

## Tiles and Coastal Trade

### A Contribution to the Economic Life of South-East Funen and Langeland during the Renaissance

by JØRGEN SKAARUP

The knowledge of the noble art of tile making seems to have reached Denmark around the middle of the 12th century when master builders and tile makers recruited from Northern Italy have in all probability been our teachers (E. Møller 1964: 11). The new building material was surprisingly quick to catch on among the big builders of the period: King, church, and nobility. This has undoubtedly been due to the huge and easily available deposits of clay. The tractability of the clay in comparison to the traditionally rigid building material hitherto used, granite and chalk, has probably also played its part.

Churches, monestaries and castles sprang up by the hundred, and towards the end of the Middle Ages commoners also began to build brick houses in several of the major Danish towns. The consumption of tile and brick must have been huge and must have formed the basis for the subsistence of numerous tile makers. Many of them seem to have been itinerant and have travelled from building site to building site, erecting their kilns where they were needed (cf. A. Steensberg 1962: column 115).

However, prior to the end of the Middle Ages permanent tileworks had also been erected in connection with feudal castles, towns, and a few large manor houses (V. Lütken 1909: 75 and 163, H. Johannsen and E. Møller 1974: column 152, J. Jensen 1977: 27). These tileworks or brickyards, some of which were in use well into the 17th cent., were always placed in areas rich in clay and with fuel available from the neighbouring forests. Furthermore, tileworks connected with feudal castles and manor houses seem generally to have been located so as to facilitate embarkation from a landing stage in the immediate vicinity (B.A. Hansen and M. Sørensen 1980: 221 f.).

This is worth notice, for whereas a substantial part of the medieval tile production seems to have taken place at the individual building sites when a demand arose as

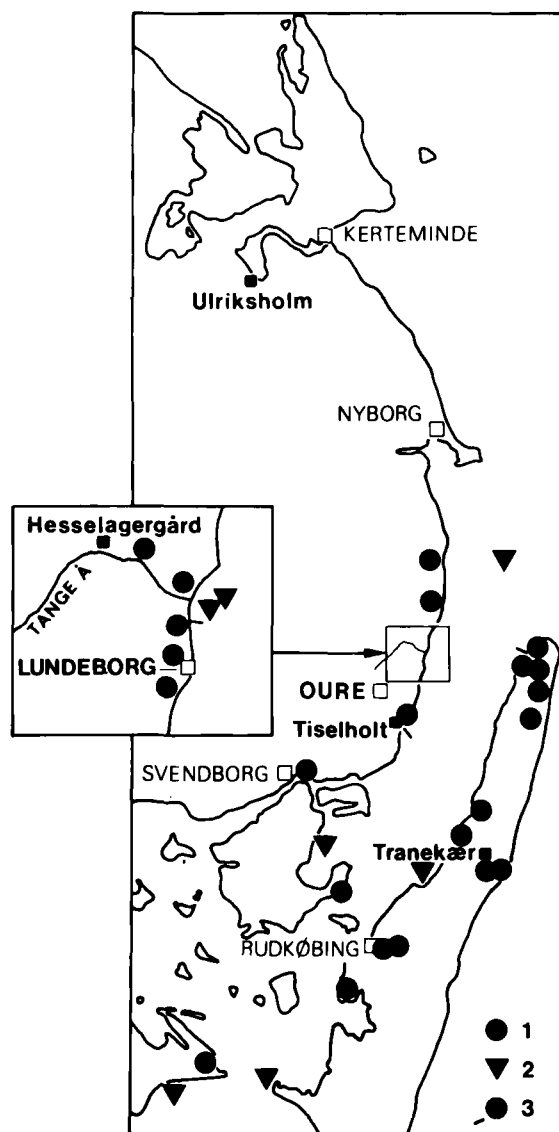


Fig. 1. Map of east Funen and Langeland showing finds connected with the brick making industry in the 16th and 17th centuries in the area around the southern part of the Great Belt. 1: Tileworks. 2: Brick-loaded wreck. 3: Site of embarkation with landing stage. At the top, at the bottom of Kerteminde inlet is Ulriksholm, one of the customers.

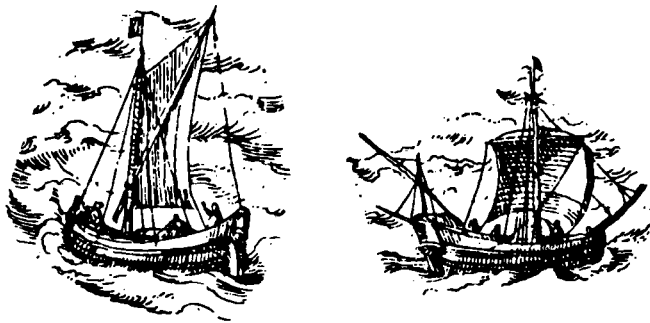


Fig. 2. Craft and Boier. The craft is a single-masted sprit-rigger, whereas the somewhat larger boier is twin-masted with a square-rigged mainmast and a lateen rigged mizzenmast. From old print.

already mentioned, this pattern seems in many cases to have been discontinued during the 16th and 17th centuries. The success of the Reformation during the first half of the 16th century did indeed put a stop to the ambitious church and monestary projects, but it also involved the transfer of huge resources to the King and the nobility. This transfer of resources and the general prosperity of the Danish Crown and nobility during the 16th and the first half of the 17th centuries seem to have created the basis for a commercial tile production. The growing wealth among the upper echelons of the commonalty may also have played a part. At any rate the Crown and the nobility as well as the commonalty invested their profits in prestige building projects.

Langeland and South-east Funen were among the areas that profited by the demand of tilework products during the Renaissance. Both areas are reasonably wooded, have excellent clay deposits, and have easy access to the Great Belt and the sound between Funen and Langeland whence the products could be embarked. Thus all basic conditions for Renaissance tile production have been present, and the presence of numerous kilns and old clay pits indicates that they have been exploited (fig. 1).

The central location of this area has probably also been of some significance. The tilework products must almost exclusively have been sent by sea route, and as will appear from the following, already at that time there were enterprising, local shipmasters whose vessels have been able to carry the heavy loads to destinations all over the realm. Overland transport must have been out of the question. The carts and wains of the period could only contain around fifty bricks (J. Koch

1973: 6), and the primitive roads were not suitable for heavy haulage.

The extensive tilework production in South-east Funen and Langeland is mentioned several times in the written sources handed down to us (V. Lütken 1909: 163, J.P. Trap 1957: 857, J. Jensen 1977: 27 f.). On Langeland the Crown with its feudal holdings seems to have played an important part in the brick making industry. The large tileworks Botofte at Tranekær Castle is first mentioned towards the end of the 15th century and seems already at that time to have made bricks for building activities elsewhere in the country. In South-east Funen tilework production seems to have started during the 16th century on the initiative of two local noblemen. Here, as well as on Langeland, there have been tileworks owned by commoners in the 17th century and probably earlier.

The 16th and 17th centuries were the heydays of the brick making industry in South-east Funen and Langeland. Subsequent disasters of war and deforestation seem then to have put a stop to the industry, and from about 1700 and well into the 19th century imported bricks from Lübeck and the numerous tileworks in Schleswig seem to have ousted the local industry from the market (Cf. E. Møller 1964: 14).

Whereas the brick making industry in the country as a whole as well as in this particular area has been reasonably well elucidated by the discovery of numerous kilns and by the written references, we have hitherto known next to nothing about the vessels in which the bricks were shipped. Stray comments in the written sources and a few illustrations of cargo vessels of the period have been just about all. However, as regards South-east Funen we are in the fortunate position of having a preserved building account supplying us with detailed information about the extensive shipping of bricks and about the numerous people engaged in this trade (J. Jensen 1977: 9 f.).

The building accounts concern the manor house Ulriksholm near Kerteminde, the construction of which was begun by Christian IV in the 1630s and continued during 1644–47 after he had presented the estate to his favourite son, the adolescent Ulrik Gyldenløve (V. Lorenzen 1963: 127–40). A total of 1,200,000 bricks were used, all purchased on South-east Funen. The sellers were partly noblemen who had their own kilns such as Tønne Friis of Hesselagergaard and Henning Valkendorff of Tiselholt, and partly commoners such as the



Fig. 3. Air-photo of the Lundeberg area. At the bottom the Lundeberg fishing hamlet and its harbour are shown. Top left the manor house of Hesselagergård and the river Tange on its way to the Great Belt. Slightly south of the mouth of the river, roughly in the middle of the sea section of the picture, the old landing stage is shown as a dark shadow across the sand bars. The dark shadows further out indicate the two wrecks, the heaps of ballast stones etc. Airphoto by U.S. Air Force 1954.

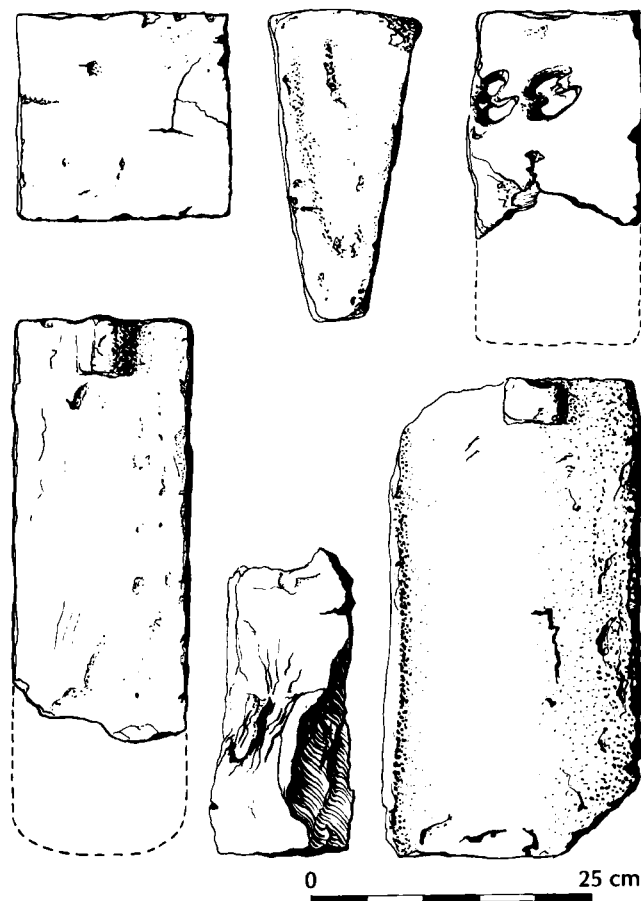


Fig. 4. Samples from the Lundeberg brick makers' line of production.

brick makers of Oure and Hesselager parishes. Among the latter, three are said to have lived in Lundeberg, among them brick maker Jens Rasmussen, one of the big producers. The transport, usually by ship from nearby sites of embarkation, was on occasion undertaken by the brick makers themselves or otherwise by local shipmasters with good Danish "sen"-names. We know little about the vessels. The classifications "boier" and "craft" are mentioned, and one single ship's name has also survived: the *Fortuna*. Of the two types of cargo vessels undertaking the Scandinavian coastal trade well into the 18th century the "craft" was the more common. Both were small, usually clinker built vessels with a rather simple rigging (fig. 2).

In 1973 in the Great Belt off Lundeberg a brick laden wreck was found which was relatively soon recognized as a craft (J. Skaarup 1980: 63 f.). The wreck was examined by archaeologists from Langelands Museum,

who became interested and decided to investigate further. The results were beyond all expectations. In the course of the ensuing years they learned of another 6 wrecks with brick loads in the water off Langeland. It has been possible to locate and examine five of them. They have all turned out to be of the Late Medieval/Renaissance period, and most of them belong to the 'craft' type.

Along with the examination of the wrecks investigations have been carried out to locate kilns, old clay pits, and sites of embarkation. On Langeland alone at least 12 sites of brick making that seem to have been in use during the Renaissance, have been established so far (fig. 1). Three sites of embarkation dating from the same period with remains of stone landing stages surrounded by dropped or discarded bricks have also been located and examined. One is located at Brunegaarden near the Northern tip of Langeland, and the other two are located off the manor houses of Tiselholt and Hesselagergaard, the very estates mentioned as major contractors in the Ulriksholm accounts (J. Jensen 1977: 27). At all three localities kilns and clay pits have also been found.

The site of embarkation at the mouth of the river Tange slightly north of Lundeberg, approx 1.5 km SE of Hesselagergaard (fig. 3.) is the most thoroughly investigated of them. Amateur divers from Funen located a large landing stage at a right angle to the coast line, and stretching out to a depth of one metre. Spread over a considerable area of sea-bottom around the landing stage were found large quantities of bricks and sherds of unglazed black pottery. The tilework represents many different types (fig. 4) and suggests, as does the pottery, a varied line of production, which can be assigned to the 16th and 17th centuries.

Due to shallow water only barges and lighters can have been loaded from the landing stage. Barges and lighters must have taken the loads out to the boiers and craft waiting at anchor at some distance from the shore – exactly where is indicated by the heaps of discarded ballast stones on the sea-bottom, often surrounded by fragments of brick dropped during the loading. These heaps also bear witness to the unilateral character of the local trade. It has apparently seldom been possible for shipmasters to secure cargoes for the landing stage at the River Tange.

It seems at least four of the brick-loaded wrecks in the waters between Langeland and Funen-Taasinge-Aerø

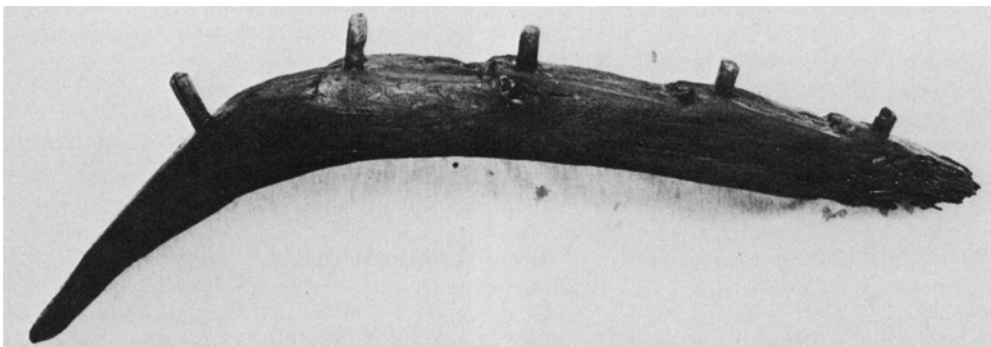


Fig. 5. Fragment of an oak rib from a brick-loaded Renaissance wreck located in the Ristinge causeway between Langeland and Ærø. The fragment is 120 cm long.

belong to the craft type. They are as follows: 1) a completely fragmented clinker built wreck loaded with large medieval bricks and pantiles which foundered in the Ristinge channel (fig. 5) – the old, now sand blocked channel between Langeland and Ærø (fig. 6), 2) a small clinker built oak vessel with a load of large medieval bricks, which foundered in the Praestegaard Bay, and 3 and 4) two partly preserved, clinker built wrecks loaded with large medieval bricks and pantiles respectively, which foundered off the site of embarkation at Lunde-borg. In the Lunke Bay at Taasinge there is furthermore a brick-loaded wreck we know very little about (V. Jensen 1982; 80), and on the dangerous stone reef off the island of Vresen is a second one. These are probably also foundered craft.

A large fragment of the forebody of a carvel built vessel loaded with large medieval bricks and with upto 40 cm wide oak planking has also been discovered at Drejet off Ærø. It is possibly the wreck of a boier. At any rate it shows that vessels with a larger cargo capacity than craft also took part in the brick traffic of the 16th and 17th centuries.<sup>1</sup>

The two wrecks at Lunde-borg, lying at a depth of 2.5 to 5 m. and approximately 100m from each other, are of special importance to the elucidation of the craft type. Both vessels seem to have foundered fully loaded, probably due to sudden shifts of wind that may easily have fatal consequences at an exposed anchorage. The craft must have arrived at the site of embarkation in ballast. Their discharged ballast stones still lie in piles on the sea-bottom close to the wrecks.

The wreck closest to the coast was heavily damaged by the passage of time. Currents, ice drift, and ship-

worm had long since removed all exposed parts, and only the sand-covered remains of the starboard side of the stern was left (fig. 7). At the sea-bottom, half buried by sand lay the remains of the ship's load: large quantities of large, red, medieval bricks, and a few pantile fragments.

By means of an injector-pump the sand was removed and the preserved portions of the wreck laid bare. It was



Fig. 6. Section of President of Charts Jens Sørensen's chart of the Western Baltic from 1692. The chart shows a.o. the depths of the navigable causeway between Langeland and Ærø. Furthest to the NE the island of Vresen is seen with the long stone reef to the south.

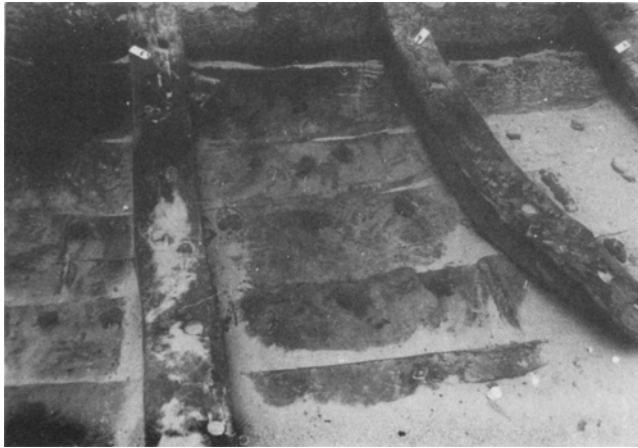


Fig. 7. Section of interior hull of brick-loaded wrecked craft at Lundeberg (Photo by P. Glud).



Fig. 9. The forebody of the craft with the repaired oak keel surrounded by pantiles from the load. On either side of the rabbets on the same level remains of the side-planking are just visible (Photo by P. Glud).

thus established that these were the remains of a clinker built oak vessel whose strakes were fastened to the ribs by means of heavy wooden nails. It must have been a rather spacious and beamy vessel. According to the strake and rib measurements the vessel must have had a length of 15–20 m and a beam of 4–6 m.

In spite of the poor condition of the wreck the exposure of the inside of the hull revealed cordage and movables, preserved because the wreck was covered by sand soon after the vessel foundered. Of importance to the dating were the sherds of several pipkins, a pitcher (?) a couple of bowls with handles, earthenware dishes with beautiful brown, green, and yellow lead glaze – all



Fig. 8. The stern of the best preserved Lundeberg wreck. The ruler shows where the sternpost has been fixed to the preserved keel. To starboard and port the collapsed side-planking is shown partly covered by pantiles (Photo by P. Glud).

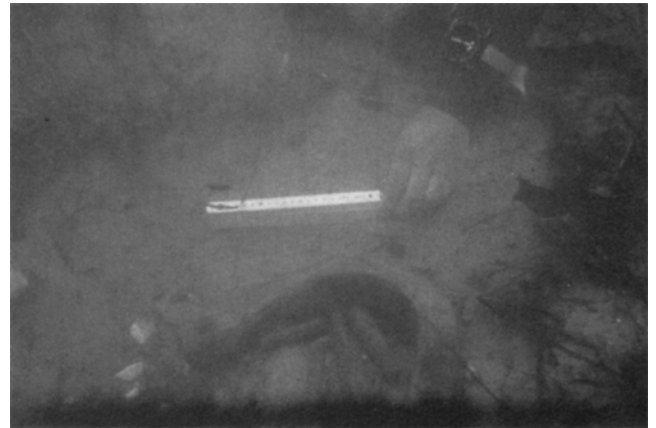


Fig. 10. U-shaped beech truss bow found along with tholepins from the boat.

of them Renaissance types, probably deriving from the 17th century. Signs of wear suggest that these are the crew's cooking utensils. The victuals to be prepared in these earthenware vessels are probably represented by a hog bone. A rather large collection of delicately woven scraps of textile, probably the remains of a piece of garment, two unfortunately quite brittle leather shoes, and scraps of knitted material (stockings?) suggest the haste with which the crew has had to leave the sinking vessel. Likewise the crew has probably been compelled to leave behind a delicately worked wooden marline spike.

The other Lundeberg craft had foundered in deeper sea and is considerably better preserved a.o. because

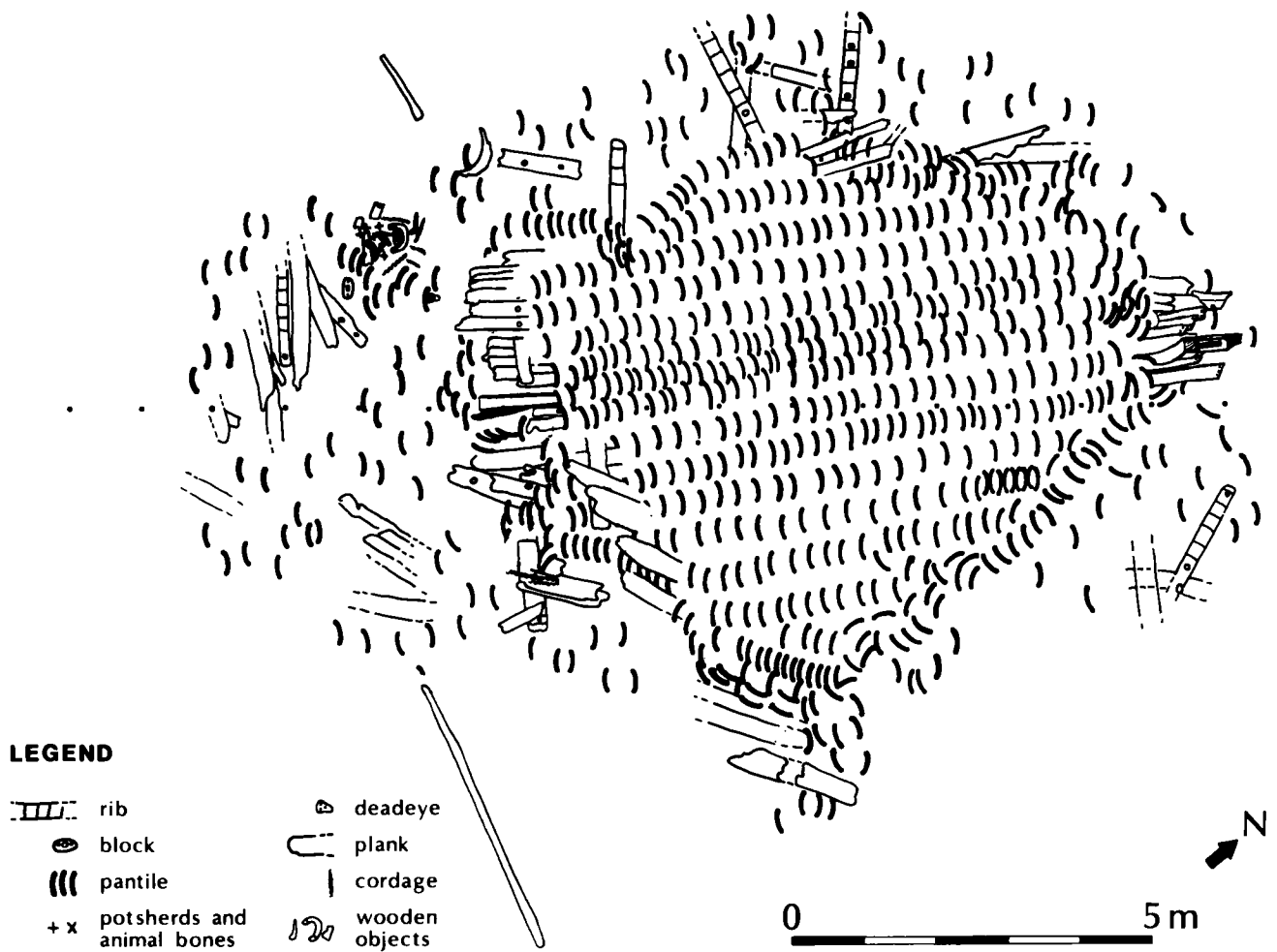


Fig. 11. Survey map of the pantile-loaded Lundeberg craft. Jørgen Skaarup del. 1:100.

the load consisting of pantiles and small amounts of flat tiles and bricks still covers large sections of the hull. On the other hand this has also considerably restricted the possibilities of investigation. For the removal of the load would invariably expose the wreck which would soon disintegrate unless it were raised and preserved, and this costly solution is unfortunately not realistic at the present.

The bow of the craft, which was turned towards SW when she foundered, is not covered by the heavy and compact load of tiles and bricks, and was thus somewhat damaged as were the upper parts of the hull that were free of the load and thus exposed to currents and seas. The stern has probably been pressed out already at the loss of the craft when the heavy load of tiles

roused into the stern of the craft. Apart from these defects the major part of the hull seems to be intact though almost completely leveled due to the weight of the load (fig. 11).

As was the case with the first mentioned Lundeberg craft the hull is made of rather thin oak planks held together by iron nails and fastened to the oak ribs with heavy wooden nails. In accordance with Scandinavian tradition it is clinker built, i.e. the planking overlaps like roof tiles. The Mediterranean fashion of laying on the planking with the edges together instead of overlapping thus forming a smooth side, the so-called caravel building named after the Portugese caravels, was however beginning to gain popularity in Scandinavia towards the end of the 15th century. But it seems not to

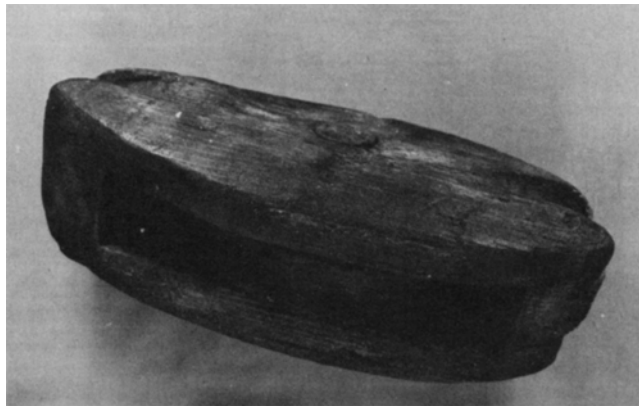


Fig. 12. Wooden block found in the forebody of the vessel.

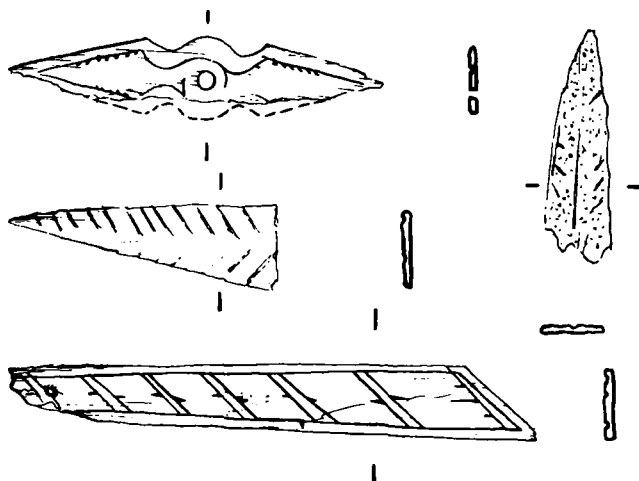
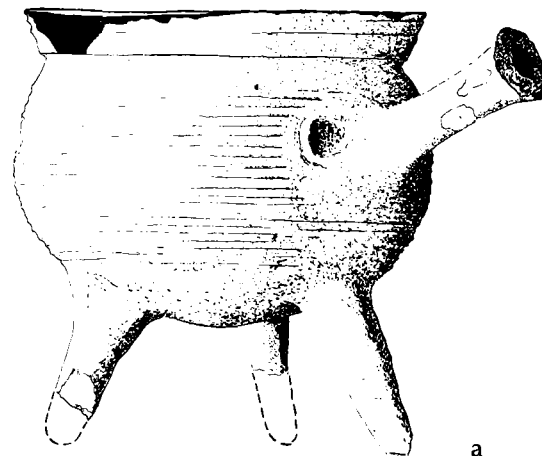


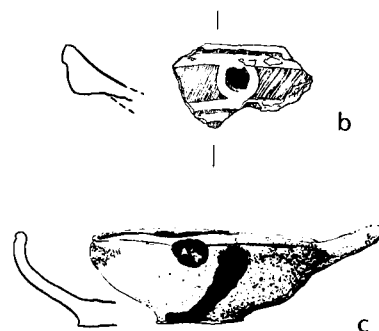
Fig. 13. Ornamental bone fittings found in the forebody of the best-preserved of the Lundeberg wrecks. The biggest one is 8.9 cm long.

have been used in small Scandinavian cargo vessels and fishing boats until fairly late. In both building methods the seams of the planking were caulked with tar-soaked hemp or wool. This was also the case with the Lundeberg wrecks.

After the partial exposure of the keel and floor timbers it was noted that the bows and stern of the craft were flared and had a slender underwater section, so they have probably been very seaworthy. The stern seems to have been straight, but with the sternpost missing, it is impossible to say whether the vessel has been sharp-sterned or has had a transom stern (Fig. 8). The heavily disrupted forebody yields no trace of the bow, but judging by contemporary illustrations the stem has probably been slightly raked. In the forebody the keel



a



b

c

Fig. 14. Pipkin (a), fragment of dish (b), and bowl with handle (c), all glazed on the inside. Found in the pantile-loaded wreck at Lundeberg. 1:3.

showed signs of heavy repairs that must have weakened the ship's hull considerably. The vessel seems to have run aground at an earlier date, which has necessitated major repairs including the replacement of the foremost 4 to 5 m of the keel. Today this section of the keel is missing (fig. 9).

There is nothing to suggest that the vessel has had a superstructure. The hull has probably been open like a boat, perhaps with the exception of a decked forecabin to give shelter to the crew and their personal belongings. Supplies and cooking utensils have probably also been kept here.

The heavy load has not rested directly on the planking of the vessel. Like most other cargo vessels the small craft has been equipped with a solid inner lining, in this





Fig. 15. Fragments of black earthenware pot found off the stern of the pantile-loaded wreck. Diameter 26 cm.

case made of one inch fir planking, to prevent the load from contacting and damaging the hull planking.

The preserved sections of the hull make it possible for us to safely determine the length of the craft to 16 m. The beam seems to have been between 4 and 5 m. Fully loaded the craft has had a draught of less than 1.5 m, which explains why this type of vessel was so widely used in the shallow waters of Northern Europe.

Little was left of the vessel's rigging, as could be expected. Traces of wear and preserved pieces of cordage seem to indicate that a U-shaped piece of delicately worked beech and with perforations at both ends must be a truss bow fastening the spar or yard or the upper edge of the sail to the mast (fig. 10). Among the finds deriving from the vessel's standing and running rigging should be mentioned a couple of beautifully preserved wooden blocks, cleats used for fastening the sheets, a wooden deadeye with traces of a surrounding iron ring, and large quantities of cordage including remnants of a three-stranded, short-spliced hemp rope. An approx. 4 m long but only 9 cm wide pole found outside the wreck seems too slender to have been a spar. It may possibly have been a sprit. Unfortunately none of the finds enable us to determine whether the craft was square-rigged or sprit-rigged. Next to the craft the remains of a small boat were found, probably used when loading and unloading.

The well-preserved load, mainly consisting of pan-

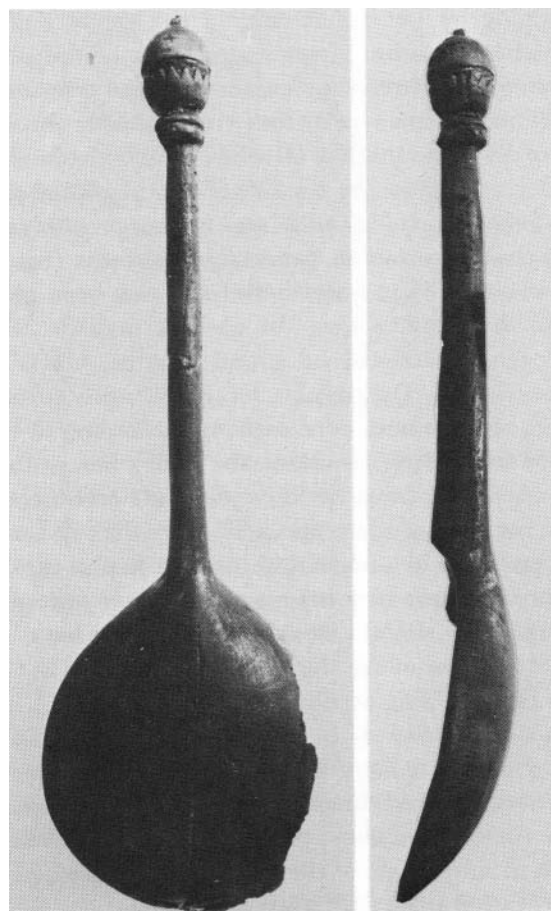


Fig. 16. Spoon made of spindletree wood, measuring 16.5 cm. The end of the handle is shaped like a stylized achorn. From the forebody of the pantile-loaded Lundeberg wreck.

tiles, has made it possible to estimate the cargo capacity of the craft. The tiles are still stacked in long, tightly packed rows along the vessel. The load seems originally to have consisted of 15 parallel rows composed of three or four layers on top of each other, covering a volume of approx.  $4 \times 8-9 \times 1$  m. With an average of 32 bricks per running metre the number of pantiles can be estimated at a minimum of 12,000. The weight of a pantile is on an average approx. 3 kg., so the entire load including bricks and flat tiles has been around 36 tons. So this vessel is among the larger ones, for the reference material mentions vessels carrying only one third of this weight. The 12,000 pantiles may very well derive from one single firing in one single kiln. Pantiles are brittle and cannot be stacked as tightly as bricks; and most of the large kilns of the period were able to bake 30,000 bricks at a time (H. Johansen and E. Møller 1974: sp 152).

Judging by the dimensions of the vessel and the limited information about cargo ships of the period found in the written sources, the crew has consisted of hardly more than two or three men besides the shipmaster. It seems that the crew has lived in the forebody of the vessel where the remains of clay pipes and shoes have been found along with bone fittings probably used as ornaments on knife handles and sheaths (fig. 13). The vessel's oaken water-barrel has also been placed before the mast as were the cooking utensils, which once again consisted of glazed pipkins, bowls and dishes (fig. 14). The supplies for this abruptly curtailed voyage seem to have been copious. According to Ulrik Møhl's bone determinations the galley has probably contained beef, lamb, suckling pig, and horse meat.

On the basis of the separate findings the two Lundeberg craft can be assigned to the first half of the 17th century. As such they belong to the latter part of the history of the site of embarkation and may have been owned by some of the shipmasters mentioned in Christian IV's building accounts. The deliveries to Ulriksholm during 1644–47 have probably been one of the Lundeberg tile makers' last contracts. A few years later the Swedes sacked the country and destroyed a.o. the active tilework industry at Lundeberg. The devastation seems to have been so thorough that production was never started again (J.P. Trap 1957; 857).

The coastal trade clearly felt the slump. The partial disappearance of the tile loads hit only one aspect of the activities of the cargo vessels, though. The farmers and fishermen of Southern Funen and surrounding islands traditionally carried out an extensive coastal trade, sailing food stuff to the towns in Northern Germany and Schleswig-Holstein and bringing back steel, salt, and hops, etc. The idea was that the owner of the craft might sell his own products and bring back goods for his own usage. These privileges were (naturally) often misused and as such an insult and injury to the area's chartered towns, who with franchise in hand sought by all means to halt the trade – never to succeed (H. Berg, L. Bender Jørgensen & O. Mortensøn 1981: 173f.). In spite of war and crisis the coastal trade seems to have survived and has formed the background for the expansion of the sea trade in the South Funen area during the next centuries.

*Translated by Ul S. Jørgensen*

## NOTE

1. The wrecks have been entered in the records of Langelands Museum under the following numbers: LMR 11316, LMR 9712, LMR 10125, LMR 11199, LMR 11241, and LMR 8334.

## REFERENCES

- BERG, H, BENDER JØRGENSEN, L. & MORTENSØN O. 1981: *Sandhagen. Et langelandsk fiskerleje fra renaissanceen*. Medd. fra Langelands Museum, Rudkøbing.
- HANSEN, B.A. & SØRENSEN, M. AA. 1980: Bistrup Teglværk. *Hikuin* 6. Aarhus.
- JENSEN, J. 1977: Organisering og finansiering af byggeriet på Ulriksholm i 1630'erne og 1640'erne. *Odense University Studies in History and Social Sciences*. Vol. 50. Odense.
- JENSEN, V. 1982: *Tåsinge rundt – en lokalhistorisk sejltur*. Svendborg.
- JOHANSEN, H & MØLLER, E. 1974: Tegl. In: *Kulturhistorisk leksikon for nordisk middelalder*. Bd. XVIII. Copenhagen.
- KOCH, J. 1973: Bagte sten. *SKALK* no. 1, 1973. Højbjerg.
- LORENZEN, VILH. 1965: Ulriksholm. In: *Danske slotte og herregårde* (AA. ROUSSEL, ed.) 2. ed. Bd. 7. Copenhagen.
- LÜTKEN, VILH. 1909: *Bidrag til Langelands Historie*. Rudkøbing.
- MØLLER, E. 1964: *Tegl* 8. Teglintustriens tekniske tjeneste. Copenhagen.
- SKAARUP, J. 1980: Et 1600-tals skibsvrag ved Lundeberg. *Fynske Minder* 1979–80. Odense.
- STEENSBERG, A. 1962: Husbygge. In: *Kulturhistorisk leksikon for nordisk middelalder*. Bd. VII. Copenhagen.
- TRAP, J.P. 1957: *Danmark*. 5. ed. Bd. 5,2. *Svendborg amt*. Copenhagen.