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On the dimensions of three skulls of the species of dolphin  
*Lipotes vexillifer* Miller, 1918 (Cetacea, Platanistoidea, Iniidae)

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## ABSTRACT

The dimensions are given of three skulls of *Lipotes vexillifer*, the only specimens preserved in collections outside of China. At the same time drawings of the *Lipotes vexillifer* skull in the British Museum (Natural History) have been made and published with a photograph of the London specimen before it was dissected. Reasons are stated for refuting the affinity of *Lipotes* with *Platanista*, as postulated by Hinton & Pycraft (1922).

Recently, Brownell & Herald (1972) excellently summarized the present knowledge concerning *Lipotes vexillifer* Miller, 1918, the primitive freshwater dolphin from China. The only omission (for which, however, the authors were not responsible) is that they did not publish the measurements of the three skulls of this species of dolphin, preserved outside of China at present. Thanks to the kind cooperation of the authorities of the National Museum of Natural History, Washington D.C., and of the American Museum of Natural History, New York, we were able to study and measure the *Lipotes* material in their collections. For this cooperation we wish to express our sincere gratitude.

As Miller (1918) published photographs and drawings of the holotype of the species and genus (USNM 218293) and Brownell & Herald (1972) of the specimen in New York (AMNH 57333), we thought it useful to publish drawings of the London skull (BMNH 22.6.22.1), made by Mr J. Zaagman. At the same time we thought it useful to reproduce a photograph made of the London specimen before it was dissected.

For the origins and histories of the specimens of *Lipotes vexillifer* preserved in the above-mentioned collections we refer to the article by Brownell & Herald (1972).

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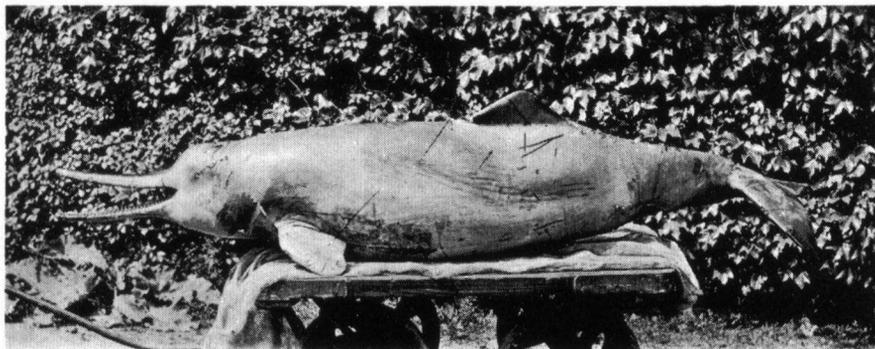


FIG 1. External aspect of *Lipotes vexillifer* ♀ (BMNH 1922.6.22.1) before the specimen was dissected. Photograph by H. G. Herring, 2-VI-1922.

In his original description of this species, Miller (loc. cit.) concluded that it had closer affinities with the South American river-dolphin *Inia* than with any other living genus. However, Hinton & Pycraft (1922) stated: "we are inclined to believe that *Lipotes* is more closely related to *Platanista* than to any other known genus — a conclusion in harmony with its distribution — and that it represents in many respects an early stage in the evolutionary processes which have led to the development of *Platanista*". These authors based their conclusions on a rather inadequate description of the blowhole mechanism in which they apparently found two floating plates of bone on either side of the vestibule, homologizing these with the "maxillary crests" of *Platanista*. In a later paper, Hinton (1936) referring to the same specimen stated: "the superficial valves are controlled by a pair of special "bones" which if not truly ossified, are formed of very dense fibrous tissue, which are worked by special protracting and retracting muscles".

Unfortunately, neither of the latter two papers were figured, and at present not a vestige of the soft parts of *Lipotes* remains in the collections of the British Museum. However, their description of the vestibular sacs of the blowhole concurs almost exactly with that given by Schenkkan for *Pontoporia* (1973) and *Inia* (in the press). It has been demonstrated by Purves & Pilleri (1973) that vestibular sacs are absent in *Platanista* and that the bones surrounding the blowhole in this genus are not floating, but are pneumatized extensions of the maxillae, the air cavities being confluent with those of the middle ear. It has also been demonstrated that no muscles whatsoever are attached to the maxillary crests in *Platanista*.

It seems highly probable that the "bones" described by Hinton & Pycraft represented the fibrous, or partly ossified fascia of the maxillonasalis muscles. It has been demonstrated by Schenkkan & Purves (1973) that a diverticulum of the right vestibular sac in *Kogia* actually penetrates the fascia of the left maxillolabialis muscle.

We conclude that neither in its skull characteristics nor in its blowhole mechanism does *Lipotes* resemble *Platanista* and is more closely related to *Inia* and *Pontoporia*.

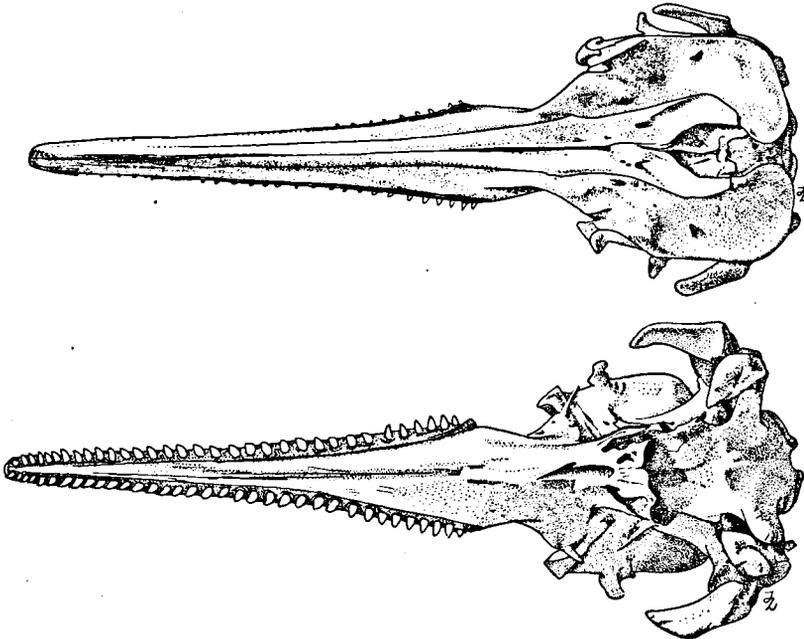


FIG. 2. Dorsal and ventral sides of the calvarium of *Lipotes vexillifer* BMNH 1922.6.22.1.

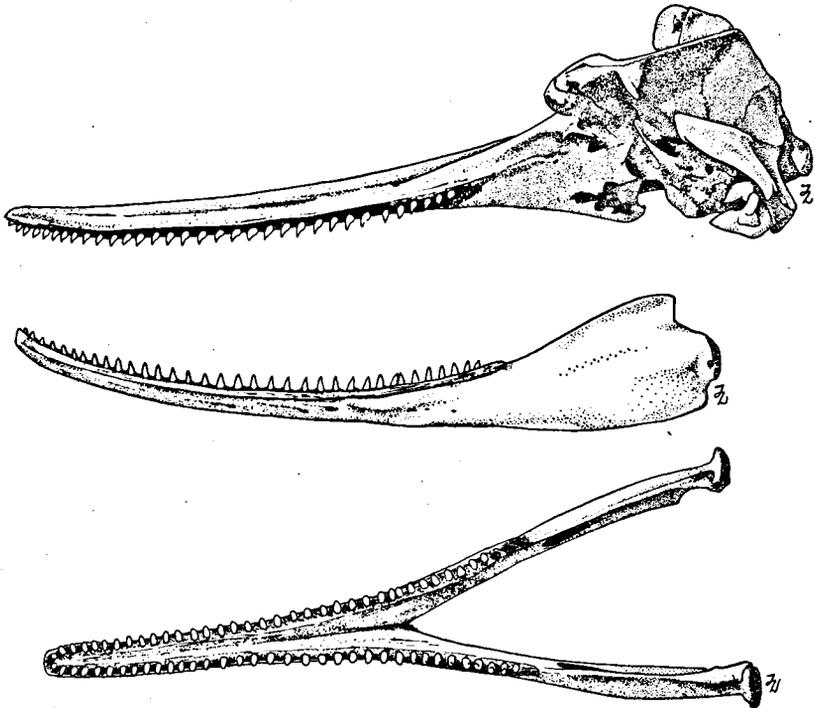


FIG. 3. Lateral view of the skull of *Lipotes vexillifer* BMNH 1922.6.22.1, and a dorsal view of the mandibles.

TABLE I. Dimensions of three skulls of *Lipotes vexillifer* (in mm and expressed in percentages of the total length of the skulls). The width of the braincase has been measured from behind just below the lateral crests.

	in mm			in %		
	USNM 218293	AMNH 57333	BMNH 22.6.22.1	USNM 218293	AMNH 57333	BMNH 22.6.22.1
	♂	♀	♀	♂	♀	♀
Total length of skull	509	586	556	100.0	100.0	100.0
Rostrum length	345	414	393	67.8	70.7	70.7
Rostrum basal width	85	95	86	16.7	16.2	15.5
Rostrum, width 60 mm anterior to base	57	61	58	11.2	10.4	10.4
Rostrum, width at its middle	35	32	32	6.9	5.5	5.7
Rostrum, width at 3/4 of its length	24	20	22	4.7	3.4	3.9
Breadth across pre-orbital angles of supra-orbital processes	135	135	125	26.5	23.0	22.5
Least width between orbits	126	127	117	24.8	21.7	21.0
Breadth across post-orbital angles of supra-orbital processes	—	168	160	—	28.7	28.8
Zygomatic width	206	—	196	40.5	—	35.3
Width of braincase across parietals	103	—	100	20.2	—	18.0
Maximum width of premaxillae	59	62	60	11.6	10.6	10.8
Length temporal fossa	106	111	111	20.8	18.9	19.9
Height temporal fossa	77	81	70	15.1	13.8	12.6
Tip rostrum — nares	384	454	440	75.4	77.5	79.1
Length of upper toothrow (right side)	285	328	317	56.0	56.0	57.0
Length of upper toothrow (left side)	281	335	315	55.2	57.2	56.6
Tip rostrum — pterygoid	—	454	432	—	77.5	77.7
Number of alveoli (upper)	32—33	34—34	35—33	—	—	—
Length mandible	455	541	505	89.4	92.3	90.8
Height mandible at coronoid	87	92	86	17.1	15.7	15.5
Symphysis mandibles (length)	224	265	256	44.0	45.2	46.0
Length of lower toothrow (right side)	286	326	321	56.2	55.6	57.7
Length of lower toothrow (left side)	284	330	319	55.8	56.3	57.4
Number of alveoli (lower)	33—31	34—33	36—35	—	—	—
Total length animal	2285	2020	2080	—	—	—

Recently Rensberger (1969) published the description of a new cetacean, *Kampholophus serrulus*, from the Miocene of California. In the discussion of his detailed and interesting paper, the author stated that the species described by him appears as closely related to *Lipotes vexillifer* as to *Inia geoffrensis*, in terms of the relative numbers of common characters. As *Lipotes* and *Inia*, however, show many primitive characters (e.g. the well developed basal process of the first cervical vertebra), also present in the extinct Squalodontidae, it is not certain whether *Kampholophus serrulus* can be regarded as a

direct forerunner of the present Iniidae. We share the view of Brownell & Herald (loc.cit.) that considerable additional study is needed to clarify the relationships of the recent Iniidae and the fossil taxa assigned to that family.

## REFERENCES

- BROWNELL JR, R. L. & E. S. HERALD  
1972 *Lipotes vexillifer*. — *Mammalian species* (Am. Soc. Mammalogists) 10: 1—4.
- HINTON, M. A. C.  
1936 Some interesting points in the anatomy of the freshwater dolphin *Lipotes* and its allies. — *Proc. Linn. Soc. London*, 148 (3): 183—185.
- HINTON, M. A. C. & W. P. PYCRAFT  
1922 Preliminary note on the affinities of the genus *Lipotes*. — *Ann. Mag. nat. Hist.*, (9) 10: 232—234.
- MILLER, G. S.  
1918 A new river-dolphin from China. — *Smiths. misc. Coll.*, 68 (9): 1—12, 13 pls.
- RENSBERGER, J. M.  
1969 A new iniid cetacean from the Miocene of California. — *Univ. Calif. Publ. geol. Sci.*, 82: 1—34, 4, 4 pls.
- PURVES, P. E. & G. PILLERI  
1973 Observations on the ear, nose, throat and eye of *Platanista indi*. — *Invest. Cetacea* (Pilleri Ed.), 5: 13—57 [only seen as preprint].
- SCHENKKAN, E. J.  
1972 On the nasal tract complex of *Pontoporia blainvillei* Gervais & d'Orbigny, 1844 (Cetacea, Platanistidae). — *Invest. Cetacea* (Pilleri Ed.), 4: 83—90.
- SCHENKKAN, E. J. & P. E. PURVES  
1973 The comparative anatomy of the nasal tract and the function of the spermaceti organ in the Physeteridae (Mammalia, Odontoceti). — *Bijdr. Dierk.*, 43 (1): 93—112.

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