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ON SOME POST TERTIARY FOSSILS FROM NEW CALEDONIA.

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I have received lately from Mons. Savés of Noumea, a small box of fossils, which are of uncommon interest. They comprise bones and land-shells, and the following is a translation of his letter concerning them:—"I found the accompanying fossils at La pointe d' Artillerie, near Noumea, during the month of February. There was a whole bed of these bones in extraordinary quantities. The bed is in certain places from 10 to 15 centimetres thick, and spread over an extent of about 20 metres. In one very sheltered place which was perfectly vaulted over by enormous rocks, these bones were completely uncovered and the small skulls of many of the animals quite entire. How have they accumulated in this way? They could not have been brought by birds of prey or they would not be so well preserved and entire. Land-shells, especially *Helix Lifouava* and *Cyclostoma Artense*, Montrouzier, are mixed up with the debris. You will notice the abundance of rats' bones. It is said that no rat is indigenous to New Caledonia, and that it was not known previous to the visit of Capt. Cook. I shall be glad of all the information you can give on the subject."

The bones in question are of different ages, some evidently of very recent date, and some, which by their dessicated state must have lain in the spot for a long period of time. They are mingled together with fragments of limestone and land-shells of the species named above and *Helicina mediana*, Gassies, *Cyclostoma couderti*, Fischer and Bernardi, and *Helix vetula*, Gassies. The latter has been found in a fossil state previously on the Isle of Pines, Koutoumo, and Alcmene. None of the bones were entirely deprived of their animal matter, and those of the rodents seemed to be the most recent in appearances.

After a close examination, I find that the only mammalian remains are those of rodents. They belong to a species of rat

very nearly, if not entirely identical with the common domestic rat. The other bones are entirely those of birds, several species being represented and some of rather large size. There are a few tarso-metatarsal bones of perching birds, and some of a raptorial kind about the size of a kite. From this I should conclude that the cave has been filled with bones brought by birds of prey, though it seems rather strange to find them in such quantities and spread over such a wide surface. It is well known that rats are very favorite food with hawks &c., and I remember finding a large quantity of rats' bones close by a nest of one of our common swamp hawks. This was at Musquito Plains, where a small and probably undescribed rat forms burrows in great numbers close by the sandhills, which abound in several localities.

Upon showing these fossils, if they may be called so, to Mr. J. Brazier, he mentioned that he had found a similar deposit at an island off New Caledonia with a large number of the remarkable land-shells, *Bulimus senilis*, Gass. The history of this species is worth recording here. It was sent home in 1868 to Mons. P. Guestier by one of Marist missionaries, the Rev. Père Lambert. It is a large, imperforate, heavy, thick, oval shell, of a chalky white color, as it is always found dead and without any trace of epidermis, having been exposed to the action of air or water or buried. Suture compressed, a little jagged; spire elongate, conical, apex acute. Whorls from 6 to $7\frac{1}{2}$, convex, the last about three quarters of the whole length. Aperture elongate, narrow, auricular, angular above, very much reflected below, columella solid, furnished with a thick plait, rounded, ascending, parietal fold dentiform, conical descending, peristome very thick, joined to the columellar callosity, labrum sinuous, broadly notched towards the summit, lines of growth very distinct, forming a stout varix, especially anteriorly, where it is in some specimens 25 millim. wide. Sometimes the specimens show traces of color, but I have never seen any, and the specimens shown me by Mr.

Brazier were smaller than those figured by Mons. Gassies, (*Faune Conchyl. de la Nouvelle Calédon.* 2. part, p. 66, 113 pl. 2, fig. 15). The original description was in the *Jour. de Conchy.*, 1869, p. 71, and the habitat given Baie du Sud.

When Mons. Gassies first saw these shells with the same constant character, that is to say their dead appearance, he justly concluded that the species or variety must be extinct. In answer to enquiries addressed to the Rev. Father Lambert, the following facts were furnished: To the south-east of the Isle of Pines there is an islet called by the natives Koutoumo. The first specimens of *Bulimus senilis* were collected there in large quantities. The islet is of a marine formation. Its base is a white sonorous (flinty?) calcareous stone, over this lies a sandy vegetable loam supporting a vigorous growth of pines, with which the whole island is covered as well as with some other large trees. It is in this loam, between the surface and the calcareous rock, that the shells of *Bulimus senilis*, are found. They are also found in holes which go to the level of the sandy loam. They are never found alive, but exist in the Isle of Pines, the islet "aux Pigeons," champs de Vao, and probably many of the low islands to the south. Where the sea has washed the soil in caverns and similar places they are seen on the surface, but do not appear on the vegetable soil, unless where by the falling of a tree they are found entangled in the roots. They are very often completely encrusted with coral or a calcareous matrix. Though coral is abundant among them, yet marine shells are not often found, and very few other land-shells. The Marist missionaries do not say if the coral is in broken rolled masses or in fragments little altered since their growth. In any case it would seem by this strange mixture of land and marine remains, as if the island has been covered for a very short time by the sea. It seems in fact more like the result of a tidal wave than any prolonged submergence. That there has been some upheaval within recent times is very evident from the coral rock here referred to, which

forms the base of the islands. It is somewhat remarkable that we meet on every side evidence of upheaval in the Pacific, where the general impression is that subsidence is taking place. The coral reef or subsidence theory of Darwin seem to have been too universally applied, and if it be the true explanation of the atoll, barrier reefs, &c., the causes at work may be much more limited and local than we are now inclined to think.