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SOUTHGATE, HARTLEPOOL. THE FISH BONES.

During the excavation of a medieval 12th Century dock at Southgate a large quantity of soil was sieved resulting in the recovery of a considerable amount of fish bone, including loose teeth and tiny dermal denticles. Significantly the only context that was not sieved (597) only produced 1 fish bone.

The table indicates the bones identified from Site A, phase 1, in which contexts 626, 624, 609/651, and 605/560 (associated with the walls of the dock) contributed most of the bone. Also the fish bone identified from site B, which although less plentiful than that from site A seems to reflect the same distribution of species with the most poorly represented species of Site A absent from B.

The contexts were grouped to keep the table to a manageable size, a detailed breakdown of each context is available from the author. The bones have been grouped into the following categories; skull fragments, dentaries, premaxillae (these are the most frequently measured bones), teeth, otoliths, vertebrae and dermal denticles. In addition the bone identified to species broader groupings have been made such as elasmobranch to include cartilaginous fish whose dermal denticles and vertebrae are not specifically identifiable. In the gadoid group large gadoid bones are most likely to belong to cod or possibly saithe (this especially applies to the vertebrae) and the small gadoid are closest to whiting. Excluded from the table is a large amount of unidentifiable material (only unidentifiable vertebrae and teeth were counted) which has not been quantified, however it is unlikely that any additional species would be found in this material, it appears to be mainly very fragmented remains of fish already itemised in the table.

The following species were identified spurdog (Squalus acanthias), roker (Raja clavata), rays (Rajidae), eel (Anguilla anguilla), herring (Clupea harengus), cod (Gadus morhua), haddock (Melanogrammus aeglefinus), whiting (Merlangius merlangus), saithe (Pollachius virens), ling (Molva molva), grey gurnard (Eutrigla gurnardus), scad (Trachurus trachurus), black sea-bream (Spondyliosoma cantharus), ballan wrasse (Labrus bergylta), mackerel (Scomber scombrus), plaice (Pleuronectes platessa), and flounder (Platichthys flesus).

The size of the fish was estimated by comparing measurements taken on the archaeological specimens against those of modern fish of known length. The measurements have been incorporated into the updated version of the computerised osteometric recording system of Jones et al 1980, and are based on the

measurements taken by Morales and Rosenlund 1979, and Wheeler and Jones 1976 with some additions. The measurements used are as follows;

Premaxilla; 2. Greatest height. Morales and Rosenlund.
4. Greatest length of the ascending process and articular process.
5. Length across base of the ascending process and articular process. Wheeler and Jones.

Dentary; 3. Inside length from most oval part to median incision. Morales and Rosenlund.
4. Anterior height. Morales and Rosenlund.
5. Depth across the proximal edge of the foramen. Wheeler and Jones.

Articular; 3. Greatest medio-lateral breadth of the articular surface. Morales and Rosenlund.

These measurements were chosen for comparison as they were the most frequently available. Three reference specimens (from the British Museum Natural History) were similarly measured for each of the major species and these measurements plotted against their total length. Although the correlations did not always produce a straight line average size ranges for each species have been calculated. The following discussion takes into account the biology (for more information see Wheeler 1978) of the fish in conjunction with their suggested sizes in postulating the type of fishing industry that would have been based at Hartlepool in the 12th century.

The main fishing industry seems to be centred on spurdog, roker (and other elasmobranchs) herring, cod, haddock, whiting, saithe and ling.

The first group spurdog and roker are both found in shallow water, on soft bottoms from 10 - 200 metres and on muddy, sandy or gravelly bottoms up to 280 metres respectively. These were probably taken on lines, although roker can be taken in shore seines (Wheeler 1977, 405). Other elasmobranchs not specifically identifiable would have been caught in a similar manner.

Herring bones were present in substantial numbers (see table), herring form large shoals, and would have been caught in fine nets seasonally.

Cod are found from the shoreline to the continental shelf, the younger fish tend to move into shallower water during the winter. The number of measured dentaries and premaxillaries were too few to suggest size groupings as shown for cod at Kings Lynn (Wheeler 1977, 407), although the comparative ranges are broadly similar averaging at 70-120 cms. Using only measurement 5 on the dentary a wide range of 60-140 cms was suggested but this was only based on 6 specimens. However 21 articulars were measured and comparison against modern specimens suggested only four were from

small fish between 60-80 cms total length, the rest were between 90-125 cms, which compared well with the broader group suggested for Kings Lynn. These larger fish may be the product of a deep water fishery from Hartlepool, the smaller ones being caught nearer inshore.

Haddock live close to the sea bed at depths of 40-300 metres, and in the south of its range which would include the coast around Hartlepool and are found in deep water in summer and inshore shallow waters in winter.The most likely fishing method for this fish at this period is by baited hook. Measurements of 15 dentaries and 21 premaxillae were taken and the average of these measurements suggests a range of 23-63 cms, with no clear divsion into size groupings, although it is possible to see a grouping of larger fish beginning at 40 cms. All the haddock cleithra were swollen as is common in this species.

Whiting prefer shallow inshore waters from 30-100 metres with the smaller fish found closer inshore, they are most commonly caught in nets but can be taken by hook. Although the small size of the premaxillae and dentaries can lead to exaggerated error in measurement an attempt was made to correlate them with modern specimens. Based on the measurements from 21 dentaries and 18 premaxillae it is tentatively suggested that the average size range is 26-56 cms, within this range a smaller (more inshore group?) appears to be under 35 cms.

Saithe; a schooling fish found near the surface and in midwater at 200-250 metres, caught in nets (seines) and on lines. Size comparisons using 12 dentaries and 13 premaxillae against three modern specimens indicated an average size range of 88-119 cms (maximum 130 cms). This is generally larger than the average size at which they are caught today of 70-80 cms (Wheeler 1978, 159).

Ling; a deep water fish, especially over rocky ground in 300-400 metres, and is certain to have been taken on lines. Few dentaries (2) and premaxillae (4) were available for measurement, but 15 articulars were plotted against the measurements for 2 modern specimens and on this basis a range of 82-155 cms is suggested, the latter being their top size range in inshore waters (Wheeler 1978, 167). Only 2 specimens were under 100 cms.

It might be postulated from the evidence of the size of the ling that the main fishery did not extend into very deep water possibly up to depths of about 300 metres and practised a variety of fishing methods seasonally to take advantage of fishes' inshore movements during certain times of the year.

The other species identified in small numbers were also all edible. The scad (a schooling fish either close inshore, or offshore near the surface up to 100 metres) and the mackerel (also found near the surface, a highly migratory fish) would have been caught in nets, the latter also on lines. Both these species could have been a by-catch of the herring fishery (Wheeler pers comm).

Inshore bottom dwellers ie the plaice and flounder were often caught on lines and also in shoreline traps which caught them as the fish returned to deeper water after feeding at the shoreline at high tide.

The grey gurnard, usually found offshore at depths of 20-50 metres, on sandy bottoms, the black sea-bream (probably a single individual), a summertime migrant in the area around rocky outcrops and the ballan wrasse (tentatively identified from a single tooth) on the edge of its range here, also common on rocks in depths of up to 20 metres, are all most likely to have been caught on lines.

The species described above suggest one of two possibilities, either they are accidental inclusions from the inshore aspects of the main fishery. Alternatively the are the result of a very small scale fishing operation such as one man setting shoreline traps, or operating a line from the shore or from a small boat.

The only possible non marine species identified is the eel represented by 6 vertebrae, all of which were very small, and may be from a fish in its freshwater stage. Eels were kept in live storage in ponds both on monastic estates (Hickling 1971-2, 118) and also in lay establishments mentioned in the Domesday book (Hickling 1962,22). Eels were also trapped as they descended rivers on their downstream migration to the sea, as well as in estuaries and on the shoreline.

The association of the deposits with the the dock suggests that debris from processing prior to distribution should be present. However direct evidence of butchery is very limited, this is in part due to the friable nature of fish bone which breaks readily. Knifecuts were observed in a few instances; on the post temporals of cod and haddock, also on the clavicles of haddock and on the dentary of a cod. These marks are likely to be associated with the removal of the head and in the case of the the dentary the splitting of the fish. The bone from individual contexts did not suggest any discrepency between the anatomies recovered for the most commonly occuring species.

However unless fish were all to be marketed close to the harbour at which they were landed difficulties in ensuring speedy distribution inland meant some kind of preservation was necessary. In the medieval period fish were often dried, salted or pickled. A ready supply of fish was necessary to provide for the large number of compulsary 'fish days' ie lent, all Fridays and Saturdays were fish days until late in the Middle Ages, also Wednesdays until the early fifteenth century (Wilson 1973,31). Drying and salting large fish usually involved the removal of the head and backbone. Salting was often carried out in port immediately after the fish was landed (Wilson 1973,33). Before the development of smoking herring in the late 13th century, and the fourteenth century practice of barrelling gutted herrings between layers of salt after they had been soaked in brine, these

fish were usually salted ungutted in heaps on the shore (Wilson 1973,33).

The scad, mackerel, grey gurnard, black sea-bream, ballan wrasse, and flatfish may well have been eaten fresh, especially if they represent a very small scale fishing operation and were not marketed. Mackerel would have been difficult to preserve as they contain so much oil.

In summary it is suggested that most of the fish bone from the deposits in the dock represents the commercial debris from a 12th century fishing industry exploiting a variety of fish from the shoreline to about 300 metres depth. Also present were a few poorly represented species that may be the domestic debris from the catch of an individual fisherman.

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TABLE

	SITE A Phase 1	SITE B Phase 1	TOTAL
SPURDOG	3 spines	-	3
ROKER	32 dermal denticles	3 dermal denticles	35
RAY	1 dermal denticle 42 teeth	16 teeth	59
ELASMOBRANCH	70 dermal denticles 38 vertebrae	13 dermal denticles 1 vertebra	122
EEL	6 vertebrae	-	6
HERRING	1123 vertebrae 92 skull frags 12 dentaries	271 vertebrae 17 skull frags 1 dentary	1516
COD	311 vertebrae 58 skull frags 17 dentaries 37 premaxillae	16 vertebrae 19 skull frags 1 dentary 2 premaxillae 1 otolith	462
GADOID (lge)	301 vertebrae 184 skull frags 11 dentaries 2 premaxillae	17 vertebrae 6 skull frags 1 dentary	522
GADOID (sm)	69 vertebrae 4 skull frags 1 premaxilla 10 frags	30 vertebrae 32 skull frags	146
HADDOCK	189 vertebrae 87 skull frags 8 dentaries 18 premaxillae 3 otoliths	25 vertebrae 15 skull frags 4 dentaries 7 premaxillae 1 otolith	357
WHITING	180 vertebrae 21 skull frags 23 dentaries 17 premaxillae 1 otolith	34 vertebrae 9 skull frags 7 dentaries 11 premaxillae 3 otolith	306
SAITHE	7 vertebrae 27 skull frags 12 dentaries 16 premaxillae	1 premaxilla	63

LING	165 vertebrae 44 skull frags 10 dentaries 4 premaxillae	8 vertebrae 3 skull frags 1 premaxilla	235
GREY GURNARD	22 vertebrae 7 skull frags 2 fin rays 2 premaxillae	3 vertebrae 3 skull frags	39
GURNARD	5 skull frags 3 spines	1 vertebra 5 skull frags 1 spine	15
SCAD	1 vertebra 1 spine	_	2
BLACK SEA BREAM	3 vertebrae	_	3
BALLAN WRASSE	1 tooth	_	1
MACKEREL	11 vertebrae 2 premaxillae	3 vertebrae 1 premaxilla	17
PLAICE	2 skull frags 2 dentaries	_	4
PLAICE/ FLOUNDER	45 vertebrae 2 skull frags	13 vertebrae	60
UNIDENTIFIED	167 vertebrae 49 teeth	99 vertebrae 35 teeth	350
TOTAL	3583	740	4323