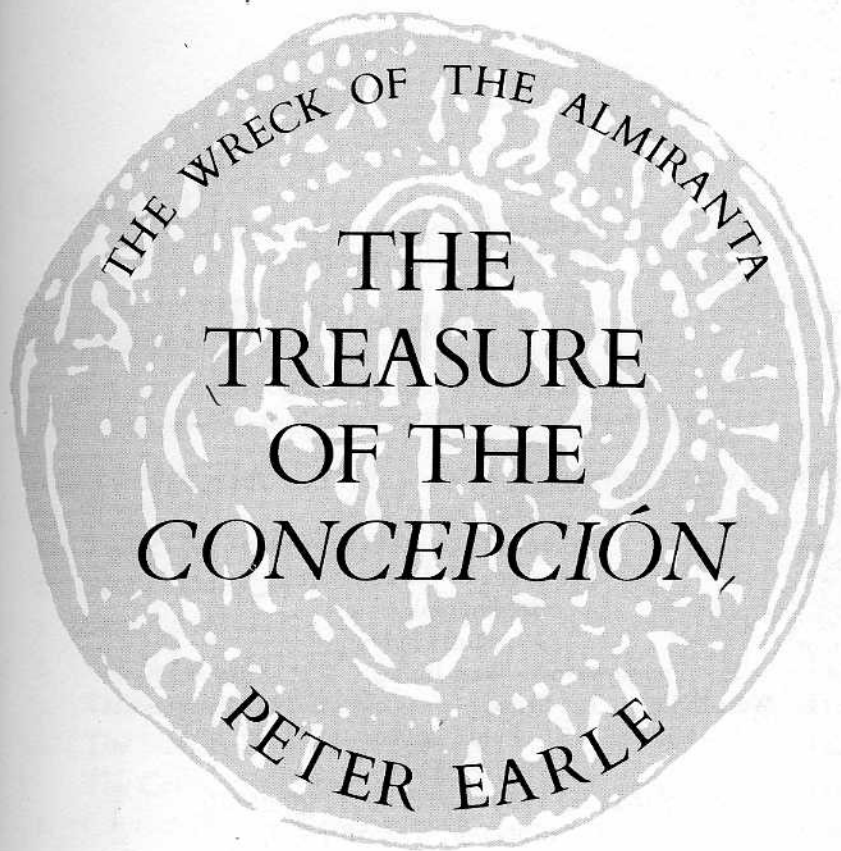
After disappearing from the record in the European Dark Ages, lead sheathing was adopted by the Spanish navy in 1514 and by Portugal as a deterrent to teredo worm and other woodborers. As was the case hundreds of years before, it was most likely attached with copper or copper-alloy tacks called “lead nails.”⁵ The development of a technique allowing the production of sheet lead (called milled lead) by rolling instead of by casting saw the method used on some twenty British naval ships and on some merchantmen around 1670.⁶ The practice was discontinued after 1691 when it was realized that the lead was damaging the rudder irons and the iron fastening bolts.⁷ The idea was resurrected and tested on two RN ships in the mid-eighteenth century, but was found to be inadequate.

Copper Sheathing

In one recent examination of sheathing as a deterrent to shipworm there is reference to reports of it being seen on Chinese junks in the seventeenth century.⁸ The use of copper sheathing elsewhere effectively dates to a patent of 1740 where a “brass latten” sheathing was suggested as a counter to the effects of fouling.⁹ It is an area very well covered in many accounts mentioned in this chapter, and in the references, and only in as much as it refers to ship’s fastenings will it be mentioned in any detail here.

In his mid-nineteenth century work, *A History of Naval Architecture*, John Fincham noted that in 1763, after experimenting with copper sheathing on the frigate *Alarm* during its voyage to Jamaica, officials were pleased with the results but later became concerned to see the effect that the copper had on adjacent iron fastenings.¹⁰ Despite this setback, by 1779 four other vessels were also “coppered” (sheathed with copper). But this was not the only method used at the time. The planking of the lower hull on the *Carcass* bomb, for example, was “filled” with copper nails by a process that entailed the hammering of large-headed copper nails as close as possible together to form a fairly continuous sheathing surface.¹¹ This reflects the method mentioned earlier, utilizing short cast or wrought iron nails with large heads, driven so close that they formed almost continuous sheet of “filling nails,” though in this case the heads spread due to corrosion. As one example, evidence of iron filling nails are found in patterns on the timbers recovered from the seventeenth-century Dutch East Indiamen *Batavia* and *Vergulde Draeck*.¹²

During this period of experimentation with “coppering” as a deterrent to marine growth, several difficulties were met in providing efficient nails (sheathing tacks) for the plates. Copper is a soft metal not conducive to hammering, and square-shanked, countersunk nails cast from an “arsenical tin bronze” were used. While of “poor metallurgical quality” (reflecting the level of technology in the mid-eighteenth cen-



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A Capitana for New Spain

The ship we are interested in was the *Nuestra Señora de la pura y limpia Concepción*, commonly known as the *Concepción*, which was selected as the Capitana of the fleet. She was described as a *nao*, a generic term for a large merchant ship, and had been built in the shipyard at Havana in Cuba in 1620.⁸ On 1 June 1639 a contract was signed between the officials of the Casa de la Contratación and the ship's owner, Don Tomas Manito of Seville. He agreed to hire his ship to the King to serve as Capitana for the voyage to Vera Cruz in Mexico, and to make all the preparations necessary for such a voyage, which would include very considerable alterations to the structure of the ship to enable her to take the forty bronze cannon which would be supplied from the royal arsenal. Don Tomas was to be paid 9,785 ducats for the hire of his ship, but he could expect to make considerably more on the side. The owner of the Capitana of a plate fleet was in a very privileged position.

The preparation of the *Concepción* was carried out during the winter of 1639–40 under the supervision of her mate, Francisco Granillo. The ship had only recently returned from her last voyage to New Spain and had in fact still been at sea when the contract was signed. She therefore needed a complete overhaul and refitting. She was hauled down and her bottom cleaned and, where necessary, resheathed with lead, to try to protect her from the ravages of the shipworm which thrived in the tropical waters of the West Indies. All her planking and decking was scraped down and recaulked. Altogether 50 quintals of tar, 18 of black oakum, 12 of hemp, 16 of lead and two barrels of grease were used in an effort to make the twenty-year-old ship sufficiently watertight to cover the four thousand miles of sea that lay between Cadiz and Vera Cruz. New masts, sails, rigging, cables and anchors were fitted as necessary and the decks reinforced to take the much greater weight of artillery required of a Capitana. On 1 March 1640 the ship was inspected, and it was noted in the margin of the copy of the contract kept by the Casa de la Contratación that Don Tomas had complied with the stiff conditions laid down by the officials.⁹

Most of this book will be concerned with the fate of the *Concepción*, above and below the water, and it is necessary to have some idea of what she looked like. We do not have a painting or even an inventory of the ship, but there is little doubt that she conformed to the general specifications for ships of her size built in Spanish and West Indian yards.¹⁰ She was referred to in the contract as a *nao* of 600 tons, but, by the time she had been refitted, she had been transformed into a galleon, and it is as a

The Treasure of the Concepción

galleon that she is normally described. She would have been about 140 feet long, with three masts, the foremast and mainmast carrying three square sails and the mizzen a large lateen sail with a square topsail. Into this comparatively small space, apart from the guns, the gear and the spare tackle necessary to make the ship a reasonably efficient sailing and fighting unit, were crammed two hundred tons of official cargo, many more tons of unofficial cargo, over five hundred men, women and children, and the general clutter of penned animals, cooped-up fowls, crates, chests, casks and barrels, which were the normal complement of a ship sailing to America.

Shipbuilding had been revolutionized by the Dutch in the previous half-century, but this had affected the Spaniards very little. Much to the scorn of foreigners, they continued to build large ships of the galleon type to very much the same design as in the late sixteenth century.¹¹ Their most strikingly archaic characteristic was their enormous, lavishly decorated poops, up to forty-five feet high, with four decks of beautifully appointed cabins, topped by the privileged poop deck from which the great could look down at the activity in the waist of the ship far below. On the poop deck of the *Concepción* there was a magnificent statue of the Virgin, the patroness of the ship. Spanish ships also continued to have built-up forecastles and very high bulwarks, which, coupled with their shallow draughts, made them extremely top-heavy and appallingly uncomfortable in a heavy sea. They were powerful, and they could carry a considerable amount of cargo, but they were very slow, very difficult to manoeuvre, liable to drift a long way off course, and unable to sail anywhere near the wind. When they were as old as the *Concepción* they were a recipe for disaster.

When the *Concepción* had passed the inspection of the officials of the Casa de la Contratación she was taken the sixty miles down the winding Guadalquivir river to the sea and so to the bay of Cadiz, some twenty miles down the coast, to join the ships of the fleet which she was to escort and to complete her lading. Meanwhile, all over Spain, those planning to travel with the fleet were making their final preparations before setting off on their separate journeys to the sea. There were many great men among them, but it is unlikely that anyone travelled in quite such style as Don Diego López Pacheco y Bobadilla, Marquis of Villena and Duke of Escalona, the newly appointed Viceroy of New Spain, who left his family estates near Madrid on 10 March 1640 to set forth on the long overland journey to the bay of Cadiz.¹²

Notes

Works listed in the Bibliography are cited by short title

CHAPTER ONE: A Capitana for New Spain

1. John Evelyn, *Diary and Correspondence* (1906) p. 461.
2. KAO U 1515/010 20 Jan 1687.
3. The description of the organization of the silver fleets which follows is based on the following authorities: Haring, *Trade and Navigation*; Artinaño y Galdácano, *Historia*; Chaunu, *Séville*; Parry, *Spanish Seaborne Empire* (1966).
4. For a recent general study of Spanish history during this period see Lynch, *Spain*, ii. For the connection between the arrival of treasure and Spanish foreign policy see Domínguez Ortiz, 'Los caudales'.
5. Hamilton, *American Treasure*.
6. Bakewell, *Silver Mining, 1546–1700*; West, *The Mining Community*.
7. AGI Ct 3053.
8. She is described as a *nao creolla* in Ct 3053. For her age see Volumbozca p. 4.
9. For the contract see AGI Ct 3053. For the number of guns see AGI 2699/3. She carried some cheaper copper and iron guns in addition to her main complement of bronze cannon. For her previous voyage to New Spain see Chaunu, *Séville* v, 324–5 and 350–3.
10. For Spanish shipping in this period see Haring, *Trade and Navigation*; Artinaño y Galdácano, *La arquitectura* and Usher, 'Spanish ships and Shipping'.
11. For an interesting critique of Spanish ships by a contemporary Spaniard see *Dialogo*.
12. Gutierrez de Medina, *Viaje*, pp. 5–12.
13. This brief description of silver-mining is based on Bakewell, *Silver Mining* and West, *The Mining Community*.
14. Hamilton, 'Wages and Subsistence'.
15. Gage, *The English American* p. 10.
16. Gutierrez de Medina, *Viaje* p. 42.

Notes

17. Cummins, *Travels of Navarrete* i, 19–20.
18. García, *Palafox y Mendoza* pp. 58–81 is a description of Palafox's voyage to Mexico based on Gutierrez de Medina, *Viaje*.
19. Gutierrez de Medina, *Viaje* pp. 11–16.

CHAPTER TWO: A Passage to Mexico





1. Gutierrez de Medina, *Viaje* p. 21. This chapter is based on the account given in this book, pp. 21–49, and I will give no further references to it.
2. Cummins, *Travels of Navarrete* p. 20.
3. For details of all these regulations see Linaje, *Norte de la contratación* and the abridged English translation by Stevens, *The Spanish Rule of Trade*.
4. For a complete list of the ships in the fleet see Chaunu, *Séville* v, 360–1.
5. For a discussion of pilots see Haring, *Trade and Navigation* pp. 298–315.
6. Gage, *The English American* p. 18.
7. BL Egerton 2395 fo. 101.

CHAPTER THREE: Too Long in Vera Cruz

1. Gutierrez de Medina, *Viaje* pp. 49–52.
2. For the corsairs see Fernandez Duro, *Armada Española* iv, 31–45, 107–116, 333–355. On the Dutch see Boxer, *Dutch Seaborne Empire*.
3. Vázquez de Espinosa, *Compendium* p. 39.
4. Chaunu, *Séville* viii (1), ch. 9.
5. Diaz de la Calle, *Memorial*.
6. For the Providence Island Company see Newton, *Colonizing Activities*.
7. CSPC 1574–1660 p. 124.
8. 'The Nature of the Island Catalina', *Navy Records Soc. Publins* xiv, 440–2.
9. CSPC p. 216.
10. *Ibid.* p. 150.
11. BL Sloane 758.
12. Hussey, 'Spanish Reaction'.
13. Gutierrez de Medina, *Viaje* pp. 51–2. See also Fernandez Duro, *Armada Española* pp. 335–7. For the general history of the Armada de Barlovento see Hussey, 'Spanish Reaction'; Parry, *Spanish Seaborne Empire* pp. 262–4 and Israel, *Race, Class and Politics* pp. 193–8.
14. Gutierrez de Medina, *Viaje* p. 51.
15. Fernandez Duro, *Armada Española* p. 336 fn. 1 has a list of the ships in the Armada de Barlovento. For the New Spain fleet see Chaunu, *Seville*, v, 360–1.
16. Fernandez Duro, *Armada Española* p. 336.
17. Gutierrez de Medina, *Viaje* pp. 51ff. For the Viceroy's career see Israel, *Race, Class and Politics* pp. 199–212.
18. Volumbozcar pp. 1–2; AGI IG 2536 p. 374.

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ABBREVIATIONS

Add	Additional Manuscripts, British Library
ADM	Admiralty Papers, Public Record Office
AGI	Archivo General de Indias, Seville
BL	British Library
Bodl	Bodleian Library, Oxford
C	Chancery Papers, Public Record Office
C de la C	Casa de la Contratación
CO	Colonial Office Papers, Public Record Office
CSPAWI	<i>Calendar of State Papers, America and the West Indies</i>
CSPC	<i>Calendar of State Papers, Colonial</i>
CSPD	<i>Calendar of State Papers, Domestic</i>
Ct	Contratación Papers, Seville 
CTB	<i>Calendar of Treasury Books</i>
DNB	<i>Dictionary of National Biography</i>
HMC	Historical Manuscripts Commission
IG	Indiferente General Papers, Seville 
Jesuit	Colección de Jesuitas, ci, fos. 277-9 
KAO	Kent Archives Office, Maidstone
PRO	Public Record Office
Navarrete	Colección de Navarrete, vii, fos. 144-51
NMM	National Maritime Museum
T	Treasury Papers, Public Record Office
Villavicencio	Ct 5101 6 Apr 1642
Volumbozcar	Ct 5118 31 Mar 1642 

MANUSCRIPT SOURCES

The story of the shipwreck of the *Nuestra Señora de la Concepción* and the subsequent Spanish attempts to locate and salvage the wreck is very well documented. I will not pretend to have exhausted the material in the Spanish archives relating to the wreck, and I list below only those documents which I, or my research assistant, Victoria Stapells-Johnson, have actually consulted.

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Ct 2900 Lib. I: Registers of the fleet of New Spain.

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Ct 5101, Havana, 1 Mar 1642: Francisco Diaz Pimienta to C de la C.

Ct 5101, Santo Domingo, 6 Apr 1642: Juan de Villavicencio to C de la C.

Ct 5118, Vera Cruz, 15 Jul 1641: Oficiales reales to C de la C.

Ct 5118, Santo Domingo, 31 Mar 1642: Antonio de Volumbozcar to C de la C.

IG 2525, 2699: Documents relating to private Spanish expeditions to search for the *Concepción* and to the Spanish reaction to Phipps's success.

IG 2536: A very large collection of papers containing letters, reports and testimonies relating to the loss of the *Concepción*.

Madrid: *Real Academia de la Historia*

Colección de Jesuítas, ci, fos. 277-9: Letter dated Santo Domingo, 20 Dec 1641, describing the loss of the *Concepción* and the fate of the survivors.

Madrid: *Museo Naval*

Colección de documentos de Fernández de Navarrete, vii, fos. 144-51:

Report of the unfortunate fate of the *almiranta* of New Spain.

There is a copy of this document in BL Sloane 2496 fos. 203-6.

The English material on the various attempts to find the wreck is also voluminous. Much of this is in standard collections, such as the Colonial Papers, Admiralty Papers and State Papers, Domestic, references to which can be found in the notes. The following documents are those which are primarily concerned with matter relevant to the subject of this book.

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London: *Public Record Office*

ADM 51/345: Logbooks of *Falcon*, 1682-4 and 1685-8.

ADM 52/35/2. Logbook of *Foresight* kept by Captain Stanley, 1687-88.

C/10/227/63: John Smith *v.* Christopher, Duke of Albemarle *et al.*

CO 1/57 fo. 38: Deposition of T. Smith about the silver wreck.

London: *National Maritime Museum*

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Rawlinson A.171, fos. 204-7: Mr Smith's information . . . touching the whole
processe of C. Phipps's late expedition.

Rawlinson A.300: Journal of *Bonetta*, 8 Apr 1683-19 Jul 1686.

Kingston, Jamaica: Institute of Jamaica

John Taylor MS, 'Multum in parvo or parvum in multo': BL M/696 is a micro-
film copy of this important source for both Jamaican history and the story of
the salvage of the *Concepción*. Unfortunately, the microfilm has been so
poorly executed as to be virtually illegible.

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1618-1686* (Cambridge, 1962)

Dialogo entre un viscaíno y un montañés sobre construcción de naves (1640) in
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route, for *La Garca*'s leadsman had sounded and found only four or five fathoms of water, and the general opinion was that the fleet had narrowly missed running up on the Florida Keys. The Capitana changed course and there were no further problems met in the passage through the Straits of Florida, from which they emerged on 27 September, a lovely day only slightly marred by the fact that there was one sail too many in the fleet, 'which we determined to be the enemy'.¹ The corsair gave no trouble, however, and the current bore them on along the coast of Florida as they tacked into the north-east wind in preparation for the long beat towards Bermuda.

The first sign of a change in the weather came on the following morning when the lookout in the *Almiranta*, which had retaken her station at the rear of the fleet, saw a long swell coming up towards them from the south and a threatening bank of clouds on the horizon. At the noon sighting of the sun it was found that they were in the latitude of 30° north, the latitude of the Spanish settlement at St Augustine, Florida. In the afternoon the wind swung round from the north-east to the south-west and then the south, and the bad weather which they had seen on the southern horizon caught up with them. The sea got up and the freshening wind from the south swept them along before it. It was clear that they were in for a bad storm and normal precautions were taken. Most of the guns and other heavy gear on the upper decks were taken below, hatches were fastened and the upper and lower gunports were closed and fitted with washers. 'By nightfall the weather was becoming increasingly violent and by midnight it was an all out storm.'² Huge waves struck the great 'mountain of wood' in the darkness and already many of the older sailors were saying that they had never experienced such a savage storm. But there was much worse to come.

By now the *Almiranta* was running before the storm with her foresail alone, trying to keep the towering poop directly before the wind, but forced by the proximity of the eastward-trending American coastline to head as much as possible to the north-east. With the wind now blowing from the south this exposed the starboard quarter to the fury of the waves which threatened every moment to overwhelm the ship. At dawn, such as it was in the driving rain, a momentary error by the exhausted pilot laid the whole side of the ship open to a freak wave which broke right over the poop lantern, fifty feet above the water level, sweeping four men and one of the ship's boats into the sea and rolling the ship over so far that the decks on the port side were under water to the foot of the

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mainmast. Hen-coops, crates of provisions, casks of sugar, anchors, cables, guns, two more lifeboats, everything vanished into the sea from the decks which looked as if they had been stripped with axes. It was a quarter of an hour before the *Almiranta* righted herself, and during this time the sea poured through the rotten washers in the gunports and through the gaping holes in the gundecks, whose seams were so bereft of caulking that you could place a bolt between them, and so down into the bowels of the ship where the water sluicing down from the decks above was like a heavy rainstorm. Desperate attempts were made to repair the gunports, under conditions of great hardship and danger, but to no avail. The sea continued to pour through as each new wave struck the crippled ship. Soon the sea found a new place to enter. The thunderous waves smashing at the stern ripped to pieces the repairs which had been done in Havana, washing away the new oakum with great ease and flooding through the ship. The pumps had been manned since the storm began and now all those not needed to work the ship joined in bailing with jugs and bowls, anything that could hold water, but it was no good. The wind continued to gain strength, and the water level kept rising, as fresh waves broke over the sides of the ship and the weight of water in the hold dragged the lower gunports down below sea-level.

First light on that terrible 29 September, St Michael's Day, revealed that the *Almiranta* was not the only ship in trouble. The fleet had been scattered by the storm, and each ship sought to save herself. Three of the merchant ships had been swamped and sank in the night with the loss of all aboard. But at dawn there were still a few ships to be seen, dismasted and helpless or running before the wind with the minimum of sails. Early in the morning the *Capitana*, the *San Pedro y San Pablo*, was seen coming up fast on the starboard quarter, still apparently in good condition. She sailed past the waterlogged *Almiranta* and headed north, followed by the *Almiranta* for a couple of hours until she was lost to sight. At ten they had a brief glimpse of one of the galleons of the Armada de Barlovento. She had lost her mainmast and was as helpless as they were as she ran before the storm with her mizzen and foremast bare of sails. Then she was gone and the *Concepción* was alone, wallowing out of control as the weather got worse and worse, 'intensifying into a fully fledged hurricane, the strongest that had ever been experienced or seen at sea'.³

At one in the afternoon Don Juan de Villavicencio discovered that there were seven and a half feet of water in the hold and it was still rising. On the advice of the ship's officers he ordered the mainmast to be cut and

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several guns to be cast overboard to lighten the ship. Shortly afterwards the foresail, the only means of keeping the ship running before the storm and preventing her from being continually broached by the waves, was torn away in three pieces by the wind. Now the Almiranta lurched side on to the sea and 'the sea and wind tossed the ship so much and she took in so much water over the side that we decided we had no hope of salvation'.⁴ Soon there were over ten feet of water in the hold and a couple of feet in the storerooms above. Barrels of gunpowder and foodstuffs were tossed about and smashed open and their contents were ruined by the water.

Now, alone and with no possibility of help, the passengers and crew began to despair. 'We thought that we were in such danger that now no one tried to do anything but that which was most important, to save their souls. Each person said goodbye to the others. Not even the bravest had any hope of life.'⁵ People tried not to look at the sea and the gigantic waves, each one of which seemed determined to bury them for ever. The priests and friars on board worked hard as everyone made their confession, including some who had not confessed for fifteen years. Now was the time to regret the absence of the Viceroy's relics. All that they could hope for was that their own contrition and 'the total kindness and compassion of God' would save them. They waited for a sign but, when it came, it only deepened their despair. The image of Our Lady of the Conception, the patroness of the ship, fastened to the poop deck by two massive bolts, was swept away and vanished for ever into the deep. 'With this, everyone was sure that they would all lose their lives.'⁶

The destruction of the Virgin marked the worst moment of the storm. Between five and six in the afternoon the weather yielded a little and the mate, Francisco Granillo, led a party of the bravest sailors, 'who were very few at that point for most of them considered themselves already dead',⁷ across the pitching, wave-swept decks to rig a jury foresail. The ship was once more brought under some control and the people recovered a little hope of life. All night they took shifts at the pumps or bailed with jugs, and the water level was lowered a little, only to rise again when the pressure forced the oakum from between the planks in the prow and let a fresh torrent of sea-water run into the ship. But now there was no more despair, and this new blow merely provoked a fighting spirit. They remembered that they were Christians and Spaniards, and love of life overcame their fear of death. All next day and the following night the pumps clanked, and passengers and crew struggled to

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keep the *Almiranta* afloat. That day, 30 September, the wind swung round to the north and north-west, and, at a meeting of the ship's officers, it was decided to make their way before the wind to one of the islands of the Bahamas where they could beach the ship and do the necessary repairs before continuing their voyage to Spain. By late afternoon the weather became more settled, although the sea was still very rough, and by midnight the exhausted men at the pumps had lowered the water level in the hold to just over two feet. The people rested, and God repaid their efforts, bringing dawn on Tuesday, the first day of October, an hour early – and what a dawn; a brilliant topaz sky and calm weather. The storm was over.

Advantage was taken of the fine weather to do some repairs. A raft was lowered with a diver, carpenters and caulkers who filled the gaping seams with barrel staves and then recaulked them. This work took three days and, when it was finished, the *Almiranta* was sound enough to pump out dry. 'God miraculously permitted this', wrote Don Juan de Villavicencio, 'it should not be attributed to human energy, for that alone would never have saved a ship from such a dangerous situation.'⁸ When the ship was dry Villavicencio ordered the *Vedor* to go below with other officials to check the extent of the damage to the stores. His report was not encouraging. Nearly all the gunpowder was ruined; there was just enough to load eighteen of the guns once and many of the provisions were so saturated by sea-water as to be useless. This was serious. They might be weeks in the Bahamas, putting the ship in sufficiently good order to make the passage back across the Atlantic to Spain. Without powder they would be at the mercy of the pirates and privateers who had their bases on the north coast of Hispaniola and in the island of Tortuga. There was no Spanish garrison, indeed no inhabitants at all, in the Bahamas to help them. A fresh junta of senior officials was called, and it was unanimously agreed that, with so few provisions and virtually no gunpowder, there was no alternative but to sail the damaged ship to Puerto Rico, the nearest Spanish base and dockyard. It seemed likely that many other ships in the fleet would do the same. On the first day after the storm they had seen two ships in the distance, one to port and one to starboard, headed in that direction. Both were dismasted except for their mizzens. The *Almiranta* had signalled to them and had kept a lantern lit at the masthead during the night, but the following day they had disappeared, and the sea was once more completely bare of other ships. A few days later they got a further unhappy indication that

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they were travelling in the same direction as their friends when they saw some masts with rigging and sails in the sea. But there was no sign of the ships which had shed them. The *Concepción* would have to solve her own problems.

It is not quite clear exactly where the *Almiranta* was when the decision was made to head for Puerto Rico. She must have gone a long way to the north and north-east, as she ran before the storm for a day and a half and was probably approximately in the latitude of Bermuda, but a long way further west, when the wind changed direction and she started sailing towards the Bahamas. If this supposition is correct, she must have been about a thousand miles north-west of San Juan de Puerto Rico when Villavicencio gave the order to make for the Spanish port, a very long way in a ship with no mainmast and in serious danger of foundering in the next storm. There was no assurance that the hasty repairs just made by the diver would hold any better than those done in Havana, once the ship was subjected to heavy weather. Confidence was not increased when it was learned that neither Bartolomé Guillen, the senior pilot, nor his assistant, Mathias Destevan Arte, had ever done this particular voyage before and would have to rely on their rudimentary charts to find Puerto Rico. None of our witnesses make any comment on the next stage of their voyage, but it must have been a frustrating and worrying time with stores and powder so low and not a sight of land or another ship. Days and weeks passed by as the *Almiranta* struggled against contrary winds and currents or remained motionless in the notorious calms of the Sargasso Sea. But there was some progress, and slowly she made her way farther and farther towards the south-west.

On 23 October, three weeks after the repairs had been completed, they found themselves in the latitude of 22° north, the latitude of the Caicos Islands at the far end of the Bahamas but considerably further east.⁹ The two pilots now declared that the ship was due north of Puerto Rico and they should turn south to search for land. Don Juan de Villavicencio protested. 'I, along with other practical persons, felt that it was not possible to have gone such a long way or to be as far to windward as the pilots made out and affirmed.'¹⁰ They had wandered in their navigation and their attempts to measure the ship's way had been blighted by the many days of calm and contrary winds and currents. In his opinion they were three hundred miles farther to the west than the pilots claimed, an enormous margin of error. To turn south now would be foolhardy for, by his reckoning, they were due north of the Abrojos, a

Notes

17. Cummins, *Travels of Navarrete* i, 19–20.
18. García, *Palafox y Mendoza* pp. 58–81 is a description of Palafox's voyage to Mexico based on Gutierrez de Medina, *Viaje*.
19. Gutierrez de Medina, *Viaje* pp. 11–16.

CHAPTER TWO: A Passage to Mexico

1. Gutierrez de Medina, *Viaje* p. 21. This chapter is based on the account given in this book, pp. 21–49, and I will give no further references to it.
2. Cummins, *Travels of Navarrete* p. 20.
3. For details of all these regulations see Linaje, *Norte de la contratación* and the abridged English translation by Stevens, *The Spanish Rule of Trade*.
4. For a complete list of the ships in the fleet see Chaunu, *Séville* v, 360–1.
5. For a discussion of pilots see Haring, *Trade and Navigation* pp. 298–315.
6. Gage, *The English American* p. 18.
7. BL Egerton 2395 fo. 101.

CHAPTER THREE: Too Long in Vera Cruz

1. Gutierrez de Medina, *Viaje* pp. 49–52.
2. For the corsairs see Fernandez Duro, *Armada Española* iv, 31–45, 107–116, 333–355. On the Dutch see Boxer, *Dutch Seaborne Empire*.
3. Vázquez de Espinosa, *Compendium* p. 39.
4. Chaunu, *Séville* viii (1), ch. 9.
5. Diaz de la Calle, *Memorial*.
6. For the Providence Island Company see Newton, *Colonizing Activities*.
7. CSPC 1574–1660 p. 124.
8. 'The Nature of the Island Catalina', *Navy Records Soc. Publns* xiv, 440–2.
9. CSPC p. 216.
10. *Ibid.* p. 150.
11. BL Sloane 758.
12. Hussey, 'Spanish Reaction'.
13. Gutierrez de Medina, *Viaje* pp. 51–2. See also Fernandez Duro, *Armada Española* pp. 335–7. For the general history of the Armada de Barlovento see Hussey, 'Spanish Reaction'; Parry, *Spanish Seaborne Empire* pp. 262–4 and Israel, *Race, Class and Politics* pp. 193–8.
14. Gutierrez de Medina, *Viaje* p. 51.
15. Fernandez Duro, *Armada Española* p. 336 fn. 1 has a list of the ships in the Armada de Barlovento. For the New Spain fleet see Chaunu, *Seville*, v, 360–1.
16. Fernandez Duro, *Armada Española* p. 336.
17. Gutierrez de Medina, *Viaje* pp. 51ff. For the Viceroy's career see Israel, *Race, Class and Politics* pp. 199–212.
18. Volumbozcar pp. 1–2; AGI IG 2536 p. 374.

Notes

19. Vázquez de Espinosa, *Compendium* p. 129.
20. Irving A. Leonard, *Baroque Times in Old Mexico* (Ann Arbor, 1959) p. 3.
21. Chaunu, *Séville* v.
22. Volumbozcar p. 4.
23. Villavicencio has been described as a veteran in some accounts of the shipwreck, but his age was clearly documented when he gave evidence later in Santo Domingo. AGI IG 2536 p. 384.
24. Fernandez de Navarrete, *Biblioteca*.
25. Unless otherwise stated the sources for the rest of the chapter are Volumbozcar pp. 1–4; Villavicencio pp. 1–2.
26. Chaunu, *Séville* viii (2), 1846.
27. For brief comments on the stowage of the treasure see Navarrete p. 146 and AGI IG 2536 pp. 207, 489. For a general discussion of the stowage of treasure in Spanish ships see Potter, *Treasure Diver's Guide* pp. 16–19.
28. AGI Ct 5118. Vera Cruz 15 Jul 1641. But note that Domínguez Ortiz, 'Los Caudales' p. 50 fn. 83, gives the much smaller figure of 770,000 pesos for the royal treasure on the two ships. On the office of *maestre de plata* see Haring, *Trade and Navigation* p. 221.
29. AGI IG 2536 p. 406.
30. Medina's statement in AGI IG 2536 p. 406. See also p. 375 for Diego Centeno's claim that he had 90,000 pesos of his own silver and jewels on board; p. 429 for a merchant with 60,000 pesos on board. Antonio Petri y Arce's statement is in AGI IG 2699/1 p. 2. The writer would like to emphasize that estimating the value and weight of the ship's cargo of silver is made even more difficult from the fact that it is never clear whether the word 'peso' means the piece of eight of 272 maravedís or the *peso ensayado* of 450 maravedís.
31. Haring, *Trade and Navigation* p. 220.
32. AGI Ct 5118. Vera Cruz 15 Jul 1641. The other man was Gaspar Gutierrez, co-owner of the *Concepción*.
33. Volumbozcar p. 14.
34. The evidence on the number on board is rather confused. The lowest figure is 400 given by Don Diego de Aldana, Captain of Infantry (IG 2536 pp. 391–4) and the highest is 514 (Navarrete letter p. 146). Several other people said there were over 500.
35. Vázquez de Espinosa, *Compendium* p. 103.
36. For a good account of the capture of Providence see Newton, *Colonizing Activities* pp. 298–304. See also Wangüemert y Poggio, *El Almirante Pimienta* pp. 107–26.
37. Chaunu, *Séville* viii (2), 1846.

CHAPTER FOUR: Shipwreck

1. Jesuit fo. 277. There are four excellent descriptions of the last voyage of the

Concepción: Villavicencio, Volumbozcar, Jesuit and Navarrete. These all agree on essentials but have varying amounts of detailed description. I will only give references when I quote from the text of these documents.

2. Jesuit fo. 277v. This letter gives much the best and most detailed description of the storm.
3. Villavicencio p. 3.
4. Ibid.
5. Jesuit fo. 278.
6. Volumbozcar p. 6.
7. Jesuit fo. 278.
8. Villavicencio p. 4.
9. Only Navarrete gives this latitude, and, in fact, the anonymous author gives 32 degrees. But this is the latitude of Bermuda and would make a nonsense of the story. I have assumed that the copyist read 32 for 22, which makes much more sense.
10. Villavicencio p. 4.
11. Ibid. p. 5.
12. AGI IG 2536 p. 61. Evidence of the *alferes* (lieutenant), Antonio de Soto.
13. The chronology of the next few days is rather confused in the documents, but the following account makes the best sense of the conflicting evidence.
14. Jesuit fos. 278v–9.

CHAPTER FIVE: Sauve Qui Peut

1. AGI IG 2699/3 p. 5. The sources for the rest of the chapter are the same as for the previous chapter, with the addition of AGI IG 2536, the record of the enquiry held later at Santo Domingo, which has much information on the last days spent on the wreck and the adventures of the survivors.
2. The best source for the controversy over the latitude is AGI IG 2536, especially pp. 34 and 54–5, the evidence of the gunner, Juan de Guebara, and the Constable, Diego de Castro. See also Villavicencio p. 6.
3. Villavicencio p. 6.
4. Gardyner, *Description* pp. 70–1.
5. Villavicencio p. 7.
6. IG 2536 pp. 499–500. Evidence of Gaspar Guttoes.
7. Villavicencio p. 7; Navarrete fo. 146; IG 2536 pp. 235–7, 400–1, 409, 415–18 give conflicting descriptions of this incident.
8. Villavicencio p. 8. This account of the adventures of the long-boat party is based on Villavicencio p. 8; Volumbozcar pp. 9–10 and IG 2536 pp. 385–7 (evidence of Villavicencio); pp. 391–4 (evidence of Diego de Aldana); *ibid.* pp. 534–65 (evidence of people from the towns of Cotuy, La Vega and Santiago).

