

Methods in our Madness: Approaches in Archaeo-malacology



Archaeomalacology Working Group Meeting
Orkney Islands

5th – 8th April 2016

Abstracts

S'ILLOT DES PORROS DURING THE NAVIFORME PERIOD. OCCUPATION, FUNCTIONALITY AND MANAGEMENT OF MEAT RESOURCES.

LUA VALENZUELA

S'illot des Porros is an archaeological necropolis located on an islet on the north-east of Majorca, distant, only 25 meters from the island coast. The better known structures date from 4th-3rd c. BC, and they consist of three collective burial chambers, although there are some funerary remains which belong to the 6th - 5th c. BC, at the beginning of the second Iron Age in Majorca (Post-talaiotic or Balearic period).

Prior its use as a necropolis, several unidentified structures containing abundant faunal remains (NSIP=5260) were excavated. These structures date from the middle and final Bronze Age or Naviform period (ca. 1600/900-850 BC). The faunal remains were associated with a special kind of pottery -*tonels*¹-, some of them decorated, a particularly unusual for this period.

This work will present the first results obtained in the PhD "*The Bronze Age in Mallorca. A perspective from zooarchaeology*". It will discuss certain aspects of the landscape and environment, the species present at the site, and the deficiency of remains of marine origin for human consumption in this and other contexts of prehistoric Majorca.

¹ They are thought to be used for storing food and for exchange.

LONG AND SHORT TERM CHANGES IN SHELLFISH EXPLOITATION PATTERNS IN NORTHERN IBERIA: THE CASE OF LA FRAGUA CAVE

ROBERTO S. REVILLA, IGOR GUTIÉRREZ ZUGASTI AND MANUEL R. GONZÁLEZ MORALES

Changes in coastal exploitation patterns have been previously recorded between the Late Pleistocene and the Early Holocene in northern Iberia. Among these, long term changes in shellfish collection between the Upper Palaeolithic and the Mesolithic were identified in the form of increased use of these resources through time. However, a comparison between long and short term changes has not been yet attempted. Recent excavations carried out at La Fragua cave (located in the Cantabrian coast, northern Iberia) produced several stratigraphic units ranging from the Late-Glacial (Late Magdalenian) to the early Holocene (Mesolithic) and containing evidence of coastal resource exploitation, mainly shells. Magdalenian shells were recovered from a single unit, while six Mesolithic units were identified (with an hiatus in the exploitation during the Azilian), providing the opportunity of analysing changes in the long term (Pleistocene-Holocene transition) but also in the short term (during the Mesolithic). In this paper we present results on quantification, biometry, fragmentation and taphonomy from the recovered shell assemblages. Results show an interesting sequence of long and short term changes in species representation, environments exploited, and intensity of coastal exploitation.

DENTALIUM SHELLS AT HARAPPAN SETTLEMENTS IN GUJARAT: USED OR ACCIDENTAL INTRUSIONS?

ARATI DESHPANDE-MUKHER

The small tusk shells of *Dentalium* sp. are frequently reported from some of the sites belonging to the Harappan civilisation mainly from the Gujarat region in western India. Prior to it these are also reported from a few Mesolithic sites in the same region. Interestingly these particular shells are not found in either contemporary Chalcolithic, Neolithic or in the later periods in the Indian subcontinent. As compared to shell objects or certain specific shells like *Turbinella pyrum*, *Dentalium* shells are found in smaller proportions. Often found as more or less complete shells but at times also as small beads which are rare. Besides identification to their generic level not

much study has been done regarding these shells from any of the Harappan sites. No attempts have been made to identify if they were actually used or were accidentally introduced due to natural processes. Dead shells of *Dentalium* sp. are found on the shores along the Gulf of Kachchh near Beyt dwarka . In this paper are discussed the results of the analysis carried out on them from the Harappan sites of Dholavira, Kuntasi, and Padri. An attempt was made to identify them to their species level, to study the extent and nature of their use. The three sites selected for the study being Dholavira one of the largest Harappan sites involved in large-scale shell working and other crafts, Kuntasi a small port and industrial centre and Padri a small salt manufacturing site. All these three sites have indicated that the shells were intentionally exploited for a specific purpose besides simple adornment.

EFFECTS OF COOKING ON MOLLUSK SHELL STRUCTURE AND CHEMISTRY: IMPLICATIONS FOR ARCHEOLOGY AND PALEOENVIRONMENTAL RECONSTRUCTION.

STEFANIA MILANO, AMY L. PRENDERGAST, BERND R. SCHÖNE

The contribution of shellfish to prehistorical mediterranean subsistence has been demonstrated by the recovering of marine mollusk shells from numerous archaeological sites along the coasts of the Mediterranean Sea. Shell middens usually represent food waste. Shells contain chemical signatures such as oxygen stable isotopes ($\delta^{18}O_{shell}$) widely used to investigate paleoenvironments, human foraging, and migratory patterns. However, shell isotopic composition may be sensitive to alterations derived by food processing (i.e. cooking). Little is known about shell thermal behavior and the implications of cooking on archeological studies. This work is a calibration study on modern *Phorcus* (*Osilinus*) *turbinatus* shells. A simulation of two different cooking methods (boiling and roasting) was carried out at four temperatures (100 °C, 300 °C, 500 °C and 700 °C) for two durations (20 min and 60 min). Shell macro-, microstructural and chemical properties were analyzed in order to obtain a multi-scale overview of shell thermal response. Our results indicate that isotopic composition and structure of shells boiled at 100 °C did not significantly change. However, higher temperatures induced relevant alterations. At 300°C significant changes are observed at all levels investigated.

Shell external coloration is shifted toward a brown shade and nacre loses its typical iridescence. Raman spectroscopy revealed that, at this temperature, the aragonite-calcite polymorphic transformation starts. Scanning Electron Microscope (SEM) analysis showed drastic changes in the microstructural organization also beginning at 300 °C.

Furthermore, the isotopic $\delta^{18}O_{shell}$ values were significantly affected. Increasing cooking temperatures resulted in an enhancement of the above-mentioned alterations. These results provide a set of temperature-related morphological, structural and biochemical characteristics for investigating the thermal behavior of biocarbonates and for estimating different cooking treatments in archeological record.

A BIOLOGIST'S OBSERVATIONS ON THE USE OF MOLLUSCA BY THE XHOSA PEOPLES OF SOUTH AFRICA

MAUREEN MOORE

It was not realised at the time of these observations that the traditional way of life of the Xhosa peoples would change as quickly as it has, so is here recorded.

I visited their coastline from 1972 to 1985 in order to record the mollusca, which were not well known at all. It was a difficult region to access; with no roads as we know them, a drop of a few thousand feet driving from boulder to boulder had to be negotiated before the narrow coastal plane was reached. This effectively kept the area isolated. Now a road has been made, three hotels built and the Mbotyi area of Pondoland promoted as a holiday venue.

The area is also a part of the infamous Wild Coast, where huge breakers crash onto a rocky coast, so the collecting of living mollusca was limited to a few sheltered rock pools.

The Pondo tribe of the Xhosa peoples were traditional farmers who specialised in cattle, a few sheep and free-ranging chickens (pigs were not eaten, as these ate the waste). However, cattle herds were relatively small due to the poor nutritional values of the grass - although it looked lush and green. As a breeding cattle herd had to be maintained for wealth, status and bride price, animals were only slaughtered for feasting occasions. Consequently there was an everyday protein shortfall and this was made up by foraged mollusca.

Observations are offered on the way mollusca were collected, as well as some details of feasts, adornments and way of life generally. In this case absence of midden material (because of the way the shells were collected) did not mean absence of mollusca from the diet.

SHELLFISHING AS EVIDENCE FOR CULTURAL CONTINUITY AND DIVERGENCE DURING THE LATE PREHISTORIC IN WISCONSIN: A COMPARATIVE STUDY OF MUSSEL SHELL USE AT TWO ONEOTA LOCALITIES

RACHEL MCTAVISH

The role of shellfish for Late Prehistoric (circa AD 1000-1400) Oneota groups in Wisconsin has been primarily extrapolated from a clustering of sites in western Wisconsin known as the La Crosse locality. This is owing to the substantial amount of published data on the topic (e.g., Theler 1985, 1993, 1994, 1999, 2000). New data from two contemporaneous sites in southeastern region of Wisconsin in the Lake Koshkonong locality is presented as a regional comparison.

Oneota is an archaeological cultural classification for sites found in the Midwestern region of the United States. Oneota groups are generally categorized as semi-sedentary to sedentary with ties to agriculture, horticulture, hunting, and foraging subsistence strategies. Sites are typically positioned in locations advantageous for utilizing wetland and agriculturally rich ecotones (Sasso et al. 1985; Edwards 2010). Pottery is a diagnostic indicator of Oneota with the use of shell-tempered ceramics with a smooth surface finishing (Mason 1981; Overstreet 1997).

This paper presents the first examination of the differential role of shellfishing as it relates regional trends of Oneota subsistence-settlement and dietary patterns in Wisconsin. Further, freshwater mussel shell at the sites provides evidence of differential cultural practices and influences by other Mississippian groups on these Oneota settlements. The presented comparative analysis, while preliminary, is an integral step towards understanding western and eastern Wisconsin Oneota groups' use of shell as a raw material for tool manufacture as well as its dietary contributions. These themes are discussed in the context of environmental adaptations along the Mississippi River Trench and Lake Michigan Basin, the transition to maize agriculture, differential use as a dietary supplement during times of conflict, and connections to other contemporaneous Late Prehistoric groups in the larger Mississippian world.

SEASONAL PATTERNS OF COASTAL RESOURCE EXPLOITATION BY MESOLITHIC GROUPS: EXPERIMENTAL PROGRAMME TO ESTIMATE ANNUAL MEAT YIELD VARIATIONS FROM MOLLUSC SHELLS IN NORTHERN IBERIA

ASIER GARCÍA-ESCÁRZAGA AND IGOR GUTIÉRREZ-ZUGASTI

Mesolithic (c. 11.000-6.500 cal BP) sites located close to the seashore along the Atlantic Europe are characterised by the formation of shell middens (i.e. large accumulation of coastal resources such as molluscs, crustaceans, echinoids, fish, etc.). Typically, the most abundant taxa in shell assemblages from the Cantabrian coast (northern Iberia) are the limpets from the *Patella* genus and the topshells *Phorcus lineatus* (Da Costa, 1778), which together represent more than 80% of the total specimens recovered in practically all archaeological sites studied in the mentioned area. Determining the pattern of seasonal collection is crucial to establish subsistence strategies and mobility of the last hunter-fisher-gatherers, and thus determine the Mesolithic settlement patterns in coastal locations. Oxygen isotope ratios and sclerochronology have been applied on shells during the last decades in different sites along the Atlantic façade. Isotopic studies

performed in the Cantabrian region showed that the top shells *P. lineatus* were collected preferably in late autumn and/or winter. However, results obtained from limpets *P. vulgata* (Linnaeus, 1758) suggested that limpets were exploited year round. In this paper we aim to explain this differential exploitation pattern from the point of view of molluscs meat yield. Three species of limpets (*P. vulgata*, *P. depressa* Pennant, 1777 and *P. ulyssipopenensis* Gmelin, 1791) and topshells *P. lineatus* were collected alive from a coastal location (Langre beach) in the Cantabrian coast in order to measure the variation of meat/shell weight ratios along the annual cycle. The results showed that the ratios between both variables are similar in the three species of limpets but quite different in *P. lineatus*, which present a higher meat yield in colder months, suggesting that higher energetic returns were promoting a seasonal collection of top shells in autumn and winter.

DAY 2 - 6th April 2016

THE RE-USE OF PINCTADA MARGARITIFERA AS RAW MATERIAL FOR THE PRODUCTION OF RELIGIOUS SOUVENIRS IN THE HOLY LAND, DURING THE 19TH AND EARLY 20TH CENTURIES

INBAR KTALAV

Over 800 shell remains from the late Ottoman and British Mandate periods (1840-1940) in Israel were studied, so as to better understand the use of nacre in local art and craft. Virtually all remains were of the black-lip pearl shell *Pinctada margaritifera*, a bivalve of the Indo-Pacific. I will discuss the finds of shell waste, imported from the mother-of-pearl button industry which then thrived in Europe, which reached the Holy Land via Jaffa's port. The waste was transported to Bethlehem and Jerusalem, where it was cut down and then used as inlay, in the religious souvenir manufacture and trade. Eventually many souvenirs were transported back to Europe and elsewhere. A recent survey at Ramat Rachel (between Jerusalem and Bethlehem) revealed an as yet unknown workshop of mother-of-pearl inlay.

SEASHELLS AS A SYMBOLIC ELEMENT AND OBJECT OF PRESTIGE IN ANCIENT SARDINIA

BARBARA WILKENS

While the use of marine mollusks for food is generally recognized in all periods, the interest of shells as objects of prestige or objects with a possible symbolic value is less known and more difficult to understand. In prehistoric Sardinia, the presence of shells in sites of cultural nature suggests their use during ritual meals, as in the case of the malacological remains found in late Neolithic levels of Grotta Verde near Alghero and in the Chalcolithic levels of the sanctuary of Monte d'Accoddi near Porto Torres.

Shells were also used in the manufacture of necklaces and other ornamental items. The deposition of shells in graves could be linked to the dressing of the dead or could have a symbolic significance mainly in the case of isolated and unpierced shells. The ornamental and luxury character is enhanced by the import of exotic shells in Phoenician and Punic period.

COWRIE SHELLS IN ANGLO SAXON GRAVES: NEW EXAMPLES FROM THE EAST OF ENGLAND

JULIA E.M. CUSSANS

Recent excavations carried out by Archaeological Solutions Ltd at an Anglo-Saxon cemetery in Exning, Suffolk revealed one of the graves - that of a probable female child - to contain a cowrie shell (*Cypraea cf. pantherina*); two other such finds have also recently been found in Suffolk. Until recently this phenomenon, while relatively well known in Anglo-Saxon graves has, in England, primarily been associated with Cambridgeshire, Kent and Yorkshire. Hence these finds extend the known range of the use of cowries as grave goods and have the potential to shed new light on their socio-cultural significance in the Anglo-Saxon world. This paper describes these new findings and their burial context and re-visits the catalogue of known examples of cowrie shells in graves in England to allow for a re-examination of their socio-cultural significance, not only in terms of their meaning(s) as objects but also in terms of their journey from their place of origin (most likely the Red Sea) to England and how these socio-cultural contacts may have influenced the inhabitants of Anglo-Saxon England.

SHELL BEADS AND SHELLFISH AT UPPER PALAEOLITHIC MANOT CAVE ISRAEL

DANIELLA E. BAR-YOSEF MAYER

The Upper Palaeolithic (UP) cave site of Manot, western Galilee, Israel is a closed and active karstic cave, which was sealed shortly after its UP occupation. The occupation was Radiocarbon and U-Th dated to ca. 30-40 ka BP. The Early UP contains a lithic industry with nosed and carinated items, retouched bladelets ('Dufour') and el-Wad points. Bone artifacts include bi-points made of antler and shell beads include perforated *Nassarius gibbosulus*, *Columbella rustica* and *Antalis* spp. as well as two cowrie beads found in association with human bones. In addition to shell beads, edible molluscs are also present: *Patella caerulea* were collected on rocky shores of the Mediterranean and *Levantina* land snails were found as a shell midden. The sum of these finds point to a strong Aurignacian affinity.

SOCIO-ECONOMIC VALUE OF COWRIE SHELL TRADE IN THE INDIAN OCEAN

ANNALISA C. CHRISTIE

Cowrie shells are widely recorded in the archaeological record across west Africa and around the Indian Ocean. Assumed to have been sourced in the Maldives, they are found in a variety of contexts and are imbued with a variety of social values. To date however, no synthetic attempt has been made to record and understand their role and value within and across West African and Maldivian communities. The Cowrie Shells: An Early Global Commodity project, funded by the Leverhulme Trust and directed by Dr Anne Haour, which started in April this year, sets out to achieve such a synthesis.

The project specifically aims to:

- standardise the classification and speciation of cowries in archaeological and ethnographic contexts;
- determine how and where these shells were sourced from (historical records point to extensive exploitation of *Cypraea Moneta* around the Maldives);
- explore the social implications of this level of exploitation Maldivian communities; and to
- elucidate how and why cowries had such an important place within West African societies.

This paper will provide an overview of the project, focusing in particular on the social value and implications of cowrie shell exploitation on the socio-cultural and economic organisation of Maldivian communities within the context of the broader Maldivian maritime landscape.

SHELLS AS BUILDING MATERIAL DURING THE ROMAN AGE IN NORTHERN ITALY: THE CASE OF AQUILEIA

SIMONE DILARIA (POSTER)

The excavations carried out by the University of Padova in two Roman domus in Aquileia, the so-called House of Tito Macro (HTM) and House of Bestie ferite (HBF), allowed to analyze three different contexts in which considerable quantities of shells were used as raw material for building activities: many oyster valves were inserted in the mortars of a V cen. A.D. mosaic at HBF; a layer of crushed murices - presumably broken for the extraction of the purpureal gland - was laid directly beneath another late antique mosaic at HBF; a foundation bed of more than one hundred whole murices and oysters was likewise arranged under the firing chamber of an oven at HTM.

In the first case, oysters, thanks to their carbonate nature, were employed probably for strengthening the cohesion of the mortar. We identified shells in other Aquileia and northern Italian pavement beddings and wall mortars. The useful role of oyster shells in plasters is also suggested in the treatise of Palladius (*Op.Agr.*, I, 40.3), whose recipe represents the written codification of a technical know-how put into practice since the Bronze Age when shells were first employed in Aegean/Levant renders.

In the last two cases, shells might have been used as light-drain devices against soil moisture. In agriculture, Virgilius (*Georg.*, II, 348-349) indicates the use of porous stones or shell layers under the ground for maintaining the soil dry. Similar foundations were documented also in other northern Italian sites in wetlands.

New insights come out on Roman building expertise in northern Italy and on the procedures adopted in Aquileia for the disposal and reuse of large quantities of mollusk shells produced by dietary consumption or by a possible purple-dye production.

DAY 4 - 8th April 2016

UNRAVELLING SEASONAL SHELLFISHING BEHAVIOUR DURING THE LATE STONE AGE AT PINNACLE POINT, SOUTH AFRICA, THROUGH SCLEROCHRONOLOGICAL ANALYSIS.

CINDY NELSON-VILJOEN

The Pinnacle Point Shell Midden Complex (PPSMC) is a Late Stone Age (LSA) open air coastal shell midden site situated on the Pinnacle Point Beach and Golf resort near Mossel Bay, South Africa. Molluscan remains recovered at the site indicate an exploitation pattern focused on the mid- to low intertidal zone from nearby rocky shores and sandy beaches and are known to have played a significant role in the diet of past people living along the coast. Pinnacle Point is one of several cave sites on the southern coast of South Africa that have proved pivotal for our understanding of the development of 'modern' forms of behaviour and cognition, which are capable of yielding detailed information on seasonality and paleoenvironment over long timescales. Determining past climate and environmental conditions at PPSMC (dated from c. 3200 to 800 cal BP) is critical for understanding seasonal procurement strategies, resource use and occupation patterns during the LSA. As molluscs preserve past and present environmental data in the structural, morphological and chemical composition of shell, this enables the reconstruction of palaeoclimate data and seasonality via shell growth rates and oxygen isotope signatures. My research uses incremental growth and stable oxygen isotope analysis ($\delta^{18}\text{O}$) of both modern and archaeological shells of *Oxystele sinensis* (pink-lipped top shell), a commonly found species in LSA shell midden sites in South Africa, to generate seasonal-resolution palaeoenvironmental data, which can then be used as a basis for assessing human-environment interactions. This paper presents the preliminary results of the analyses, highlighting issues in the use and effectiveness of *O. sinensis* for sclerochronological research.

SIZE AND FLESH PREDICTION ON FLAT OYSTER *OSTREA EDULIS* L.: APPLICATION TO ARCHAEOLOGICAL SITES

LAURA LE GOFF AND CATHERINE DUPONT

Studying archaeozoological remains is always associated with difficulties linked to their preservation. Malacological remains make no exception and some species tend to fragment after disposal. The flat oyster *Ostrea edulis* has been one of the most consumed seashells, especially during historic times. If we find it in great amounts on archaeological sites, measuring its length is often impossible. However, a large number of greatly fragmented flat oysters were noticed on which the hinge and the muscular impression were preserved nonetheless. Therefore, we tested possible relationships between the height of the valve and several intermediate measurements. The first results on an archaeological sample being encouraging, we decided to enlarge our study to contemporary populations. We mobilized different operators with various levels of knowledge in biometrics to test the repeatability and reproducibility of these measurements. The results showed that there were no significant variation between them, even with novices and the correlation keeps strong in every case. This method allowed us to recollect total length of up to over half of the fragmented oysters.

This study also included weighing fresh oysters to see if the mass of flesh from the mass of empty shell was predictable. This would help to better estimate the part of oysters in seashells consumption and in alimentation in general.

CHROMATOGRAPHIC ANALYSES OF ARCHAEOMALACOLOGICAL PURPLE PIGMENTS

ZVI C. KOREN

Looking "under the shell" of certain Muricidae mollusks inhabiting the Mediterranean Sea one finds the hypobranchial gland from which a purple pigment can be extracted. This colorant, which

was used from about four millennia ago in the Near East, was the most royal and sacral of all of the natural dyes and pigments used in antiquity. The three species of sea snails that were exploited for this purple production included *Hexaplex trunculus*, *Bolinus brandaris*, and *Stramonita haemastoma*. The production of this purple pigment, which can range in color from blue-purple (violet) to red-purple, as well as its subsequent processing into a dye for textile dyeing involved a series of complex biochemical steps.

Archaeo-chemical examinations of ancient vats in which the purple pigment was used for textile dyeing have provided new perceptions regarding the various processing stages. These steps were described two millennia ago by Pliny the Elder in his encyclopedic *Naturalis Historia* treatise. A critical re-analysis of Pliny's writings combined with the archaeological record and with modern laboratory experiments on all-natural dyeings have provided new insights into this craft.

Recent findings show that misinterpretations exist regarding the biotechnological process associated with the molluscan purple pigment and of its uses in textile dyeing and stone painting. The major conclusions from recent investigations are: (a) chromatic differences among pigments produced from different Muricidae snails and their uses in dyeing; (b) a new understanding of Pliny's descriptions; (c) a recognition of the exact fermentation method by which ancient purple dyeing was performed; (d) determination of the quantities of snails needed for a typical dye vat; (e) a revolutionary re-evaluation of who discovered the purple colorant, the Aegeans or the Phoenicians.

The talk will discuss the results of my chromatographic analyses (via HPLC) on archaeomalacological purple pigments from Phoenician, Persian, and Roman-Period artifacts.

LAND SNAIL TAPHONOMY AND ENVIRONMENTAL INTERPRETATION IN TWO YORKSHIRE CAVES.

TERRY O'CONNOR

Excavations of animal bone assemblages in karstic cave systems often encounter concentrations of land snails. In some cases, these are derived from human subsistence activity, while in others they represent the environment of the cave and its immediate surroundings. The challenge is to differentiate the endogenous mollusc fauna, the true death assemblage of the cave, from the transported assemblage from the cave surroundings, which represents local vegetation and soil conditions. In this paper, two examples are presented from recent work in caves in the glacio-karst landscape of the Yorkshire Dales, in northern England. The assemblages exemplify the taphonomic challenge, and also contribute to our understanding of local extirpations during the Holocene.

MARINE MOLLUSCS IN SCOTTISH ISLAND ARCHAEOLOGY: PATTERNS AND PROBLEMS IN CONSTRUCTING A SYNTHESIS

MATT LAW AND JENNIFER R. JONES

Marine shells have been some of the most visible remains in Scottish island archaeology: on machair sands previously unknown archaeological sites can be detected where rabbits have brought shells to the surface. Shell remains are vital for understanding economic trends, and for understanding the importance of marine foods in past societies. A vast number of marine shells have been analysed from Scottish islands, over many decades and to widely variable standards. Sampling and sieving strategies have a huge impact on the marine mollusc remains, and the species recovered.

This paper presents emerging results, with special focus on the Western Isles and Orkney, highlighting the importance of detailed recording and the problems attendant to inter-site comparisons of this scale. It also presents a suggested protocol for standardising sampling, recording and further scientific analyses.

THE CHAOS THAT IS MOLUSCAN TAXONOMY: CAUSES, EFFECTS AND REMEDIES

MAUREEN MOORE

Causes

Starting with the voyages of discovery, countless new species were described which were duplications or not valid species. Reasons varied, but mostly resulted from malacologists and conchologists working in isolation with descriptive papers generally difficult-to-get.

Effects

Being the second largest group (phylum) in the animal world - only the insect group is larger - mollusca contain around a quarter of a million species. Finding one's way through this can be difficult - even without duplications (synonyms) - and a deterrent. For example, the Cape cone was known as *Conus aurora* for a long time - an appropriate name, as it occurred in a variety of colours. On investigation it was found to have an earlier name, *Conus tinianus*. On an early sea voyage, the discoverer had muddled the localities and thought it came from the Tinian Islands!

Remedies

The learning of taxonomy and nomenclature is essential in every field of natural history, as well as in those disciplines that transcend the socio-scientific boundaries. The proven system - and only feasible approach - is the Linnaen binomial system.

One shell can appear almost identical to another but belong to an entirely different family, genus or species when the animal is examined. The microscopic study of radula remains the best tool available to malacologists but, as the living animals of so many species remain unknown, even this does not go far enough to solve all molluscan taxonomic problems. In utopia, the only way to ensure one mollusc is the same as another is to be able to compare their DNA. Unfortunately, most museums cannot even afford researchers and reference collections, let alone DNA identification.

Information technology, especially the cloud, offers a very practical way to make all traceable information accessible to workers across various fields.

SOMEONE HAD TO BE FIRST: REACTION BY THE WIDER ARCHAEOLOGICAL COMMUNITY TO AN EARLY ATTEMPT AT ARCHAEO-MALACOLOGY GUIDANCE (CAMPBELL, 2015).

GREG CAMPBELL

Concern amongst archaeo-malacologists about standards and consistency in the recovery of marine shells from excavations is now great enough that it is a topic for this meeting. One version of archaeomalacology guidance aimed principally at the British field archaeologist has survived peer-review (*Quaternary International*, 2015: doi: 10.1016/j.quaint.2015.09.013), and has been incorporated into archaeological policy for one English region. The guidance has also been submitted for comment to British formal associations for field archaeology, CRM managers, and museum professionals. The process of incorporation into policy, and these comments, will be outlined to show archaeo-malacologists the nature of the process of formal adoption of standards. No guidance is fixed, it must be adapted to incorporate the knowledge and experience of its practitioners: following this presentation, comments on the published guidance will be sought from practicing archaeo-malacologists.