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## FOSSIL SEACOWS IN THE EOCENE OF TAULANNE\*

One day in August 1969, I was startled to receive a telephone call from the Geological Institute in Amsterdam giving me the information about the discovery of jaws and skulls of large mammals in the Eocene surroundings of Castellane.

Although, at that time, the type of animals involved in this discovery were not clearly known, it seemed interesting to carry out further investigations into this matter. Despite the several short telephone conversations that took place on this matter between Leiden and Castellane, it was not clear as to what animal species were involved; nevertheless, it became evident that they related to well-preserved materials of skulls, jaws, and probably whole skeletons. Since such type of discoveries are very rare in mammal paleontology, certainly in Early Tertiary excavations, we resolved not to miss this opportunity and decided to undertake an on-the-spot study. Since the group from Amsterdam wanted to stay on for a week in the region of Castellane, we had to move into action immediately, and a few days later I was sitting in the plane bound for Nice along with a laboratory assistant from the Rijks Museum of Geology and Mineralogy. We were received by T. de Booy, who transported us, under heavy rains, through the valley of Var to Castellane.

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On my arrival there, I was able to study the mammal material that had already been collected in advance of our arrival. Although it was obvious that we had discovered some well-preserved mammal remains belonging to a large animal, yet we were unable to establish its identity.

In the following days we carried out a detailed study of the discovery area. This was not an easy task, because the stony material within which the remains were ensconced was very hard, even harder than the bones. A further problem was the rain, which came down fairly heavily during all that period. In the collection of mammal fossils, a frequently used and good method is to impregnate the cleaned bones with artificial hair. The bone is pried free with a small chisel and sometimes even needles and impregnated whenever a free place is created. In this manner, a bone that was initially very soft and would break into pieces at the slightest touch, could be rendered firm enough to resist breakage even upon falling to the ground. So as to accomplish this, it is very necessary that the bone be completely dry, an essential requirement for sticking together the pieces that break off during cleaning. In this respect we were not so successful. This was because of the continuous rains and (when there was no rain) the fact that the water used for cleaning the bones did not dry quickly and sometimes not at all, consequently we barely managed to preserve the fragile material. Nevertheless, each evening we were successful in retrieving a substantial quantity of the material. During the period of our stay, we had collected six boxes for further processing, among which were present the most valued 10–15 beautiful skulls and jaws.

The retrieval of this material was an extraordinarily difficult task. The hard matrix was difficult to dislodge by mechanical means, and therefore the extraction required considerable

time. We are, at present, investigating the possibilities of using a suitable sand blaster to overcome this problem. This will probably save a very considerable amount of time.

Even though all the material is not available as yet, so that we may make a responsible identification, we have assembled together some pieces to enable us to form a tentative opinion. We believe that the material under study is either *Prototherium* or *Protosiren*, both of which have been found in the Eocene of France and Italy, as well as Egypt (Fayum). The set of teeth of sea cows resembles that of tapirs, which is not surprising because we know that both species feed on soft plants. Apart from their characteristic skulls, sea cows are distinguished by the construction of their skeletons, which differ considerably from that of normal mammals living on land, the former being clearly adapted to sea life. The ribs are very heavy and massive. The fore feet are formed into broad fins suitable for forward movement; the hind feet are marked by a considerable reduction which have completely disappeared in the present-day living forms. In the course of evolution a considerable reduction of the hind legs has been observed; the feet have disappeared, the shin, calf, and thigh bones of the hind legs have become smaller and eventually disappeared with a simultaneous reduction of the pelvic girdle, which has lost its function as a support and hinge for the hind legs. The size and forms of the pelvic girdles are of particular importance as data for determining and tracing the evolution of fossil sea cows. It is still not known whether the collected material also contains one or more pieces of the pelvic girdle. If not, then it may be necessary to organize another expedition for this purpose.

One skeleton of a Recent sea cow is available for inspection in Artis. In the Rijks Museum of Geology and Mineralogy at Leiden, a skeleton of a Miocene sea cow (*Halitherium*) from the Mainzer Becken is on display. Illustrations and data on sea cow fossils can be observed in Romer, "Vertebrate Paleontology" in Piveteau, *Traite de Paleontologie*, Vol. VI, 2.

Apart from the beautiful material that will be placed on display at the Rijks Museum of Geology, the main purpose of this expedition is, in the event of a similar discovery, to immediately organize a campaign, within the shortest period of time, to stimulate a useful cooperation between the various geological institutes in the Netherlands.

M. Freudenthal.

DESCRIPTION OF NUMMULITES AT THE SITE  
OF THE SEA COW DISCOVERY, TAULANNE.

The following remarks relate to the nummulites that were present alongside the excavation containing vertebrates.

Until now only one species, represented by A- and B-forms, has been encountered.

External characteristics of A-form:

Bulging habit and small dimensions (diameter 2.5 mm ~ thickness 1.5 mm).

The shell has, at both poles, a clear bump, the so called central pillar.

From the central pillar run straight and sigmoidal lines toward the edge of the shells.