

## 8. The mollusk fauna of the Monte Postale

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Fossil marine mollusks from Monte Postale, about one mile NE of Bolca (Verona and Vicenza Provinces) and 300 m N of the “Pesciara” (see the map in Papazzoni & Trevisani, 2006), were collected and catalogued at least since the 18<sup>th</sup> century. Shells were first seen, in the second decade of the 19<sup>th</sup> century, as means to date the rocks, and the already famous “Monte Bolca” fauna was one of the first tackled by a new generation of modern geologists. In 1823, on the footsteps of Alberto Fortis (1778), Alexandre Brongniart drew stratigraphic sections and collected fossils in the Vicenza province, assigning the Bolca and Roncà invertebrates to one and the same geological interval. In the newly introduced bipartition of the Tertiary, the Bolca fossils showed close affinities with mollusks of the Paris Basin. This meant to Brongniart that they belonged to the older Tertiary, and were distinct from the fossil shells described by Giambattista Brocchi in 1814, typifying the younger Tertiary (Rudwick, 2005). “I can relate the calcareous-trappic terrains of Northern Italy to the lower formation, the most ancient of the upper sediment [i.e., the Tertiary]. I’m struck by the analogy between these two terrains, their utter similarity under almost any aspect. Nothing of the lower terrains of the Parisian limestone is missing in Bolca, Roncà, etc. Many shells are absolutely of the same species: Strombus, Melania, Turritella, Caryophyllia are present in both” (Brongniart, 1823).

Tommaso Antonio Catullo, successor of Stefano Andrea Renier at the Natural History chair of the University of Padova, reported that the Monte Postale fossil shells belonged to the uppermost part of the local succession, above the famous ichthyolithic strata. “The grey shelly limestone covers the basalt, forming the top of the mountain. (...) The shells collected so far belong to the upper sedimentary formation” (Catullo, 1826).

The first modern account of these fossil shells was published by Ferdinand Bayan in 1870, after a tour guided by Giovanni Meneguzzo in 1869. The shelly limestone, close to the top of Monte Postale, was dubbed “Limestone with *Cerithium gomphoceras*, *Alveolina longa*, etc.”. Bayan listed 16 characteristic species of gastropods, and one lucinid bivalve, assigning the unit to his Eocene “interval B”, immediately preceding the strata with the Roncà and San Giovanni Ilarione faunas (Bayan, 1870a). Bayan dedicated a short monograph to many new species he had encountered, including *Cerithium gomphoceras* and other characteristic gastropods, such as *Cerithium vicetinum* and *Cerithium chaperi* (Bayan, 1870b; the monograph faced heavy, unjustified criticism: Anonymous, 1871) (Figs 1-2).

In the same year, Karl Mayer introduced *Lucina escheri* and other new taxa from the “strata with *Cerithium giganteum* of Monte Postale” (Mayer, 1870), together with new names for species already described by Bayan. “*Cerithium giganteum*” of Mayer



FIG. 1- Plate I of Bayan (1870b) showing, among the others, the adult shells of *Bellatara palaeochroma* (1), *Pseudobellardia gomphoceras* (2, 3), *Cerithium chaperi* (4, 5), and juveniles of *Velates schmidelianus* (6).

(1870), in fact distinct from the Paris Basin congeneric form, was *Cerithium vicetinum* Bayan (1870b), so that their descriptions coincide. A short species list, very similar to Bayan's, was given in 1877 by Edmond Hébert & Ernest Munier-Chalmas, with additional information of the stratigraphy of the "Monte Postale limestone with *Cerithium gomphoceras*": "Immediately above [the ichthyolithic limestone], and deeply connected with it, we find the limestone exploited at the Monte Postale. Here the rock is filled with alveolinae, but a new fauna appears, together with some rare *Nummulites* and *Nerita schimdeliana*". These strata were referred to the "middle Eocene" by analogy with the Paris Basin fauna (Hébert & Munier-Chalmas, 1877).

The first dedicated paleontological monograph was published in 1895 by Antonio De Gregorio. This was introduced by a summary of previous studies, comprising a mention of the Bayan-Mayer priority issue, and with some information on the provenance of the fossils. Although De Gregorio partly collected the shells himself ("some specimens"), the bulk of his collection was purchased from Meneguzzo, who regularly provided other collectors and museums of the time. "Many species I have myself extracted from the blocks I was sent -I'm sure of the provenance of all my fossils, because I recommended to rigorously avoid all promiscuities, but also because the color of the fossils and the nature of the matrix are characteristic and impossible to misinterpret" (De Gregorio, 1895). De Gregorio lists some 21 species-level bivalves, 62 gastropods, and one cephalopod. He also reported that, compared to the Monte Postale species, "the S. Giovanni Ilarione and Roncà are much more numerous". The following year Paul Oppenheim, with a brief stratigraphic introduction based on Hébert & Munier (1877), raised the species count to 32 bivalves, 82 gastropods, and two cephalopods (Oppenheim, 1896). Meanwhile, two rather large collections were acquired by the Universities of Pisa and Firenze, thanks respectively to Giuseppe Meneghini and Igino Cocchi, and studied at the end of the century by Paolo Vinassa de Regny. In 1896 Vinassa listed 15 bivalve and 50 gastropod species, recognizing the paleoenvironmental meaning of the association, interpreting all cerithiiform gastropods as indicative of restricted coastal conditions. "Probably Monte Postale formed a bay of the Eocene sea, then becoming separated from it, towards subaerial conditions; the overall shallow marine aspect of the fauna, the abundance of new forms, decidedly of little marine affinity, prove this opinion, together with the brackish and terrestrial overlying faunas" (Vinassa de Regny, 1896).

The Monte Postale stratigraphy was revised and published by Ramiro Fabiani in his study of the Veneto Paleogene (Fabiani, 1915), confirming that the shells came from a single and very limited stratigraphic interval, his "unit 7b", or "*Alveolina* limestones with marine mollusks". Building on the Fabiani stratigraphy, and after revising all the existing literature and available species lists, Roberto Malaroda studied and published in 1954 a thorough study of all the specimens then hosted in the Padova, Verona, Pisa and Firenze museums. The Padova collection includes a small lot of specimens originally belonging to the De Gregori collection, once hosted in Palermo, and saved from destruction during World War II. According to this ultimate revision, the Monte Postale species-level list of Mollusca amount to 47 Bivalvia, 120 Gastropoda, and four Cephalopoda. However, the list includes many species cited by previous authors that Malaroda did not find in the collections he examined. Given the updated comparison with species lists from other European faunas, the study assigned the Monte Postale mollusks to the Lutetian (lower part of the middle Eocene) (Malaroda, 1954). In 2005 Cesare Papazzoni and Enrico Trevisani dated to the late Ypresian (Early Eocene) the portion of the Monte Postale succession below the mollusk levels. Since there are no updated biostratigraphic studies regarding the mollusk levels, they could be either of Ypresian age, as the underlying limestones, or

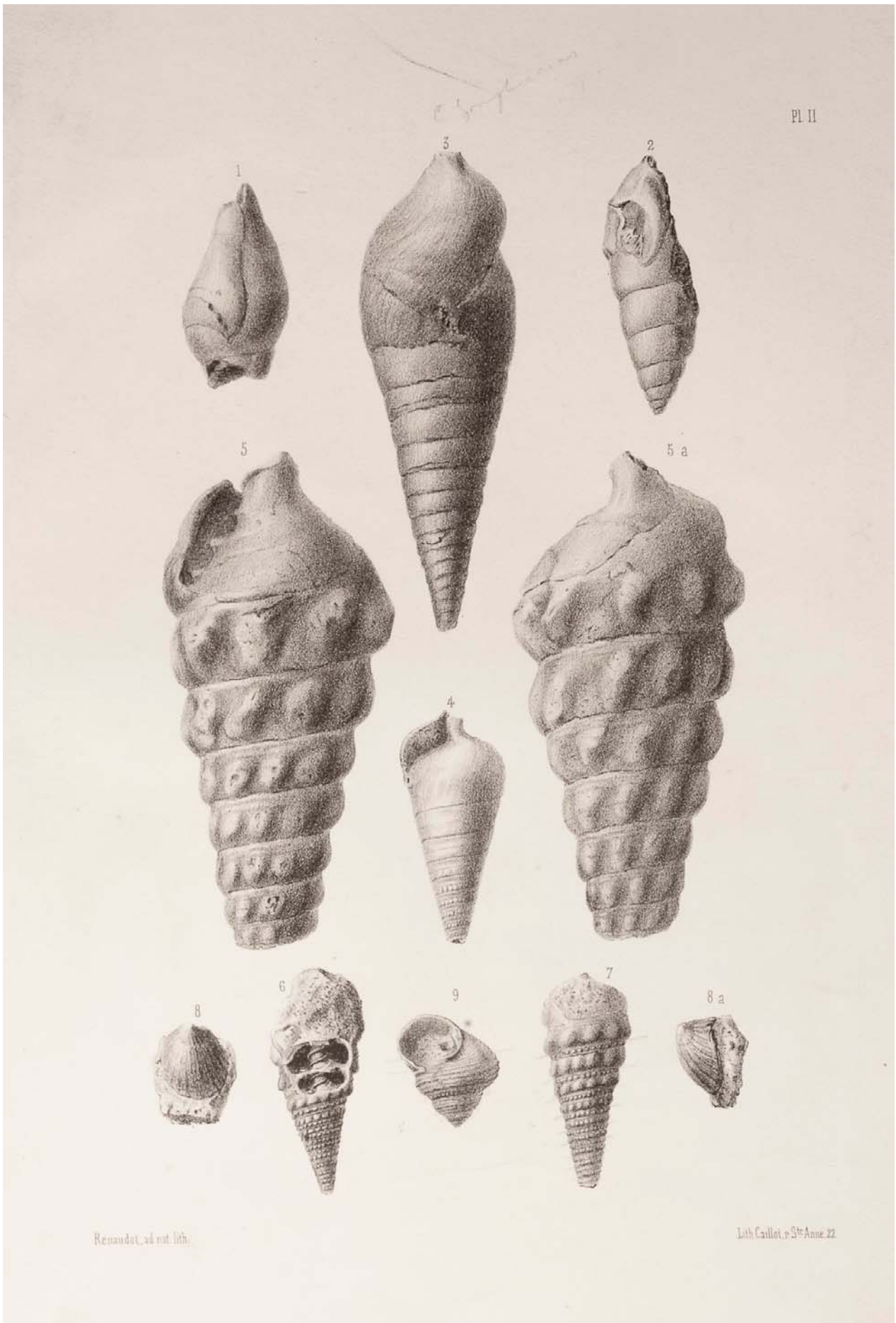


FIG. 2 - Plate II of Bayan (1870b), with *Pseudobellardia gomphoceras* (3, 4), and *Campanile vicetinum* (5, 5a, 6, 7).

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	Superfamily	Family	Species	This paper (2014) (Firenze)	Malaroda (1954) (Firenze)	Malaroda (1954) (Padova)	Malaroda (1954) (Pisa)	Malaroda (1954) (Verona)	Malaroda (1954) (TOTAL)
1	Mytiloidea	Mytilidae	<i>Modiola postalensis</i> Oppenheim, 1896	0	0	0	0	2	2
2	Ostreoidea	Ostreidae	<i>Crassostrea sparnacensis</i> (Defrance, in Deshayes, 1821)	1	1	0	0	0	1
3	Pectinoidea	Spondyliidae	<i>Spondylus radula</i> Lamarck, 1806	0	0	1	0	0	1
4	Lucinoidea	Lucinidae	<i>Pseudomiltha escheri</i> (Deshayes, 1824)	4	4	6	2	3	15
5	Lucinoidea	Lucinidae	<i>Pseudomiltha gigantea</i> (Deshayes, 1825)	2	0	16	3	9	28
6	Lucinoidea	Lucinidae	<i>Divalinga</i> sp.	0	0	2	0	0	2
7	Lucinoidea	Lucinidae	<i>Fimbria lamellosa</i> (Lamarck, 1806)	0	0	2	1	0	3
8	Lucinoidea	Lucinidae	<i>Fimbria major</i> (Bayan, 1870)	0	0	8	2	3	13
9	Tellinoidea	Tellinidae	<i>Tellina (Tellinella) biangularis</i> Deshayes, 1825	0	0	2	2	0	4
10	Tellinoidea	Tellinidae	<i>Tellina (Macaliopsis) scalaroides</i> Lamarck, 1806	0	0	1	0	0	1
11	Tellinoidea	Tellinidae	<i>Tellina (Macaliopsis) sp.</i>	0	0	0	0	1	1
12	Tellinoidea	Tellinidae	<i>Arcopagia (Bertinella) erycinoides</i> (Deshayes, 1824)	0	0	7	1	3	11
13	Cardioidea	Cardiidae	<i>Criocardium gratum</i> (Defrance, in Deshayes, 1829)	1	1	16	1	1	19
14	Cardioidea	Cardiidae	<i>Granocardium</i> sp.	1	1	1	1	3	6
15	Glossoidea	Glossidae	<i>Meiocardia carinata</i> (Deshayes, 1824)	0	0	1	0	0	1
16	Veneroidea	Veneridae	<i>Katelysia (Textivenus) texta</i> (Lamarck, 1806)	0	0	0	0	1	1
17	Veneroidea	Veneridae	<i>Venerella secunda</i> (Deshayes, 1857)	0	0	0	0	1	1
18	Veneroidea	Veneridae	<i>Pitar (Chionella) lunularia</i> (Deshayes, 1825)	0	0	1	0	0	1
19	Veneroidea	Veneridae	<i>Pitar (Calpitaria) parisiensis</i> (Deshayes, 1857)	0	0	1	0	0	1
20	Patelloidea	Patellidae	" <i>Patella</i> " <i>boreani</i> Bayan, 1870	0	0	1	0	0	1
21	Phasianelloidea	Colloniidae	<i>Homalopoma minimum</i> (Malaroda, 1954)	0	0	1	0	0	1
22	Trochoidea	Trochidae	<i>Clanculus zignoi</i> (Bayan, 1870)	6	6	24	8	6	44
23	Trochoidea	Calliostomatidae	<i>Calliostoma raffaelei</i> (Mayer-Eymar, 1888)	2	2	2	0	2	6
24	Trochoidea	Calliostomatidae	<i>Calliostoma mayeri</i> Fabiani, 1915	0	0	1	0	0	1
25	Trochoidea	Skeneidae	<i>Leucodiscus helicoides</i> (Cossmann, 1888)	0	0	0	0	1	1
26	Neritoidea	Neritidae	<i>Velates schmidelianus</i> Chemnitz, 1786	0	0	44	2	17	63
27	Neritoidea	Neritidae	<i>Neritopsis agassizi</i> Bayan, 1870	0	0	1	0	0	1
28	Cerithioidea	Cerithiidae	<i>Cerithium chaperi</i> (Bayan, 1870)	15	16	14	5	20	55
29	Cerithioidea	Cerithiidae	<i>Cerithium fabiani</i> Malaroda, 1954	0	0	5	0	1	6
30	Cerithioidea	Cerithiidae	<i>Pseudovertagus striatus</i> (Bruguière, 1792)	4	4	6	0	0	10
31	Cerithioidea	Cerithiidae	<i>Besançonina pyrenaica</i> (Cossmann, 1898)	0	0	3	1	3	7
32	Cerithioidea	Cerithiidae	<i>Ptychocerithium lamellosum</i> Bruguière, 1792	0	0	0	0	1	1
33	Cerithioidea	Cerithiidae	<i>Bellatara palaeochroma</i> (Bayan, 1870)	7	6	34	2	11	53
34	Cerithioidea	Thiaridae	<i>Pseudobellardia auriculata</i> (Schlotheim, 1820)	0	0	1	0	1	2
35	Cerithioidea	Thiaridae	<i>Pseudobellardia gomphoceras</i> Bayan, 1870	24	21	52	21	33	127
36	Cerithioidea	Potamididae	<i>Tympanotonos tristriatus</i> (Lamarck, 1804)	0	0	1	0	0	1
37	Cerithioidea	Batillariidae	<i>Pyrazopsis pentagonatus</i> (Schlotheim, 1820)	0	0	1	0	0	1
38	Cerithioidea	Siliquariidae	<i>Tenagodus</i> sp.	0	0	1	0	3	4
39	Cerithioidea	Turritellidae	<i>Vermicularia biangulatus</i> (Deshayes, 1832)	0	0	0	0	13	13
40	Campaniloidea	Campanilidae	<i>Campanile vicetinum</i> (Bayan, 1870)	7	9	53	11	19	92
41	Campaniloidea	Ampullinidae	<i>Ampullina vulcani</i> Brongniart, 1823	1	1	6	0	5	12
42	Campaniloidea	Ampullinidae	<i>Ampullina hybrida</i> (Lamarck, 1804)	1	1	39	5	5	50
43	Campaniloidea	Ampullinidae	<i>Pachycrommium circumfossa</i> (Rauff, 1884)	2	2	10	1	3	16
44	Littorinoidea	Littorinidae	<i>Littoraria (Littorinopsis) postalensis</i> (De Gregorio, 1870)	1	1	0	0	1	2
45	Vanikoroidea	Hipponicidae	<i>Hipponix cornucopiae</i> (Röding, 1798)	7	7	34	6	9	56
46	Naticoidea	Naticidae	<i>Cepatia cepacea</i> (Lamarck, 1804)	13	13	40	0	19	72
47	Stromboidea	Aporrhaidae	<i>Digitolabrum princeps</i> (Vasseur, 1881)	1	1	0	0	0	1
48	Stromboidea	Rostellariidae	<i>Semiterebellum postalensis</i> (Bayan, 1870)	10	11	42	8	9	70
49	Stromboidea	Seraphsidae	<i>Seraphs convolutum</i> (Lamarck, 1802)	8	8	23	9	5	45
50	Cypraeoidea	Cypraeidae	<i>Archicypraea lioyi</i> (Bayan, 1870)	3	3	19	3	4	29
51	Cypraeoidea	Cypraeidae	<i>Vicetia hantkeni</i> (Lefèvre, 1878)	0	0	3	0	1	4
52	Cypraeoidea	Cypraeidae	<i>Cypraeda elegans</i> (Sowerby, 1823)	0	0	1	1	0	2
53	Cypraeoidea	Cypraeidae	<i>Cypraeda (Protocypraeda) interposita</i> (Deshayes, 1855)	0	0	2	1	0	3
54	Cypraeoidea	Cypraeidae	<i>Cypraeglobina praegnans</i> (De Gregorio, 1880)	0	0	0	0	1	1
55	Tonnoidea	Cassidae	<i>Cassis postalensis</i> Oppenheim, 1896	0	0	1	0	0	1
56	Muricoidea	Muricidae	" <i>Drupa</i> " <i>crosei</i> (Mayer-Eymar, 1870)	0	0	0	1	0	1
57	Muricoidea	Volutidae	<i>Voluta musicalis</i> (Lamarck, 1802)	0	0	6	1	2	9
58	Buccinoidea	Fasciolaridae	<i>Clavilithes (Rhopalites) rugosus</i> (Lamarck, 1803)	0	0	2	1	0	3
59	Buccinoidea	Melongenidae	" <i>Melongena</i> " <i>robusta</i> Dainelli, 1915	0	0	1	0	0	1
60	Conoidea	Conidae	<i>Leptoconus deperditus</i> (Bruguière, 1972)	0	0	1	0	0	1
61	Conoidea	Conidae	<i>Hemiconus incomptus</i> (Deshayes, 1865)	0	0	1	0	2	3
62	Conoidea	Conidae	<i>Cryptoconus priscus</i> (Solander, in Brander, 1766)	0	0	1	0	0	1
63	Actenoidea	Acteonidae	<i>Liocarenus hilarionis</i> (Bayan, 1870)	1	1	0	0	0	1
64	Actenoidea	Acteonidae	<i>Acteon subinflatus</i> D'Orbigny, 1850	1	1	0	0	0	1
65	Architectonicoidea	Architectonicidae	<i>Architectonica bistrata</i> (Deshayes, 1832)	1	1	0	0	0	1
				124	122	542	100	224	988

TAB. 1- Species list of the Monte Postale molluscan fauna, with updated taxonomy and number of specimens. The latter refers to the collections of Firenze (checked by the author and according to Malaroda, 1954), Padova, Pisa, and Verona (all according to Malaroda, 1954).

younger (Lutetian) as pointed out by Malaroda (1954). A summary of the Monte Postale collection hosted at the Museo di Storia Naturale of the Università di Firenze is here reported with updated taxonomy (Tab. 1).

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