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RESULTS OF THE BRANNER-AGASSIZ
EXPEDITION TO BRAZIL.

V.

MOLLUSKS FROM THE VICINITY OF
PERNAMBUCO.

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DURING Dr. J. C. Branner's expedition for the study of the coast reefs of Northeastern Brazil collections of various invertebrates were made. As this region is seldom visited by naturalists and is important in the study of the geographical distribution of the mollusks of the Western Atlantic, Dr. Branner requested me to report on that part of the collection.

Both Dr. Pilsbry and myself in listing collections of shells from the Brazilian and Uruguayan coasts have been struck with the predominant Antillean element among the mollusks, and it seems as if the present distribution of littoral species must have been largely brought about before the discharge of the Amazonian watershed attained its present volume, since it is difficult to imagine exclusively shore species passing the barrier of several hundred miles of fresh water which intervenes between the present northern and southern strips of coast unaffected by this mighty flood. The present collection confirms the view previously taken of the very large Antillean element in the fauna. Ninety-one species in all were obtained; deduct-

ing from them four confined to land or fresh water, there remain eighty-seven, of which thirteen alone are peculiar to the eastern coast of South America south of the West Indies, and seventy-four are common Antillean shells. Two appeared to be undescribed, and one, a very young *Octopus*, was too immature for identification. This would leave eight-ninths of the species in common with the fauna of the Antilles. A large proportion of these extend at least as far southward as Montevideo, and the southern limit of the Antillean fauna may be regarded as situated in that vicinity.

Most of Dr. Branner's shells were obtained from the vicinity of Pernambuco, collections were made from the existing coral reefs, the limestone reefs of doubtful age which exist along this coast, and to some extent from the sand beaches behind the reefs. The collection was not large enough to indicate whether the fauna of the stone reefs and that of the coral reefs differ, but in all probability they do not.

The localities from which mollusks were obtained are as follows :

Pernambuco and Tacuara near by.

Maceio ; on granite boulders, sand beach and reefs, latitude $9^{\circ} 40' S.$

Boa Viagem ; stone reef.

Cotonello Bay.

Managuas and Mangosoules on the Rio Parahyba do Norte, Cabedello ; mangrove swamps.

Mamanguape ; stone reef, latitude $6^{\circ} 58' S.$

Rio Goyanna ; stone reef off the mouth of the river, latitude $6^{\circ} 33' S.$

Among the local species *Voluta hebræa* and *Turbinella ovoidea* appeared to be common, and *Fasciolaria aurantiaca* abundant. No peculiarity of texture or aspect which could be regarded as general differentiates the Antillean species of Brazil from the individuals of the same species found in the West Indies, the only approximation to such a feature being the gray color of the specimens of *Trivia pediculus* which I have not observed in any of our very numerous series of that species from the West Indies and Florida.

LIST OF THE SPECIES OBTAINED.

Ostrea puelchana d'Orbigny.

Mangosoules, Managuas and Maceio.

Ostrea equestris Say.

Managuas; attached to the shells of *Cerithium algicola*.

Spondylus echinatus Martyn.

Mamanguape; a single young valve.

Lima inflata Lamarck.

Maceio.

Margaritifera radiata Leach.

Goyanna; a single young valve.

Mytilus exustus Linné.

Maceio; young shell from oysters.

Mytilus exiguus Dunker.

Mamanguape; young shells.

Modiolus (Gregariella) coralliophagus Gmelin.

A single specimen at Cotonello Bay and another from a rock reef at Goyanna. This form is remarkable for the series of four or five sharp conical teeth on the hinge on each side of the largely internal ligament. These teeth are below the line of the marginal serrations. The exterior of the shell is covered with a concretionary layer which completely hides the posterior part of the valves and must act as a sort of operculum closing the entrance of its burrow against enemies and protecting the mollusk. This layer, like that on *Diberus*, must be partly due to the animal itself.

Lithophaga (Diberus) antillarum d'Orbigny.

Mamanguape, Maceio, Goyanna and Pernambuco; in coral.

Lithophaga nigra d'Orbigny.

Boa Viagem; one specimen.

Arca umbonata Lamarck.

Common on the reefs at Goyanna, Mamanguape, Pernambuco, Maceio and Boa Viagem.

Arca Adamsi (Shuttleworth) Smith.

Maceio, Mamanguape and Goyanna.

Arca (Scapharca) Deshayesii Hanley.

Pernambuco; one valve.

Arca (Cunearca) brasiliiana Lamarck.

Mamanguape; one valve.

Phacoides pectinatus Gmelin.

Mangosoules.

- Codakia orbicularis* Linné.
Maceio.
- Divaricella quadrisulcata* d'Orbigny.
Tacuara, Pernambuco.
- Cardium muricatum* Linné.
Pernambuco.
- Venus (Chione) cancellata* Linné.
Goyanna.
- Venus (Anomalocardia) flexuosa* Linné.
Mangosoules.
- Tivela mactroides* Born.
Mamanguape.
- Petricola typica* Jonas.
Maceio, Pernambuco and Boa Viagem; in coral.
- Sanguinolaria sanguinolenta* Gmelin.
Mamanguape.
- Tellina lineata* Turton.
Mangosoules and Maceio.
- Semele proficua* Pulteney.
Managuas.
- Mactrella alata* Spengler.
Mamanguape.
- Mulinia Branneri* Dall, n. sp.
Mamanguape.
- Gastrochæna ovata* Sowerby.
Goyanna; burrowing in stone.
- Martesia clavata* Lamarck.
Goyanna.
- Discinisca antillarum* d'Orbigny.
Goyanna; on the reef.
- Strophocheilus pudicus* Müller.
Mamanguape.
- Oxystyla pulchella* Spix.
Pernambuco.
- Planorbis helopilus* d'Orbigny.
Pernambuco.
- Bulla striata* Bruguière.
Mangosoules, Managuas and Maceio.
- Micromelo undata* Bruguière.
Goyanna; on the reef.
- Terebra cinerea* Born.
Goyanna, Maceio, and Boa Viagem.

Drillia Greeleyi Dall, n. sp.

Goyanna; on the reef.

Voluta hebræa Linné.

Pernambuco and Maceio; common.

Turbinella ovoidea Kiener.

Pernambuco, Managuas and Maceio.

Fasciolaria aurantiaca Lamarck.

Maceio, Pernambuco and Managuas.

Melongena morio Linné.

Mangosoules, Managuas and Maceio.

Latirus (Leucozonia) cingulifera Lamarck.

Pernambuco, Maceio and Goyanna; common.

Latirus (Leucozonia) ocellata Lamarck.

Pernambuco, Maceio and Goyanna; common.

Tritonidea auritula Link.

Pernambuco, Maceio, Mamanguape and Goyanna.

Pisania janeirensis d'Orbigny.

Maceio; on the reef.

Nassa vibex Say.

Rio Parahyba and Boa Viagem.

Anachis lyrata Sowerby.

Pernambuco, Boa Viagem and Cotonello Bay.

Columbella mercatoria Lamarck.

Maceio, and on the reef at Boa Viagem.

Murex brevifrons Lamarck.

Mangosoules and Managuas; young shells.

Purpura deltoidea Lamarck.

Pernambuco and Maceio.

Purpura (var.?) trinitatensis Guppy.

Mamanguape, Mangosoules, Managuas, Maceio, Goyanna and Pernambuco; common.

Coralliophila galea Gmelin.

Maceio; very variable.

Janthina communis Lamarck.

Mamanguape.

Distortrix reticulata Link.

Mangosoules.

Gyrineum ponderosum Reeve.Maceio. This may prove but one of the varieties of *Ranella affinis* Broderip, but the subdivisions by sculpture are convenient.**Lampusia pilearis** Lamarck.

Goyanna.

Lampusia chlorostoma Lamarck.

Maceio ; young, on the reef.

Cassis tuberosa Linné.

Maceio.

Cassis flammea Linné.

Maceio.

Cassis inflata Shaw.

Mamanguape.

Dolium perdix Lamarck.

Maceio.

Dolium olearium Lamarck.

Maceio.

Cypræa exanthema Linné.

Maceio and Mamanguape.

Cypræa spurca Linné.

Mamanguape.

Trivia pediculus Linné.

Maceio and Boa Viagem. A dark gray form with the usual dark spots, but no suggestion of pink coloration.

Cerithium algicola C. B. Adams.

Mangosoules, Managuas, Mamanguape, and Maceio ; common.

Cerithium thomasæ Sowerby.

Maceio and Goyanna. Probably a variety of *algicola* with de-pauperate sculpture.

Melaraphe nebulosa Lamarck.

Rio Parahyba, Mangosoules and Managuas, on shrubs near the water ; Maceio, on granite boulders on the shore.

Melaraphe columellaris d'Orbigny.

Maceio ; on granite boulders.

Melaraphe columellaris var. *flava* Broderip.

Rio Parahyba.

Ampullaria zonata Spix.

Managuas, and Traicao on the Mamanguape River.

Amalthea antiquata Linné.

Maceio.

Amalthea subrufa Carpenter.

Boa Viagem.

Polynices mamillaris Linné.

Mamanguape and Maceio.

Polynices porcellana d'Orbigny.

Maceio.

Natica canrena Lamarck.

Managuas.

Natica livida Pfeiffer.

Rio Parahyba, Mangosoules and Maceio; on sand beaches.

Natica marochiensis Gmelin.

Mamanguape, Mangosoules and Managuas.

Acmæa onychina Gould.

Mamanguape and Goyanna.

Turbo Spenglerianus Gmelin.

Managuas.

Astralium latispina Philippi.

Mangosoules, Rio Parahyba and Managuas.

Astralium imbricatum Gmelin.

Mamanguape and Maceio; common.

Astralium armatum Philippi.

Goyanna.

Omphalius viridulus Gmelin.

Mamanguape, Maceio, Goyanna and Pernambuco; common.

Neritina virginea Lamarck.

Rio Parahyba, Managuas, Mangosoules, and Goyanna. The shells are usually smaller than those found in the Antilles but pass through the same multitude of color variations.

Submarginula octoradiata Gmelin.

Maceio.

Fissurella rosea Gmelin.

Mamanguape, Maceio and Goyanna.

Fissuridea alternata Say.

Maceio and Goyanna.

Fissuridea Listeri d'Orbigny.

Maceio; one young shell.

Ischnochiton squamulosus C. B. Adams.

Maceio; one young specimen.

Octopus sp. indet.

One very young specimen from the reefs.

DESCRIPTION OF THE NEW SPECIES.

Mulinia Branneri Dall.

Shell small, solid, elevated, short, subtriangular, white under a pale brownish periostracum; beaks high, full, subcarinate behind; an obscure impressed line in front proceeding from the beaks delimits a

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lanceolate area simulating a lunule; a similar line on the opposite slope within the carina marks a smaller area which may be compared to an escutcheon; the space between this line and the carina which extends from the beaks to the lower posterior angle of the valves, has the periostracum exceptionally rugose; and on the carina itself this feature is elevated into a low keel which disappears in drying; the periostracum is concentrically wrinkled and even lamellose toward the margin, with irregular small radial wrinkling; the valves are polished beneath the periostracum, practically smooth, and nearly equilateral, rounded in front, arcuate below and bluntly pointed behind; the hinge is normal and strong, the pallial impression broad and indented by a narrow linguiform sinus reaching nearly to the vertical of the beaks. Lon. of shell 22.5, alt. 18.5, diam. 13.5 mm.

This neat little species is perhaps the same as the "*Mulinia* near *lateralis* Say" mentioned in Pilsbry's list of the shells obtained by Dr. Rush at Maldonado Bay, Uruguay (*Nautilus*, xi, p. 8, May, 1897). It is larger and less rostrate than any specimens of *M. lateralis* I have seen. The nearest relative I have noticed in the American series of this group is *Mulinia portoricensis* Shuttleworth, which is pretty close to the present species, though more produced at the ends, and much more rostrate than *M. Branneri*. The latter is named in honor of Dr. J. C. Branner of Stanford University to whom the formation of the collection is due.

Drillia Greeleyi Dall.

Shell small, stout, solid, acute with eight or nine whorls; nucleus small, smooth, dark reddish purple with two whorls followed by a third with strong arcuate ribs concave anteriorly, and which at the end of the whorl are replaced by transverse nodules separated from the suture behind by a revolving ridge; the last whorl has twelve or thirteen narrow transverse ribs, extending forward from the anal fasciole; behind the fasciole a stout ridge revolves a little in advance of the appressed edge of the whorl, the ridge is nodulous where it rides over the ribs of the preceding whorl; in front of the fasciole the ribs are crossed by two adjacent and four rather distant stout revolving threads, beside which there are four or five smaller threads on the canal, and in the interstices and on the fasciole extremely fine sharp revolving threads; all the large threads form nodules where they cross the ribs and these nodules are yellow, the shell elsewhere being dark reddish, nearly black; the last whorl is more than half the shell; the aperture narrow and dark. Lon. 10.5, max. diam. 4.5 mm.

This neat shell is not quite mature and its aperture in the adult state cannot be described, but is undoubtedly normal. The species belongs in the section *Crassispira* near such species as *D. albinodata* Reeve, but differs in details of sculpture as described from all those with which I have compared it. It is named in honor of Mr. A. W. Greeley who, under the direction of Dr. Branner, collected it and nearly all the specimens mentioned in this paper.