TRANSPORTATION OF HORSES BY SEA DURING THE ERA OF THE CRUSADES: EIGHTH CENTURY TO 1285 AD

Part II: 1228–1285

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THE sources for Louis IX's Sixth and Seventh Crusades in 1248 and 1270 are both well known and also critical to this subject. Joinville wrote that in 1248:

> We went aboard our ships (*neis*) at Marseilles in the month of August. On the day we embarked on the ships, the port of the ship was opened and all the horses we wanted to take overseas were put inside. And then the port was closed and well caulked, just as when a cask is submerged, because, once the ship is on the high seas, the entire port is in water.[53]

Joinville's testimony confirms the evidence of other sources that on large sailing ships of the type on which he took passage the horses were stabled on the lowest deck, just at or slightly above the waterline when fully laden. When the ships heeled over under sail, the ports would indeed have been submerged as Joinville said.

The ships of Joinville and of other Crusaders who sailed from Marseilles with him were all sailing round ships. Nowhere in his narrative did Joinville mention oars. On the other hand he did mention the sails several times as well as the trouble his ship had in passing Cape Bon at the North-East tip of Tunisia against the current. Had it had oars, it would not have experienced the same degree of difficulty. The surviving evidence suggests in fact that the bulk of Louis's fleet, with the exception of twelve *taride* leased from Genoa, was comprised of large round ships which needed deep water and wharf facilities to land their horses. A letter written from Damietta after its capture by one of Louis's chamberlains, Jean de Beaumont, numbered the fleet which left Cyprus at 120 *magne naves* but only 80 *minora vasa*.[54] Virtually all the sources testify that the main fleet had to anchor well out to sea. Jean Sarrasin, a bourgeois of Paris and another of Louis's chamberlains, said three leagues off shore. The approach to the beaches had to be made by a

variety of small craft which the various sources identified as galleys (*galies* – which very probably included the twelve Genoese *taride*), small boats (*menuʒ vaissiaus, minuta vexilla, minora vasa, parva vasa*), ship's boats (*barges de cantiers*), skiffs (*scaphe*), and longboats (*chaloupes*). Some of these had been built by Louis at Cyprus during the previous winter when he apparently realized how poorly suited his fleet was to its field of operations. According to Jean Sarrasin, Louis himself made the trip to shore in a boat of North European type which he must have brought with him: a *coche de Normandie*. According to Joinville, Louis used the *barge de cantiers* of his round ship.[55] But even these boats were poorly suited to the task at hand. All the sources are agreed that the boats grounded well before they reached dry land and that the knights had to jump overboard and wade ashore. The consensus on the depth where they grounded is that the knights went in up to their arm pits.[56] Properly designed landing craft would have been able to reach much shallower water than this. Perhaps this is why Joinville expressed such admiration for the galley of John of Ibelin, Count of Jaffa, who obviously did have a ship properly designed for its task. Its oarsmen drove it at the shore and ran it well up onto the sand so that the Count and his knights could land *moult bien armei et moult bien atirie*.[57] But in general, because his fleet was so poorly suited to its task, Louis was unable to land many horses to help his forces establish a beach head and his knights had to do so on foot. Joinville commented in fact that God had shown his grace to the Christians in enabling knights on foot to defeat a mounted enemy. Nevertheless, although most of the knights landed on foot and it was they who established the beach head, some horses were landed in the small boats. Jean Sarrasin said that once the landing had been made and while the French were still under attack in the shallows some of them succeeded in getting horses out of the boats at great risk to themselves. Eight of Joinville's horses were in a small round ship (*petite nef*) which had been given to him by his cousin, Echive de Montbeliard, widow of Balian III, Count of Beirut, but he made his landing in his ship's longboat (*chaloupe*) and seems not to have taken this small round ship in to the shore.[58]

As opposed to the grasp of logistics which the evidence suggests that Frederick II had, the evidence for Louis IX suggests that the bulk of his fleet was poorly designed for the conditions in which it would have to operate. Of the extant contracts which Louis made with Marseilles and Genoa to supply ships for his fleet, only the one called for oared *taride* suitable for a landing of cavalry on the beaches off Damietta.

Contracts for the lease and construction of ships for Louis's two

Crusades are the first major non-chronicle evidence relating to trans-
portation of horses by sea in the Middle Ages. From them we can discern
something of the details of stabling arrangements on board ship and of
the costs of transport. According to the extant contracts, for the Crusade
of 1248 Louis ordered twenty sailing round ships from Marseilles and
twelve round ships and twelve oared *taride* from Genoa.[59] In a contract
made with Genoa on 13 September 1246, for the lease of twelve round
ships, it was specified that the horses' stables should be fitted with:

> . . . maniaoras, stangas, et restos, ad sufficientiam, pro ponendis sub pedibus equorum qui
> ponentur in dicta navi, et anellos sufficientes pro ligandis equis . . .[60]

Trusting Jal's explanations of the terms *maniaora, stanga*, and *restus*, I
translate as follows:

> . . . feed troughs, stall rails, and litters made of old esparto grass rope in sufficient quantity
> to place under the hooves of the horses which may be embarked on the same ship, and suf-
> ficient ring bolts to lift the horses up off their feet. . . .[61]

Three private contracts for the lease of round ships from Marseillese
shipowners, made by the Count of Forez, the Count of Dreux and
Braine, and the Archbishop of Tours in 1248 also specified that the ships
should have *(e)stablarie fornite de restibus et omnibus aliis* for the horses.
On the *Bonaventura*, leased to the Count of Forez, there was to be space
for at least sixty horses.[62]

It is surely significant that in all these contracts for the lease of round
ships no mention was made at all of stern ports or landing ramps. Being
sailing ships they could not be run onto beaches without wrecking them
and Louis certainly did not intend to use the horses on these ships for
assault landings. On the other hand, just as did Joinville's, these ships
probably did in fact have ports in their hulls and ramps for ease of
loading and unloading. But because these ports and ramps were not
intended to play an essential role, it was not considered necessary to
include specification of them in the contracts.

On the other hand, in March or April 1246 Louis's agents made
another contract with the Genoese for construction of twelve oared
taride which were obviously intended to take part in the first assault
wave on the beaches off Damietta.[63] Being specialized horse transports
and assault ships, the Genoese had to build these *taride* from new rather
than being able to draw upon their existing merchant fleet as they could
for round ships. The contract for their construction provides the first
known dimensions for horse transports: overall length 48 *cubiti* (35·71
m), width on the floor at the waist thirteen and a half *palmi* (3·48 m),
headroom in the hold at the waist above the keel nine *palmi* (2·25 m),

camber in the deck from centre line to gunwale half a *palmus* (·125 m), beam in the waist at the wale before the tumblehome sixteen and a half *palmi* (4·10 m). They were to have specially constructed bluff sterns with three stern posts and at least two ports for embarkation and landing of horses, obviously intended for backing onto beaches, and were to be fitted with stalls for twenty horses.[64]

Horses, or at least destriers of the medieval type, from which modern shire horses are descended, are large animals measuring about 2·4 m from nose to rump. Even allowing for medieval horses being somewhat smaller than this, when this figure is deducted from the width of these *taride* on the floor where the horses were stabled at the waist, it becomes clear that they must have been stabled in a single row down the centre of the ship. Since there were two ports at the stern on either quarter, the horses would seem to have been stabled facing half to port and half to starboard with two companionways along either hull allowing them to be landed in two files at the same time. The statutes of Marseilles of 1253 specified that the width of each space allotted a horse on a Crusader transport should be three Marseillese *palmi* (·76 m) and if this, or something like it, was also the case at Genoa, then twenty horses could easily have been stabled in a single row down the centre of one of these *taride*.[65]

Such horses are also very tall. A modern shire horse stands about 1·7 m at the withers. Allowing for a somewhat smaller medieval destrier and assuming that in the thirteenth century a knight still had enough mobility in his armour to lean down over his horse's neck to some degree at least, the headroom in the hold (2·25 m) would seem to have been just barely adequate to allow a mounted knight to ride his destrier out of a *tarida* and down the landing ramp.

The lease of twenty round ships from Marseilles for the 1248 Crusade specified no details of stabling or of the construction of the ships but it did state the passage rates. For transportation of each horse with its necessary equipment and harness and a squire and his equipment, plus water, for the voyage, the cost would be five marks of pure silver at a rate of £2.13.4 Tours to the mark.[66] Two of the private lease contracts made by Crusaders with Marseillese shipowners, those of the Count of Dreux and Braine and the Archbishop of Tours, specified that the water allowance for each horse for the voyage to Cyprus should be fourteen *millairole*: 888 litres.[67]

The statutes of Marseilles also contain some information about the actual techniques of transportation in this period. Amongst the duties of a ship's scribe on Crusader transports was to record in two separate

cartularies the name of each Crusader, with which member of the ship's crew he was to mess, and the number of his horses carried. One of these cartularies was deposited with the courts at Marseilles before the ship sailed. The scribe retained the other during the voyage and each Crusader was given a parchment slip with his name and the number of his berth written on it.[68]

For Louis IX's 1270 Crusade to Tunis he leased at least eight sailing round ships and four *salandria* from Genoa especially to carry horses.[69] The dimensions of these *salandria* resemble those of contemporary horse-carrying *taride* although their beam:length ratio was higher than that of the latter.[70] Since neither oars nor stern ports and landing ramps were specified in the lease contracts for these ships, they were not intended to take part in any initial landing. Neither were the great round ships, some of whose names we know: the *Bonaventura*, the *Sanctus Salvator*, the *Sanctus Nicolaus*, the *Sanctus Spiritus*, and the *Caritas*.

Details of stabling arrangements are very sparse but in each contract it was at least specified that the ships should have stalls (*stabulariae, scabianae*, or *staiariae*) for the horses. Some of the contracts also specified that there should be litters of old esparto grass rope (*restes* or *resti, sub pedibus equorum*). Only one of the contracts, that made at Genoa on 26 November 1268, for the construction of two unnamed round ships, specified how many horses the ships were to carry: 100 each. This figure is extremely high and it seems clear that these two ships were exceptionally large horse transports. Their construction has been the subject of much discussion for over a hundred years and this is not the place to go into it again. Suffice it to say that in my opinion,[71] they had a hold and two tweendecks. They were 23·2 m long in the keel, had an overall length of 37·4 m and a maximum beam of 10·04 m, were 4·34 m deep in the hold, and had a headroom of 2·23 m on the first deck and 1·98 m on the second. If one attempts to draw a plan of the first deck on such a ship, it becomes clear that it cannot have been more than about 33 m long with a beam of no more than nine metres. If the horses were stabled in two rows facing in to the keel with companionways along both hulls, then allowing for unusable space at bow and stern and using the width of ·76 m for each horse's stall given by the statutes of Marseilles, it becomes clear that no more than about 80 horses could possibly have been stabled on this lower deck. Both first and second decks of these ships must, therefore, have been intended to be used for horses, possibly, although not necessarily, in equal numbers of 50 on each deck.

A load capacity far above normal for these two great Genoese round

ships of 1268 is not at all improbable. The Venetians also seem to have built massive transports in the third quarter of the thirteenth century. For the Tunis Crusade Venice offered Louis fifteen transports consisting of three *magne naves*, whose names we know (*Sancta Maria, Roccafortis*, and *Sanctus Nicolaus*), as well as twelve other smaller ships all of the same size. We are not told the individual load capacity of each of these ships but we are told that in all they should be able to carry 4,000 horses and 10,000 Crusaders.[72] These figures are quite impossible. No matter how one looks at the dimensions of the ships in question, even if they carried horses on every available tweendeck, the fifteen ships probably could not have carried 4,000 horses let alone the Crusaders as well.

The contract between Venice and Louis informed him that the cost of passage for a complete entourage of one knight, two attendants (*servitores*), a horse, a groom (*puerus*), with provisions and with space for the horse's harness would be eight and a half marks of silver, Paris weight. For a single knight with a place below deck aft of the middle mast the cost of passage would be two and a quarter marks. For a squire (*scutiferus*) with a place above deck, also aft of the middle mast, it would be seven ounces of silver. One mark equalled eight ounces. For a horse and groom (*garconius*) staying with the horse, it would be four and a half marks. For all other Crusaders lodged forward of the middle mast, it would be three quarters of a mark, provisions and room for equipment included. Now, we are told that the total cost of leasing the *Sancta Maria* and *Roccafortis* was 1,400 marks each, the *Sanctus Nicolaus* 1,100 marks, and the other twelve ships 700 marks each. Using these figures we may estimate that all the fifteen ships could have carried no more than 1,450 complete knight's entourages, i.e., 1,450 horses and the same number of knights, 2,900 attendants and 1,450 grooms: a total of 1,450 horses and 5,800 Crusaders. If different combinations of men and horses were used, then the figures would vary, but, nevertheless, it is clear that the figures of 4,000 horses and 10,000 men were not realizable. Even if each knight had only a bare minimum entourage of one horse, a squire, and a groom, no more than about 1,615 such entourages could have been taken.

According to the contract, Louis had wanted to know the price of the passage and the Venetians had replied that this was to some degree dependent on the quantity of provisions required, including the quantity of barley and hay for the horses and the amount of water required per horse per day. They suggested that each horse should have four *modia* of barley by the measure of Acre, a barrel (*vata* or *botta*) of hay measuring nine feet in circumference (1·00 m diameter) by five feet (1·74 m) high,

and fifteen quarts of water per day by the measure of Paris, i.e., 27·94 litres.[73]

An agreement reached with Marseilles in 1268 stipulated that passage for one horse and its harness and for a squire or groom and for their water would cost four and a half marks at a rate of £2.15.0 Tours to the mark.[74] Since the voyage to Tunis was much shorter than that to the Levant, comparing these figures to those stipulated by Marseilles for 1248 suggests that there had been considerable inflation since 1248 and also something of a decline in the value of the royal Tours currency.

By the middle and later years of the thirteenth century, all the maritime powers of the Mediterranean had become accustomed to transporting horses in large numbers. The Byzantine historian George Acropolita reported that in 1249 William II of Villehardouin, Prince of Achaea, took horses with him from the Morea on triremes when he went to Cyprus to join Louis IX on Crusade. Marino Sanudo Torsello confirmed the account, declaring that in fact Villehardouin fitted out a formidable force of 24 galleys and *navili* on which he embarked his knights with 400 horses. Somewhat later in 1249 the Byzantine emperor of Nicaea, John Vatatzes, assembled a fleet at Smyrna for an attack on Rhodes and shipped across 300 horses on triremes for the use of his troops. After the restoration of the Byzantine empire in 1261 under the Palaeologan dynasty, the fleet of their Genoese allies became a major force in their attempts to reimpose Byzantine rule in the Balkans and the Aegean islands. In 1263 the Genoese fleet in fact transported Byzantine troops, which certainly included cavalry, to attack Monemvasia in Villehardouin Achaea. The Genoese role in this affair provoked a vigorous protest from Pope Urban IV.[75]

In 1266 and 1268, by the two closely-fought battles of Tagliacozzo and Benevento, Count Charles I of Anjou, a younger brother of Louis IX, conquered the Kingdom of Sicily. He established what was perhaps the most remarkably organized feudal monarchy of medieval Europe. The archives of the Angevin Kingdom of Sicily and Naples, tragically destroyed by the Germans during the Allied invasion of Italy in 1944, were beyond doubt the richest surviving archives of any feudal monarchy. Fortunately, however, in the nineteenth and early twentieth centuries a number of scholars published extensive extracts from them, particularly from the registers of Charles I, and some of what they published contains important information on the subject of transportation of horses by sea.

During the three decades *c.* 1270–1300, Charles I and his son

Charles II were constantly at war on two fronts: against the Byzantines in the Peloponnesus and Albania and, from 1282, against the Sicilians and the Aragonese in the Western Mediterranean. With close connections with the Villehardouin principality of Achaea, over which he became overlord in 1267, and the remnants of the Crusader Kingdom of Jerusalem, which he acquired by purchase in 1277, Charles I used his domains in Southern Italy as a supply centre for war materiel shipped to other areas. Amongst this materiel were horses.

A number of general categories of recipients may be singled out. Firstly, the military orders of the Hospital and Temple, who shipped their horses to the Holy Land. Secondly, Charles's forces in Albania, Hungary, Serbia, and Dalmatia; Slavonia in general. Thirdly his forces in the Holy Land. Fourthly, his allies the Frankish lords of Achaea, Negropont, Athens, and Cephalonia. Finally, both political allies and enemies such as the King of Armenia, the Prince of Antioch, the Despot of Epirus, and the Bishop of Nicosia, etc., who at various times and for various reasons received diplomatic gifts of licences to export horses. The evidence of the Angevin archives indicates that horses were in short supply throughout the states of the Latin Levant.

Of the two major military orders, the Hospitallers seem to have benefitted most from Charles's generosity. I have found only one grant of permission for the Templars to export horses. On 13 April 1277, Charles gave permission to brother Aymeri de Petrucia of the Templars to send the horses and arms which had belonged to Charles's late son Philip, Prince of Achaea, to the Holy Land for the use of the Temple.[76] This was obviously an exceptional act of piety. On the other hand, the Hospitallers received numerous royal licences to export horses: five horses and mules on 6 July 1269, seven horses and seven mules on 4 August 1272, four palfreys and eight mules on 15 April 1276, an unknown number of horses on 14 August 1276, an unspecified number of horses and mules on 13 February 1279, an unspecified number of horses on 1 March 1280 and 60 horses and 40 mules on 6 July 1281. These licences also continued in the reign of Charles II. On 7 August 1291 the Hospitallers were allowed to take out 20 palfreys and mules and one warhorse, and on 16 August 1300, 30 horses and mules.[77]

The largest numbers of horses exported were sent to support Charles's forces struggling to enforce his authority over what he claimed in 1272 as the Kingdom of Albania. From 12 May 1273, when Charles instructed the Port Masters of Apulia to allow Niccola of St Omer to ship 60 horses from Apulia for services in Serbia and 'Bulgaria' to 2–3 November 1280, when he ordered the Port Masters to embark 104

horses, 100 asses, and eight mules on five *taride* and a round ship at Brindisi and to send them to Durazzo and Romania, there is a constant stream of such orders.[78] Perhaps the most striking and important of these are: an order of 3 February 1275, to the Justiciar of the Terra di Otranto to provide for the provisioning and wages of fifteen *taride* at Brindisi with 360 stalls for horses to be used for military transport to Durazzo; an order of 13 August 1279, to the Vice Admiral from the river Tronto to Cotrone to hold all his ships ready on 22 August to transport Hugh the Red, of Sully, Captain and Vicar General in Albania, to Albania with 892 cavalry and 100 asses, amongst other troops and supplies; an order of 3 August 1280, ordering ships and *taride* held ready at Brindisi to send 400 horses and 200 men at arms to Sully to replace those killed at Vallona and Spinarsa; and finally an order of 2 November 1280, to the Port Masters of Apulia ordering them to arm five *taride* and to hold them ready to embark 104 horses and 100 assses for Romania.[79] On 3 July 1281, Charles also concluded an alliance between himself, Phillip of Courtenay, the titular Emperor of Constantinople, and Venice preparatory to an attack on Byzantium. Under the terms of the alliance Charles was to supply fifteen galleys and ten *taride* capable of carrying about 300 horses and men at arms.[80]

From 1282, after the outbreak of the revolt in Sicily against his rule which is known as the Sicilian Vespers, Charles's attention was forcibly diverted to the West. Orders and licences for shipment of horses to the Eastern Mediterranean disappeared from the registers and were replaced by similar orders preparatory to sending invasion fleets against Sicily. On 3 June 1282, Charles ordered the Justiciar of the Capitanata to enroll 100 mounted Saracen archers from Lucera and then three days later ordered his Master of Horse for Apulia and Calabria to send 100 horses for their use. In fact mounted Saracen archers appear many times in the registers between June 1282 and Charles's death in January 1285. They were an important part of his invasion forces. On 29 August 1282, Matthew of Ruggiero, Vice Admiral of the Principato and Terra di Lavoro, received an order to prepare sixteen *taride* at Catona to embark Charles's cavalry for Sicily. On 21 March 1283, while Charles himself was absent from the kingdom, his son Charles of Salerno ordered eight *taride* and a galley armed with men and horses and entrusted to the Count of Alençon for an attack on Sicily.[81]

In 1277 Charles had bought the Kingdom of Jerusalem from its heiress Maria of Antioch for a thousand pounds of gold and an annuity of £4,000 Tours. It was to prove money not at all well spent. In 1278 he sent Roger of San Severino, Count of Marsico, to the East as his

Vicar General but Roger became so embroiled in Levantine politics that Charles had to send him a constant stream of supplies and reinforcements, including horses. The despatch arrangements in Italy were handled by Roger's son Thomas. On 13 February, 1278, before Roger's initial departure for the East, Charles ordered Angelo Faraone of Gaeta, Provost of Ships in the arsenal at Gaeta, to prepare twenty *taride* to transport Roger and his horses and troops to Acre. Then on 2 April 1278, Thomas was given permission to export horses and mules for his father's support. On 4 May 1278, he was given permission to leave Italy with 34 warhorses, six mules, and twelve other horses destined for his father. On 3 August 1278, Charles informed the Port Masters of Apulia that he had commandeered a Templar ship to carry 35 more horses to Acre and then three days later, on 6 August 1278, Thomas was again given permission to leave for the East with twelve horses. By 1281, however, he had returned to Italy for on 5 June of that year he was given permission to send 25 more horses to his father in Acre.[82]

From early in his reign Charles supplied horses to the Frankish lords of the Latin states in the Levant: two warhorses, two palfreys, and four other horses for the Bishop of Negropont on 17 January 1272; sixty horses and one destrier for the Duke of Patera on 16 April 1273 and 11 August 1274; two warhorses and six other horses for the Admiral of Achaea on 24 October 1276; ten horses and six asses for the bishop elect of Romania on 6 August 1277; three warhorses, eight asses, and four *ronzini* for the Duke of Neopatras on 1 May 1278; two warhorses, four other horses, and one mule for the ambassador of the barons of Achaea on 15 October 1278; a stallion and an ass for the wife of Gaetano de Carcere, lord of one sixth of Negropont, on 5 June 1280; four horses and four *ronzini* for an unknown person on 25 May 1280; 50 warhorses for William de la Roche, Duke of Athens, eight warhorses for Guy de Tremolay, and 25 assorted horses for the Count of Brienne, all on 8 July 1280; two palfreys and two mules for the widow of the Prince of Achaea on 12 March 1284.[83] Many of these grants were, of course, in the nature of diplomatic gifts. In addition, once Charles had acquired a direct personal interest in the Principality of Achaea, he began to send his own troops there to maintain the wars against the Byzantines of Mistra and Epirus. On 13 May 1273, he ordered three *taride* belonging to the Count of Brittany seized at Brindisi made ready to transport horses to Achaea. On 12 April 1280, the Port Masters of Apulia were instructed to allow Charles's new Constabler of Achaea, Giovanni Calderon, to leave for Achaea with six warhorses and sixteen others. Then on 3 August 1280, Charles ordered ships prepared at

Brindisi to carry Philip de Lagonessa, his new Bailiff and Vicar General in Achaea, to the principality with 179 horses. On the eighth of the same month a further 50 horses and palfreys followed.[84]

Finally, Charles granted a number of licences to export horses as diplomatic gifts to both allies and enemies. Recipients included the King of Armenia, the Prince of Antioch, the Queen of Serbia, and Charles's implacable enemy Nicephorus Comnenus Ducas, Despot of Epirus. Between 14 April 1277, and 14 March 1280, Charles allowed no less than five sets of envoys from Nicephorus to return to their master with a total of two warhorses, 44 general horses, six mules, and an ass. The last set of envoys were allowed to take 30 horses.[85] These grants to the envoys were made in attempts to reflect honour on their master and to smooth negotiations with him. Whether the horses remained in the hands of the envoys or were handed over to Nicephorus Ducas we may not know, although in the last case the latter was almost certainly true.

As well as providing details of numbers of horses shipped from Southern Italy, the Angevin archives also provide our most detailed information about the techniques of transporting horses in the thirteenth century. In fact the information provided by them goes a long way towards providing a relatively complete picture of how a horse-carrying *tarida* was fitted out. In 1897 R. Bevere published an article incorporating extracted snippets from the Angevin archives under the title: 'Ordigni ed utensili per l'esercizio di arti, ed industrie, mezzi di trasporto, ed armi in uso nelle provincie napolitane dal XII al XVI secolo.'[86] Bevere was interested in the technical terminology of medieval industry, commerce, and government and in compiling his article he apparently ransacked the Angevin archives for material. In section 2 (b) of the article, entitled: 'Mezzi di trasporto per acqua (epoca angioina). Attrezzi e forniture navali (affisa, correda e guarnimento), Bevere adduced the word *cynta*. The text cited was: *Cynta de tela et cordis ad ponendum sub ventribus equorum.*[87] Unfortunately, Bevere was less than scrupulous in giving contexts and provenances for the texts he cited and this text is a case in point. We are not told from what register it was drawn or what was the context in which it was used. The registers have, of course, now been destroyed. However, since the text cited came in Bevere's section on equipment and fittings for transportation by sea, it is clear that the context was in fact the transportation of horses by sea sometime in the Angevin period; probably in the reign of Charles I since most of Bevere's other references were from his reign. Now, a *cynta* or *cinta* could be almost anything with a curve. Jal defined *cinta* as a wale and the word was indeed used for a wale in the Angevin registers. But in

this context it clearly referred to a sling of canvas and rope passed under the horses' bodies to take their full weight off their feet, immobilize them, prevent them attempting to lie down, and prevent them being thrown about and injured by the pitching and rolling of the ship. To my knowledge, this is the only specific mention of the use of such slings in the Middle Ages. However, there is no reason to question Bevere's citation and I conclude that, since their use seems eminently desirable, such slings were certainly in use in the late thirteenth century and in all probability much earlier. When Ambroise said that Richard the Lion Heart's horses had been standing for the whole month they were at sea, surely what he meant was that they had been in such slings.

In section 2 (a) of this article (Mezzi di trasporto per acqua (epoca angioina). Diverse specie di navi), Bevere turned to the word *tarida*, citing extracts from three texts drawn from the registers of Charles I which gave information about this ship type. These three texts must be considered with two others, one an extract and the other complete, published in 1876 and 1878 by the great Neapolitan historian Camillo Minieri Riccio.

I. (Pergamena della Regia Zecca, 1271)
. . . eighteen *canne* long and eight *palmi* high [on the floor] . . . fourteen *palmi* high [wide] on the floor, . . . fifteen *palmi* from wale to wale, . . . eight *palmi* high from the planks of the hold to those of the deck, . . . four and a half [fourteen and a half] *palmi* high at the stern . . . thirteen *palmi* high at the bow . . . and [the *tarida*] should have four entrance ports, to wit, two below and two above, and it should have on the inside a swinging door, such that the port should be sealed up, . . . rounded at the stern in such a way as to allow a horse to be able to embark and land armed and saddled, . . . it should be strewn on the floor to receive at least thirty horses . . . it should have the necessary ring bolts for securing the horses and keeping them off their feet, . . . every five palmi there should be a standing beam . . . and it [the *tarida*] should have . . . a ramp for embarking the said horses at the position of the gangway . . . (Date unknown)[88]
II. (Reg. Ang. 22 [1275, A], fol. 77v)
. . . eighteen *canne* long, . . . fifteen *palmi* high at the stern, . . . thirteen and a half *palmi* wide on the floor . . . from the straw where the horses should have their feet seven and a half *palmi* high . . . in the lesser or least low place of the *tarida* under the deck beams such that the thickness of the beams should not be included in that figure . . . from wale to wale fifteen and a half *palmi*, . . . thirteen *palmi* high at the bow, . . . the *tarida* should open out in the waist at fifteen and a half *palmi* just as at the wale, . . . it should have three ports all of which should be above [deck], . . . there should be one port . . . eight and a half *palmi* high and five and a half *palmi* wide [at the stern], . . . in each port . . . there should be false beams, so that where the *taride* are weak because of the large openings of the ports, they should be strong because of the beams, . . . at the stern . . . there should be six quite strong deck beams . . . of elm . . . and lacking [elm] . . . of fir . . . twelve *canne* should be strewn for receiving the horses, counting from the stern to the bow and the remaining six *canne* towards the bow should be left to stow victuals, rigging, and other equipment, . . . it should have the necessary wooden side rails for securing the horses and keeping them off their feet . . . (Date unknown)[89]

III. (Reg. Ang. 22 [1275, A], fol. 77v)

. . . In each *tarida* there should be entrance ports on the deck above . . . there should be one port at the stern . . . for embarkation and landing of men and horses . . . eight and a half *palmi* high and five and a half *palmi* wide and that port should be closed with two very strong doors and those doors should have false beams so that where the *taride* are weak because of the large opening of the ports, they should be strong because of the beams . . . at the stern . . . in that space where it is usual to stow things, the deck beams should be doubled and six quite strong ones should be built in and these should be of good oak or of good ash or of elm. Which beams are *syonate* as the Provençals say. . . . Twelve *canne* should be strewn for receiving the horses, counting from the stern to the bow, such that [the deck of] all those strewn *canne* should be of good oak and towards the stern the oak planks should be heavier and stronger than the other planks of the strewn area on account of the embarkation and landing of armed men and horses . . . and on account of the weight of those same armed men and horses it is apposit that the planks themselves be heavier and stronger. . . . Every eight *palmi* there should be a standing beam twice as high as it is thick, such that between two beams there should be three horses, since three horses should be accommodated within seven and a half *palmi*, and in the remaining half *palmus* there should be the standing beam, and the standing beams should be placed in such a way that within a length of ten *canne* at least thirty horses should be able to be accommodated easily and well in each *tarida*. (Date unknown)[90]

IV. (Reg. Ang. 9 [1270, C], fol. 112r)

. . . Each [*tarida*] should be eighteen *canne* long, and fifteen *palmi* high at the stern, and thirteen at the bow, and thirteen and a half *palmi* wide on the floor. Item, it should open out in the waist to fifteen and and half *palmi*. Item, there should be entrance ports on the deck above, [and] one port at the stern for embarkation and landing of men and horses eight and a half *palmi* high and five and a half *palmi* wide. Item, each *tarida* should be rounded at the stern so that a horse may embark and land saddled and armed. Item, the deck beams should be nineteen *palmi* long. Item, in each *tarida* twelve *canne* should be strewn for receiving the horses and in each places for thirty horses should be provided . . . each [*tarida*] should have a ramp for embarking the horses fourteen *palmi* long. (Date unknown)[91]

V. (Regg. Ang. 1 [1268, A], fols 112r & 153r-v)

. . . The aforesaid *tarida* . . . should be eighteen *canne* long. Item, fifteen *palmi* high at the stern. Item, thirteen and a half *palmi* wide in the floor. Item, from the straw where the horses should have their feet it should be seven and a half *palmi* high . . . in the lesser or least low place of the *tarida* under the deck beams, such that the thickness of the beams should not be included in this figure. Item, it should be fifteen and a half *palmi* from wale to wale. Item, thirteen *palmi* high at the bow. Item, the *tarida* should open out in the waist to fifteen and a half *palmi*, just as at the wale. Item, there should be ports on the deck above just as is suitable and as is the custom in other *taride*. Item, there should be one port at the stern of the *tarida* for embarkation and landing of men and horses; which port should be eight and a half *palmi* high and five and a half *palmi* wide. And that port should be able to be closed with two very strong doors and those doors should have false beams so that where the *tarida* is weak because of the large openings of the ports it should be strong because of the beams. And that port at the stern of the *tarida* should [have] a good strong swinging door. Item, at the stern in the space where it is usual to stow things, the deck beams should be doubled and six quite strong ones should be built in made of good oak or ash or elm; which beams are *syonte* as the Provençals say. Item, it should be rounded at the stern so as to allow a horse to be able to embark and land saddled and armed. Item, the deck beams should be nineteen *palmi* from end to end. . . . Item, on that same *tarida* twelve *canne* should be strewn for receiving the horses, counting from the stern towards the bow such that [the deck of] all those twelve strewn *canne* should be of

good oak and towards the stern the oak planks should be heavier and stronger than the other planks of the same straw [strewn area] because of the embarkation and landing of armed horsemen, who embark and land armed from that same *tarida* on the said horses; and because of the weight of those same armed men and horses it is apposit that those same planks be heavier and stronger. And the remaining six *canne* of the same *tarida* towards the bow should be left for stowing victuals, rigging, and other equipment. Item, it should have the necessary wooden side rails for securing the horses and keeping them off their feet. Item, every eight *palmi* there should be a standing beam twice as high as it is thick, such that between two standing beams there should be three horses since three horses should be accommodated within seven and a half *palmi*, and in the remaining half *palmus* should be the standing beam. And the standing beams should be built in such that within a length of ten *canne* at least thirty horses should be able to be accommodated easily and well in each *tarida*. Item, there should be on that same *tarida* those planks for the gangway, which in Provence is called *corde*, of good oak. . . . Item, that same *tarida* should have . . . two masts of which one, namely the foremast, should be twenty two *gubiti* long . . . and the other stern mast should be seventeen *gubiti* long. . . . Item, it should have spliced yards of which that which is near the bow should be thirty six *gubiti* long. Item, another spliced yard near the stern which should be thirty *gubiti* long. . . . Item, that same *tarida* should have two steering oars each of which should be twenty eight [eighteen] *palmi* long at least. . . . Item, it should have one hundred and twelve oars, of which half should be twenty eight *palmi* long and the other half twenty nine. Item, a ramp for embarking the horses as wide as the [stern] port of the *tarida* and fourteen *palmi* long. . . . Item, two sails, one of which should be thirty six *gubiti* [on the yard] . . . and the other thirty . . . *gubiti* . . . (1 May 1278, Torre S. Erasmo, near Capua. Letter of Charles I to the Justiciar of the Capitanata instructing him to assist the construction of *taride* at Brindisi under the direction of Simon di Belvedere, Vice Admiral from the river Tronto to Cotrone, and specifying construction details of the *taride*)[92]

These texts have many internal difficulties. Anyone who has worked on thirteenth-century notarial and chancery registers will know that the orthography of such texts is very unclear; particularly in the case of unfamiliar technical terms. Orthography was very variable at the time and since the Latin used by clerks and notaries had to translate what were in fact vernacular technical terms, the problems are compounded. Moreover, many terms have since disappeared from use and are quite unfamiliar to the modern reader. Bevere asterisked hundreds of terms whose meaning he could not ascertain from any dictionary. It is a great pity that Jal did not use the Angevin registers for any of his work and that consequently the *Glossaire nautique* is of use only where terms also occurred in other sources which he did use. Since many of the technical terms were not familiar to them from other contexts, both Bevere and Minieri Riccio obviously had trouble with the orthography and in some cases it is probable that the words which they have transmitted to us were not in fact those which occurred in the manuscripts. However, since the latter have now been destroyed, we have no way of vetting the texts as Bevere and Minieri Riccio have presented them to us. Moreover, with the exception of Text V, of which I have presented here only the parts relevant to this discussion, the texts are incomplete and out of context
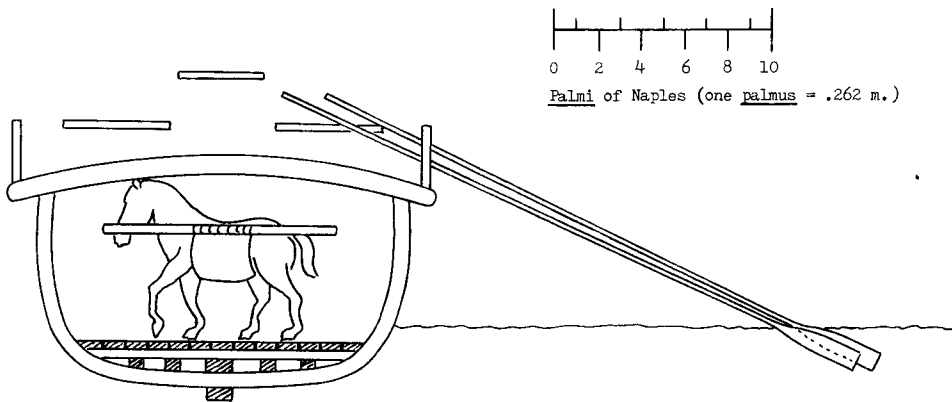
Fig. 1   Midship section of the *taride* built at Brindisi in 1278 for Charles I of Anjou, King of Sicily.

and this makes their interpretation even more difficult. The problems are compounded by the fact that the editors have supplied all the punctuation for the texts and sometimes this is incorrect and obscures the meaning.[93]

This is not the place for a study in depth of the construction of thirteenth-century *taride*. I hope at some future time to complete such a study for both *taride* and galleys, based largely on specifications to be found in the Angevin archives. However, what follows here is merely a comment on aspects of *tarida* construction related to the problems of transportation of horses and a reconstruction of the *taride* of Charles I of 1278 without an excursus on their construction.

The five texts given above are all from different original documents. The internal construction of each text and the source citations given by the editors make that clear. Consequently there are slight variations in the dimensions specified and different aspects of construction are emphasized in each text. Nevertheless, it is also clear that the clerks of the Angevin chancery were following models when they drafted the orders from which these extracts have been taken. Similarities in language, order of presentation, and dimensions specified indicate that even though *taride* were built with slight variations in construction for particular circumstances and requirements, the type used by Charles I was probably quite standard throughout his reign.

Dimensions specified in the chancery were internal dimensions stipulated in order to ensure sufficient stowage space for the needs of transportation. They were not shipwrights' measurements. The references in Texts II and V to the scantlings of the deck beams not being included in the stated height of the horse deck is sufficient proof of this.[94] Consequently, the dimensions of keels, kelsons, floors, hulls, frames, sternposts
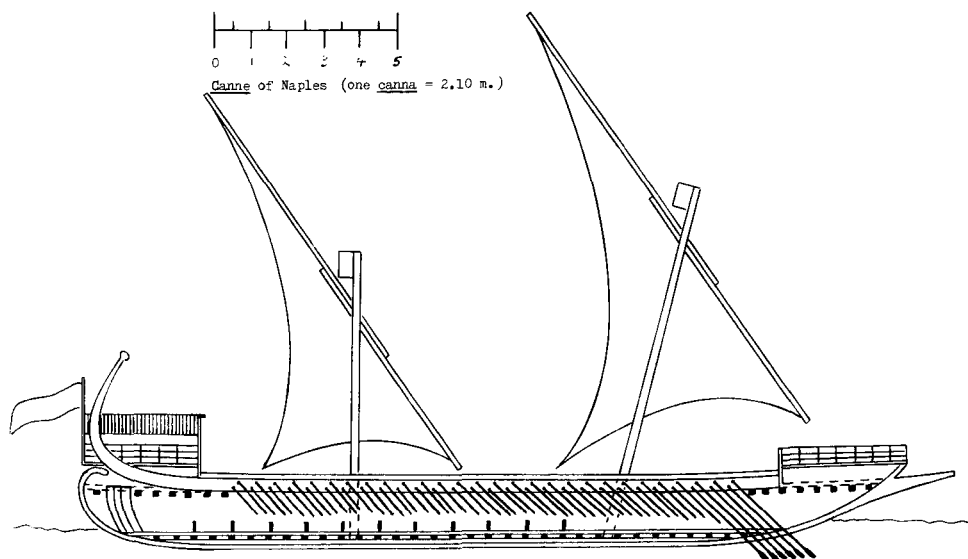
Fig. 2   Longitudinal section of the *taride* built at Brindisi in 1278 for Charles I of Anjou, King of Sicily.

and stemposts, forecastles and poops, etc., have to be added to the stated dimensions to arrive at overall dimensions.

Three measurements were used in the chancery orders: *canna, gubitus*, and *palmus*. A *canna* equalled eight *palmi* and a *gubitus* three *palmi*. The Neapolitan *palmus* of the thirteenth century was about ·262 metres.[95] Averaging out the slightly variant dimensions given in the five texts, Charles I's *taride* would have had an internal length on the floor of eighteen *canne* (37·73 m), have been about eight *palmi* (2·01 m) high on the floor, over thirteen and a half *palmi* (3·54 m) wide on the floor, over fifteen *palmi* (3·93 m) high at the stern, and over thirteen *palmi* (3·41 m) high at the bow. The *tarida* of Text V drawn in Figures 1 and 2 had dimensions only slightly different from these. Its stern port was eight and a half *palmi* by five and a half (2·23 m by 1·44 m), the landing ramp was fourteen *palmi* (3·67 m) long, the foremast was twenty two *gubiti* (17·29 m) high with a yard of 36 *gubiti* (28·30 m), and the middle mast was seventeen *gubiti* (13·36 m) high with a yard of 30 *gubiti* (23·58 m). It carried 112 oars, two to a bench on 28 benches per side with the inboard oarsmen rowing an oar of 29 *palmi* (7·60 m) and the outboard oarsmen one of 28 *palmi* (7·34 m).

The fact that the average height of bow and stern, or stempost and sternpost, was only fourteen *palmi* while the height of the floor deck was about seven and a half or eight *palmi* means that there cannot have been more than one tweendeck. The horses must have been stabled on the

floor and this explains why all of the texts giving general dimensions (i.e., except for Text IV) specified the width of the floor and why this was so large in relation to the maximum beam at the wales. These *taride* were extremely flat-bottomed ships designed to have a very shallow draft so that they could be backed onto the beaches. The consistent comment of the Angevin texts that the sterns should be especially rounded or bluff accords with the evidence for Louis IX's Genoese *taride* of 1246. Moreover, the insistence of Texts II, III, and V on having especially strong planking for the floors of the *taride* at their sterns, and the relation of that demand to embarkation and landing of armoured men and horses, suggests that the knights and their horses grouped in formation here inside the stern before the ramps were lowered and they moved out on to the beaches. The demand of Texts II, III, and V for especially strong deck beams at the stern seems to be related to the need to provide a strong aftercastle on which crossbowmen and missile throwers could be massed to cover the knights while landing. Unlike galleys, *taride* were not designed to fight bow to bow. The point at which they were most likely to come under heavy attack was at their stern.

As in the Genoese *taride* of Louis IX of 1246, so also in the *taride* of Charles I the horses must have been stabled in a single row centred over the keel for stability and with companionways along both hulls allowing access to them and allowing for their embarkation and landing. The height of the stern ports of eight and a half *palmi* (2·23 m) would seem just barely adequate to allow knights to ride their destriers out of the ships and down the ramps.[96]

The stern ports were apparently closed with two doors. One was an external door which we know from Joinville was caulked to make it watertight once put into position. The other was an inner door, a *bactiporta* or *battiporta*, which, according to Jal, was hinged at the top so that it opened vertically and which, according to Texts II, III, and V, was closed fast and tight by a bar on the inside.

We are told that the overall length of the stabling deck was eighteen *canne*, of which twelve towards the stern were to be laid with straw for the horses and the remaining six towards the bow left free for general stowage. Of the twelve *canne* strewn it seems that only ten were actually used for stabling because the total consignment of horses was 30 and three were stabled every eight *palmi*, i.e., one *canna*. In fact three horses stabled side by side occupied only seven and a half *palmi* (1·97 m). The remaining half *palmus* was occupied by a *catena mortua* between each set of three horses. Each horse thus had a stall space no wider than ·66 m; ten centimetres smaller than that allotted to them by the Marseillese

statutes of 1253. In the ships of Text I the *catene mortue* were only five *palmi* apart which would have meant that only two horses could have been stabled between each set and that even then they would have had a space of only ·59 m each. A modern shire horse measures between ·65 m and ·70 m across the girth. I conclude, therefore, that the *taride* of Texts III, IV and V provided a space barely adequate for a destrier for a voyage of short duration while those of Text I were probably intended to transport mules or smaller horses such as palfreys.

What exactly was the purpose of a *catena mortua*, I am unable to say. It was a lateral beam of some sort but its purpose cannot have been to strengthen the hull since it was *mortua*, not part of the living ship, and, moreover, its purpose was clearly associated with the horses' stalls. Neither can it have extended laterally from hull to hull since it would then have blocked off the companionways at the hull and prevented the horses from embarking and landing through the stern port. Moreover, *catene mortue* did not apparently serve as rails around the stalls of the horses, except perhaps in the *taride* of Text I, since we are told that three, rather than two, horses were stabled between each set. And in any case the function of stall rails seems to have been filled by the *costaneole*, which, we are told, were designed to secure the horses and to lift them off their feet. As I comprehend the situation, in the *taride* of Text I the horses were boxed in by *catene mortue* either side of each set of two horses and were raised off their feet by canvas slings, the *cynte de tela et cordis ad ponendum sub ventribus equorum*, slung from ring bolts, *anuli*, in the deck beams above. In the *taride* of Texts II and V three horses were placed between each set of two *catene mortue* and between each horse there was a *costaneola*. On these ships the slings were slung from the *costaneole*.

Notes

52 See 'The naval architecture of crusader transport ships: a reconstruction of some archetypes for round-hulled sailing ships,' forthcoming in *The Mariner's Mirror*.

53 Jean, Sire de Joinville, *Histoire de Saint Louis, Credo, et Lettre à Louis X*, ed. N. de Wailly (Paris, 1874), XXVIII.125 (p. 70): Au mois d'aoust, entrames en nos neis à la Roche de Marseille. A celle journée que nous entrames en nos neis, fist l'on ouvrir la porte de la nef, et mist l'on touz nos chevaus ens que nous deviens mener outre mer; et puis reclost l'on la porte e l'enboucha l'on bien, aussi comme l'on naye un tonnel, pour ce que, quant la neis est en la grant mer, toute la porte est en l'yaue.

The translation is mine. That of Shaw in *Joinville & Villehardouin* is misleading here.

54 Jean de Beaumont, *Letter to Geoffroi de la Chapelle*, ed. P. Riant in *Archives de l'Orient Latin* 1 (1881), pp. 389–90. The figure of 120 large round ships is also given by one John, monk of Pontigny, in a passage excerpted by Matthew Paris. Matthew Paris, *Chronica majora*, vol. 6 (Additamenta) (London, 1882), No. 83 (p. 163). However, the *naves* of St Louis were certainly not called *dromones* as claimed by John of Pontigny. A knight by the

name of Guy, who was in the household of the Viscount of Melun at Damietta gave the number of larger ships as 150 in a letter to a friend who was a student at Paris. *Letter to master B. of Chartres* in Matthew Paris, *Chronica majora*, loc. cit., No. 81 (p. 156).

55 Jean Sarrasin, *Lettre à Nicolas Arrode*, ed. A. E. Foulet (Paris, 1924), §§ VIII–IX (pp. 4–5). Joinville, *Histoire*, XXXIII.155 (p. 86). Robert d'Artois, *Letter to Blanche of Castille (23 June, 1249)* in Matthew Paris, *Chronica majora*, loc. cit., No. 80 (pp. 153–4). Guy, knight of the household of the Viscount of Melun, *Letter to master B. of Chartres*, p. 158. Jean de Beaumont, *Letter to Geoffroi de la Chapelle*, p. 389. Giovanni de Columna, *E mari historiarum* in *Recueil des historiens des Gaules et de la France*, vol. 23, ed. N. de Wailly et al. (Paris, 1876), p. 119.

56 *Chronografia magna*, fol. 83v. Joinville, *Histoire*, XXXV.162 (p. 88). Jean Sarrasin, *Lettre à Nicolas Arrode*, IX (p. 5). Robert d'Artois, *Letter to Blanche of Castille*, p. 153. Jean de Beaumont, *Letter to Geoffroi de la Chapelle*, p. 389. Guy, knight of the household of the Viscount of Melun, *Letter to master B. of Chartres*, p. 158.

57 Joinville, *Histoire*, XXXIV.158–59 (pp. 87–8).

58 Jean Sarrasin, *Lettre à Nicolas Arrode*, IX (p. 5). Joinville, *Histoire*, XXXIII.151–4 (pp. 85–6).

59 A. Jal, ed., 'Pacta naulorum des années 1246, 1268 et 1270,'in M. Champollion-Figeac, ed., *Documents historiques inédits sur l'histoire de France* (Paris, 1841–48), vol. 1, Doc. XXV (pp. 605–9). M. Champollion-Figeac, ed., 'Traités passés en l'année 1246 entre les commissaires du roi St Louis et le procureur du podestat de la commune de Gênes,' in his *Doc. hist. inéd.*, vol. 2, Doc. 1 (pp. 51–4) & Doc. 2 (VII) (pp. 59–60).

60 Champollion-Figeac, 'Traités,' Doc. 1.

61 For the purpose of the ring bolts see below pp. 112–3 and nn. 88–9. This text accords so closely with the Angevin text of n. 88 that I believe that the real purpose of the ring bolts was to take the slings which were passed beneath the horses' bellies and which lifted them off their feet.

62 L. Blancard, ed., *Documents inédits sur le commerce de Marseille au moyen-âge* (Marseilles, 1884–85), vol. 2, part II: Les notules commerciales d'Amalric notaire marseillais de XIIIme siècle, nos 549, 777 & 878.

63 Champollion-Figeac, 'Traités,' Doc. 2 (VII).

64 Loc. cit.: . . . et habuit popam rotundam ad tres rodas, et erant ibi porte per quas poterunt exire equi et intrare . . . Et ibi debent habere stabularias paratis pro XX equis si necece fuerit . . .
The Genoese *palmus* equalled ·248 metres.

65 R. Pernoud, ed., *Les statuts municipaux de Marseille* (Monaco/Paris, 1949), IV.58 (p. 158). The *palmus* of Marseilles equalled ·252 metres.

66 Jal, 'Pacta naulorum,' Doc. XXV.

67 Blancard, *Documents inédits*, vol. 2, part II, nos 777 & 878. One *millairola* of Marseilles equalled four cubic *palmi* or 63·4369 litres.

68 Pernoud, *Statuts*, IV.26.3–4.

69 Jal, 'Pactas naulorum,' Docs Ia & XIII–XXII.

70 See 'Naval architecture of crusader transport ships.' The beam:length ratio of these four *salandria* averaged 1:4·59 whereas that of Louis's Genoese *taride* of 1246 was 1:8·71 and that of the *taride* of Charles I of Anjou of 1278 was about 1:11·61. See below p. 113 and Figure 2.

71 Jal, 'Pacta naulorum,' Doc. Ia. See 'Naval architecture of crusader transport ships' for an assessment of the historical discussions of these ships and my own views on their construction.

72 There are five available versions of the *Contractus navigii domini regis cum Venetis factus anno domini MCCLXVIII*. Jal edited the text in part in his *Archéologie navale* (Paris, 1840) vol. 2, pp. 335–6 but omitted the sections of interest here. Of the other texts the oldest is that of A. du Chesne in his *Historiae Francorum scriptores* (Paris, 1636–49), vol. 5, pp.

435–7. It is followed by G. von Leibnitz in his *Codex juris gentium diplomaticus* (Hanover, 1693), pp. 24–7; J. Dumont in his *Corps universel diplomatique du droit des gens* (Paris, 1726–31), vol. 1, pp. 277–8; and J. C. Lünig in his *Codex Italiae diplomaticus* (Frankfurt and Leipzig, 1725–35), vol. 2, cols 1957–66. The texts of Dumont and Lünig are simply extracted from Leibnitz. R. Bastard de Péré has shown conclusively in his 'Navires méditérranéens de temps de St Louis,' *Rev. d'hist. éc. et soc.*, 50 (1972), pp. 328–32 that the Du Chesne version is to be preferred. However, even this text is replete with errors of omission and inaccuracy and what follows here is based on a comparative reading of all texts.

73 One *quarta* Paris equalled 1·8626 litres.

74 Jal, 'Pacta naulorum,' Doc. XXVI.

75 Georgius Acropolita, *Annales*, ed. I. Bekkerus in *Corp. script. hist. Byz.* (Bonn, 1836), c. 48 (p. 94). Marino Sanudo Torsello, *Istoria del Regno di Romania*, ed. C. Hopf in *Chroniques Greco-Romanes*, p. 102. Caffaro, *Annali genovesi*, vol. 4 (Rome, 1926), p. 51. J. Guirand, ed., *Les registres d'Urbain IV (1261–1264)*, fasc. 1 (Paris, 1892), no. 228 (p. 100).

76 C. Minieri Riccio, *Studi storici su' fascicoli angioini dell'archivio della regia zecca di Napoli* (Naples, 1863), pp. 5 & 84. [Regia Zecca, Fasc. 42, fol. 133r].

77 J. Delaville le Roulx, *Cartulaire général de l'ordre des Hospitaliers de S. Jean de Jerusalem (1100–1300)*, vols 1–3 (Paris, 1894–99), vol. 3, Nos 3350, 3466, 3599, 3609, 3690, 3717, 3758, 4163 & 4512.

78 C. Minieri Riccio. 'Il regno di Carlo I° d'Angio dal 2 gennaio 1273 al 31 dicembre 1283,' *Archivio storico italiano*, ser. 3, 22 (1875) to ser. 4, 5 (1880), various pages; here ser. 3, 22 (1875), p. 33 & ser. 4, 3 (1879), p. 169.

79 Ibid., ser. 3, 24 (1876), p. 229; ser. 4, 2 (1878), p. 355; ser. 4, 3 (1879), pp. 165 & 169.

80 Tafel and Thomas, *Urkunden*, vol. 3, pp. 296–7.

81 C. Minieri Riccio, 'Memorie della guerra di Sicilia negli anni 1282, 1283, 1284 tratte da' registri angioini dell'Archivio di stato di Napoli,' *Arch. stor. per le provincie napoletane*, 1 (1876), 85–105, 275–315, 499–530; here pp. 87–8, 91, 98–9, 99, 102, 278, 279, 281, 289, 311–12. 508 & 509.

82 Minieri Riccio, 'Regno di Carlo I°,' ser. 4, 1 (1878), pp. 5, 238, 427 & 428; ser. 4, 4 (1879), p. 10. E. M. Jamison, 'Documents from the Angevin registers of Naples: Charles I,' *Papers of the British School at Rome*, 17 (n.s., 4) (1949), No. 1.

83 Minieri Riccio, 'Regno di Carlo I°,' ser. 3, 22 (1875), pp. 5 & 19; ser. 3, 23 (1876), p. 239; ser. 3, 25 (1877), p. 407; ser. 3, 26 (1877), p. 220; ser. 4, 1 (1878), pp. 198 & 440; ser. 4, 3 (1879), pp. 17–18, 162 & 163. Jamison, 'Documents,' No. 162. C. Minieri Riccio, 'Il regno di Carlo I° d'Angio dal 4 gennaio 1284 al 7 gennaio 1285,' *Archivio storico italiano*, ser. 4, 7 (1881), p. 11.

84 Minieri Riccio, 'Regno di Carlo I°,' ser. 3, 22 (1875), p. 33; ser. 4, 3 (1879), pp. 13 & 169. Jamison, 'Documents,' Nos 199 & 203.

85 Minieri Riccio, "Regno di Carlo I°,' ser. 3, 26 (1877), pp. 14 & 421; ser. 4, 1 (1878), pp. 2 & 13; ser. 4, 2 (1878), pp. 197, 198, 199 & 356; ser. 4, 3 (1879), pp. 4–5 & 8.

86 *Archivio storico per le provincie napoletane*, 12 (1897), 702–38.

87 Ibid., p. 720.

88 Ibid., p. 716: … longitudinis cannarum decem et octo et altitudinis palmorum octo, . . . altitudinis in plano palmorum quatuordecim, . . . a cinta in cinta palmorum quindecim, . . . a tabule sentine usque ad tabulam cohoperte altitudinis palmorum octo, . . . alta in puppi altitudinis palmorum quatuor et dimidii . . . in prora altitudinis palmorum tredecim, et debet habere portas quatuor, duas videlicet subtus et duas superius, et debet habere intus unam battiportam, ad hoc ut porta possit esse stanea, . . . rotunda in puppi in modum conduri ad hoc ut equs [*sic*] possit intrare et exire armatus et insellatus, . . . debet esse impaliolata in fundo pro recipiendis triginta equis ad minus, . . . debet habere anulos necessarios pro ligandis

et appendendis equis ipsis, . . . de quinque ad quinque palmos sit una catena mortua, . . . debet habere . . . pontem unam pro ascendendis equis ipsis loco scale . . .

The transcription of this text is particularly corrupt. Without emendation it makes no sense at all. Obviously the height (*altitudo*) of the *tarida* was more than eight *palmi* since we are told that that of the bow was thirteen. Since the height on the floor given (14 *palmi*) is also impossible because of the height of the bow and is also improbable when compared to the height on the floor given in the other texts, I read the height of eight *palmi* as being the height on the floor and emend *altitudinis in plano* to *amplitudinis*. An editorial transcription error of *altitudo* for *amplitudo* is quite comprehensible and the emendation makes the stated dimensions correspond to the pattern of the other texts.

Alta in puppi altitudinis quatuor et dimidii is an obvious transcription error for *quatuordecim et dimidii*.

The word *conduri* (or *comoduri* as it is in Text V) is apparently some form of a latinized version of a hybrid vernacular term somewhere between classical Latin *commodare* (to accommodate, to serve, to allow) and Italian *condurre* (to manage, to lead, to carry out). Its meaning seems clear enough.

The adjective *impaliolatus* (or *impallulatus* as it is in Text II) and the noun *paliolus* or *potactus* (Texts II, III & V) have defied all efforts to define them. However, they do all seem to have a common derivation in Latin *palea* (straw or chaff). Du Cange gives *impalare* (*in palum impingere*, to lay down straw) and Jal has *impagliettatura* (from *paglietto*, a cloth or mat of straw with which a gunwale was covered to protect those behind it from arrows and missiles). I have been able to make these terms consistently comprehensible only by regarding *potactus* as a transcription error for *paliolus* and by regarding *paliolus* as a noun referring to the area covered with straw for the horses and *impaliolatus/impallulatus* as an adjective derived from it.

Catena meant a beam, in particular some sort of cross beam inside the hull of a ship, as well as its normal meaning of a chain. A *catena mortua* must have been some sort of beam which was self-supporting and not an integral part of the living hull of the ship.

89 Ibid., pp. 716–7: . . . longitudinis cannarum decem et octo, . . ., altitudinis in puppi palmorum quindecim, . . . in plano latitudinis palmorum tredecim et medii . . . altitudinis a paliolo ubi equi debent tenere pedes palmorum septem et medii, de canna de minori et minus basso loco teride, subtus laccas ita quod crossicies laccarum non comprehendatur in dicto numero . . . de cinta in cintam de palmis quindecim et medio, . . . alta in prora palmorum tredecim, . . . aperiatur terida per buccam de palmis quindecim et medio sicut est in cinta, . . . debet habere portas tres omnes superius existentes, . . . fiat porta una . . . altitudinis palmorum octo et dimidii et latitudinis palmorum quinque et medii, . . . in qualibet porta . . . fiant false catene, et in eo in quo sunt teride debiles propter magnam aperturam portarum fiant fortes propter catenas, . . . in puppi . . . debent esse lacce sex bene fortes . . . de ulmo . . . et in defectum . . . de zappino, . . . sint impallulate canne duodecim pro equis recipiendis numerando a puppi versus proram et relique canne sex versus proram remaneant pro ponendis victualibus affisis et aliis guarnimentis, . . . debet habere costaneolas necessarias de ligno pro ligandis et appendendis equis . . .

Lacce (or *lattte*) were deck beams. Since they were considerably longer than the maximum beam of the hull at the wales (Texts IV & V) they obviously projected through the hull and formed part of the support for the *apostis*.

Costaneola has defied every effort to define it. In this text and in Text V the *costaneole* seem to have performed the same function as the *anuli* (ring bolts) of Text I in providing a means of securing the horses (*ligare*) and raising them off their feet. *Appendere* means literally, to weigh, but here it seems to mean simply to take the weight. Since the *costaneole* were expressly said to be wooden, they cannot have been the same thing as ring bolts, which we may presume were iron. The word *costaneola* would appear to have some connection with *costa*, a side or a rib, and I therefore presume that *costaneole* were rails on either side of the horses, from which a *cynta* could be slung.

The clauses: . . . *de canna de minori et minus basso loco teride subtus laccas ita quod crossicies laccarum non comprehendatur in dicto numero* . . ., and the similar clauses in Text V, make no sense at all to me as they stand. Indeed, I am unable to fit the words *de canna* into any context at all and have therefore excluded them from the translation. The rest of the text, in conjunction with the preceding clause, seems to mean that the height of the deck on which the horses were stabled was seven and a half *palmi* at the least low point; i.e., at the point where the headroom between floor and deck was at its lowest. But this height was to be measured from the *paliolus* to the bottom of the beams carrying the deck above, not to the planking of that deck.

Affisis has similarly defied all my efforts. In Text V the word is *assisiis*. Fs and Ss can, of course, be horribly confused and confusing in the orthography of the period. Can it be some sort of misreading for a Latinization of a vernacular term for *sarcia*, rigging. Rigging seems to fit the context.

90 Ibid., pp. 717–8: . . . In qualibet terida sint porte in coperta superiori . . . fiat porta una in puppi . . . pro introitu et exitu hominum et equorum . . . altitudinis palmorum octo et medii et amplitudinis palmorum quinque et medii et ista porta debet claudi duabus ianuis fortissimis et ille ianue debent habere falsas catenas ut in eo in quo sunt teride debiles propter magnam aperturam portarum fiant fortes propter cathenas . . . in puppi . . . in illo spatio ubi consueverunt poni res lacce duplicentur et ponantur sex bene fortes et fiant de bona quercu vel de bono fraxino aut de ulmo. Que lacce sint syonate sicut dicunt provinciales. . . sint impaliolate canne duodecim pro equis recipiendis numerando a puppi usque proram ita quod omnes ipse canne impaliolate fiant de bono robore et prope puppim sint tabule de robore grossiores et fortiores quam alie tabule ipsius palioli propter introytum et exitum hominum et equorum armatorum . . . et propter pondus ipsorum hominum et equorum armatorum expedit quod tabule ipse grossiores et fortiores fiant . . . de octo ad octo palmos sit catena una mortua que sit altitudinis in duplum quam in latitudinem ita quod infra duas catenas sint equi tres, cum equi tres debeant morari infra palmos septem et medium, et reliquo medio palmo erit cathena et sic oportet poni catenas que infra decem cannas longitudinis morari possint ad minus habiliter et bene in qualibet terida, equi triginta . . .

91 C. Minieri Riccio, *Della dominazione angioina nel reame di Sicilia. Studi storici estratti da' registri della cancelleria angioina di Napoli* (Naples, 1876), pp. 46–7: . . . quelibet debet esse longitudinis cannarum 18 altitudinis in puppi palmorum 15 et in prora 13 latitudinis in plano palmorum. 13½ Item aperiatur terida per bucciam, de palmis. 15½ Item fiant porte in cooperta superiori, fiat porta una in puppi pro introitu et exitu hominum et equorum altitudinis palmorum 8½ et amplitudinis palmorum 5½. Item quelibet terida sit rotunda in puppi ut equus possit exire insellatus et armatus. Item in lattis de punta sit longitudinis palmorum 19. Item in qualibet terida sint impaliolate canne 12 pro equis recipiendis et in qualibet debent fieri loca pro equis 30 . . . qualibet habeat pontem pro recipiendis equis longitudinis palmorum 14 . . .

Minieri Riccio's punctuation is obviously awry. The figure 13½ belongs with *latitudo in plano palmorum* 13½ and the figure 15½ with *aperiatur terida per bucciam de palmis* 15½.

92 Minieri Riccio, 'Regno di Carlo I°,' ser. 4, 1 (1878), pp. 234–6: Predicta terida debet esse longitudinis cannarum decem et octo. Item altitudinis in puppi palmorum quindecim. Item in plano latitudinis palmorum tredecim et medii. Item debet esse altitudinis a potacto ubi equi debent tenere pedes palmorum septem et medii de canna in minori vel minus basso loco. Teride suptus laccas ita quod grossicies laccarum non comprehendantur in isto numero. Item debet esse de cinta in cinta de palmis quindecim et medio. Item alta in prura palmorum tredecim. Item aperiatur Terida per buccam de palmis quindecim et medium sicut est in cinta. Item debent fieri porte in cohoperta superiori sicut expediens fuerit et consuevit fieri in aliis Teridis. Item fieri debet porta una in puppi ipsius teride, pro introytu et exitu hominum et equorum. que porta debet esse altitudinis palmorum octo et medii et amplitudinis palmorum quinque et medii et ista porta debet claudi duabus ianuis fortissimis et ille ianue debent habere falsas catenas ut in eo in quo terida ipsa est debilis propter magnam aperturam

portarum fiat fortis propter cathenas et debeat porta illa de puppi Teride bonam et fortem bactiportam. Item debet esse in puppi in illo spatio ubi consueverit poni res. lacce duplicentur et ponantur sex bene fortes et fiant de bona quercu aut de bono fassino aut de hulmo. que lacce sint syonte. sictut dicunt provinciales. Item sit rotunda in puppi ad modum comoduri ad hoc quod equus possit intrare et exire insellatus et armatus. Item in laccis de puncta in punctam sit longitudinis palmorum decem et novem. . . . Item in terida ipsa sint impaliolate canne duodecim pro equis recipiendis numerando a puppi versus pruram ita quod omnes ipse duodecim canne impaliolate fiant de bono robore et prope puppim sint tabule de robore grossiores et fortiores quam alie tabule ipsius palioli per introytum et exitum hominum equitum armatorum qui in dictis equis armati intrabunt et exibunt teridam ipsam et propter pondus ipsorum hominum et equorum armatorum expedit quod tabule ipse grossiores et fortiores fiant. et relique canne sex ipsius teride versus portam [proram] remaneant pro reponendis victualibus assisiis et aliis armamentis. Item debet habere costanioles de ligno necessarias pro ligandis et appendendis equis. Item de octo ad octo palmos sit catena una mortua que sit altitudinis in duplum quam in latitudinem ita quod infra duas cathenas sint equi tres cum equi tres debent morari infra palmos septem et medium et in reliquo medio palmo erit cottuna et sic oportet poni catenas quot infra decem cannas longitudinis morari possint ad minus abiliter et bene in Terida ipsa equi triginta. Item debent esse in terida ipsa tabule pro cursia que in Provincia dicitur corde. de bono robore. . . . Item Terida ipsa debet habere . . . arbores duas quarum una videlicet illa de prura sit longitudinis gubitorum vigintiduorum . . . et alia arbor de puppi sit longitudinis gubitorum decem et septem . . . Item debet habere antennas ginnatas quarum illa que est prope pruram sit longitudinis gubitorum triginta sex. Item alias ginnatas prope puppim que esse debent longitudinis gubitorum triginta . . . Item debet habere Terida ipsa Temones duos quorum quilibet sit longitudinis palmorum vigintiocto ad minus . . . Item debet habere Remos centum duodecim, quorum medietas sit longitudinis palmorum vigintiocto et alia medietas sit longitudinis palmorum vigintinovem. Item pontem unum pro recipiendis equis latitudinis sicut est porta teride et longitudinis palmorum quatuordecim . . . Item vela bombacina duo quorum unum sit gubitorum trigintasex . . . et aliud velum bombicinum debet esse de gubitis triginta . . .

The length of 28 *palmi* for the steering oars is quite improbable considering that the height of the sternpost was only fifteen *palmi*. I suggest an emendation to eighteen *palmi*, and even that is long.

The term *antenna ginnata*, or simply *ginnata*, appears nowhere else as far as I know. I suggest, very tentatively, that the adjective *ginnatus* may be a Latinized form of a thirteenth-century vernacular word derived from classical Latin *jungere* (to join). Since yards of the length specified in this order would have had to have been composed of two or more separate spars spliced, lashed, or joined together, 'spliced' seems a reasonable guess at a translation.

93 For reasons of economy of space it is not possible to give precise references for works used in determination of the meaning of technical terms in these texts. Works used include: A. Jal, *Glossaire nautique* (Paris, 1848), A. Guglielmotti, *vocabulario marino e militare* (Milan, 1967), Du Cange (C. du Fresne) *Glossarium mediae et infimae latinitatis* (Niort, 1883–7), R. d'Ambra, *Vocabulario napolitana-toscana domestico di arti e mestieri* (Naples, 1873), L. Fincati, *Vocabulario nautico inglese-italiano e italiano-inglese* (Rome, 1877).

94 See also 'Naval architecture of crusader transport ships.'

95 H. Doursther, *Dictionnaire universel des poids et mesures anciens et modernes* (Brussels, 1840), p. 375.

96 Text I called for two ports at the stern as did the contract of Louis IX with the Genoese of 1246. The other texts called for only one.

NOTES

LITERACY IN THE MERCANTILE MARINE 1788–1815

The level of literacy among seamen remains a mystery due to the lack of evidence. Unlike the