A STUDY OF THE VARIATION IN OYSTER SHELLS FROM ARCHAEOLOGICAL SITES AND A DISCUSSION OF OYSTER EXPLOITATION

CHAPTER 1
INTRODUCTION

Oysters have held a great fascination for people over the years. Gourmets have eulogised upon their exquisite taste; their medicinal and supposedly aphrodisiacal powers are legendary; and they are often mistakenly thought to produce valuable pearls. But, to me, the most interesting feature of the common flat oyster (Ostrea edulis L.) is the great variation in the outward appearance of their shells and the potential of this characteristic for archaeological interpretation. The first aim in this thesis is to use that variability to make both spatial and temporal comparisons of oyster shells from archaeological excavations. This is undertaken at an intrasite and intersite level. The second aim is to explore the possibility that the variations could be used to understand the different ways in which oyster populations have been being exploited.

The importance of biological material in archaeology is now well established (Shackley, 1981; Evans, 1978). Environmental archaeology has become one of the main ways of examining the environment and economics of past settlements. This has included the examination of marine molluscs (e.g. Bailey 1975, 1978, 1983; Bailey and Parkington 1988; Deith 1983a, 1983b, 1985a, 1985b, 1988; Koike 1979, 1981; Shackleton 1983, 1988). It is possible to investigate the reasons for variation in present-day populations of organisms in order to interpret the past. This has been the basis of my work on shells of the British flat oyster. It has been possible to use biological and environmental information concerning oysters and oyster farming at the present time and in the recent past to determine the contribution of oysters to diet in the distant past, to suggest the levels of exploitation involved, to provide evidence for trade, and to show how British oyster farming may have developed.

Oyster shells have been a neglected resource. I was first made aware of the need to evaluate the usefulness of oyster shells from excavations of the past two thousand years while I was working with the Faunal Remains Unit based in Southampton University in 1975. Substantial numbers of oyster shells were being recovered from such places as the Saxon urban contexts at Melbourne Street, Southampton, and the Saxo-Norman to early medieval levels of Paradise Street, Poole. Other types of environmental evidence from these sites had already proved invaluable for archaeological interpretation but the potential of oyster shells from these relatively recent deposits had not been assessed. Archaeologists were faced with the dilemma of storing such bulky material at considerable cost against the eventuality that they would be proved useful, or discarding oyster shells after a cursory examination. Initial work on the Melbourne Street material produced promising results (Winder, 1980).

At that time, the detailed examination of edible marine molluscs in Britain was usually confined to large middens of much earlier periods (e.g. Mellars, 1978) although elsewhere more recent shell deposits had been analysed (Bailey, 1975; Meehan, 1982). In the absence of any work on British oysters from the period under consideration, archaeologists had tended to quote without criticism classical references on the subject. These ancient sources contain valuable information but frequently they have been liberally interpreted to support a particular point of view.

One ancient writer in particular must have been the first to record details of oyster variability. Pliny the Elder in his Natural History commented on the fact that the Romans could identify the place of origin of oysters by the taste and appearance of the meat and shell. Modern oyster fishermen often claim that they can tell from which place an oyster was fished. Encouraged by these somewhat folkloric claims and my own observations, I decided that oyster shell variations might be quantifiable and attributable to geographical and

environmental phenomena and that a study of variation would be an ideal research subject.

Several years into the project, I came across a publication more directly relevant to my own study. In the 1921 Alfred Bell made the first attempt to substantiate the claims of regional variability in oysters which I was now attempting to verify myself. He not only distinguished about fifty different types of flat oyster but gave each variety a name. Bell discusses how he had been working on fossil oysters from the Eastern Pliocene (Crag) deposits when he extended his studies to include oysters from modern and archaeological sources. He observed that they fell into "easily recognised" groups, each of which he felt should have a distinctive name. Detailed descriptions and illustrations are given for each group but unfortunately it is not clear how many specimens have formed the basis for each type. In some cases he refers to a "series" but in other instances one suspects it may have been an individual specimen.

The qualitative approach which Bell used is not so easily followed without reference to the original material, and doubts arise from the knowledge that in any sample of oyster shells the scope for variation in size and shape is considerable. However, discovering Bell's work increased my belief that it should be possible to establish the source of oysters in an archaeological sample. The characteristics exhibited by oysters from different regions, and possibly from different fishing or farming methods, could be used in a way similar to the use of regional and period characteristics in pottery to determine trade routes. I had been impressed by the work of David Peacock and David Williams in the use of petrological analyses to determine sources (Williams and Peacock, 1986) and could see that in an analogous way it might by possible to determine the production areas for oysters and then the distribution pattern for this food commodity. My thesis represents the first thorough investigation of all sources - archaeological, biological and documentary - using quantitative and qualitative techniques to establish variability in

the flat oyster and evaluate its significance in archaeological terms.

My own background seemed particularly apt for pursuing this project. My first degree was in zoology with a littoral ecology dissertation on rocky shore zonation in animals. Five years were then spent curating natural history collections, including British marine molluscs. While working in a museum which was mostly orientated to Roman archaeology, I became interested in the environmental evidence being recovered from excavations. This led to the establishment of a reference collection of modern skeletal material for comparative purposes and the initiation of strategies for the recovery and analysis of excavated bone. This was followed by a short spell with the Faunal Remains Unit associated with the Archaeology Department at Southampton University where, under the supervision of Jennie Coy, I was given my first batch of a hundred large boxes of muddy oyster shells to examine.

There were two main reasons for deciding to concentrate on the macroscopic aspects of shell variation. Foremost in my mind was the need to devise rapid techniques of analysis, which could easily be learnt and repeated, for dealing with the large quantities of oyster shell already in store and currently being recovered from excavations. In the context of modern contract archaeology, the cost effectiveness of procedures is important. Secondly, resources for this project were very limited. These factors meant that chemical, physical or microtextural analyses of the shells had to be discounted despite the splendid foundation laid in these areas of research by workers such as Margaret Deith, H. Koike and Judith Shackleton. For the same reasons, and also because the work was only belatedly brought to my attention, it was not possible to take advantage of methods outlined by Bretton Kent in his excellent study Making Dead Oysters Talk (1988). Certain aspects of this work coincide with mine. These include the analysis of shape, epibiont analysis, and intensity of harvesting. However, his approach is far more sophisticated in

these areas and in the application of schlerochronology and demographic studies. Additionally, Crassostrea virginica has very different growth characteristics and habits and therefore the techniques may not be directly applicable to Ostrea edulis.

THESIS ORGANISATION

Having discussed something of the background to this thesis, it is now appropriate to outline its contents. The following chapter, 2, contains mostly biological information which it is hoped will provide a basis for understanding the features in the structure of oyster shells, and the variation in those features, observed in the archaeological material. The typical appearance and construction of the shell in Ostrea edulis L. is described together with the types of variation and reasons behind the variations. An account of suitable habitats for the growth and breeding of flat oysters is also provided.

The methods by which variability in oyster shells was demonstrated are given in Chapter 3. Hints on conservation and storage of oyster shells, necessary equipment, and techniques of recording details are all presented here. The basic record sheet, how to sort the shells, how to record size, age, infestation and other descriptive features are described with an estimate of the average achievable processing rate.

Chapter 4 shows how the techniques described in Chapter 3 were used in a case study of oyster shells from Saxon Southampton. The preliminary analysis of size and infestation showed intrasite differences in the samples. Further investigation into the possible reasons for these differences used age, growth rate, shape, cultch types, and associated molluscs to arrive at decisions concerning the effects of temperature and substrate on the oyster shells and the possible locations being fished.

Intrasite variations were then studied in a series of samples from over twenty sites. It should be noted that the selection of archaeological samples of oyster shells analysed in this research project was dictated largely by circumstance rather than deliberate choice. It represents the response to a request circulated among archaeologists for large samples of shells to be made available for examination. For this reason, there tends to be an uneveness in the distribution of sites and periods covered by the analyses. The evidence from these sites has been presented in separate chapters relating to regions. Chapter 5 contains the data from sites in the Southampton region and includes details of shells from Owslebury near Winchester, Newport Roman Villa on the Isle of Wight, and 11 The Hundred in Romsey. This information is in addition to the evidence from the Six Dials site in Southampton which is considered in Chapter 4.

Chapter 6 covers the evidence from archaeological sites in and around Poole in Dorset. It includes the findings from work on oyster shells from several sites in Poole itself: Paradise Street, Thames Street and Shipwrights' Arms. The other sites were Ower Farm and Corfe Castle on the Isle of Purbeck, Lodge Farm near Kingston Lacey, Greyhound Yard and Alington Avenue in Dorchester, and Halstock Roman villa on the Dorset-Somerset border.

The intrasite variation information for oysters from sites in the North Wessex and London region is given in Chapter 7. The samples were recovered from Ludgershall Castle near Andover, 39 Brown Street in Salisbury, Cross Street in Wokingham, and Reading Abbey Wharf. In London oyster shells from the Moorgate and Coleman Street, Guildhall House and Pudding Lane excavations were studied.

The results of analyses on oyster shells from the region of East Anglia form the basis of Chapter 8. Shells from Bury St Edmunds Abbey, Burrow Hill, Leiston Abbey, Colchester and North Shoebury were

examined. This chapter concludes the presentation of results from intrasite comparisons of samples of archaeological oyster shells.

Chapter 9 starts to draw the evidence together from all the basic analyses described in Chapters 4 to 8. Intersite variation in size of oyster shells is the topic. The evidence for spatial variation, is first given on a site by site basis, followed by an overview of the evidence for regional variations in oyster shell size. Size variation in oyster shells from coastal versus inland sites, and urban versus rural sites is briefly discussed. Finally temporal variations in oyster shell size are considered.

Intersite variation of infestation in oyster shells forms the subject of Chapter 10.

The final chapter, 11, discusses the results of the variability study under two main headings: the natural history contribution and the contribution to archaeology. The synthesis of natural history data enables conclusions to be drawn about the way oyster shells reflect not only the immediate environment but environmental changes taking place on a broader scale. Attention is drawn to the many factors, both natural and man-made, which may also have affected the abundance and quality of oysters through time. Oyster populations are affected by overfishing, salinity fluctuations, changing sea levels, diseases, the weather, pests and predators, and many of the more recent developments such as land reclamation, increased shipping and water-based leisure pursuits, and the direct and indirect effects of industrial and agricultural pollutants.

The main contribution made to archaeology by this thesis is the assessment now possible of the role of oysters in the economy of past times. The first section deals with evidence for the contribution made by oysters to the diet. Then the evidence for trade in live and pickled oysters, both for the home market and overseas, is considered. Note is made of the evidence for the oyster trade in

Roman Britain - for which many suppositions have previously been made.

The third section discusses the way in which oyster cultivation may have developed in Britain with the gradual introduction of oyster farming, as opposed to mere oyster fishing, resulting from a combination of circumstances in the later Middle Ages (A.D. 1300 onwards).

This is followed finally by a discussion of the level of exploitation of oysters over the past two thousand years in Britain. Of particular importance is the outline development of a transitional series of theoretical models which illustrate how the basic data recorded from the shell samples could be used to decide how intensively oysters were being exploited. The range of exploitative activities extends from sporadic collection by hand from natural, intertidal oyster beds to full-scale cultivation and marketing of oysters.

It is concluded that the macroscopic investigation of variability in oyster shells can be used to illuminate questions of past behaviour and to put into perspective changes taking place in oysters today.