

FISH IN TUDOR NAVAL DIET - WITH REFERENCE TO THE *MARY ROSE*

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**ABSTRACT:** Fish remains retrieved in the orlop deck and the hold of the tudor man-of-war *Mary Rose*, which sank in 1545 outside Portsmouth, are evaluated with the help of documentary records concerning victualling of the english fleet during that historical period. Though the bones testify to the almost exclusive presence of processed cod, the biased skeletal spectra and other features of the samples prevent a detailed evaluation of specimens present as well as an estimation of their sizes.

**KEYWORDS:** FISH, COD, *Gadus morhua*, DIET, PROCESSING, TUDOR PERIOD, ENGLAND, HISTORICAL RECORDS

**RESUMEN:** Los restos de peces recuperados en las bodegas del buque de guerra inglés *Mary Rose*, hundido en 1545 en el puerto de Portsmouth, son evaluados a la luz de la documentación histórica de que se dispone sobre el avituallamiento y las ordenanzas de armada inglesa de ese periodo. Si bien los restos coinciden en señalar una dominancia de bacalao procesado con vistas a un consumo a medio o largo plazo, las características de la muestra ósea impiden una evaluación efectiva de número de ejemplares y de sus tamaños.

**PALABRAS CLAVE:** PESCADO, BACALAO, *Gadus morhua*, DIETA, PROCESADO, PERIODO TUDOR, INGLATERRA, REGISTRO HISTORICO

During the reign of Henry VIII (1509-1547 AD) the English naval fleet expanded from a mere 5 ships to over 80. In July 1545 this large and effective navy was defending the south coast against an invading French fleet (Davies, 1963). It was at this time that King Henry's previously successful warship the *Mary Rose* accidentally sank with almost all hands just outside Portsmouth harbour. The ship was carrying about 700 men and included some 300 armed infantrymen above the normal complement. Of these soldiers and sailors only 30 survived and 200 skeletons were recovered from the wreck during its excavation in the early 1980's.

The wreck lay on its side half buried in the silt until this surviving section was excavated. It was subsequently raised from the sea bed in October 1982. Although a great deal of work remains to be done, large amounts of finds have been recovered and studied including many animal bones. Over 30,000 of them were fish bones. Most of these were recovered from the stern of the vessel in an area of the orlop deck and the hold. These bones were in disarray, having been scattered with other items when the ship settled on the bottom, but remained within this storage area, some still in articulation. They had to be extracted from a matrix of fine, partially hardened, silt. As the exposed part of the wreck rotted away, that part buried in the silt was sealed by a layer of shelly clay. Beneath this were stratified deposits including the primary layers from which the bones in this study were recovered (Rule, 1983). We can be reasonably certain that all of the bones considered here were part of stores on the ship when she went down, rather than fish that had died and been incorporated in the deposits. This is confirmed on examination of the bones themselves.

Many thousands of these fragments were fin rays unidentified to species. Almost all of the other bones were identified to cod, *Gadus morhua*, and if it is accepted that the fin rays etc. were also of cod then this species constituted over 90% of the remains (Table 1). No cod jaws or cranial bones were recovered. There were, however, many cleithra (a large bone at the back of the head, behind the gills). Several of these were chopped, the cranial portion missing. The atlas (first precaudal vertebra) was absent along with most of the first 5 vertebrae. Some of the remaining precaudal vertebrae were chopped medio-laterally, so it seems the fish had been prepared by at least beheading (Table 2).

SPECIES	U4	M5	O8	O9	O10	O11	H3	H4	H5	H8	H9	H11	U/S	TOTAL
<i>Conger conger</i> , congrio	-	-	84	-	1	71	-	-	-	13	-	-	1	170
<i>Gadus morhua</i> , cod	4	1	47	1	22	729	-	162	21	25	4	2310	478	3804
GADIDAE	-	-	3	-	16	70	-	39	-	-	-	20	34	182
Unidentified	-	-	427	-	187	7186	20	2129	15	151	-	16014	458	26587
Other species	-	-	8	-	1	19	-	-	-	-	-	5	4	37
TOTAL	4	1	569	1	227	8075	20	2330	36	189	4	18349	975	30780

TABLE 1. *Mary Rose* fish bone: distribution of species. Key: U = upper deck; M = main; O = orlop; H = hold; numbered from stem to stern.

ANATOMY	Conger	Cod	Gadidae	Others	Unidentified	TOTAL
cranium/fragment	16	-	15	3	9	43
facial/opercular	68	-	3	1	1	73
dentary/premaxilla	9	-	-	-	-	9
pectoral (not fin)	2	616	91	-	72	781
precaudal vertebrae 1-5	14	-	1	2	-	17
other precaudal vertebrae	30	288	3	4	-	325
caudal vertebrae	15	2784	36	25	129	2989
vertebral fragments	16	114	33	-	400	563
other including fin rays	-	2	-	2	25976	25980
TOTAL	170	3804	182	37	26587	30780

TABLE 2. *Mary Rose* fish bone: distribution of anatomical elements.

Information about revictualling (i.e. resupplying) ships from various documentary sources had suggested the use of dried or salted cod but had not revealed whether they were with bone or filleted. This is not helped by the lack of precise information on the use of fish names, both of the species and of the end product. The term 'stockfish' in documents seems to mean dried cod but sometimes also salted cod and is possibly used as a generic term for fish prepared 'in the round', sometimes cleaned and beheaded but not completely de-boned or filleted which would normally have been the case for 'salt fish' (Cutting, 1955). 'Ling' is another confusing term which sometimes seems to mean dried cod rather than ling, *Molva molva*, while 'greenfish' was probably wet-salted cod ('green' often implies fresh, wet or unseasoned in English e.g. unsmoked bacon). 'haberdine' was probably salt dried fish, a corruption of Dutch and French words - not surprising as the records were often written by French speakers. In Southampton, for example, several merchants were Channel Islanders (Studer, 1913). We must look to Scandinavia for modern examples of this type of fish as it is almost unobtainable in England today.

The amount of fish originally on the ship is almost impossible to estimate, not least because there are still a number of silt samples awaiting processing. Large quantities of infill were sampled in order to understand the stratigraphy and processes of deposition. One big question is the amount of preparation of the fish before loading. Already we have seen that the cod were all beheaded. It is possible that different types and sources of prepared fish might differ in the methods used. Some may have had all or most of the bones removed, leaving little or no evidence. The estimation of the minimum number of cod individuals (MNI) based on cleithra is just over 100. The numbers of caudal vertebrae in cod are about 30, approximately twice the number of precaudal vertebrae. Only 288 cod precaudal vertebrae have been recovered so far as against 2,784 caudal. This would give MNI estimates of 19 and 93 respectively. If boned fillets were also present any calculation of MNI could be a considerable underestimate. Modern smoked 'Finnan' haddock and salt dried cod in Britain often contain all or part of the cleithrum similar to the findings of cod here. The vertebrae, however, are usually removed except for a short section at the tail end.

Although cod can be caught in considerable quantities locally in the Solent the fish may have been caught or traded from many sources to cope with the provisioning of such a large force. An Act of Parliament in 1542 gave free entry for fish imported from Ireland, Scotland, Orkney, the Shetlands, Iceland and Newfoundland (Cutting, 1955). The Port books and Brokerage accounts for Southampton, almost unique records of trade for this period, show that there was already a considerable trade in fish, both fresh and preserved, of all kinds in the preceding century. Records of cod and other Gadidae are common (eg. Studer, 1913; Cobb, 1961; Stevens & Olding, 1985; Coy unpublished).

State letters and papers relating to the war with France 1512-13 include lists of 'revytaylyng' for the *Regent*. This was to be for 700 men for 3 months and includes '1110 and 510 score (20) fissue', at 2 different prices in addition to '500 dryelinges, 300 coddess and 1,000 mud-fysse' (possibly small wet salted fish?). The list for another ship not only quotes large numbers of fish, some 'drye fissue', some 'stokefissue', but also 'Stepping fattys for the shippe : 2 greate fattys to water fissue in : 2s.8d.' i.e. vats to reconstitute (steep) dried and/or salted fish (Spent, 1897). One documentary source in the British Museum for 1522 quotes a requirement of 18,000 salt fish per 3,000 men for eight weeks, being one piece a day to every 4 men on the 3 fish days in the week. What size the piece was to be is not recorded (Anon. 2.).

The observance of 'Fish days' (and Lent) is not unexpected despite the Reformation of the church - old habits have been slow to change even in the recent past, but the real reason for adherence to the laws of observance was probably economic; keeping a large number of people employed, ships built and relieving the pressure on the meat supply.

The household account books of Sir William Petre, Secretary of State, record stores for Lent in 1549 of 'haberdine 75 couple, ling 46 couple, red herring two cades (2 x 600 salted and smoked), white herring (pickled) a barrel, salted eels a barrel, salmon half a barrel and six salted congers' (Cutting, 1955). Presumably salt cod kept better than herrings :

*'Spend herring first, save salt fish last:  
for salt fish is good when Lent is past.'*

says Thomas Tusser (1524-1580) (Cutting, 1955) and it is interesting that herring and eel bones were almost entirely absent from the wreck despite being extremely common from archaeological sites on land.

In a record for 1565 the naval victualler was contracted to supply each sailor with, amongst other things, 3/4lb (400g) stockfish per week (Davies, 1970). Samuel Pepys (of the diaries) includes in the record of a victualling contract of 1677 1/8 of a full sized 24" (60 cm) north sea cod for each man on Wednesday, Friday and Saturday and gives various alternatives including 1/4 haberdine of 16" (40 cm) (Tanner, 1920). There is an almost identical naval rations allowance of 1/8 of a 24" cod mentioned in the House of Commons journal for 1698 (Maybray King, 1968). To date I have insufficient evidence to tell whether this 24" size is with or without the head although later sources imply that the measurement is of a beheaded fish. As no atlas vertebrae were found it has not been possible to use Enghoff's regression curve on these bones in order to estimate the size of the fish (Bødker-Enghoff, 1983), nor were there any dentaries or premaxillae for the methods of Wheeler & Jones (1976). Comparison of the cod bones from the *Mary Rose* with fish in the collections of the Faunal Remains Unit, University of Southampton, imply a total length of 60-100 cm for the fresh fish, mostly around 80-90 cm. After beheading these would be around 24", depending on the butchery technique, and fit quite well with the later regulations of 24" cod. These estimates although tantalisingly similar must remain tentative as much work is still required, both in documentary research and in experimentation on modern fish. It would be most interesting to learn of any groups of cod head bones of this date for comparison.

Other fish were present in only very small quantities; conger, *Conger conger*; haddock, *Melanogrammus aeglefinus*; hake, *Merluccius merluccius*; and pollack, *Pollachius pollachius*. The 3 Gadidae were represented by single tail portions and may have been included only to make up the numbers in the consignment. The conger bones were mostly recovered from a different location on the orlop deck and may have been associated with a staved container. These fish had been butchered in a different way. They included the head and had been cut down the length of the fish, either side of the vertebral column and through the processes, presumably for the production of long flat fillets for speedier preservation; perhaps as a speciality for the captain's table? As many of the vertebral processes were found in the same group the bones probably represent the actual product rather than waste material.

As to the rest of the diet on board ship, many other animal bones were found on the *Mary Rose* including quantities of butchered pig and cattle. Again this fits well with available records of

salt beef and salt pork or bacon accompanied by beer, bread or wheaten biscuit, peas, oatmeal, butter, cheese and mustard. These last four are often listed for the 'fish days' (eg. Anon. 1.). In addition the sailors would have been able to supplement their diet with fresh fish, hand-line frames were among the finds from the ship (Steane & Foreman, 1988).

In conclusion the evidence seems to indicate the organised provision of specific types and amounts of fish as part of the regular diet on board naval ships. This precedes any records found so far of regulations to this effect. Victualling does not seem to have come under official control until 1550 (Davies, 1965). This unique find with its secure, single moment, provenance has been of great interest to historians and archaeologists alike but as usual many questions as well as answers have been raised along with the ship.

### ACKNOWLEDGEMENTS

I would like to thank Margaret Rule and the trustees of The *Mary Rose* Trust, Portsmouth for the use of the material and permission to publish these preliminary results.

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