

Nagao, Takumi

1941

On the skeleton of *Desmostylus* (Abstract)*

The remains of *Desmostylus* obtained in Keton, Japanese Saghalien, include the greater part of the skeleton. The skull of this animal has been described in detail by Hay, Abel, and Vanderhoof, but we have no precise knowledge of the postcranial skeleton.

The ordinal position of *Desmostylus* has been open to question. While Abel once included it in Multituberculata and later in Monotremata, most authors put it under Sirenia. On the other hand, this mammal is long known to bear many features quite different from the sirenians, and Hay divided the order into Trichechiformes and Desmostyliformes. The most distinctive features frequently cited by previous authors are, among others, long nasals, epitympanic sinus and extremely small jugals.

In the present paper *Desmostylus* is compared with the oldest proboscideans, upper Eocene *Moeritherium* and lower Oligocene *Palaeomastodon*, and also with some Eocene Sirenia such as *Eotherium* and *Eosiren*.

Vertebrae: The total number is supposed to be 40–42, of which 30 have been collected. The presacral vertebrae do not differ much from those Sirenia and Proboscidea, but seem to be characterized by a rather broad centrum and a lower and weaker neural arch. The caudals have a long centrum and a very weak neural arch. There are no transverse processes, showing the absence of the horizontally flattened tail of Sirenia.

Ribs: 14 ribs have been obtained. The posterior ones are thick, being subcircular or broadly oval in cross-section and differ from terrestrial mammals. The pachyostosis, very characteristic of Sirenia, is not observable in *Desmostylus*. The histological study shows that the ribs do not much differ from many bones of higher mammals.

Sternum: The bone, which is considered to be such, consists of 8 flat elements arranged in two longitudinal rows, very curious in outline and construction and almost unknown in mammals. Young *Monodon* is known to bear somewhat similar sternum.

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Scapula: Different from that of Proboscidea and Sirenia in outline, and rather akin to that of some ungulates.

Humerus: Much deformed; apparently expanded at both extremities, with a broad and thin shaft. This bone differs from that of *Palaeomastodon* and other proboscideans in various points, such as the deltoid crest, the inner condyle, and the supinator ridge. Sirenian humeri are much shorter in accordance with aquatic life.

Ulna and radius: Both bones much expanded distally, heavier than those of Sirenia and without the characteristic mutual position of these bones as shown in Proboscidea.

Os innominatum: Heavily built, with an expanded ilium, a deep acetabulum, a large obturator foramen and a well developed ischium. The reduction of this bone in Sirenia is observable in *Eosiren* and also in *Eotherium*. Less heavy than that of many graviportal mammals including proboscideans.

Femur: Short and heavy, with a well developed lesser trochanter and without a third trochanter.

Tibia: Also heavy and short, with a well developed cnemial crest. Different from that of Proboscidea in many points.

Carpus: 6 bones have been identified. No fusion among the elements is indicated. Not serial in arrangement, the lunar-unciform contact being probably present. In form and arrangement of these bones, *Desmostylus* is different from Proboscidea and Sirenia and somewhat similar to some ungulates.

Metacarpus and phalanges: Two metacarpal bones at hand are short and very heavy. Of the phalangeal bones, 9 right, besides 3 left, belonging to at least 4 digits have been collected.

The hand is certainly pentadactyl and probably semi-digitigrade. The terminal bone with a small hoof or nail.

Tarsus: Astragalus is very peculiar in various features, with a broad trochlea, a short and narrow neck and head, a small ectal and a larger and centrally situated sustentacular facet, a small navicular facet and probably also a cuboid facet. Calcaneum with the facets different from those in the proboscidean calcaneum in form, size and situation.

Metatarsus and phalanges: Also pentadactyl. Metatarsals and phalanges short and heavy, with the terminal point covered with a hoof or nail.

The skeletal features of this animal are quite different in many points from those of Proboscidea and Sirenia. Some resemblances with ungulates or with extinct orders, such as Taligrada, Amblypoda and Condylarthra, probably indicate a closer relationship of this animal. *Desmostylus* is thought to be amphibious in mode of life.