The archaeological discoveries in the deep sea in the international waters off Skerki Bank document a new ancient trade route over the open seas between ancient Carthage and Rome (fig. 1). At a depth of about 800 m, eight individual shipwreck sites, ranging in date from the first century BC to the nineteenth century AD were discovered in 1989 and 1997. They were studied and mapped with selected material recovered from all but the modern wrecks. Five of the wrecks are Roman, the earliest, Skerki Wreck D, dating in the first half of the first century BC and the latest, named by this author, the ISIS, dating in the last quarter of the fourth century AD. The other three merchantmen all date in the earlier imperial period. The largest and heaviest laden of these, designated Skerki Wreck F (fig. 2), is selected for discussion here with focus upon the amphora finds which suggest a date for the wreck around the mid-first century AD.

Summary of catalogued finds from Skerki Wreck F:

<table>
<thead>
<tr>
<th>Number</th>
<th>Type</th>
<th>Fabric</th>
<th>Origin</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK97.081</td>
<td>Amphora, Dressel 2 (wine)</td>
<td>Ceramic</td>
<td>Tarragonensis</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.082</td>
<td>Amphora, Dressel 7-11 (garum)</td>
<td>Ceramic</td>
<td>Baetica</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.083-087</td>
<td>Lid/plate</td>
<td>Ceramic</td>
<td>CI AD</td>
<td>30-100 AD</td>
</tr>
<tr>
<td>SK97.088</td>
<td>Amphora (wine)</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.089</td>
<td>Jug</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.089A</td>
<td>Nail, with wood</td>
<td>Bronze, wood</td>
<td>North Africa?</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.090</td>
<td>Nail</td>
<td>Bronze</td>
<td>North Africa?</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.091</td>
<td>Nail, in wood</td>
<td>Bronze</td>
<td>North Africa?</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.097</td>
<td>Amphora, flat base (lomentum?)</td>
<td>Ceramic</td>
<td>North Africa?</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.098</td>
<td>Pan, round bottomed</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.099</td>
<td>Lid/plate</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.100</td>
<td>Pan, round bottomed</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.101</td>
<td>Casserole Hayes Form 194</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.102</td>
<td>Pan, flat bottomed</td>
<td>Ceramic</td>
<td>Pompeii?</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.103</td>
<td>Amphora, flat base (lomentum?)</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.104</td>
<td>Amphora, flat base (lomentum?)</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.105</td>
<td>Basin</td>
<td>Ceramic</td>
<td>North Africa?</td>
<td>50-75 AD</td>
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<tr>
<td>SK97.107</td>
<td>Lid</td>
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<td>North Africa?</td>
<td>50-75 AD</td>
</tr>
<tr>
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<td>Lid</td>
<td>Ceramic</td>
<td>North Africa?</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.110</td>
<td>Casserole Hayes Form 194</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
<tr>
<td>SK97.111</td>
<td>Lid</td>
<td>Ceramic</td>
<td>North Africa</td>
<td>50-75 AD</td>
</tr>
</tbody>
</table>

2 Ballard/McCann et al. 2000.
4 McCann/Freed 1994, 3–38.
5 Ballard/McCann et al. 2000, 1612–1614, with John P. Oleson. — In the study of the amphoras I am particularly grateful to Elizabeth Lyding Will, Joann Freed, Archer Martin and Clementina Panella for their generous help. I am also grateful to David F. Williams for his petrological analyses of the material as well as many helpful suggestions.
The wreck site measures 20 m overall, suggesting that Skerki F was a medium-sized freighter measuring about 19–20 m in length with a beam of 7–8 m. The sailing vessel was loaded with a remarkably varied cargo: high quality building stone roughed out for columns and blocks, wine, oil and fish sauce amphoras in addition to numerous sets of virtually every shape of cooking and coarse ware needed.

for a fully-equipped Roman kitchen. An iron anchor probably indicates the bow. An isolated amphora and several cooking ware vessels lie near it. The cargo of stone which was carefully packed in at least two layers is visible 6 m to the SE: six large, irregular polygons and two roughed-out, monolithic column blanks c.2.6 m long. For loading purposes, the irregular shapes were carefully arranged to form an efficient rectangular mass c.2.6 m side to side and c.3.3 m fore and aft. Three other tumbled blocks appear in the mud to the NW. Samples could not be taken of the blocks with the equipment available, but the slightly rounded polygonal shapes and dull color look more like quarry-fractioned granite than roughly trimmed marble. The stone probably was loaded before the rest of the cargo. If they are granite, the blocks most likely came from the quarries in Aswan, shipped down the Nile to Alexandria on barges to be loaded on seagoing ships there. A deep-bellied cargo ship such as one pictured on a sarcophagus from the second half of the first century AD in the National Museum, Beirut, Skerki Wreck F probably had a weight aboard of at least 250 tons and may well have carried both cargo and passengers (fig. 3).

An empty space now seems to separate the stone from the cargo of pottery to the SE. Two bilge pump discharge pipes can be seen in this area, oriented perpendicular to the restored line of the keel. Organic cargo may have been stored in this section of the hold such as grain or lentils in sacks.

The shipment of Roman kitchen ware was stowed 8 m to the SE, on line with the anchor and stone blocks: basins, saucepans, casseroloes, frying pans, bowls, lid-plates, jars, jugs and pitchers. Many of the vessels were still stacked as they were shipped, lids and lid-plates nestled one into another, and casseroloes nestled one on top of another, according to size.4 No remains of packing materials were observed, but the mud between the packed vessels had a more yellow-brown color than the usual gray clay of the sea floor. Samples were taken of the mud around the pottery, and microscopic examination may reveal remains of packing material, or crates or baskets into which the pottery may have been stacked. While a few amphoras lay around and on top of the stacked kitchen ware shipment, this portion of the cargo is very well defined and probably was packed separately as a unit.

From Skerki F, 26 artifacts were recovered: seven amphoras, eight lids/plates, six casseroloes, two jugs, one large washing basin, and three nails. The amphoras are of five different types. The petrological analyses of their fabrics by David F. Williams indicates that they come from North Africa, Spain, Sicily and Pompeii. Of particular interest are three amphoras of the same form (SK97.097, SK97.103, SK97.104), but in graduated sizes, suggesting that their contents were for a diverse and varied market (figs. 4–7). This flat-bottomed shape is known to me only from an example in Pompeii9, and one in Padua10. A dipinto on the vessel from Pompeii identifies the contents as lomentum. Lomentum is described by Pliny the Elder11 as both a blue pigment and a powder made from bean meal used as a cosmetic, detergent and medicine. The fabric, however, of SK97.103, which is very similar to both SK97.097 and SK97.104, Williams indicates is not Campanian but suggests an origin in North Africa. On the basis of the Pompeiian example, however, it seems reasonable to date the Skerki flat bottomed jars in the third quarter of the first century AD, before the destruction of Pompeii in AD 79. They appear to be the first evidence for the export of this product.

Also represented on Skerki Wreck F is a flat-bottomed wine jar from Sicily (SK97.088), a very popular type from the first through the fourth centuries AD (fig. 8).12 Originating in Naxos, Sicily, typical features are the narrow neck with round handles with a deep central groove, ovoid body with a high shoulder and a flat ring base. This form is also found at Pompeii and Ostia, dated by Clementina Panella between 30 and 100 AD.13

Two other amphoras from Skerki F come from Spain: SK97.081 and SK97.082. Williams identifies the fabric of

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5 Plin. nat. 18.117; 33.89; 33.162.
SK97.081, a Dressel Form 2 wine jar, with Tarraconensis (fig. 9). This general class of amphoras, frequently referred to as Dressel 2–4, includes many variants of form and fabric and is based on the famous Greek Koan wine amphoras with double rolled handles made on the island of Kos. The Italian pseudo-Koan amphoras are amongst the most common wine amphoras in use during the period from the latter

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Fig. 4: Flat-bottomed amphoras from Skerki Wreck F: SK97.104, SK97.097, SK97.103. Institute for Exploration, Mystic, Conn. (Photo M. Hamilton).

Fig. 5: Flat-bottomed amphora from Skerki Wreck F, SK97.097. MPH: 0.32. Scale: 1:5. (C. Alexander).

Fig. 6: Flat-bottomed amphora from Skerki Wreck F, SK97.104. MPH: 0.47. Scale 1:5. (C. Alexander).

Fig. 7: Flat-bottomed amphora from Skerki Wreck F, SK97.103. MPH: 0.49. Scale: 1:5. (C. Alexander).

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AN EARLY IMPERIAL SHIPWRECK IN THE DEEP SEA OFF SKERKI BANK

Fig. 8: Wine amphora from Sicily, Skerki Wreck F, SK97.088. MPH: 0.587. Institute for Exploration, Mystic, Conn. (Photo M. Hamilton).

Fig. 9: Wine amphora from Tarragonensis, Skerki Wreck F, SK97.081. MPH: 0.98. Institute for Exploration, Mystic, Conn. (Photo M. Hamilton).

Fig. 10: Amphora for fish products from Baetica, Skerki Wreck F, SK97.082. MPH: 0.81. Institute for Exploration, Mystic, Conn. (Photo M. Hamilton).

Fig. 11: Neo-Punic amphora from Tunisia, Skerki Wreck F, SK97.087. MPH: 0.55. Institute for Exploration, Mystic, Conn. (Photo M. Hamilton).
part of the first century BC and the first century AD.\textsuperscript{16} They were produced in great numbers at many places both in the eastern and western Mediterranean.\textsuperscript{17} More than 350 Dressel 2–4 amphoras from Spain and Italy have recently been documented by Joann Freed from the excavations at Carthage.\textsuperscript{18} That they made their way as far east as India has been shown by Elizabeth Lyding Will in her recent studies of the amphoras from Arikamedu.\textsuperscript{19}

The Skerki Wreck F amphora, SK97.081, with its long, tapering body with a height of 98 cm and diameter of 29 cm corresponds closely to the Dressel 2 amphoras from Tarraco in the Second Amphora Wall at Carthage documented by Freed and dated c. AD 50.\textsuperscript{20} From among the many Spanish shipwrecks found carrying Tarraconensian amphoras, a close parallel in size and fabric to the Skerki amphora are those from the wreck of the Petit-Congloué also dated around the mid first century AD.\textsuperscript{21} The Dressel 2–4 amphoras from this wreck vary in height from 97.5 to 105.5 cm with diameters between 29 and 30.5 cm,\textsuperscript{22} measurements that closely correspond to those of SK97.081. The Dressel 2 form differs from the earlier Dressel 3 type which is both shorter and more ovoid in shape.\textsuperscript{23} Dressel 3 is mainly known in Campania but was also produced in northeastern Spain.\textsuperscript{24}

The petrological analysis of the second amphora from Spain, SK97.082 (fig. 10), suggests an origin along the coastal area of Baetica. This jar belongs to a widespread class of amphoras, Dressel Forms 7–11, commonly associated with garum or other fish products. This general type of vessel is commonly found on many Roman sites, especially military ones.\textsuperscript{25} The main floruit for the export of this class of amphora is from the late first century BC to the first century AD.\textsuperscript{16} The Skerki example appears closest to forms dating around the mid first century. For example, compare the jar from the Dramont D wreck grouped with Dressel 9 amphoras in M. Sciallano and P. Sibella.\textsuperscript{26} The Skerki jar with its heavy, projecting collar rim with concave sides and ovoid body appears closest in shape to this Dressel 9 group.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{Fig_12.png}
\caption{Casserole, African Red Slip Ware, Hayes Form 194. Skerki Wreck F, SK97.110; lid, SK97.109. Institute for Exploration, Mystic, Conn. (Photo M. Hamilton).}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{Fig_13.png}
\caption{Casserole, African Red Slip Ware, Hayes Form 194. Skerki Wreck F, SK97.110. Scale: 1:3. (C. Alexander).}
\end{figure}

\textsuperscript{16} Freed 2000, 459–466.
\textsuperscript{18} Freed 2000, 461 fig. 5.2 with wider button end.
\textsuperscript{19} Corsi-Sciallano/Liou 1985, 26–43 figs. 17–19. - Parker 1992, 309, also dates the wreck 40–60 AD(?).
\textsuperscript{20} Corsi-Sciallano/Liou 1985, 31; 43.
\textsuperscript{21} Freed 2000, 461 fig. 2.1. For contrast between earlier and later forms see illustration in Corsi Sciallano/Liou 1985, 169 fig. 126.
Finally, a small neo-Punic amphora was recovered, SK97.087 (fig. 11). These thin walled amorphas with wide mouths are not found in large quantities on ancient shipwrecks, indicating that they were probably taken on board as ship's supplies rather than cargo. Their contents are uncertain but olives have been found in a neo-Punic jar from the Dramont A wreck and oil, garum and grain have also been suggested. Petrological analysis of SK97.087 indicates a Tunisian origin. The cylindrical body with two small ring handles on the upper shoulder and wide flaring mouth with overhanging rim is very similar to van der Werff Form 2. He dates Form 2 from the second half of the second century BC until the end of the first century AD. A close comparison in form may be found with the neo-Punic amphora on the Chrétienn Ha wreck dated in the first quarter of the first century AD. In conclusion, the seven amorphas recovered from Skerki Wreck F can all be dated in the second or third quarter of the first century AD. Thus, on the basis of the evidence of the amorphas, it is reasonable to date Wreck F around the middle of the first century AD.

Further support for a mid first century date for Skerki Wreck F are some of the kitchen ware now being studied by John P. Oleson. Several of the casserole shapes (SK97.101, SK97.110) with their brick red fabric are a standard form of African Red Slip Ware and can be identified with Hayes Form 194 found at Carthage and dated in the second half of the first century AD (figs. 12–13).

Where was Skerki F loaded and where was its destination? Given the exigencies of weight and balance, it is likely that the stone was loaded first, probably at Alexandria. The ship may then have picked up the large shipment of kitchen ware and amorphas in Carthage or another coastal city along the North African coast, to head on to Sicily and southern Italy. Of course, amphoras from Spain, Sicily and Pompeii could have been loaded at any of the large entrepots like Carthage, Tarraconensis or Puteoli. The visible cargo reinforces the picture of lively trade between the eastern and western Mediterranean in the early Empire and the use of direct trading routes over the open seas.

It is clear from the archaeological material documented so far that the Skerki Bank route across the open ocean, despite its dangers, was active throughout Rome’s long maritime history. Since each shipwreck is a precious ‘capsule in time’, study of the material from the five Roman merchantmen who met their fate off Skerki Bank is providing new information about ancient trade routes, ceramic forms and their chronology, the loading of ships and their cargoes, as well as the ships themselves.

We now have the technology to search the depths for new knowledge about our maritime past. Continued successful collaborative efforts between engineers who can provide the technology and archaeologists who can identify and interpret the discoveries, as exemplified by the pioneering Skerki Bank Projects, is essential for the future of deep water archaeology. And amorphas are the key — as this short study illustrates — for dating and interpreting these ancient wrecks from the depths of the Mediterranean and their still undiscovered trading routes.

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