Preistoria Alpina	v. 34 (1998)	pp. 185-191	Museo Tridentino di Scienze Naturali	Trento 2001	ISSN 0393-0157

The malacological collection from Riparo Dalmeri (Trento)

GIAMPAOLO DALMERI & CHIARA FIOCCHI

ABSTRACT - The collection is composed of twenty-five shells and has been studied from a paleontological and palethnological point of view. A total of five species have been determined which are all present in the modern fauna in the Mediterranean area and which are probably contemporary with the age of the site. An ornamental use is very probable because there are a lot of perforations which have also been studied using both a stereomicroscope and a scanning electron microscope. Comparisons were made with other malacological collections from Epigravettian sites on the southern slopes of the Eastern Alps.

Key words: Riparo Dalmeri, Veneto, Final Epigravettian, Malacology, Ornaments
Parole chiave: Riparo Dalmeri, Veneto, Epigravettiano recente, Malacologia, Ornamenti

Giampaolo Dalmeri - Museo Tridentino di Scienze Naturali, Via Calepina 14, I-38100 Trento
Chiara Fiocchi - Dip. Scienze Geologiche e Paleontologiche, Università di Ferrara, Corso Ercole I d'Este 32, I-44100 Ferrara. E-mail: fcc@dns.unife.it

1. THE FAUNA AND THE STATE OF PRESERVATION

The malacological collection found in the final Epigravettian levels at Dalmeri rockshelter, at the end of the excavation campaign which took place in the year 1997, is composed of twenty-five mollusca shells belonging to the Class of Gastropods. Five species were determined; two of these are in open nomenclature: *Cyclope* sp., *Cyclope neritea* (LINNAEUS, 1758), *Cyclope pellucida* Risso, 1826, *Columbella rustica* (LINNAEUS, 1758) and *Mitra* sp. (Fig.1). The shells are preserved quite well and only a low percentage is fragmented (Fig.2). The *Columbella rustica* specimens are slightly decorticated, while the *Cyclope* shells present more evident alterations of the surface. Traces of the original colour are present in one of the specimens of *Cyclope neritea* which features a flamey brown colour.

2. OBSERVATION ON THE SPECIES

A systematic general outline of the identified species, the number of samples found, the habitat and the geographic distribution hereby follows. The classification presented by BODON *et al.* (1995) in the Checklist of the Italian fauna species has been used for the general systematic outline.

Class: Gastropods
Subclass: Prosobranchia
Superorder: Caenogastropods
Order: Neogastropds
Family: Buccinidae
Genus: *Cyclope* Risso, 1826

Cyclope sp.
Material: 1 shell.
Observations: this is a fragment of only part of the columella callus and of the columella, so it was impossible to determine the exact species that it belongs to.

Cyclope neritea (LINNAEUS, 1758)
Material: 5 shells, four of which were almost completely intact.
Habitat: this species lives on sandy mobile substrata on the intercoastal area. It is an euryhaline species diffused in estuaries and brackish lagoon enviroments, belonging to the Bio-complexes of the Euryhaline and Eurytherm Lagoons (PÉRÈS & PICARD, 1964).
Geographic distribution: diffused in all of the Mediterranean area.

Cyclope pellucida Risso, 1826
Material: 2 shells, one of which is almost completely intact.
Habitat: lives in the mobile substrata on the top level of the intercoastal area, associated with the bio-complexes of the sands which are quite protected from the breaking of the waves (PÉRÈS & PICARD, 1964).This species is also present in the bio-complexes of fine superficial layers of sands at a depth of 0 to 2.5cm (PÉRÈS & PICARD, 1964; SABELLI & SPADA, 1977). In waters with a low content of salt it is substituted by *C. neritea* (LINNAEUS, 1758).
Geographic distribution: species common in all of the Mediterranean area.

Family COLUMBELLIDAE
Type *Columbella* Lamarck, 1799

Columbella rustica (LINNAEUS, 1758)
Material: 16 shells, ten of which were almost completely intact.
Habitat: lives on the intercoastal levels, either under stones or associated with algae and Zosteracae (SABELLI & SPADA, 1986).
Geographic distribution: species abundant in all of the Mediterranean area.

Family MITRIDAE
Type *Mitra* Lamarck, 1798

Mitra sp.
Material: 1 shell.
Observations: part of the last circle is missing and the columella is exposed showing the characteristic columella pleats.

3. THE SELECTION AND THE POSSIBLE PROVENANCE

All the species that were determined belong to the modern fauna present in the Mediterranean area (*e.g.* BODON *et al.*, 1955; POPPE & GOTO, 1991; COSSIGNANI *et al.*, 1992; D'ANGELO & GARGIULLO, 1981). The absence of fossil species and the well-conserved specimens suggest that the shells are contemporary with the age of the site, although the absence of radiocarbon dates of the shells does not allow to confirm this hypothesis.

Apart from just the one fragment belonging to the *Mitra* sp., whose form vaguely reminds us of the *Columbella rustica*, only the *Cyclope* and *Columbella* species were present. Due to the fact that only two species were found, it would seem that they were purposely chosen by man and were probably gathered along the beaches. The two species have, in fact, very distinct forms: low orbicular (genus *Cyclope*) or spiral (genus *Columbella* and *Mitra*.) forms. In natural conditions the shells are shiny with a porcelain-coloured smooth surface and their colour is characterised by blotches and small flames. Neither of the species show evident signs of ornaments or sculpture. Both the species have a smooth surface.

4. THE PERFORATIONS

Each of the fourteen specimens have one perforation: *Cyclope neritea* (one perforation), *Cyclope pellucida* (two), and *Columbella rustica* (eleven). These perforations are always located near the border of the labium and have a subcircular outline and irregular margins with very sharp edges (Fig.3). Three hypotheses have been put forward to explain the origin of these perforations: they could be fractures caused by the impact on hard surfaces due to the waves, or traces of predators such as Crustacean Decapods (ROBBA & OSTINELLI, 1975), or otherwise they could be made by man (TABORIN, 1993a,1993b). Experiments carried out show that if the perforations result from anthropic activity, pressure and indirect percussion techniques must have been used to produce similar perforations (FRANCIS, 1982; TABORIN, 1993a). Analyses carried out using both a stereomicroscope and a scanning electron microscope have not produced conclusive results in distinguishing how the perforations came about since there are no traces (Fig.3). The shells could have been used for ornamental reasons. Perhaps they were already perforated, or they were perforated later. The stereomicroscopic analysis showed that there were traces of a reddish colouring which was probably ochre, along the sutures and inside some of the specimens.

5. COMPARISONS

Parallelisms can be found in the molluscfauna of Dalmeri rockshelter and the collections recovered on three Epigravettian sites on the Southern slopes of the Eastern Alps: Villabruna rockshelter A (Sovramonte-BL), Tagliente rockshelter (Stallavena di Grezzana-VR), and Biarzo rockshelter (Biarzo-UD) (Fig.4). Four marine shells were found at Riparo Villabruna A (A-

MAR *et al.*, 1994) respectively from the subunits 9A, 5, 4A and from the rearranged deposit. Three of these belong to the Class of Gastropods: two specimens of *Columbella rustica* (LINNAEUS, 1758) and one specimen of *Mitra* sp. One of the shells has been attributed to the Class of Scafopods, *Dentalium* cf. *inaequicostatum* Dautzemberg, 1891 species.

127 specimens were identified at Tagliente rockshelter belonging both to the Class of Gastropods and the Class of Bivalves (BENINI ACCORSI, 1974). Two species of the Class of Gastropods were identified, one of which is in open nomenclature: a specimen of *Aphorrais* sp. and 124 specimens of *Cyclope neritea* (LINNEAUS, 1758). Two specimens belonging to the Class of Bivalves were identified, attributed to the *Glycymeris* sp. in open nomenclature. All the shells belonging to the *Cyclope* type feature a perforation near the border of the labium, while in the *Glycymeris* sp. and in the *Aporrhais* sp. there is evidence of polishing as well (BENINI ACCORSI, 1974). During excavation campaigns which took place after 1973, many other shells were found (Guerreschi, pers. com.).

Thirteen shells and two fragments belonging to the Class of Gastropods and to the Class of Bivalves (GIOVANNELLI, 1996) were found in level 5 at the Biarzo rockshelter. Four species belonging to the Gastropods were identified, one of which in open nomenclature: one specimen of *Theodoxus* cf. *danubialis* (PFEIFFER, 1828), three specimens of *Littorina (Melaraphe) neritoides* (LINNAEUS, 1758), six specimens and a fragment of *Cyclope (C.) neritea* (LINNAEUS, 1758) and three specimens of *Columbella rustica* (LINNAEUS, 1758). Just one fragment is attributed to the Class of Bivalves, to the *Unio* cf. *elongatulus* (Pfeiffer, 1825) species, in open nomenclature. Apart from the fragment of *Unio* cf. *elongatulus*, all the other specimens had one perforation. All the species stated above are typically marine, apart from *Theodoxus danubialis* (PFEIFFER, 1828) and *Unio elongatulus* C.Pfeiffer, 1825, which live in fresh waters.

6. CONSIDERATIONS

The exams of the mollusc collections allows for different opinions in evaluating the role of these materials. The limited amount of species present indicates that man chose the shells when gathering them, considering that the thanato-complexes of the shell detritus on the shores or the fossil finds were usually more varied. The fact that only a few species with particular morphologies were gathered is obviously related to their use. The shells were used mainly for their symbolic significance. Each different shape was probably attributed with a different significance, as for example the family origin or the social class. The shells could have also been used as amulets and have a magic significance.

The specimens were found in sites far from the sea and could have been obtained in two different ways: special organized journeys from the site to the gathering area or through exchange. Considering that the present distance from Dalmeri rockshelter to the nearest north Adriatic coast is about 80Km, the journey was very long. During the Tardiglacial period, it was even further away because the coasts were much lower and were -60 m from the present sea level as estimated by many authors, (*e.g.* LABEYRIE *et al.*, 1987; Shackleton, in BARD *et al.*, 1990; FAVERO, 1984).

The specimens of the Dalmeri rockshelter shells that are perforated were probably used as beads, as dressing pendants or ornaments, although the analysis using scanning electron microscope has not come to any conclusions. The analysed shells, in fact, do not show particular or evident wear to be able to compare them with the insufficient bibliography on the matter (D'ERRICO *et al.*, 1993; TABORIN, 1993a). Further analyses will be carried out on this aspect as well as on the origin of the perforations featuring subcircular profile and irregular margins with very sharp edges.

ACKNOWLEDGEMENTS

The study was carried out with the financial help of the Consiglio Nazionale delle Ricerche (n.96.04098.CT08). Special thanks to: Prof. A.Broglio for reading the manuscript, M.Taviani for the revision of the part dealing with the malacological study and Prof. G.Giacobini for having tutored one of the writers (C.F.) during the stereomicroscope and scanning electron study of the malacological collection.

SUMMARY - Twenty-five well preserved mollusc shells have been found in the final Epigravettian levels at Dalmeri Rockshelter (Trento) which were probably used as ornaments. A total of five species have been determined, all of which belong to the Class of Gastropods; two of these are in open nomenclature and they are all present in the modern fauna in the Mediterranean: *Cyclope* sp. (1 specimen), *Cyclope neritea* (5), *Cyclope pellucida* (2), *Columbella rustica* (16) and *Mitra* sp. (1). The shells have two different shapes: low orbicular (genus *Cyclope*) or spiral (*Columbella rustica* and *Mitra* sp.); in natural conditions the shells are shiny with a porcelain coloured smooth surface. The good preservation and the absence of fossil species suggests that the shells are contemporary with the age of the site, although the absence of radiocarbon dates from the shells themselves means that it is not possible to confirm this hypothesis. Fourteen specimens have perforations, always located near the border of the labium and with a subcircular contour and irregular margins. Various hypotheses have been put forward to explain the presence of these perforations: natural, caused by predators or resulting from anthropic activity, although the analysis using both a stereomicroscope and a scanning electron microscope has not produced conclusive results since the perforations are lacking any traces. The comparative analysis of the malacological collections from Epigravettian sites on the southern slopes of the Eastern Alps has demonstrated that only a small number of species was collected, and that these were likely to have been chosen on the basis of their form since they were probably attributed with a social, economic, juridical or religious significance. Future research will be developed on the specific use of the shells and on the origins of the perforations *(trad. S. Milliken).*

RIASSUNTO - Nei livelli dell'Epigravettiano recente del Riparo Dalmeri (Trento) sono state rinvenute venticinque conchiglie di Molluschi, in buono stato di conservazione, utilizzate probabilmente a scopo ornamentale. Gli esemplari appartengono alla Classe dei Gasteropodi e sono rappresentativi di cinque specie, di cui due in nomenclatura aperta, tutte appartenenti alla fauna attuale del Mediterraneo: *Cyclope* sp. (1 esemplare), *Cyclope neritea* (5), *Cyclope pellucida* (2), *Columbella rustica* (16) e *Mitra* sp. (1). Le conchiglie hanno due forme morfologiche ben distinte: orbicolare depressa (genere *Cyclope*) e ad avvolgimento a spirale (*Columbella rustica* e *Mitra* sp.); allo stato naturale sono lucide e porcellanacee e possiedono la superficie liscia. Il buono stato di conservazione e l'assenza di specie fossili permettono di supporre la contemporaneità tra l'età delle conchiglie e l'età del sito in questione, anche se, a conferma di tale ipotesi, mancano delle datazioni radiometriche effettuate sulle conchiglie stesse. Quattordici esemplari presentano un foro, sempre localizzato vicino al bordo del labbro e dal contorno subcircolare a margini irregolari. Per giustificare la presenza di questi fori sono state avanzate diverse ipotesi: azione naturale, di predazione oppure azione antropica, ma l'analisi condotta allo stereomicroscopio e alla scansione elettronica non ha fornito risultati conclusivi, poiché il fori si presentano privi di qualsiasi tipo di traccia. L'analisi comparativa delle collezioni malacologiche provenienti da siti di età epigravettiana del versante meridionale delle Alpi orientali, ha mostrato la costante presenza di sole poche specie, selezionate probabilmente in base alla forma poiché ad essa veniva probabilmente attribuito un particolare significato sociale, economico, giuridico o religioso. La ricerca infine avrà ulteriori approfondimenti sia per quanto riguarda lo specifico utilizzo delle conchiglie, sia per l'origine dei fori presenti.

REFERENCES

AIMAR A., ALCIATI G., BROGLIO A., CASTELLETTI L., D'AMICO C., GIACOBINI G., MASPERO A. & PERESANI M., 1994 - Les abris Villabruna dans la Vallée du Cismon. *Preistoria Alpina* 28:227-254

BARD E., HAMELIN B., FAIRBANKS R.G. & ZINDLER A., 1990 - Calibration of the C14 timescale over the past 30,000 years using mass spectrometric U-Th ages from Barbados corals. *Nature* 345:405-410

BENINI ACCORSI C., 1974 - Le conchiglie lavorate dell'Epigravettiano evoluto del Riparo Tagliente. *Memorie Museo Civico Storia Naturale diVerona* 20:405-411

BODON M., FAVILLI L., GIANNUZZI SAVELLI R., GIOVINE F., GIUSTI F., MANGANELLI G., MELONE G., OLIVERIO M., SABELLI B. & SPADA G., 1995 - Gasteropoda Prosobranchia, Heterobranchia Heterostropha. In: A.Minelli, S.Ruffo & S.La Posta (eds), Checklist delle Specie della Fauna Italiana 14. Calderini, Bologna

COSSIGNANI T., COSSIGNANI V., DI NISIO A. & PASSAMONTI M., 1992 - Atlante delle Conchiglie del Medio Adriatico. L'Informatore Piceno, Cupra Marittima (AN)

D'ANGELO G. & GARGIULLO S., 1981 - Guida alle Conchiglie Mediterranee, Conoscerle Cercarle Collezionarle. Fabbri editori, Milano

D'ERRICO F., JARDON-GINER P. & SOLER-MAYOR B., 1993 - Critères à base expèrimentale pour l'étude des perforations naturelles et intentionnelles sur coquillages. In: P.C.Anderson, S.Beyries, M.Otte & H.Plisson (eds), Traces et Fonction: les Gestes Retrouvés, *ERAUL* 50:243-254. Liège

FAVERO V., 1984 - Evoluzione delle linee di costa dell'Altoadriatico. In: A.Aspes (ed), Il Veneto nell'Antichità, p.53-68. Banca Popolare di Verona

FRANCIS P., 1982 - Experiments with early techniques for making whole shells into beads. *Current Anthropology* 23,6:710-714

GIOVANNELLI M.M., 1996 - I molluschi utilizzati dell'uo-

mo. In: A.Guerreschi (ed), Il Sito Preistorico del Riparo di Biarzo (Valle del Natisone, Friuli). Museo Friulano di Storia Naturale, Comune di Udine

LABEYRIE L.D., DUPLESSY J.C. & BLANC P.J., 1987 - Variations in mode of formation and temperature of oceanic deep waters over the past 125,000 years. *Nature* 327:477-482

PÉRÉS J.M. & PICARD J., 1964 - Nouveau manuel de Bionomie benthique de la Mer Mediterranee. *Recueil des Traveax de la Station Marine d' Endoume* 31,47:1-137

POPPE G. T. &, GOTO Y., 1991 - European Seashells, Vol. I. Verlag Christa Hemmen-Viesbaden

ROBBA E. & OSTINELLI F., 1975 - Testimonianze di predazione sui molluschi pliocenici di Albenga. *Rivista Italiana di Paleontologia* 81,3:309-372

SABELLI B. & SPADA G., 1977 - Guida illustrata alla identificazione delle conchiglie del Mediterraneo. *Conchiglie* XIII,11-12

SABELLI B. & SPADA G., 1986 - Guida illustrata alla identificazione delle conchiglie del Mediterraneo. *Bollettino Malacologico* XXII,1-4

TABORIN Y., 1993a - Traces de façonnage et d'usage sur les coquillages perforès. In: P.C.Anderson, S.Beyries, M.Otte & H.Plisson (eds), Traces et Fonction: les Gestes Retrouvés, *ERAUL* 50: 255-267

TABORIN Y., 1993b - La parure en coquillage au Paléolithique. *Gallia préhistoire* suppl.29:1-538. CNRS

Cyclope sp.

Q.	U.S.	Height	Width
44N/a	26b+c	8	7

Cyclope neritea (LINNAEUS, 1758)

Q.	U.S.	Height	Width
49M/f	14b	9	7
41N/c	26b	10	9
40I/h	26b1	9	8
41N/a	26c	13	10
42N/d	26c	9	8

Cyclope pellucida Risso, 1826

Q.	U.S.	Height	Width
49M/h-g	4a-14b	8	6
50M/e	14	9	6

Columbella rustica (LINNAEUS, 1758)

Q.	U.S.	Height	Width
49M/i	4a-14b	10	8
48N/b	11-12	12	9
49M/g	4a	9	7
48L/c	14	13	8
50M/e	14	16	9
48I/d	14b	16	10
45M/g	25b	13	8
44M/d	26	10	7
41M/h	26b	14	9
41N/g	26b	13	8
42N/b	26b	13	9
44M/i	26b	14	9
47L/b	26b	13	8
46I/g	26c	13	7
46M/h	28	18	11
44N/a	26b+c	14	9

Mitra sp.

Q.	U.S.	Height	Width
44L/i	24a	12	7

Fig. 1 - Dalmeri rockshelter. Composition, area of distribution, stratigraphic distribution and the measure values of the malacological collection

Fig. 2 - Dalmeri rockshelter. Some specimens of *Columbella rustica*: the good state of preservation can be seen as well as the morphology and the repetitive position of the perforations (photograph: R. Brandoli)

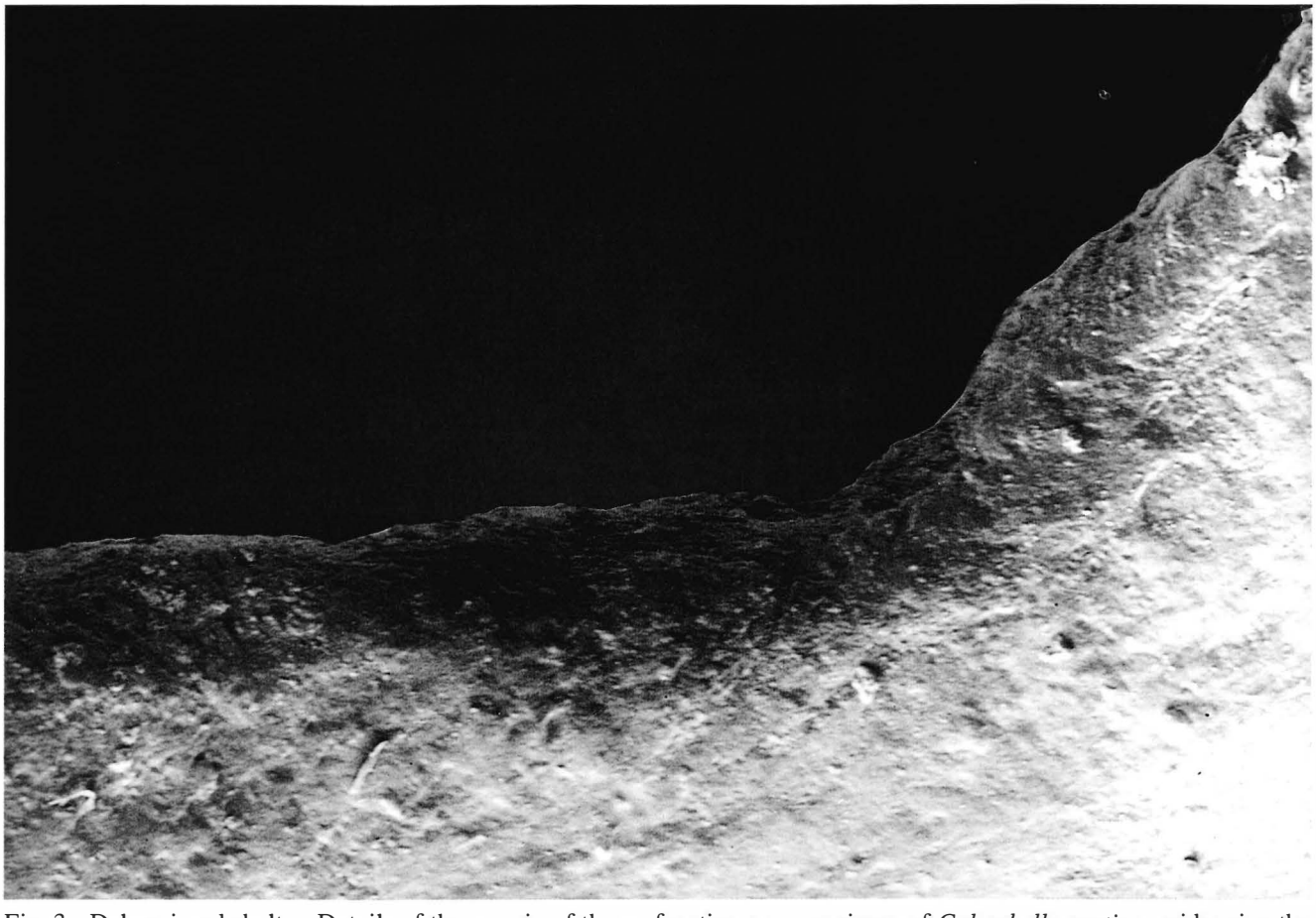

Fig. 3 - Dalmeri rockshelter. Details of the margin of the perforation on a specimen of *Columbella rustica*, evidencing the irregular surface and the complete lack of traces (SEM photograph: G. Giacobini)

	Riparo Dalmeri	Riparo Villabruna A	Riparo Tagliente	Riparo di Biarzo
Cyclope pellucida Risso, 1826	2			
Cyclope neritea (Linnaeus, 1758)	5		124	7
Columbella rustica (Linnaeus, 1758)	15	2		3
Mitra sp.	1	1		
Aporrhais sp.			1	
Theodoxus danubialis (Pfeiffer, 1828)				1
Littorina neritorides (Linnaeus, 1758)				3
Glycymeris sp.			2	
Unio elongatulus C. Pfeiffer, 1825				1
Dentalium cf *inaequicostatumm* Dautzemberg, 1891		1		
TOTAL	23	3	127	15

Fig. 4 - Composition of the malacological collection of the Epigravettian sites of the Southern slopes of the Eastern Alps