

IV.—ON A SPOTTED DOLPHIN APPARENTLY IDENTICAL WITH THE PRODELPHINUS DORIS OF GRAY.

By FREDERICK W. TRUE.

Upon the return of the U. S. Fish Commission steamer Albatross from an expedition to the island of Cozumel, in the spring of the present year, the naturalists attached to the vessel informed me that while in the Gulf of Mexico they fell in with a large school of dolphins of very peculiar appearance, the back being covered with white spots. The descriptions of the animal aroused my curiosity, and at my suggestion Professor Baird, Secretary of the Smithsonian Institution, immediately offered a reward for the capture of one or more individuals of the species. Messrs. Warren and Stearns, fish dealers of Pensacola, Fla., very kindly offered to direct the attention of the fishermen to the matter, and so efficient were their services that on the 3d of June, only a few weeks after the presence of the species in the Gulf was first made known, we received by steamer an adult male in perfect preservation.

Judging from the remarks of the naturalists of the Albatross, and the fact that a specimen was so quickly secured by the Pensacola fishermen, it would appear that the species is abundant in the Gulf. Furthermore, upon the return of the Albatross from a cruise on the Hatteras ground, only a few days after the Pensacola specimen was received, I was informed that great schools of a spotted dolphin, apparently identical with the latter, were seen in that locality. Two individuals, in fact, were harpooned, but broke away and sunk before they could be hauled up to the deck of the steamer.

The Pensacola dolphin was certainly the most beautiful cetacean I have ever examined. The outlines of the body were very graceful, and the gray tints of the sides and the spots on the lower surfaces exquisitely delicate. Upon the first superficial examination I was convinced that I had before me a representative of the genus *Prodelphinus*, but to reach a conclusion concerning the species was a far more difficult matter. In the title of this essay I have adopted the name of *P. doris*

(Gray). My reasons for so doing will be presented after the characters of the exterior and skeleton have been described.

EXTERNAL MORPHOLOGY.

An adult male dolphin 85 inches in length. The general conformation of the body is similar to that of *Delphinus delphis*, but the dorsal fin is higher and more arched, the pectoral fins are somewhat broader, and the tail is deeper at the insertion of the flukes. The snout (the upper and lower jaws taken together) is of moderate length, stout, and about a third deeper than broad. The lower jaw does not project beyond the upper. The outlines of the lips are slightly concave. The pectoral fins and the flukes present no peculiarity of form, being gently and evenly convex anteriorly, and similarly concave posteriorly, and obtusely pointed at the tip. The dorsal is strongly bent backward, a line connecting the tip and center of the base, when prolonged making an angle of 45° with a line connecting the extremity of the beak and the notch of the flukes. The anterior margin is straight in the lower three-fourths of its length, then rather strongly curved backward; the concavity of the posterior margin forms an arc of a circle.

The distribution of color is peculiar and somewhat difficult to describe. Beginning at the base of the dorsal fin and passing downward the color is first dark purplish slate, and becomes gradually lighter until the middle of the side is reached. At this latter point it grades somewhat more rapidly into the pure white of the belly. From the line of the anus backward, and from the region of the pectoral fin forward, the dark color of the back extends down much lower. There is no pure white posterior to the anus. The dark color involves the head and beak and the extremity of lower jaw. It also borders the sides of the latter to a depth of two or three inches. The entire body is covered with spots of dark and light color, the largest of which are about 18^{mm} in length. A line connecting the center of the base of the dorsal fin, with the median line of the belly is twenty-two inches in length. Beginning at the top, in the first four inches the body is about free from spots; the next seven inches are occupied by large, light, slate-colored spots on a dark ground; and the remaining eleven inches are occupied by large, dark, slate-colored spots on a light ground. Speaking generally, where the body is dark the spots are light, and *vice versa*. This is true of the dark post-anal region and the head. The flukes, dorsal fin, and pectoral fin are dark like the back, and all are covered with small light-colored spots. The latter are scarcely perceptible on the flukes. Upon examination of the plates, especially that showing the under side of the body, it will appear that the dark spots, which are roughly elliptical in outline, change direction in different regions of the body. Beginning on the inferior surface of the lower jaw, it will be observed that the axes of the spots converge toward the median line of the belly as far as a point slightly anterior to the pectorals; then they

diverge abruptly to the line of the hinder edge of the pectorals, posterior to which the spots of the sides again converge toward the median line. On the sides there is a similar change of direction, which is especially noticeable over the pectoral fin. It is to be remarked that there is a similar change in direction in the lines of light color on *D. delphis* and other species.

Measurements of the exterior of Prodelphinus doris, No. 15030, ♂.

	Centimeters.
Total length.....	215.7
Length of mouth.....	25.0
Extremity of snout to eye.....	33.7
Extremity of snout to blow-hole.....	34.7
Extremity of snout to anterior base of pectoral fin.....	50.7
Extremity of snout to anterior base of dorsal fin.....	104.5
Extremity of snout to anterior end of genital slit.....	134.3
Extremity of snout to anus.....	153.5
Length of pectoral fin.....	30.4
Greatest breadth of pectoral fin.....	12.6
Width of base of pectoral fin.....	11.9
Distance between bases of pectoral fins on under side of body.....	21.3
Length of genital opening.....	13.9
Length of anus.....	2.0
Breadth of flukes.....	52.7
Depth of flukes.....	16.0
Length of anterior margin of dorsal fin (following curve).....	44.3
Vertical height of dorsal fin.....	24.1
Length of base of dorsal fin.....	36.7
Length of beak.....	12.7
Length of eye.....	2.8
Breadth of blow-hole.....	2.5

OSTEOLOGY.

The skull has the form of the type specimen of *Prodelphinus doris*, with which the species is believed to be identical. The length of the beak is a little less than three-fifths that of the skull; its width at the middle is one-eighth the total length. The intermaxillaries are high and rounded. The palate is generally flat, but with a deep channel in the median line anteriorly, in which the vomer becomes visible. The pterygoids, which meet in the median line, are very long, making the distance from their extremity to the tip of the beak three-fourths the length of the skull. They stand on a raised table 3.3^{cm} broad. The prenarial triangle is short (about 7.6^{cm}), depressed, and rugose in the anterior part. The temporal fossæ are large and rounded. Teeth $\frac{37-37}{34-33}$; the crown of the largest tooth .8^{cm} long, .5^{cm} in diameter at the base. They are slightly worn at the tips.

The vertebral formula is as follows: C. 7; D. 14, L. and Ca. 48 = 69. The atlas and axis are united, but the remaining cervicals are free. Except that the neural spine of the atlas is not bifurcated, the cervical vertebræ present no salient characters by which they could be distin-

guished from those of *D. delphis*. The inferior transverse process of the sixth cervical is large and hamular.*

The neural spines of the dorsal vertebræ are somewhat broader than in *D. delphis*, but otherwise the vertebræ resemble those of that species very closely. The first five pairs of ribs possess heads, which touch the centra of the vertebræ. Anterior zygapophyses become obsolete at the thirtieth vertebra (counting from the atlas). They begin again at the fortieth vertebra. There are nineteen chevrons, the first of which is attached to the fortieth vertebra.

The sternum consisted originally of three pieces, but the first two are anchylosed together. The scapula is very similar to that of *P. marginatus* as figured by Messrs. Van Beneden and Gervais (*Osteog. des Cétacés*, pl. XL, fig. 23), except that the acromion is considerably more expanded.

The formula for the phalanges is as follows: I, 2; II, 9; III, 7; IV, 3; V, 1. The position of the metacarpal of the pollex is somewhat peculiar. It does not form a part of the radial margin of the hand, but its outer border is in a line with the median axis of the first phalanx. On the outer surface of the carpus a small bone is visible, situated between the metacarpals of the first and second fingers and the bones reckoned as scaphoid and trapezoid by Professor Flower. This should be a rudimentary trapezium if the system of Professor Flower be adopted.

The pelvic bones are about 8 centimeters in length and are sigmoid in outline.

Measurements of the skeleton.

	Centimeters.
Greatest breadth of atlas	13.2
Greatest height of atlas	9.8
Greatest breadth of first dorsal	9.2
Greatest height of first dorsal	8.4
Greatest breadth of first lumbar	19.5
Greatest height of first lumbar	14.1
Greatest length of scapula	19.7
Greatest height of scapula	14.1
Greatest length of pectoral fin	34.8
Greatest length of longest rib in straight line	30.6
Greatest length of sternum	17.5
Greatest breadth of sternum	10.4

* I find that the possession of a large inferior transverse process is not a safe guide to the position of the vertebra in the cervical series. In a large collection of cervical vertebræ of *T. tursio*, in some cases the inferior transverse process of the fifth vertebra is greatly expanded and in other cases that of the sixth vertebra.

Measurements of the skull of *Prodelphinus doris*, No. 45939, ♂; the type of *P. plagiodon*, No. 3884; and the type of *P. doris*, British Museum, No. 352a.

Measurements.	<i>P. doris</i> , No. 21915. U. S. Nat. Mus.		Type of <i>P. pla-</i> <i>giodon</i> , No. 3-84. U. S. Nat. Mus.		Type of <i>P.</i> <i>doris</i> , No. 352a. Brit. Mus.	
	cm.	100ths.	cm.	100ths.	cm.	100ths.
Total length	46.2	100.0	43.1	100.0	39.2	100.0
Length of beak	26.9	58.2	24.3	56.5	23.4	59.9
Breadth of beak at base of notches	10.1	21.9	9.1	21.2	9.4	23.9
Breadth of beak at its middle	5.8	12.6	5.6	12.9	4.9	11.9
Breadth of intermaxillaries at same point	3.3	7.1	2.8	6.5	2.7	7.1
Greatest breadth between outer margins of inter- maxillaries, proximally	8.1	17.6	7.8	18.2	7.3	13.8
Length of tooth-line	23.6	51.1	21.0	48.2	20.2	51.8
Last tooth to base of maxillary notch	5.3	11.5	4.6	10.6	4.0	10.4
Tip of beak to anterior margin superior nasal open- ing	32.4	70.3	28.0	65.9	26.9	68.6
Tip of beak to end of crest of pterygoid	34.7	75.2	.....	.....	28.7	73.1
Breadth between orbital processes of frontal	18.5	40.1	18.0	41.8	16.3	41.7
Breadth between hinder margins of temporal fossae	14.4	31.3	14.2	32.9	13.1	33.3
Length of temporal fossa	8.1	17.6	8.1	18.8	7.1	18.1
Depth of temporal fossa	5.6	12.1	6.1	14.1	5.3	13.6
Total length of mandible	39.2	85.2	36.7	85.2	33.8	86.4
Depth between angle and coronoid process	7.3	15.9	7.1	16.5	6.0	15.5
Height of crown of largest tooth .....	.....	.....	.....	.....	.....	.....
Greatest diameter of crown at base .....	.....	.....	.....	.....	.....	.....
Number of teeth	37-37 33-34	.....	35-35 34-35	.....	38-34 34-34	.....

TAXONOMY.

The majority of species of *Delphinidae* are founded upon single skulls. All dolphins' skulls differ from one another to a greater or less extent, and it is impossible, therefore, to find any which will agree exactly with the types. Furthermore, the limits of cranial variation have been determined only in the case of two or three well-known species. For these reasons there is a strong temptation, when a fresh specimen of which the external characters are undescribed is acquired, to erect a new species. The skull presents differences which separate it from the type skulls of any previously described species, and there is no criterion by which one may judge whether these differences are of specific value or only represent individual variation. Such is especially the case in the genus *Prodelphinus*, in which the species may be as few as three or four or as many as twenty or twenty-five.

Under these circumstances there is no escape from a very unpleasant dilemma. If a new species is erected, there is constantly a suspicion that it is identical with some one previously described from the skull; while, on the other hand, if the newly-acquired specimen is referred to a species already in the literature, there is always the possibility that if the external characters of the latter were known they would prove the two to be distinct. It is seldom that cetologists have the opportunity to compare large numbers of individuals of the same species in a fresh state, except in the case of such forms as *Globiocephalus*, of which large schools are frequently stranded. It is imperative that we should make careful study of such material, and from the results of such

investigation draw our opinions regarding the variations of other species. In the present instance it is hoped that a considerable number of crania may be secured at no distant day.

What has been said concerning species described from single skulls holds true for species described from external characters only, and of which no measurements are recorded or specimens preserved. It is doubtful whether such species should be recognized.

At least three species have been described which, so far as external appearance is concerned, bear a more or less close resemblance to the specimen under consideration.

First may be mentioned the *Delphinus maculatus* of Lesson and Garnot, (Zool. Voyage Coquille, p. 183), seen in the vicinity of the Society Islands. This quondam species has the sides and belly impure grey, with rounded white spots margined with rose-color. As this is one of the species *vus en mers et dessinés à distance*, it is scarcely worthy of serious consideration, but it is evident that even so far as the spots are concerned—the only definite character given—it bears no close resemblance to the Pensacola dolphin, and it may therefore be dismissed.

Another spotted species is the *Delphinus Boryi* of Desmarest (Mammalogie, p. 513), from Madagascar. Its colors are thus described: "Dessus du corps d'un gris de souris fort tendre; dessous d'un gris très clair, avec des taches, peu tranchées, d'un gris-bleuâtre; côtés de la tête d'un blanc d'ivoire, nettement séparé par une ligne droite, de la couleur du dessus." The color of the head and of the spots is evidently quite different from that of the specimen under consideration.

A third species, with a spotted skin, is the *Delphinus Pernetyi* of Desmarest (Mam., p. 513). Pernety's figure, though somewhat crude, evidently represents a species whose coloration is similar to that of our Pensacola dolphin. The transition from light to dark color is represented as very abrupt, the light color involves the eye and the beak, and the back is without spots, in all of which characters Pernety's dolphin differs from that represented in the plates accompanying this essay. The last character, however, seems to be of little significance. I was informed by one of the naturalists of the Albatross that in the schools seen off Hatteras the young animals were not spotted on the back.

If our Pensacola specimen is to be accredited to any species known only by the exterior, I believe it should be to this *D. Pernetyi*. As no portions of the animal were preserved, however, and no diagnosis or measurements were given, I think it undesirable to withdraw the species in question from the list of *espèces douteuses*.

There is at least one other species which seems to bear some relation to that under consideration. This is the *Delphinus punctatus* of Gray. A skeleton, drawing and measurements of this animal are preserved in the Public Museum of Liverpool, where I examined them in the winter of 1883-'84. Gray's figure (Cat. Seals and Whales, p. 399) is a correct

reproduction of the somewhat crude original. The whole lower part of the body, including the pectorals and beak and a band over the tail, is represented as being of a very dark stone-color, while the upper half is black. The whole body is sparingly covered with irregular white spots. In having light-colored pectorals and beak and a lunate band of light color over the tail, this animal appears to differ from the Pensacola specimen. The skulls are quite similar, but the beak is longer and narrower in *D. punctatus* and the teeth are more numerous ⁽¹²⁻¹⁹⁾₍₄₁₋₄₀₎. The skeleton, on account of restricted time, I was unable to examine in detail.

A comparison with the species known only from the skull is not entirely satisfactory. The Pensacola specimen is identical, in the first place, with the *D. plagiodon* described by Professor Cope in 1866 (P. A. N. S. P., 1866, p. 296) from a single skull, without locality, contained in the collections of the National Museum. I have compared the two skulls with each other and can find no differences of importance. (See measurements, p. 321.) *D. plagiodon*, however, as Professor Cope himself suspected, would appear to be identical with *Prodelphinus doris* (Gray). (See measurements, p. 321.)

The type of the latter species is considerably smaller than that of *P. plagiodon*, but agrees with it closely in detail. So far the identification is reasonably sure, and it is, perhaps, best that we should not attempt to seek an earlier name. If we do we fall inevitably into perplexity. There are a number of skulls in the Paris Museum labeled *P. dubius*, which, as Professor Flower has already pointed out, show a great similarity to the type of *P. doris*; but we do not know to which particular specimen Cuvier first applied the name, and his description is too vague to be of any value where closely allied species are concerned. Furthermore, the skulls labeled *P. dubius* agree with others bearing different names, notably with one called *P. brevimanus*, of which the external form and color were made known by Hombron and Jacquinot (in Voyage de l'Astrolabe, Zool., 1840, pl. 21), and of which the skeleton and skin are still preserved. In color and number of vertebræ this specimen does not agree with our Pensacola animal, and thus we find that our chain of resemblances will not meet at the ends. The case is the same upon comparing *P. frænatus*, *P. frontalis*, and other species. We are forced, therefore, to fall back on *P. doris*, the earliest described species with which our specimen can be satisfactorily identified.

Diagnosis of the species.

PRODELPHINUS DORIS (Gray) Flower.

Delphinus Doris, Gray, Zool. Ereb. & Terr., 1846, p. 39, pl. xx.

Delphinus (Cephalorhynchus) Doris, Gray, Cat. Mam. Brit. Mus., Cetacea, 1850; p. 114.

Tursio Doris, Gray, Cat. Seals & Whales, 1866, p. 255.

Clymenia Doris, Gray, Synopsis Whales & Dolphins, 1868, p. 6.

Prodelphinus doris, Flower, List of Cetacea Brit. Mus., 1835, p. 29.

Delphinus plagiodon, Cope, Proc. Acad. Nat. Sci. Phila., 1866, p. 296.

FEMALE ?

MALE—*Exterior*.—Form of *D. delphis*, with higher and more arched dorsal fin and broader pectoral fins. Back, dorsal fin, flukes, upper part of head, and pectoral fins dark slate-color, growing gradually lighter on the sides. Belly and lower half of sides white. The dark-colored upper half of the body, tail, and fins spotted with white or light slate-color; light-colored lower half spotted with dark slate-color.

Skull.—Length of beak three-fifths and width at middle one-eighth length of skull. Intermaxillaries high and rounded. Prenarial triangle short, depressed, rather less than one-third the length of the beak. Temporal fossæ large, rounded, their length about one-eighth that of the skull. Teeth $\frac{37}{34}$.

Skeleton.—Vertebral formula: C. 7; D. 14; L. and Ca. 48=69.

During a superficial examination of the viscera no especial peculiarities were noticed except so far as the penis was concerned. This organ, instead of having the tapering form common among the dolphins, is lingulate, strongly flattened, and obtusely pointed. The orifice is inferior.

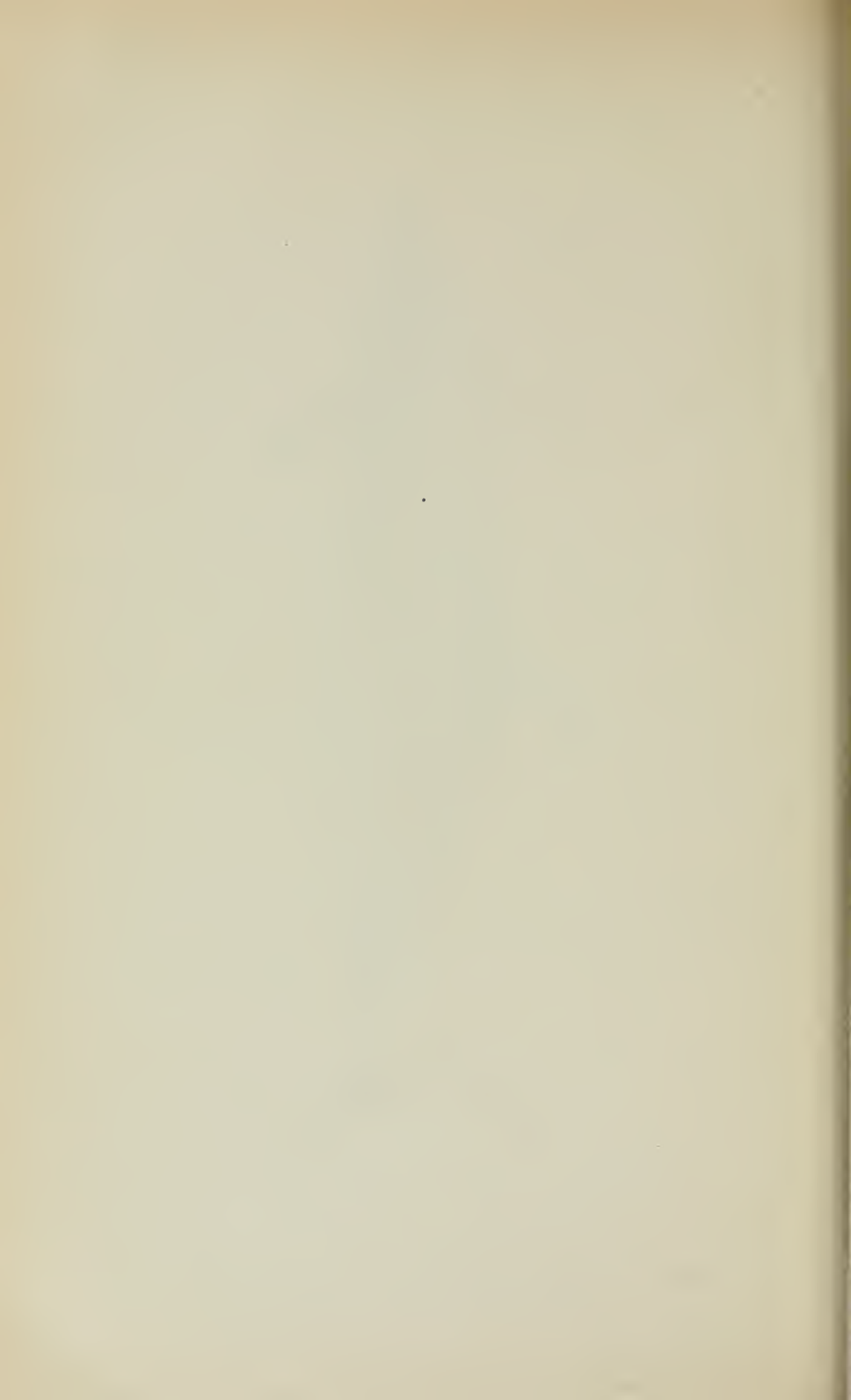
The testicles were of immense size, showing that the animal was captured in the rutting season. They measured 30^{cm} in length.

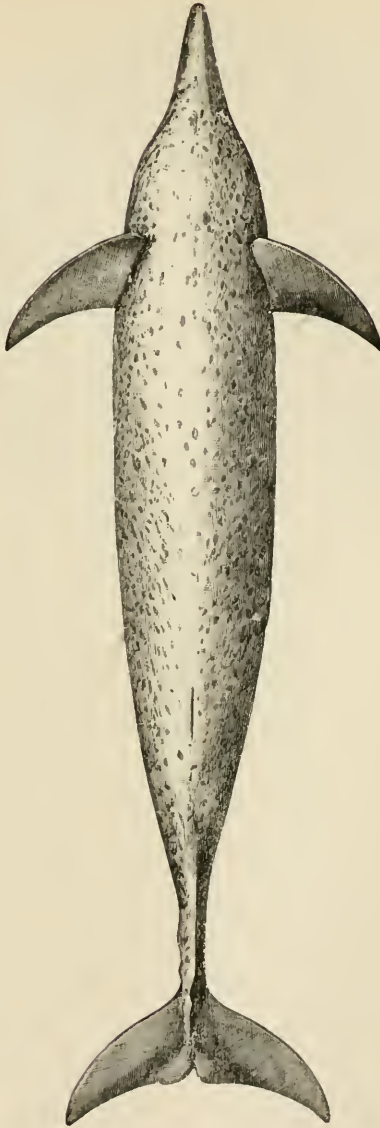
The intestine measured 60 feet in length, and is, therefore, short compared with *Tursiops tursio*, *Delphinus delphis*, and some other species. The stomach, which was of the normal form, was filled with the bones of the scuppaug (*Stenotomus*) and a species of sea-robin (*Prionotus*).

The animal had met with a severe accident in the course of its career, the fifty fourth to the fifty-seventh caudal vertebræ being broken and soldered together. The margin of the caudal peduncle above these vertebræ was broken by deep grooves, and a swelling of considerable size was visible on its side.

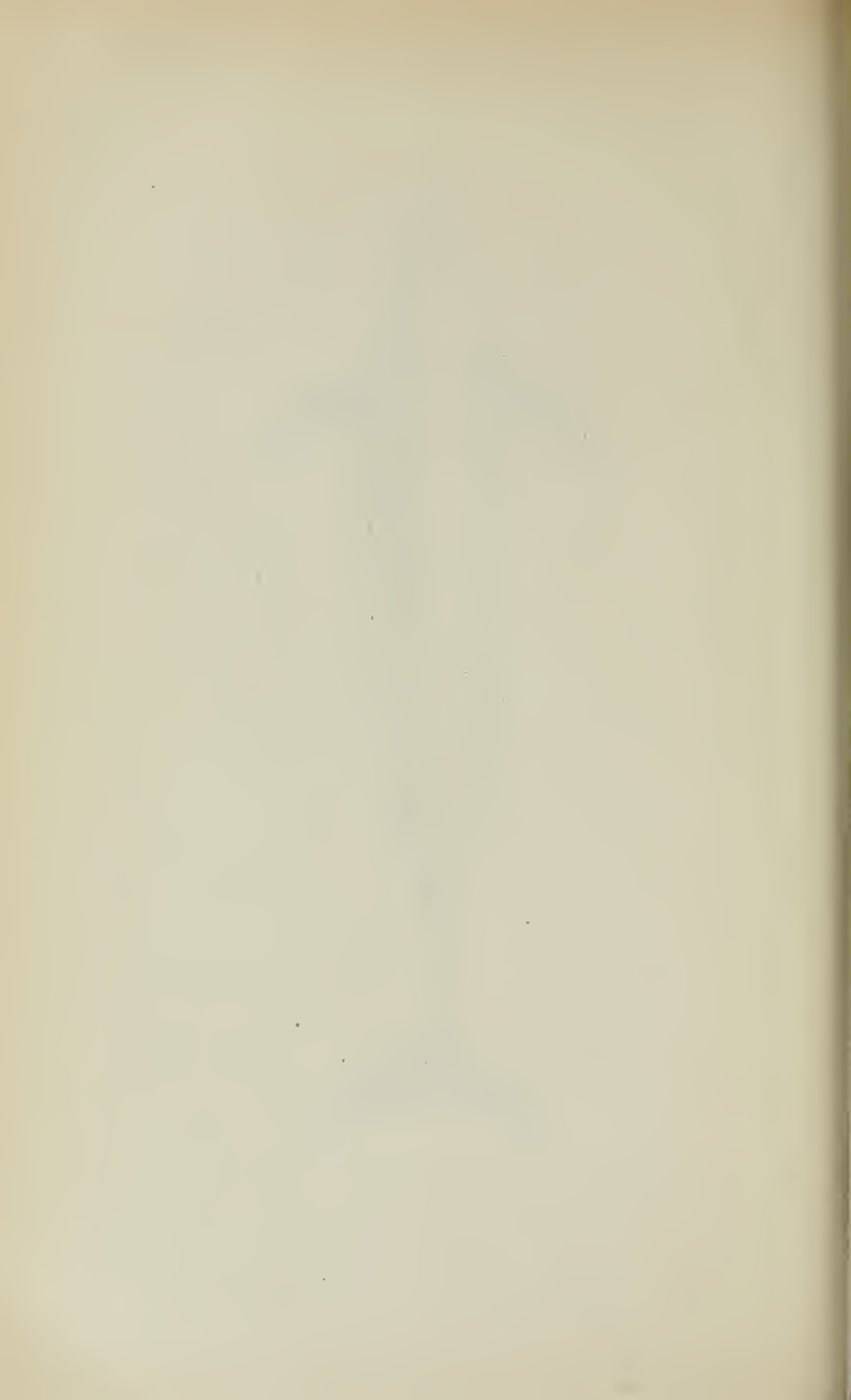


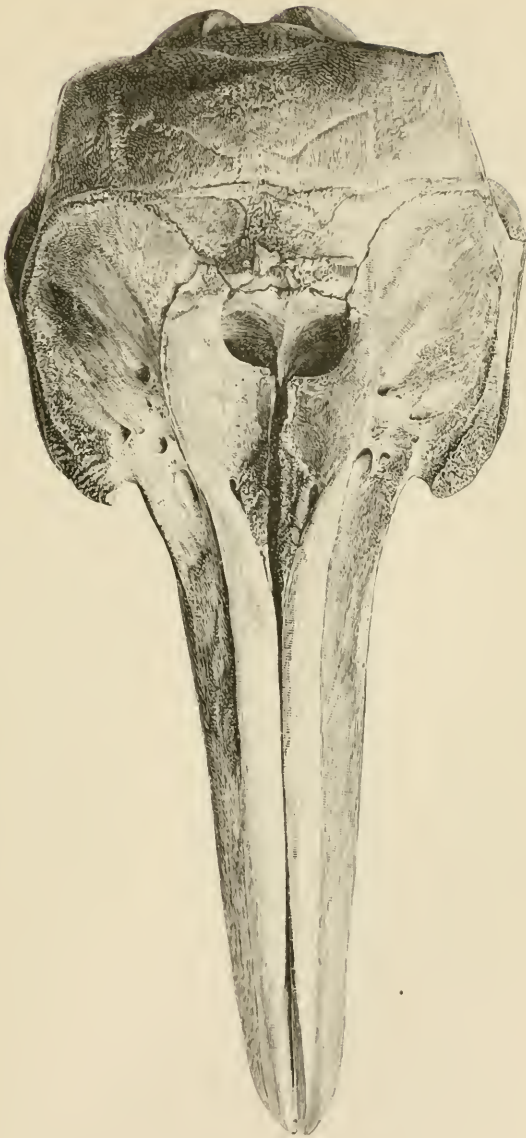
Prodelphinus doris, Gray. Lateral view.



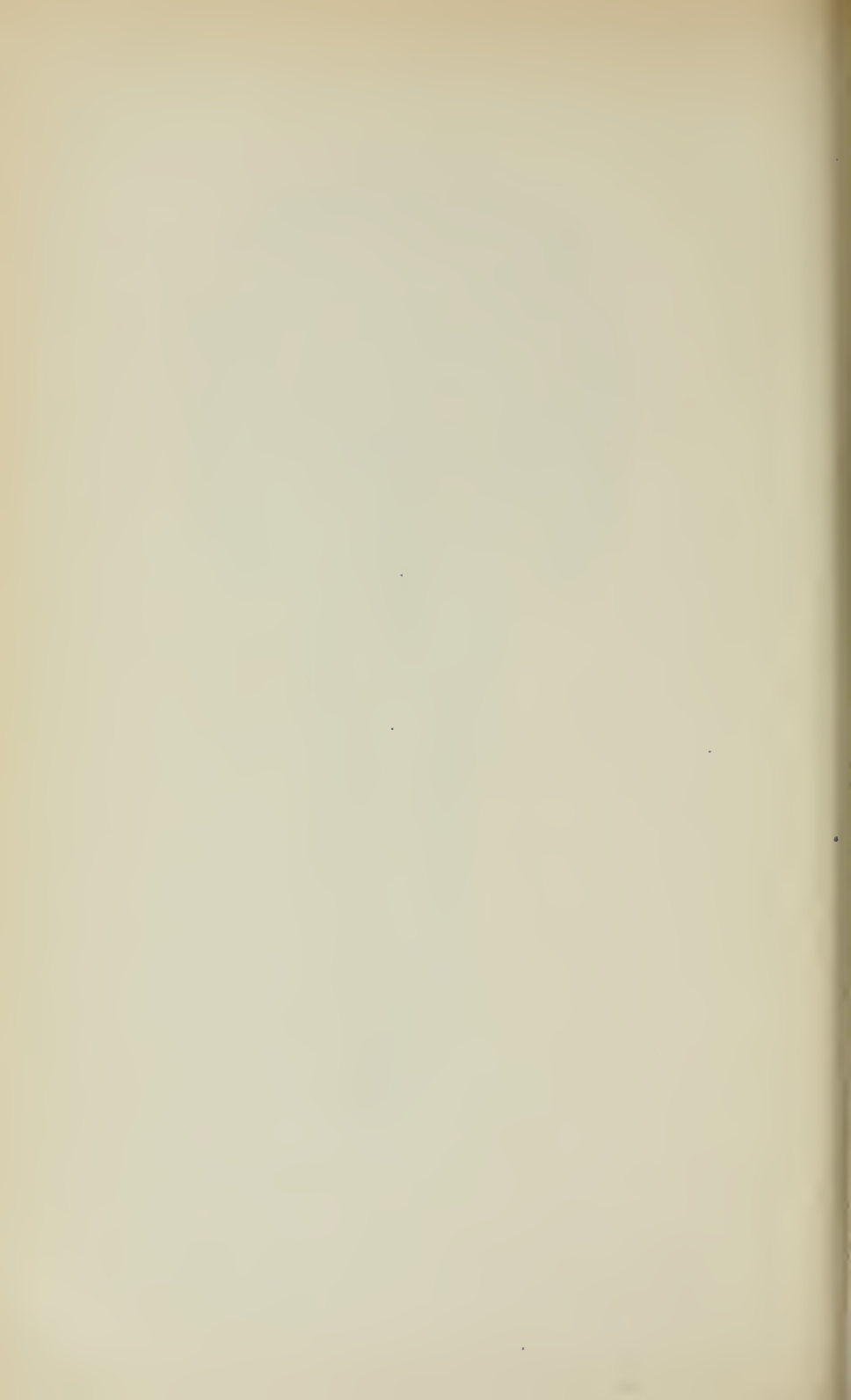


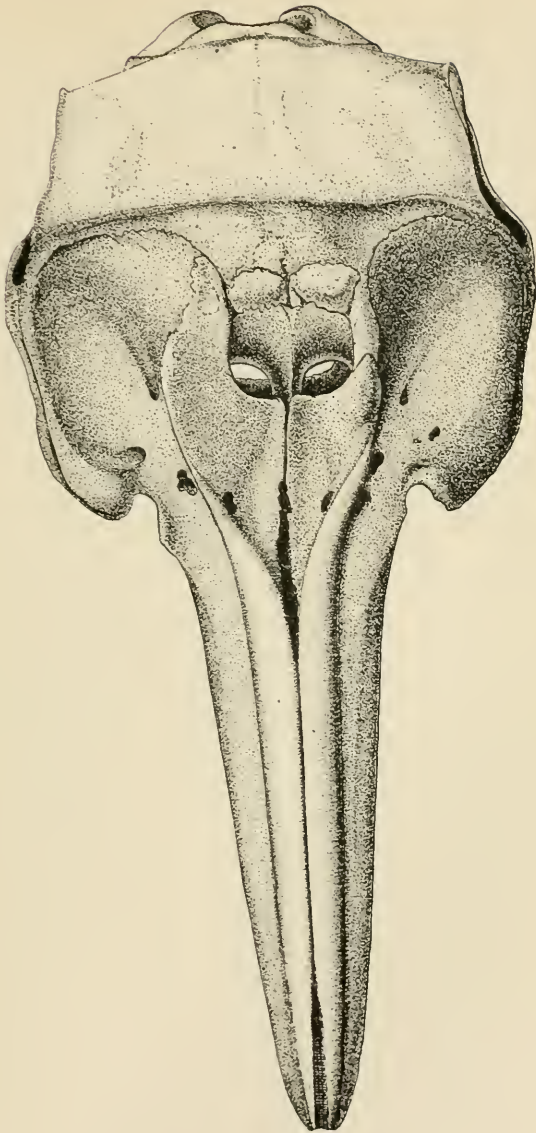
Prodelphinus doris, (Gray). View from below.



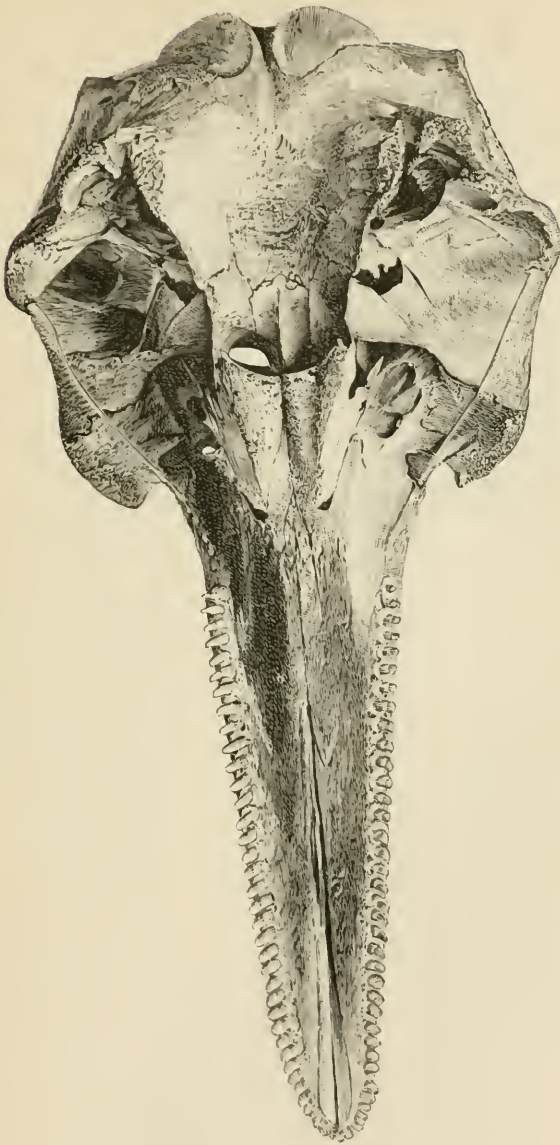


Skull of *Prodelphinus doris*, (Gray). View from above.

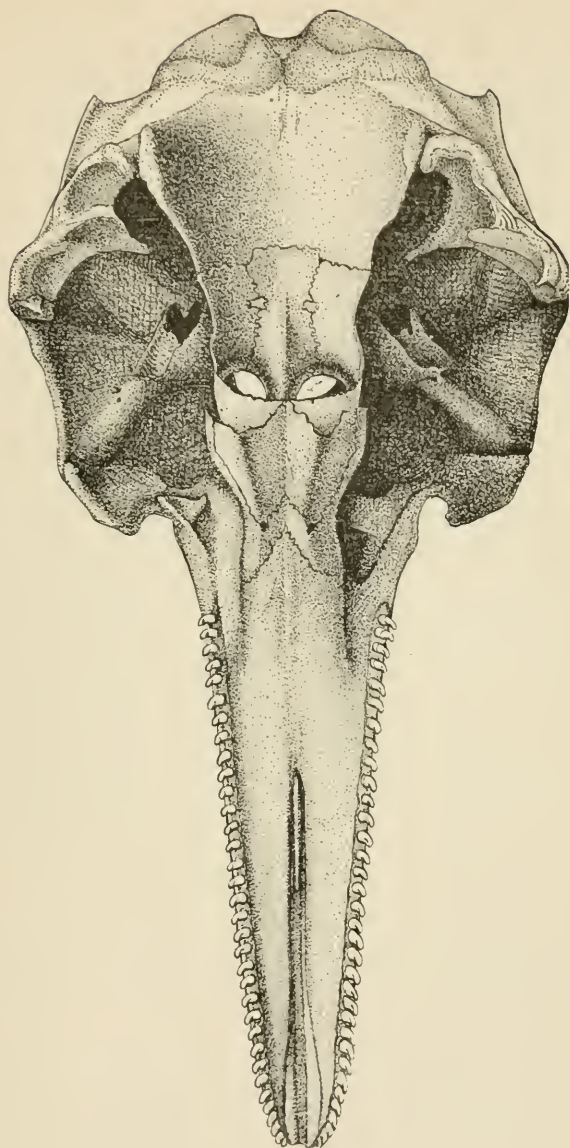




Skull of *Prodelphinus plagiodon*, (Cope). Type. View from above.
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Skull of *Prodelphinus doris*, (Gray.) View from below.



Skull of *Prodelphinus plagiodon*, (Cope). Type. View from below.

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