

LE BULLETIN DE LA BIPEDIE INITIALE

***Editée par le Centre d'Etude et de Recherche sur la
Bipédie Initiale :***

BIPEDIA

A Review from the STUDY and RESEARCH CENTER for INITIAL BIPEDALISM

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BIPEDIA N° 11

(juin 1994)

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by François de SARRE 

ON THE ORIGINS OF WHALES AND DOLPHINS FROM AN ARCHAIC MARINE FORM

by François de SARRE

ABSTRACTS : *the natural history of the CETACEA appears not to be the cause of any trouble or controversy among the scientists. They agree on a development from some land mammal ancestors whose structure has been modified to adapt them for full life in the water.*

Two main explanations jointly occur for this ancestry : either the CETACEA are coming from ancestors common to those of the today ONGULATA or they evolved from the primitive CARNIVORA, 50 million years ago, for instance from a stage that resembled the modern Phocidae.

Convincing arguments for the first hypothesis seem now to assert from the recent discovery of Ambulocetus remains in Pakistan. They suggest that an evolution of this former genus can be followed up to the level of the nowadays CETACEA.

The aim of the present article is to demonstrate that the latter proposition is quite unacceptable.

On the other hand, an alternative paradigm is now proposed and the possibility evaluated that it was a transformation from former marine bipeds that led into the today whales or dolphins.

The fish form of the *CETACEA* is not surprising at all for animals which swim all their life in the ocean. In some way, it is even convenient for the taxonomist, because the ancestors of the *CETACEA* might have evolved from any branch of the anterior Mammals up to their today *hydrodynamic* shape and configuration...

Morphology

Simple suspension in the water, *without moving*, has already been put into effect by a *spherical* form of the body, like in jellyfishes or in some algae.

As the oceanic creature tries to move, the things become a lot more complicated... The animal's body is now thrust against the water surface, through the action of the Archimede's forces !

So, if the creature really attempts to keep itself steadily *sunk* in the water, then it must actively fight against the natural tendency of its body to ascend and to break surface : otherwise, the animal only floats !

The anatomical structure of the whales, in the same way as the corresponding structures in a fish or in an ichthyosaur, are obliged to yield to the needs of a

straight horizontal locomotion through the aquatic milieu. With one big difference between fish and *CETACEA* with the latter, the flipper-tail knocks *up* and *down*, while the fish-tail curves only laterally in the water.

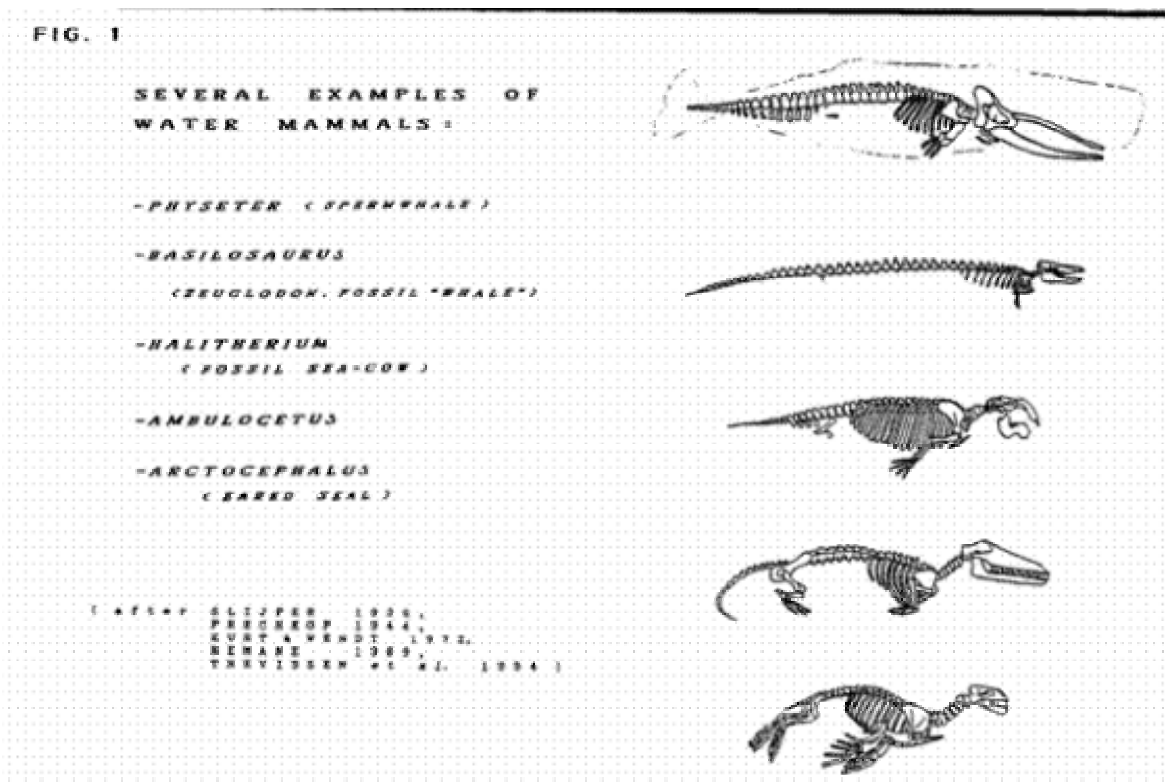
According to this, there is thus a merely *superficial* resemblance of the *CETACEA* to the fish, surely best pronounced in the external form of the *head*...

The *CETACEA* neck is short or not distinguishable (the 7 neck vertebrae are short or are fusing in one another : they are not freely movable like in other mammals). The extremity of the snout is *not* necessarily sharp-pointed, rather somewhat *well-rounded* (like in fish), for the best possible "high speed" penetration through the water. In whales and dolphins, moreover, the flattened and compressed head also serves to reverse the upward or downward progression.

Since, this peculiar character of a smooth-truncated head in whales, correlated with the flattening of the whole rostrum and with the strong development of the trunk musculature (in order to allow the "dolphin"swim), lead us to think that these are indeed among primordial features in the *CETACEA* ancestry !

In such a sense, the antecedents of the whales could *not*, for instance, have been in possession of a large, sharp-pointed snout, as suggested (fig. 1) by the reconstitutions of *Basilosaurus cetoides* or of *Ambulocetus natans*.

The character of a "pointed" snout, resembling the snout of a crocodile, with nostrils at the tip, is rather a phylogenetically *derived* feature, as also suggested by stages of the foetal development in the whales.



Anatomy

Similitudes in the fossils and in the modern representatives of the *CETACEA* groups, are surely found in the shape and function of the auditory bones, in the dentition or in the development of mighty jaws, regarding the manners to retain a prey with their teeth and to gobble it up without masticating... Furthermore, some whales developed specific structures like the *whalebone sieve*.

In that sense that they do not masticate, the *CETACEA* resemble more the dinosaurs (or water reptiles like the crocodiles, the plesiosaur or the ichthyosaur) than the other mammals.

In my opinion, a fossil like the *Ambulocetus*, recently found in Pakistan by Hans THEWISSEN of the Northeastern Ohio College of Medicine and his team, is neither related to the *ARCHEOCETI* (allegedly thought to be the ancestors of the whales) nor to the *PINNIPEDIA* (otaries and seals) that are connected with the *plantigrade* bears and with the originally bipedal mammals...

I would propose a special taxon, *AMBULOCETI*, for the genus *Ambulocetus*, with the characteristics of a quadrupedal big-footed amphibious creature, probably originated from some undifferentenced *CREODONTA* (see the tabloid on fig. 4). *Ambulocetus* used to catch its prey in diving with the help of its strong hind legs. He also used *flexion-extension* (in a vertical plane) of its back musculature to progress among the surface, as seals and otaries also do. The tail had more of a rudder function.

Ambulocetus was tramping on flat-bottom seas and pools, walked on land in the art of otaries by bending his webbed hands and feet *outsidewards*. The *AMBULOCETI* had certainly no particular disposition to remain during all of his life in the water and even not to rush into the conquest of the ocean's immensity by transforming into whales...

The *AMBULOCETI* surely became extinct in the course of the Tertiary period, without leaving any descent...

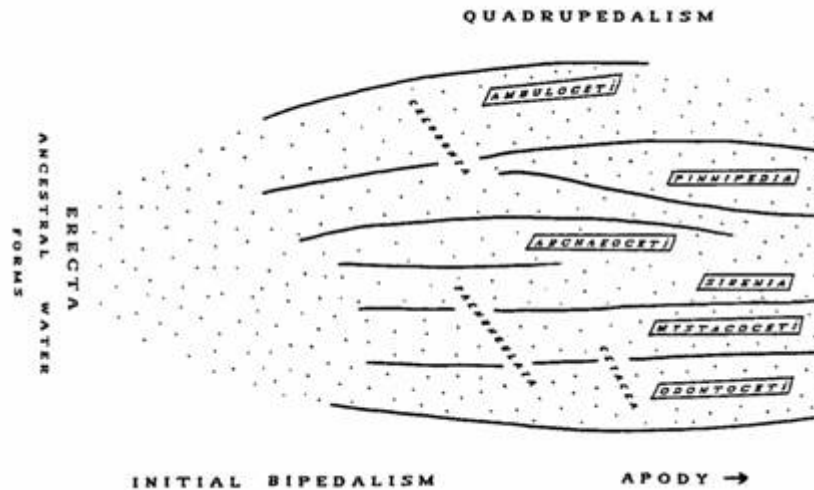


FIG. 4

PHYLOGENETICAL SCALE OF THE EVOLUTION OF BIG WATER MAMMALS

REFERRING to *INITIAL BIPEDALISM* and to DE SARRE 1993, THE ABOVE TAXA DEVELOPED FROM THE ANCESTRAL WATER FORMS WITH AN ERECT BODY POSTURE (*ERECTA*) - THEY EVOLVED (*on the right side of the tabloid*) INTO THE *CETACEA* THAT LOST THEIR HIND LEGS (= APODY)

Particularities of the *CETACEA*

Before we come to speak of the caudal fin with its 2 horizontal flukes, let us consider some other typical characteristics of the whales.

The auditory bones (hammer, anvil and stirrup-bone) are highly modified, the tympanics are shell-like and loosely attached to the skull : these modifications are done to adapt in the conditions of audition among the water surface. Similar adaptations may have occurred in other aquatic lineages and are a simple result of *convergence* : they cannot be invoked in phylogenetical purposes, as the palaeontologists claim.

The nostrils (= blow holes) have been shifted in whales to the upper side of the head, at some distance from the tip of the snout or beak. The blow holes are either 2 longitudinal slits in the *MYSTACOCETI* (whalebone whales), or a single crescentic slit in the *ODONTOCETI* (toothed whales).

The nasal canals (see fig. 2) pass nearly vertically downwards in front of a lofty brain-case which is home the big globulous encephalon.

The larynx and epiglottis form a tube through the oesophagus, so the blow holes become *continuous* with the windpipe and the lungs. The mouth is being used

solely for feeding, as in newly born mammals, but not in adults, which can breathe through either the nose or the mouth. In fact, this system is a particular feature of the whales that indicates a very ancient adaptation to life in the water. It is not to be observed in the allegedly "prior" forms, like the *AMBULOCETI* or the *ARCHEOCETI*.

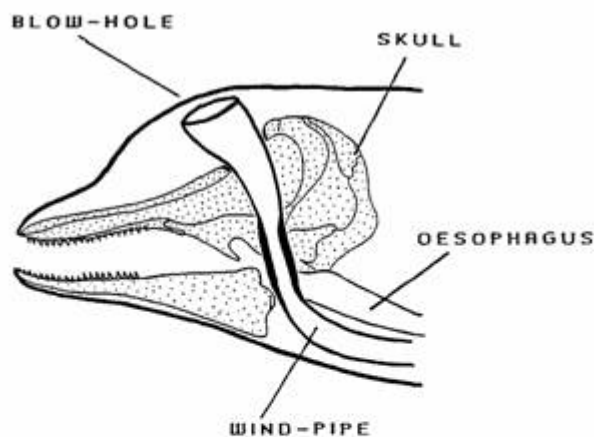


FIG. 2

MEDIAN SECTION OF THE
HEAD OF *DELPHINUS*
TO SHOW THE BLOW-
HOLES AND THE COURSE
TAKEN BY AIR AND BY
THE FOOD

The question of the caudal fin

The palaeontologists usually claim that the *CETACEA* developed during the Eocene period. Their ancestors were quadrupedal land mammals. Through a transitional form that may have looked like a seal, then losing legs and pelvis (vestiges of which, as well as vestiges of femurs, are still embedded in the flesh of the baleens), they evolved into the typical whalebone (*MYSTACOCETI*) or toothed (*ODONTOCETI*) whales.

The problem is not only how the *CETACEA* obtained a big globulous brain from antecedents that may have looked like *Ambulocetus*, but also how they develop their typical caudal fin ?

It must first be said that the "tail" (as it is commonly called) of the whales, is in reality a *sympodium* attached to the extremity of it.

The tail is only the prolongation of the body vertebrae. The 2 horizontal flukes are boneless fleshy *appendices*. They are supported in the middle by the tail.

As expressed by mammalogist Serge FRECHKOP in 1944, the lower skin surface of the *CETACEA* flukes is homologous to our *plantar* foot surface !

Dr. FRECHKOP further remarks that the caudal fin of the *CETACEA* works in a similar way like a motor-boat propeller, i.e. in a *helicoidal* motion, with the only restriction that the rotation is, evidently, not complete !

This fact can surely be explained by the *original disposition* of their 2 legs and feet (see fig. 3) before they began to disappear, as the specific tail muscles parallelly developed...

Similar patterns are certainly due to explain the development of the caudal fm in the *SIRENIA* and in the *ARCHEOCETI*, which kept a movable neck.

The horizontal disposition of the tail-flukes in the ancestors of the *CETACEA* did facilitate the rising *from* or *to* the water surface, whereas the fore limbs were used for maintaining the body's balance and for steering. They contain the typical mammalian bones.

A fleshy dorsal fin for a better stabilization in water then appeared in the whales, as they became the hydrodynamic *fish* form. Sometimes, the dorsal fin is wanting, as the rostrum is well-careened.

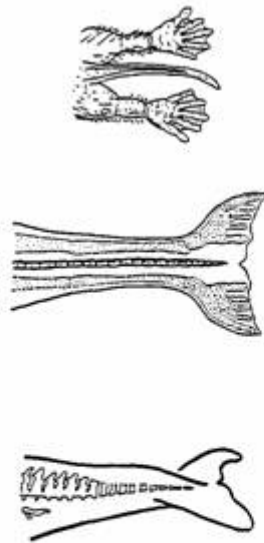


FIG. 3

DEVELOPMENT FROM
AN ORIGINAL TWO-LEGGED
DISPOSITION INTO THE
CAUDAL FIN OF THE *CETACEA*

Phylogeny

From the standpoint of the Theory of *Initial Bipedalism*, as emphasized by several authors (Max WESTENHOFER, Serge FRECHKOP, Bernard HEUVELMANS), the original mammals were bipeds and they were closely connected with a prior aquatic phase.

In my *Marine Homonculus* Hypothesis, I suggested the vertebrate brain resulted of an ancient apical organ that was conceived originally as a *spherical float* in a marine creature.

The characteristics of a big brain in a globular skull, and of the bipedal gait, were obtained *before* the adaptation of the first mammals to a terrestrial way of life.

As a matter of fact, the skull of the *CETACEA* is being deeply transformed, consistently with the external "fish" form. Therefore, the large and efficient encephalon has remained quite undamaged, not far different from a human brain !

So I emphasize that the *CETACEA* directly evolved from the *Marine Homonculus* stage. In other words, *the whales and dolphins have always lived in the ocean !*

Indeed, with the exception of the zoophagic feeding, the *CETACEA* show no characteristics that would bring them in connection with the quadrupedal *CARNIVORA* or with the undifferentiated ancestors of the today *ONGULATA*.

In that sense, the relation with the newly discovered fossil *Ambulocetus*, enhanced as "missing link" by the scientific press, appears as one of the usual and common blowers in the course of the development of natural science...

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