

A REPORT ON TWO TYPES OF MODIFICATION TO GASTROPOD MOLLUSC SHELLS FROM INDIAN CREEK, ANTIGUA

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Introduction

Gastropod molluscs were an important part of the diet and general economy of the prehistoric West Indies (Fewkes 1922, Goodwin 1979, Jones 1980, Olsen 1975, Rainey 1940, Rouse 1948). The conch *Strombus gigas* was of particular importance as food on some islands whilst a wide variety of univalves were used for tools, utensils, jewelry, tinklers, three-pointed stones and so on. Shells of animals gathered for food usually do not show modification suggesting a 'chowder' type of culinary preparation. The shells used as utensils, *etc.*, however, were generally modified to a greater or lesser extent; a conch axe or a perforated olive shell are clear examples. This report describes two types of modification; one appears to be related to food preparation, the other is of unknown significance.

Site and Collection

The shells discussed in this paper were excavated from the Indian Creek midden site in Antigua during July 1979. The site and the Yale University/Antigua Archaeological Society excavations there in 1973 have been reported by Olsen (1974) and Rouse (1974, 1980). An earlier faunal excavation at this site also has been reported (Jones 1980). The present material was obtained from two pits (PA4/FA79 I and II) adjacent to those designated 6 and 5 respectively by Rouse and Olsen. Each pit was small, measuring 1 m. by 0.5 m., divided into horizontal levels of 12.5 cm. (half the depth of those dug by Rouse). Pit I reached virgin ground at a depth of 1.35 m., Pit II at 1.20 m. The material was passed through a screen having a mesh of about 4×4 mm. Along with other animal material, all the molluscan shells were retained for later examination.

Representative shells were radiographed using a Hewlett-Packard Faxitron X-ray machine.

There are relatively few remains of large gastropods (*Strombus*, *Cassis*, *etc.*) at Indian Creek and the marine gastropod shells recovered there fall into two major groups. Firstly, medium to large *Cittarium pica* (averaging about 35 mm. from umbilicus to apex) which were almost certainly used for food. Secondly, small (less than 30 mm. maximum dimension) shells representing a

wide variety of species and including some small *Cittarium*. Although some of this latter group may represent food organisms this is not true for all as some were beach worn specimens undoubtedly empty when collected.

Whorl Removal in *Cittarium pica*

The whelk, *Cittarium pica* is a common dietary element in the remains from Indian Creek. Jones (1980) reported that its shells constitute 39.7% by weight of the faunal remains and calculated that it represented 4.3% of the animal food. It is one of the few animals that is found commonly at almost all levels of excavation. In many cases the shells are intact. However, in other cases a consistent form of damage is to be seen (Figs. 1 and 3a) in which a portion of the body (final) whorl is removed from the region opposite to the aperture.

If a live *C. pica* is observed it will be seen that the body can retract a considerable distance into the shell protecting itself with the horny operculum. It is then almost impossible to gain access to the soft parts in such retracted animals without breaking the shell, and even after boiling the meat may be difficult to extract. Thus it seems likely that the shell damage was a deliberate attempt to open the shell behind the operculum to permit removal of the animal. Whether the breaking of the shell took place before or after cooking is not clear but live gastropods are firmly attached to their shell by means of columella muscle so that the latter is more likely.

Whorl removal as seen in archaeological material can be mimicked fairly easily by striking the base of the shell against a stone with the point of contact close to the umbilicus and opposite the aperture (Fig. 2). The blow should be directed slightly outwards from the axis of the shell. Fig. 3b shows a shell broken in this way by the author. The point of impact in both experimental and archaeological material is often characterized by a notch in the fractured line (Figs. 2, 3a and 3b).

Only a relatively small portion of the *Cittarium* shells recovered showed this type of damage. Of 148 shells whose umbilicus and opening were intact 12 showed whorl removal, or some 8.1%. The average height (from spire to umbilicus) of the damaged shells were 39.1 (S.D. \pm 10.0) mm. whilst that for undamaged shells was 38.1 (S.D. \pm 14.2) mm. Thus there appears to be no selection of individuals for whorl removal on the basis of size. The practice of whorl removal was acquired either prior to or soon after the arrival of the Indian Creek people in Antigua as modified shells have been found at the lowest levels of excavation II; the same level as that dated by Rouse (1980) at A.D. 200 ± 80 . Further, the practice was a persistent one as such shells are found up to the shallowest level dated by Rouse at A.D. 1105 ± 80 .

Columella and Inner Whorl Removal

Robinson (1978) has described a number of modifications to olive shells (*Oliva* spp.) from the Virgin Islands including the removal of the spire, either in part or entirely, and the removal, *via* the apex, of part of the body whorl. Hoffman (1970) has reported finding large *Cassis* and *Charonia* shells at Mill Reef, Antigua, from which most of the interior (columella and whorl partitions) had been removed. The modification described below, whilst bearing some relation to those of Robinson and Hoffman, appears to be distinct and characteristic. In its least profound form it is seen as an elongated hole in the upper surface inside the final whorl penetrating into the space of the whorl above (Fig. 4). More elaborate modification involves the removal of more of this inner whorl surface and a part of the columella (the central 'spine' of the shell), usually the part nearest the aperture. In nerites (*Nerita* spp.) the teeth and part of the parietal area are often removed (Fig. 5) while in *Cittarium pica* modelling of the shell *via* the umbilicus is not uncommon (Fig. 6). In one case an olive (*Oliva* sp.) was collected in which the spire had been removed and part of the columella removed from the top of the shell as described by Robinson (1977). Removal of the columella is difficult to show in photographs but the X-radiographs in Fig. 7 give some indication of its nature.

In all, 223 small gastropod shells were collected and of those 101 (43.3%) showed columella and whorl removal. The Table at the end of this article shows that at whatever level the gastropods were collected a portion of them were modified. However the distribution of gastropods as a whole was far from uniform. They were fairly common throughout Pit I, but in Pit II they were present at the top, virtually absent from the intermediate levels and very common at the lowest levels.

It is not clear how the modification was produced. The removal of part of the columella close to the aperture as well as wear and polish on the lip of the aperture of many shells suggests that internal whorl penetration was the result of a filing or rubbing action rather than a cutting process. This is confirmed by examination of the area of penetration into the upper whorl which often shows clear signs of wear around the hole suggesting that some sort of tool was pushed backwards and forwards through the aperture (Fig. 4). In some cases there is evidence of internal whorl and columella removal *via* a hole in the side of the spire. Coral files (*Acropora cervicornis*) are common at Indian Creek but would have been too large and soft for this purpose. However flint flakes, which are both small and sharp enough, are plentiful and could have been used. Why the Indian Creek people should have modified the shells in this way is not known. Examples of 22 species of gastropod have been collected which show signs of having been worked (*vid.* Appendix). The group is diverse including shells with a more or less round aperture (*e.g.* *Nerita*, *Tectarius*, *Natica*), shells with a

siphonal canal (e.g. *Murex*, *Strombus*, *Cymatium*) and shells with relatively small openings (*Oliva*). Curiously, the shells of *Turbo castanea* which were frequently recovered were never found to be modified. Perhaps there is some significance in this. As stated, modification of this type was confined to small shells in my material, and is unlikely to be concerned with the removal of soft parts for food. Hoffman (1970) has reported large *Cassia* and *Charonia* which have had almost all of the columella and internal whorls removed and suggests that they could have been used as vessels, which, while it may be true cannot hold for these smaller shells. Whatever the purpose of the modification the practice seems to have been common and widespread in both time and space. Worked shells have been recovered from most of the levels at Indian Creek and are so plentiful that it is likely that the whole midden contains close to a million such shells. The author has been shown a typically modified specimen of *Colymbella meratoria* from the Virgin Islands and has been assured that such shells are relatively common there (Linda S. Robinson, personal communication). Similar material also has been collected from Barbuda (David R. Watters, personal communication) although a superficial examination of Watters' shell material from Montserrat failed to reveal this type of modification.

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Appendix

Species of gastropod recovered from Indian Creek showing internal whorl and columella modification.

Cittarium pica
Astraea caelata
A. tuber
Nerita peloronta
N. versicolor
N. tessellata
Cerithium algicola
Tectarius muricatus

Strombus gigas (immature)
Natica canrena
Cymatium poulsenii
C. caribbeaum
C. microbaricum
C. pileare
C. paribenopeum

Murex pomum
M. brevifrons
Thais deltoidea
Nassarius albus
Leucozomia nassa
L. ocellate
Oliva sp.

TABLE

Numbers of gastropod shells recovered from Indian Creek Pits I and II (excluding *Cittarium pica*).

Pit I			Pit II		
Level	Total Shells	Modified Shells	Level	Total Shells	Modified Shells
1a	8	3	1a	8	2
1b	9	6	1b	5	1
2a	11	5	2a	0	0
2b	8	1	2b	0	0
3a	6	2	3a	0	0
3b	19	8	3b	1	1
4a	17	8	4a	1	0
4b	10	5	4b	1	0
5a	20	4	5a	25	20
5b	13	5	5b	52	27
6a	9	3			

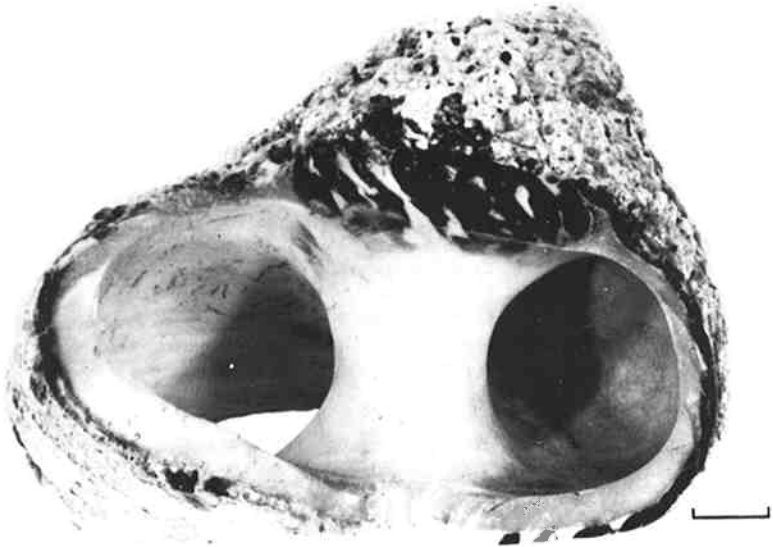


FIGURE 1.
Cittarium pica: a lateral view of a typical specimen showing whorl removal. Scale bar represents 10 mm.

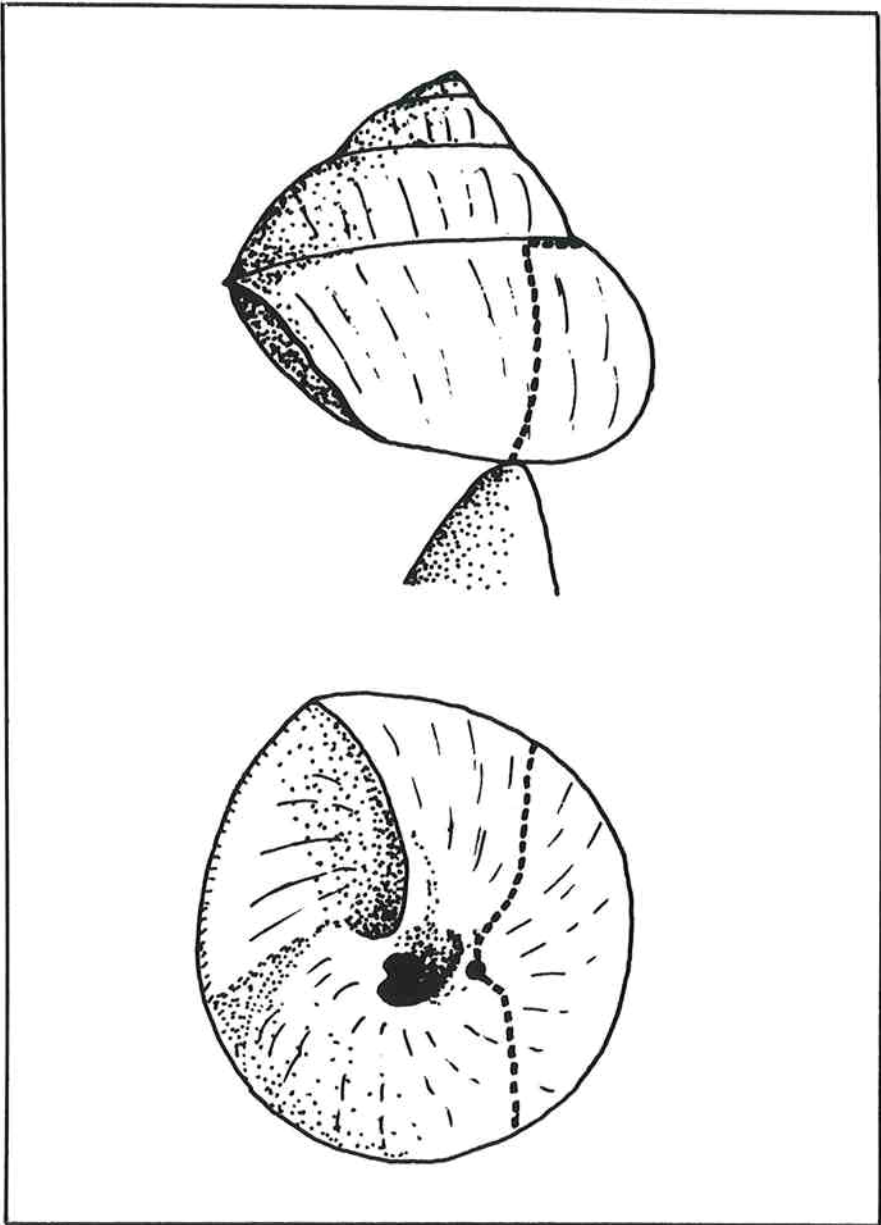


FIGURE 2.

The upper diagram shows the suggested method of whorl removal, striking the shell downwards onto a pointed stone. The portion marked by the dotted line breaks away. The lower diagram shows the breakage(dotted) line and the point of impact (black spot) from a ventral view.

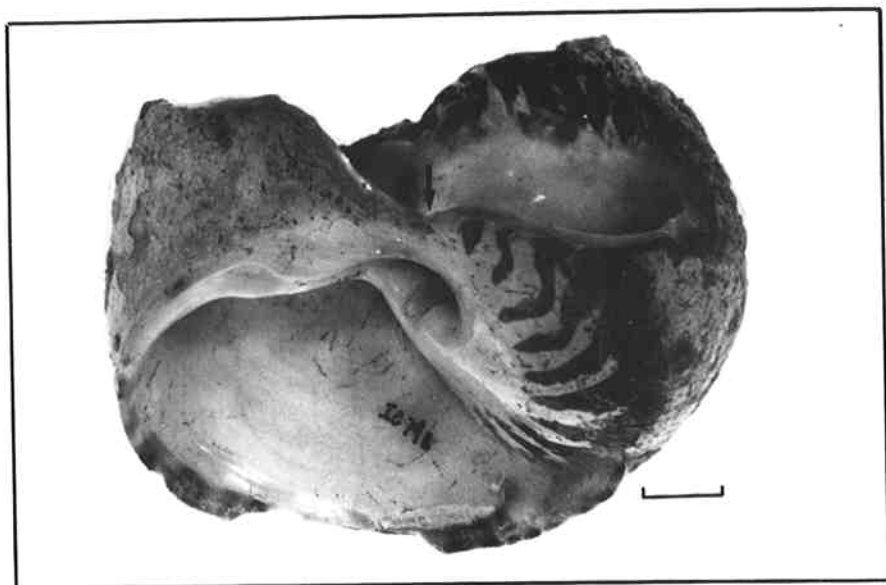


FIGURE 3.

- a. Ventral view of the shell shown in Fig. 1. Point of impact shown by an arrow.
- b. Shell broken by the author by method shown in Fig. 2. Point of impact showed by an arrow. Scale bar represents 10 mm.

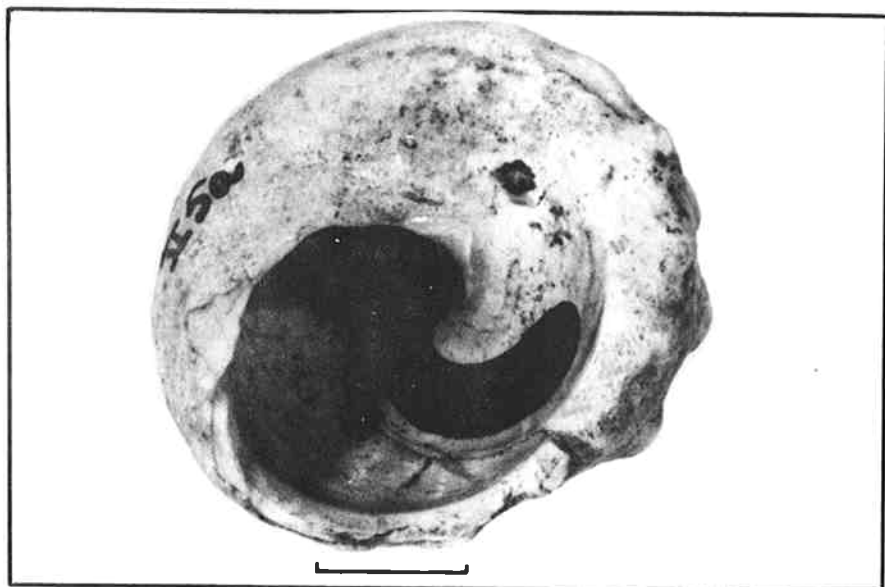


FIGURE 4.

Astraea tuber: inner whorl penetrated. Note the wear marks at the extremity of the penetration. Scale bar represents 10 mm.

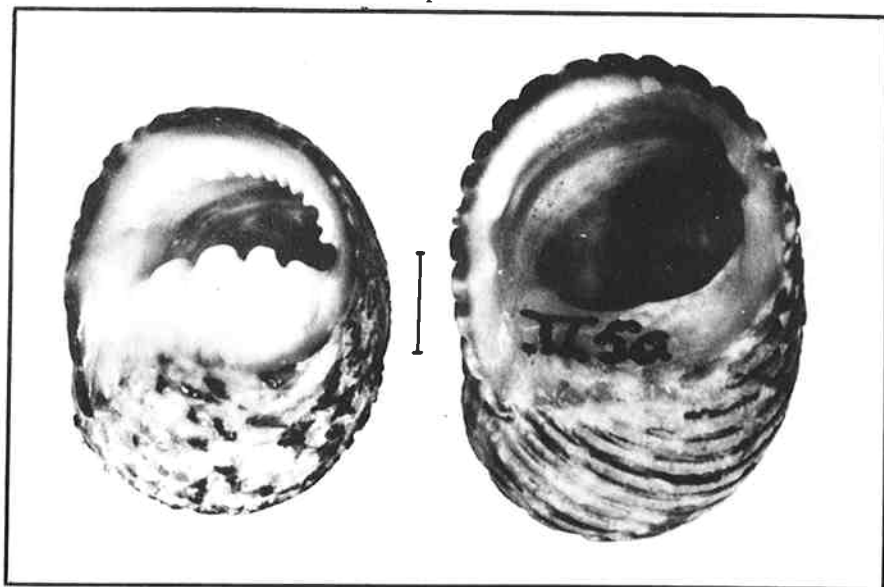


FIGURE 5.

Nerita versicolor: The left hand specimen is recent and intact. The right hand shell recovered from Indian Creek has had the teeth removed from the parietal area and around the aperture. Scale bar represents 5 mm.

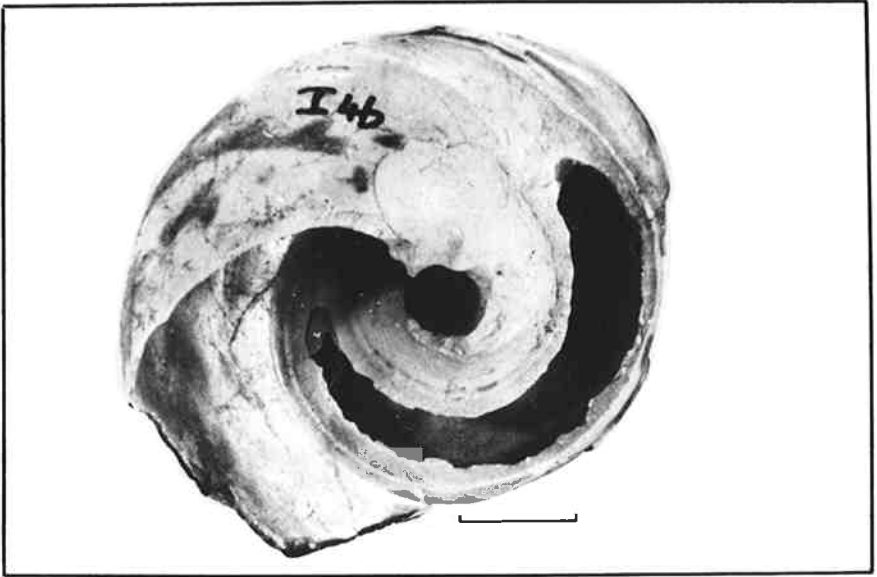


FIGURE 6.

Cistarium pica: showing (in a broken shell) whorl penetration and modification of the umbilicus. Scale bar represents 10 mm.

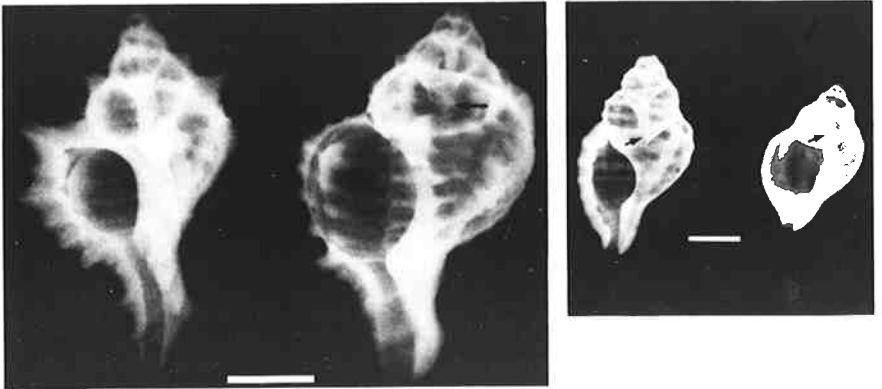


FIGURE 7.

X-radiographs of modified shells.

a. Left hand shell is an unmodified *Murex brevisfrons*. On the right a modified *M. pomum* from which the columella has been removed as far as the arrow.

b. *Cymatium* sp. showing columella removal to the arrow. Scale bar represents 10 mm.