TRANSACTIONS

OF

THE ZOOLOGICAL SOCIETY.

I. *On Risso's Dolphin*, *Grampus griseus* (Cuv.). By WILLIAM HENRY FLOWER, F.R.S., F.R.C.S., V.P.Z.S., *Hunterian Professor of Comparative Anatomy and Conservator of the Museum of the Royal College of Surgeons of England.*

Read June 6th, 1871.

[PLATES I. and II.]

ON the 28th of February, 1870, an animal belonging to the Order Cetacea was taken in a mackerel-net near the Eddystone Lighthouse, and brought into Plymouth. It was afterwards sent to the Columbia Fish Market, London, was then exhibited in the Kingsland Road, where I first saw it on the 4th of March, and finally lodged at Mr. E. Gerrard's workshop, where the skin and skeleton were prepared for the British Museum, and where the very carefully executed drawings (Pl. I. figs. 1-3) which accompany this communication were made, by Mr. Sherwin, under my superintendence¹.

The animal was a female, and (as afterwards appeared from the condition of the bones) perfectly adult. Moreover there was evidence that she had recently given birth to a calf.

The principal dimensions were as follows (all the measurements are taken in a straight lines with calipers, unless otherwise stated):—

	ft.	in.
Length, from anterior edge of upper lip to notch in middle of caudal fin .	10	6
From upper lip to anterior edge of dorsal fin	3	11
From upper lip to anterior angle of eye	1	1 $\frac{1}{4}$

¹ I have much pleasure in acknowledging the great facilities which Mr. Gerrard afforded me in examining both the specimens described in this communication.

	ft.	in.
From upper lip to blow-hole (following curve)	1	7
From upper lip to junction of anterior edge of pectoral fin with the body	1	9
From upper lip to angle of mouth	0	10½
From upper lip to anus	7	0
Length of eye-aperture	0	1
From posterior angle of eye to ear-aperture	0	3¼
From angle of mouth to anterior angle of eye	0	3½
Pectoral fin, length from junction of anterior edge with body to tip . . .	1	11¾
Pectoral fin, from junction of posterior edge with body to tip . . .	1	7
Pectoral fin, breadth at base	0	6
Pectoral fin, greatest breadth	0	6½
Height of dorsal fin	1	4
Breadth of caudal fin	2	5
Vertical height of body, at the eye	1	3½
Vertical height of body, immediately behind the pectorals	1	7
Vertical height of body, immediately in front of dorsal fin	2	0
Vertical height of body at pudendal orifice	1	3

In general form the animal more resembled a *Globicephalus* than any other Cetacean with which I am acquainted—so much so that I was at first inclined to refer it to that genus. The front part of the head was furnished with a similar rounded adipose protuberance, though developed to a less extent; and the pectoral fins had almost the same low position and narrow falcate form, though they were considerably less elongated; the dorsal fin, however, was higher. A better idea of the general form of the body can be obtained by an inspection of the figure (Pl. I. fig. 1) than by any description.

The crescentic aperture of the blow-hole, 1½ inch in width, was placed directly over the eyes. The minute external auditory meatus (no larger than a hole made by pricking the skin with a needle) was an inch lower than the eye-aperture, and ¾ inches behind its hinder angle.

From the blow-hole the upper contour of the head was continued at first nearly horizontally forward, then curved pretty rapidly downwards to form the nearly vertical anterior surface of the head. This was somewhat hollowed in the middle line, and expanded below into a thick, rounded, very short snout, which projected 1½ inch further forwards than the edge of the lower lip.

The lower jaw was narrowed in front. The opening of the mouth was directed slightly upwards towards the angle, but finally took a sweep downwards near the junction of the upper and lower lips. There were no traces of teeth in the upper jaw; but there was a deep narrow groove along the alveolar margin of the palate. In the lower jaw, near the anterior or symphysial region, were three rather small teeth on each side, the apices

of which were worn quite flat. The hinder edge of the most posterior of these was $2\frac{1}{2}$ inches from the anterior edge of the chin; and the three occupied a space of 1.7 inch. The middle one was slightly larger than the others, the truncated crown being 0.3 of an inch in diameter, and projecting 0.2 of an inch above the level of the gum. The space between the right and left anterior tooth was 1.2 inch.

On the under surface of the body there was a deep median depression containing the vulva and anus, 8 inches in length, and bordered in its anterior portion by prominent labia. The nipples were each placed in a slit, 1 inch long, on the side of the median pudendal fissure, and $1\frac{1}{2}$ inch distant from it. The mammary glands were largely developed, the internal reservoir being filled with milk. This circumstance, combined with the dilated, vascular condition of the uterus, showed that the animal had recently given birth to a young one.

Perhaps the most noticeable external character was the very marked and peculiar coloration. The most prevalent tint was grey, varying in some parts to pure white, and in others to deep black; but the light parts of the head and anterior portion of the body had a yellowish wash, and the dark parts a slight bluish or purple tinge which varied much in different lights. The length of time that the animal had been out of the water may have modified these colours somewhat; but the general disposition of the light and dark shades, as shown in the figure, were evidently natural.

The head and the whole of the body anterior to the dorsal fin was generally of a lightish grey, variegated with patches of both darker and whiter hue. The eye was surrounded by a small oval patch of black. The lips were mottled with black. There was a large, nearly black, patch on the top of the head, extending backwards a short distance behind the blow-hole, and on each side towards, but not reaching, the eye. Both surfaces of the pectoral fin were nearly black, very finely mottled or dappled with grey, and becoming darker towards the tip. The neighbourhood of the axilla was of the same dappled colour. Behind the anterior edge of the dorsal fin the general colour of the surface, including the dorsal and caudal fins, was nearly black, though with a large light patch on the upper part of the side directly above the pudendal orifice. The middle of the belly, as far back as the pudendal orifice, was greyish white.

But what gave the most remarkable and characteristic appearance to the animal was the presence of conspicuous, but most irregular, light streaks and spots, scattered over the whole of the sides from the front of the head to about two feet from the end of the tail, where they ceased, at least on the lateral surfaces. These markings were naturally most conspicuous in those parts of the surface where the ground-colour on which they were placed was dark. The streaks or lines were of various lengths, and running in all directions in a most fantastic manner, some parallel, some crossing each other, and some forming sharp angles, zigzags, and scribble-like patterns. When most completely developed, and not interfered with by others, each linear marking was of a compound character, consisting of a very narrow, central white line, with an irregular, black,

mottled border, which, again, was separated from the general dark colour of the surface by another white line, so that there were three white and two black lines, altogether nearly half an inch in width. In some places the central white line was absent; and then the marking showed only a dark centre, bordered by white. There are also many round and oval patches of white, generally with a dark centre. On close inspection it was seen that these dark lines and patches were really formed by aggregations of minute black dots and fine linear streaks placed transversely to the main line, and that they depended altogether upon the disposition of the pigment in the cuticle, the peculiar coloration passing through its entire thickness.

Nothing but the drawing can convey any idea of the extraordinary and irregular manner in which these markings were distributed. Though there was a general correspondence between their arrangement on the two sides, there was no symmetry in detail. They were entirely absent from the dorsal, pectoral, and upper surface of the caudal fins, though on the under side of the right lobe of the latter were some broad, rather indistinct, white lines, parallel with the anterior border of the lobe, and following its curve. There were no corresponding markings on the other lobe.

The viscera generally, as far as I had an opportunity of examining them, appeared closely to resemble those of *Globicephalus*. The stomach was nearly empty, containing only a little fluid, and in its last compartment a single crystalline lens, apparently of a small Cephalopod.

Skeleton.—The condition of the bones showed that the animal was adult but not aged: all the epiphyses of the limb-bones were completely united with the shafts; and the disk-like terminal epiphyses of the bodies of the vertebræ were likewise joined with the rest of the bone, with the exception of a few in the lumbar region, which still remained distinct.

In general appearance the skeleton presents the same kind of resemblance to that of *Globicephalus* that the external figure of the animal does, the proportions of the different regions of the trunk being very similar; but as the vertebræ are more numerous, especially in the lumbar region, they are individually shorter from before backwards. The spinous and transverse processes are also longer and more slender, approaching in this respect *Delphinus* and *Lagenorhynchus*, and deviating greatly from *Orca* and *Pseudorca*.

The most noticeable peculiarity of the vertebral column, taken as a whole, is the very feeble development of the metapophyses.

The total number of vertebræ is 68, which may be divided into 7 cervical, 12 thoracic, 19 lumbar, and 30 caudal¹.

The seven cervical vertebræ are all firmly united together by the laminæ of their arches and the spines; but the body of the seventh is quite distinct from the sixth, and that of

¹ Exactly the same numbers as those found by Fischer in a specimen of *Grampus griseus*, stranded in 1867, on the west coast of France. (Annales des Sciences Naturelles, 5th ser. viii. p. 363, 1867.)

the latter only imperfectly joined to the fifth. The bodies of the remainder are completely consolidated together. The spines of all seven are joined into a single conical mass, flattened in front, and compressed from side to side posteriorly. Indistinct traces of their original individuality may be seen on the sides of the laminae. The pedicles of the arches are all distinct, with interspaces for the passage of the nerves; but, with the exception of the first and seventh, they are scarcely thicker than pieces of cardboard. There is no foramen in the arch of the atlas for the passage of the suboccipital nerve, but merely a shallow groove. The transverse process of the atlas is directed nearly straight outwards, is stout, somewhat flattened from above downwards, and rounded at

Fig. 1.

Anterior surface of cervical vertebrae. $\frac{1}{2}$.

Fig. 2.

Side view of cervical vertebrae. $\frac{1}{2}$.

the extremity; that of the axis forms a small but distinct tubercle, projecting somewhat backwards from the middle of the transverse process of the atlas; that of the seventh is long and slender, inclining forwards and downwards, its apex being but 0.2 of an inch behind the end of the transverse process of the axis, and extending as far laterally. The transverse processes of the intervening vertebrae are but slight triangular projections from the roots of the flattened pedicles of the arches. The side of the body of the seventh vertebra has a well-marked articular surface, which receives the head of the first rib. Slight rough elevations on the bodies of the vertebrae in front of this, and at a lower level, are all the indications shown of the inferior transverse processes so commonly met with in this region in the Cetacea. The dimensions of these vertebrae are¹:—

¹ The cervical vertebrae most closely resemble those of *Grampus griseus* figured by Van Beneden and Gervais (*Ostéographie des Cétacés*, pl. 54, figs. 8 & 8 a).

	inches.
Length of inferior surface of conjoined bodies	2·4
Length of conjoined arches	2·2
Height from inferior surface of atlas to apex of conjoined spinous processes	5·4
Breadth of articular surfaces of atlas	4·7
Breadth between tips of transverse processes of atlas	7·7
Breadth between tips of transverse processes of axis	5·3
Breadth between tips of transverse processes of seventh vertebra	5·2
Greatest breadth of spinal canal (inside arch of atlas)	2·0
Height of spinal canal at the same place	1·4

The thoracic vertebræ are twelve in number. The body of the first is but 0·6 of an inch in length; they gradually increase from this to the fifth; but the remainder are very nearly equal, viz. 1·7 inch in length, and present no marked differences in breadth and height. Articular surfaces for the heads of the ribs are developed on the hinder edge of the base of the pedicle of the arch of the first five; and on the sixth there is a rough tubercle in the corresponding position. The spine of the first is very small and directed forwards; that of the second is equally low, but broader in the antero-posterior direction; that of the third is long and pointed, and sloping much backwards; the remainder increase gradually in length to the last, and become more upright in position; beyond the sixth they have a slight forward curve. The transverse processes arise in the anterior vertebræ high up on the sides of the arch; but, as in other true Dolphins, their position is gradually lowered until, before the termination of the thoracic region, they are transferred to the bodies of the vertebræ. In the first seven vertebræ they are of nearly equal length, but from the eighth to the twelfth they gradually increase. They all have articular surfaces at their extremities for the heads of the ribs, at first oval from above downwards, but gradually becoming elongated in the other direction. In the twelfth the surface is convex and very slightly marked. Zygapophyses are developed only as far as the articulation between the sixth and seventh. The metapophysial tubercles are slightly indicated on the third, near the outer end of the anterior edge of the transverse process; on the sixth and seventh they are prominent, conical, and close to the base of the process; on the eighth they become less marked, and begin to rise on the side of the arch; and they no longer exist as distinct processes on the eleventh, and thenceforth are only indicated by a slight bulging forwards of the anterior edge of the upper part of the arch, and do not reappear, as is usually the case, in the lumbar or caudal region¹.

The bodies of all the lumbar vertebræ are very nearly equal in length, viz. 1·4 inch.

¹ The metapophysies of the posterior thoracic region are much better developed in the skeleton of the "*Grampus rissoanus*," figured by Van Beneden and Gervais (*op. cit.* pl. 54. fig. 1), than in the present specimen.

In height they gradually increase from 2 inches (first) to 2.4 inches (nineteenth); in breadth they increase from 2.3 inches (first) to 2.4 inches (nineteenth) at the articular ends. The sixth, seventh, and eighth have the highest spines, viz. 6.4 inches from the upper surface of the body of the vertebra to the tip of the spine—the height of the first being 6 inches, that of the last 4.3 inches. The spines are long, slender, upright, and devoid of metapophyses. The transverse processes gradually diminish from the first (where the breadth of the vertebra between the tips of the processes is 11.2 inches) to the last (where the same measurement is but 7.5 inches); they are very nearly equal in antero-posterior breadth throughout, viz. 0.9 of an inch; and they arise from rather nearer the front than the hinder end of the body; but this is less marked in the posterior than in the anterior portion of the series.

I have, as usual, reckoned as the first caudal vertebra that which bears at the hinder end of its body the first chevron bone. The bodies of these increase in length from the first (which is 1.4 inch) to the sixteenth and seventeenth (which are 2 inches), after which they again diminish. In height they do not differ greatly, until beyond the eighteenth, when they rapidly decrease. They begin to diminish in breadth after the eleventh. The lateral compression characteristic of this part of the vertebral column of Cetacea continues until the twentieth vertebra; the twenty-second is the first of the series of broad, depressed, terminal vertebræ, the twenty-first being of transitional form. The spinal canal ceases at the nineteenth caudal vertebra. The transverse process is reduced to a low ridge on the fourteenth, and disappears altogether on the fifteenth. The vertical vascular canals first appear in the middle of the base of the transverse process of the fifth, though small, and on the right side only; on the sixth they are present on both sides, and they continue as far as the penultimate vertebra. The terminal vertebra is a small, triangular nodule, very inferior in width to that which precedes it.

The chevron bones present are twenty in number, all having the two lateral halves united. It is not improbable that some additional ones from the hinder end of the series may have been lost in macerating the skeleton. The first two are small, with no spines developed beyond the union of the laminae. The third shows a sudden increase in length, which augments in each succeeding one until the seventh, after which they diminish in length, but are more expanded in the antero-posterior direction.

There are twelve pairs of vertebral ribs, all of which, except the first three or four, are very slender. The anterior six pairs have long necks, reaching in each case to the articular surface on the side of the vertebra in front of that to which the tubercle is attached. The seventh presents, on both sides, a peculiar arrangement. The rib is not developed inwards beyond the tubercle, which articulates (as do all the posterior ribs) with the end of the transverse process of the corresponding vertebra; but, detached from the rib, and fused with the under surface of the transverse process of the vertebra, is a strong spiculum of bone 1.4 inch long, with its free end pointing forwards, downwards, and inwards, and reaching to within half an inch of the before-mentioned tubercle on

the base of the pedicle of the arch of the sixth vertebra. This obviously represents the neck of the seventh rib.

There are eight pairs of sternal ribs, the last being very rudimentary. The first pair articulate near the anterior extremity of the sternum, the second at the junction of the first and second segments of that bone, the third at the junction of the second and third segments, and the fourth and fifth to the hinder end of the third segment. The remainder are not directly connected with the sternum.

The various elements of the sternum are consolidated into a single bone, though traces of its original formation out of three segments can be seen, and the primordial median fissure is indicated by a slight longitudinal groove on its inner surface and a small foramen near the anterior part of the first segment or manubrium. The entire length is 11·2 inches. The greatest breadth of the first segment is 5·5 inches; the least breadth, at the middle of the second segment, is 1·7 inch. The manubrium is very slightly notched in the middle line in front; behind the attachment of the first pair of sternal ribs its lateral borders expand as usual into rough triangular processes, directed outwards and backwards. The hinder end of the posterior segment is deeply notched¹.

The pelvic bones are slender and styliform, 4·9 inches in length.

In general form the skull resembles the well-known figure of that of *G. griseus* in Cuvier's 'Ossements fossiles,' pl. 223.

In plate 54 of the great work on the osteology of the Cetacea, now in progress, by Professors Van Beneden and Gervais, are beautifully executed and evidently most faithfully drawn figures of skulls, named respectively *Grampus rissoanus* and *Grampus griseus*, from specimens in the collection at Paris, doubtless the type specimens². There are certain obvious differences between these two figures, especially in the size of the nasal bones and the width and form of the rostrum; but whether these are more than individual differences it would be hard to say, without a comparison of a large series of specimens. It is to be noticed, however, that in all those points in which the figures differ, the present specimen resembles *G. griseus* rather than *G. rissoanus*; indeed the figure of *G. griseus* (fig. 7) is so close a representation of it, both as to form and size, that, except for a trifling difference in the shape of the anterior edge of the narial aperture, it might very well have been drawn from it.

In the flatness and breadth of the cranial part of the skull, and the wide expansion of the maxillæ above the orbits, it much resembles that of *Globicephalus*; but it differs in the rounded form and absence of elevation of the region behind the superior narial apertures, in the marked convexity of the præmaxillæ in front of these apertures, and

¹ This sternum appears narrower, in proportion to its length, than that of *Grampus griseus* figured by Van Beneden and Gervais (*op. cit.* pl. 54. fig. 9), but otherwise does not differ materially from it. It closely resembles the sternum of *Globicephalus*.

² Unfortunately the letterpress of this portion of the work has not yet appeared.

in the comparative narrowness of the rostrum. The general aspect of the upper surface somewhat recalls that of a Beluga.

There are no traces of alveoli in the maxillæ; but there is a slight depression in the usual situation of the upper teeth, with numerous openings of vascular canals. At the extreme tip of each præmaxilla is a conspicuous rounded foramen of the same nature¹.

The petrotympanic bones closely resemble those of *Globicephalus*, and are almost of the same size as those of an animal of that genus of nearly double the length of the present specimen.

Fig. 3. Periotic and tympanic bones united, outer surface. Fig. 4. Periotic and tympanic bones united, under surface. Fig. 5. Periotic bone, under surface. Fig. 6. Tympanic bone, upper surface. All the natural size.

per, periotic; *ty*, tympanic; *m*, posterior end of the periotic, answering to the mastoid of ordinary mammals; *a*, principal articular surface between periotic and tympanic; *e*, fissure for Eustachian canal at anterior extremity of tympanic; *e.a.m*, external auditory meatus; *e.p.l*, external posterior lobe of tympanic; *i.p.l*, internal posterior lobe of tympanic; *g*, groove between these lobes; *f.r*, fenestra rotunda in periotic; *a.f*, aqueduct of Fallopius; *s*, stapes.

The thyro-hyals are ankylosed to the basi-hyal, but with distinct marks remaining of the original suture. The thyro-hyals are more flattened and less tapering at their free extremities than in *Globicephalus*; and the basi-hyal has not the same median prolongation in front for the attachment of the anterior cornua.

The principal dimensions of the skull are as follows (the measurements of the

¹ This is evidently the foramen thus described by Fischer, "En avant des intermaxillaires on voit deux petits trous où devaient être enchassées les incisives rudimentaires." He appears also to have taken the other vascular foramina in both upper and lower jaws for alveoli of rudimentary teeth (*loc. cit.* p. 367).

skull of the animal next to be described are also appended for convenience of comparison):—

	Skull of adult.	Skull of young.
	inches.	inches.
Entire length	19·2	13·6
Length of rostrum ¹	9·3	6·1
Breadth of occipital foramen	1·5	1·2
Greatest height of occipital foramen	1·9	1·7
Breadth of occipital condyles	4·5	3·2
Greatest breadth of cranium (at parietal region, in temporal fossa)	9·1	7·7
Greatest breadth of skull (at zygomatic process of squamosals)	12·9	9·0
Breadth at anteorbital processes of frontals	11·8	8·2
Breadth of anterior narial apertures	2·8	2·2
Breadth of rostrum at base (bottom of anteorbital notch)	7·7	5·6
Breadth of rostrum at the middle	4·4	3·3
Length of tympanic bone	1·8	1·6
Mandible.—Length of ramus	15·4	10·6
Length of symphysis	1·9	1·2
Breadth at condyles	11	
Height at coronoid process	4·3	2·7
Hyoid.—Breadth between tips of thyro-hyals	8·7	
Basi-hyal.—Greatest antero-posterior length	3	

The bones of the pectoral limb generally present a nearer approach to those of *Globicephalus* than any other Cetacean, or, rather, may be described as intermediate between that genus and *Delphinus* proper.

Of the two scapulæ figured by Van Beneden and Gervais, one of *G. rissoanus*, and the other of *G. griseus*, the present one most nearly resembles the latter in outline, especially in the form of the acromion; it is rather smaller, however, in all its dimensions, in which respect it is more like the former.

The humerus is immovably united with the radius and ulna. These bones are not so broad in proportion to their length as in *Globicephalus*.

The carpal bones are five in number, and form a close mosaic, three in the first and two in the second row, and have precisely the same arrangement as in *Globicephalus*. The pollex consists of a short, nearly square metacarpal, and a single, conical, tapering phalanx, reaching nearly to the end of the second metacarpal. It is certain that no other ossified phalanx was present in this digit on either hand—a circumstance which I note particularly, because in Gervais's figures², both of *G. griseus* and *G. rissoanus*, there

¹ Measured from a line drawn between the anteorbital notches.

² *Op. cit.* pl. 54. figs. 10 & 5.

is a small additional phalanx to the pollex, and one is also present in all the specimens of *Globicephalus* which I have examined.

As the bones of the digits have never been separated, there can be no doubt as to their correct number and position. The second digit is the largest, and has ten distinct ossifications including the metacarpal, the last being a rounded nodule rather smaller than a pea. The third has eight ossifications; its metacarpal is considerably longer than that of the second digit; and its proximal phalanges are rather broader, though more flattened and more compressed, especially at their posterior or ulnar edge, than are those of the second digit. The relative condition of the bones of these two digits thus agrees rather with Gervais's figure of the limb of *G. griseus* (fig. 11) than of *G. rissoanus* (fig. 6). The fourth digit is very short, and has but three ossifications; and the fifth is rudimentary, being mostly cartilaginous, with a nodular metacarpal bone at the base. The minute bone-specks represented in the terminal portion of the cartilages of these last two digits in Gervais's figure of *G. griseus* are not present.

The principal dimensions of the bones of the pectoral limb are as follows:—

	inches.
Scapula.—Height	8·0
Breadth	11·0
Length of acromion	2·9
Greatest depth of acromion	1·9
Length of coracoid process	2·5
Length from head of humerus to tip of second finger ¹	22·5
Length of humerus	4·4
Length of radius	5·2
Length of ulna	4·6
Breadth of radius at distal extremity	2·4
Breadth of ulna at distal extremity	1·9

About a month after the capture of this Dolphin (viz. March 31st) Mr. Gerrard gave me an opportunity of examining another specimen which he had bought at Billingsgate Market; but, as it had changed hands several times, he was unfortunately not able to obtain any trustworthy account of the place of its capture, though this was probably somewhere in the Channel. It was quite fresh at the time of my seeing it. This was also a female, but, as the condition of the bones afterwards showed, a very young animal.

Although very different from the former in the disposition of the surface colours, the other characters, especially those of the skeleton and dentition, are so closely similar that I have little doubt of its specific identity; and such being the case, it is within the bounds of probability that this might have been the identical young animal which

¹ Owing to the drying and contraction of the cartilages, this must be somewhat less than in life.

the former must have had near her at the time of her capture; or, as small herds of these Cetaceans generally travel in company, it might have been a member of the same band. There is no evidence, however, in the present case of more than these two individuals having been seen¹.

In general form the young animal closely resembles the old one; but the head is more rounded, the dorsal fin is not quite so high, and slightly more posterior in position, and the pectoral fin is decidedly shorter in proportion to the general size of the body.

These differences will be best appreciated by the following table of proportions, the entire length of the animal being in each case taken as 100:—

	Young.	Adult.
Length of pectoral fin	16·4	18·8
Breadth of caudal fin	20·0	23·0
Height of dorsal fin	10·3	12·7

I think that the difference would be even greater, if in the entire length the caudal portion of the body could be excluded; for that this grows more in proportion than the head and trunk, seems to be shown by the relatively more advanced position of the dorsal fin in the adult. It is but natural to suppose that the locomotive appendages should be more highly developed in the full-grown than the new-born animal; and there is certainly a similar alteration with age (at least as regards the pectoral fin) in the allied genus *Globicephalus*.

I am indebted to Mr. Gerrard, jun., for the following dimensions, as well as for the drawing of the animal (Pl. I. fig. 4):—

	ft.	in.
Length, in straight line from the upper lip to notch in middle of caudal fin	6	1
From the upper lip to anterior edge of dorsal fin (following curve)	2	11½
From the upper lip to anterior angle of eye	0	9
From posterior edge of dorsal fin to middle of tail	2	10
From posterior edge of dorsal fin to angle of mouth	0	7¾
Length of eye-aperture	0	0¾
Pectoral fin.—Length of anterior border	0	10
Length of posterior border	0	7
Height of dorsal fin	0	7½
Antero-posterior length of dorsal fin at base	0	10
Width of caudal fin	1	2½
Girth of body immediately in front of dorsal fin	3	8

The upper parts and sides of the body were almost black, the lower parts nearly

¹ It is stated by the late Mr. Jonathan Couch, in 'Land and Water,' March 19th, 1870, that an animal of the same species was observed off the coast of Cornwall in the month of May 1869.

white, the junction between the two colours being very abrupt, passing from the angle of the mouth above the origin of the pectoral fin backwards to the vulva, behind which the whole of the surface was black. On the sides were several large longitudinally disposed nebulous washes of light grey, the most conspicuous of which was between the pectoral and dorsal fins; and the lateral surfaces of the last-named fin, especially near its base, were yellowish white. The upper lip, the front surface of the head, as high as the top of the vertical anterior wall of the adipose prominence, and the chin and throat were white, with a distinct yellow tinge. The pectoral fin was black on both sides, and showed none of that peculiar delicate mottling or dappling so conspicuous in the larger specimen. Both surfaces of the caudal fin were black. So much for the general ground-colour, upon which were laid certain markings of a somewhat similar character, though very different in number and in arrangement, to those of the adult animal. On each side of the body were six vertical whitish stripes, nearly symmetrically arranged, and almost equidistant, being about six inches apart. They did not extend quite to the middle line of the body above, and were lost below in the light colouring of the abdomen. These stripes were not so complex in structure as those of the adult specimen, being merely broad white lines, shading insensibly at the edges into the general dark colour of the surrounding cuticle, and with an obscure dark central line. In addition to these, however, there were three others, which, though short and straight, had exactly the same characteristic formation as the best-marked streaks of the other specimen, having a white central line, bordered first with black and then again with white. These were situated:—one on each side of the narrow part of the tail, close to the upper median ridge, just before the commencement of the lateral expansions of the caudal fin; and the third obliquely longitudinal, a little to the left of the middle line of the back, just in front of the dorsal fin. This last, especially, was extremely important, as, being asymmetrical, it showed the tendency to variation in colouring and surface-markings, and so helps to account for the great difference in these respects between the two specimens.

On each side of the upper lip were eight extremely short, whitish bristles, their tips only just projecting beyond the level of the cuticle, arranged in two rows, six in the lower and two in the upper row, as shown by the dots in the figure. There were no similar bristles on the under lip or chin.

The condition of the teeth was of extreme importance, as helping to establish the normal dentition of the species. There were no teeth visible above the gum in either jaw; and on a careful examination of the soft tissues between the surface and the bone, not a rudiment of any tooth could be found in the upper jaw, while in the lower jaw were the germs of seven teeth—four on the right and three on the left side, close to the symphysis. The crowns of these teeth were conical, pointed, and strongly curved. Calcification had extended rather below the base of the crown or neck of the tooth.

The *skeleton* presents all the signs of immaturity which might be expected in an

animal of so early an age; but in other respects it does not differ materially from that of the other specimen.

The total number of vertebræ is 69, being divided into 7 cervical, 12 dorsal, 20 lumbar, and 30 caudal; this gives one additional vertebra in the lumbar region, an individual variation by no means uncommon in the Cetacea.

The bodies of the first and second cervical vertebræ are united; but those of all the others consist of very thin plates still separable from each other, or in some cases, as between the fourth and fifth, united by a partial ankylosis in the centre of the disk. Except in the atlas and axis, the arches have not yet united with the bodies; but the spines are joined into two sets—one consisting of the first, second, and third, and the other consisting of the last four. The metapophyses of the posterior dorsal and anterior lumbar vertebræ are more developed than in the adult specimen, resembling those in Van Beneden and Gervais's figure of the skeleton of *G. rissoanus*. The chevron bones are twenty-one in number.

There are twelve pairs of vertebral ribs, of which the first six have necks; in the seventh the neck is represented by an unossified ligament. The sternal ribs resemble those of the adult in number and connexions. The three segments of the sternum are not united by bone; the last is divided in the middle line into two separate pieces.

The skull, as is usual with young animals, differs from that of the adult in the large size, globular form, and smooth outlines of the cerebral portion as compared with the rostrum. It much resembles that of a young *Globicephalus* of corresponding age, but can be at once distinguished by the convexity of the upper surface in front of the narial aperture. The under surface of the anterior portion of the maxilla has a well-marked, but narrow, longitudinal groove near the outer border, corresponding to the alveolar line of other Dolphins; but there are no distinct alveoli. The opening of the vascular canal at the apex of the præmaxilla is very distinct. In the anterior portion of the upper edge of the mandible is a deep narrow groove, $4\frac{1}{2}$ inches long, the anterior portion of which is dilated into a wide alveolar chamber (1·8 inch long on the right side and 1·5 inch on the left), divided by very imperfect septa into chambers for lodging the teeth, four on the right and three on the left side. The principal dimensions of the skull are given at p. 10.

The carpal bones and the phalanges, though of course far less developed, are the same in number as in the adult, except that the minute terminal ossifications of the second and third fingers of the latter were not yet apparent¹.

There can be no doubt that these two animals belong to a peculiar group of the Cetacea constituting the genus *Grampus* of Gray, of which two species are commonly

¹ Some notes upon the visceral anatomy and external characters of this individual have been given by Dr. Murie in the 'Journal of Anatomy and Physiology,' Nov. 1870, p. 118. The differences in Dr. Murie's description of the external surface from that given above, are probably due to changes resulting from the greater length of time that had elapsed between the death of the animal and his examination of it.

recognized as inhabiting the northern hemisphere (one having hitherto been met with only in the Atlantic, and the other only in the Mediterranean), and have been named respectively *G. griseus* (= *G. cuvieri*, Gray) and *G. rissoanus*¹.

The earliest account of both of these animals is contained in the 'Rapport fait à la classe des sciences mathématiques et physiques sur divers Cétacés pris sur les côtes de France,' by G. Cuvier (Annales du Muséum, tome xix. 1812).

The first is described from a drawing of the external characters, accompanied by the skeleton of the animal, sent to the Paris Museum from Brest. It is stated to have been $3\frac{1}{2}$ metres in length, to have had but four teeth in the lower jaw, "toutes très-usées et prêtes à tomber," and to be of a "grisâtre" colour, whence Cuvier bestowed upon it the name of *Delphinus griseus*. The skeleton (in a very imperfect condition) is still in the Museum at the Jardin des Plantes.

The drawing, reproduced at pl. 1 of the volume of the 'Annales,' obviously gives but a mere rude approximation to the true external form of the animal; but it must be remarked that there are numerous irregular scratch-like black lines on the face, around the eyes, on the dorsal and pectoral fins, and especially on the tail, which can scarcely have been put in by the artist without some foundation in nature, although they are not alluded to in the exceedingly brief description.

To continue the history of the various specimens which have been considered to belong to this species:—

In the middle of June 1822, four Dolphins were stranded near l'Aiguillon (la Vendée), and were described in some detail by D'Orbigny. F. Cuvier (Histoire Naturelle des Cétacés, 1836, p. 183), citing this account, speaks of them under the denomination of "Le Marsouin de d'Orbigny, *Phocæna griseus*," and recognizes their specific identity with the Brest specimen. The length of the full-grown individuals of this band is stated to have been ten feet (Fr.). "La teinte générale du dessus du corps et de la tête est d'un noir bleuâtre; le dessous est d'un blanc sale, qui se fond sur les côtes avec le noir." A figure of one of them is added to the description; but it is probably not to be depended upon as giving a correct outline of the animal, owing to the decomposed state of the bodies at the time they were examined. There were no traces of teeth in the upper jaw of either. A young specimen is said to have had eight teeth in the lower jaw, and the older ones from six to seven. The statement that "la mâchoire supérieure est plus longue et s'avance de quatre pouces au-delà de celle d'en bas," does not accord with the descriptions of other observers; but D'Orbigny's observations were made under difficulties.

In consequence of D'Orbigny's statement as to the colour, Dr. Gray changed the specific name from *griseus* to *cuvieri* (Ann. N. H. 1846).

¹ A third species (*G. richardsonii*, Gray) is founded on a lower jaw of unknown locality, and a skull from the Cape of Good Hope, which differs slightly from those above described. (Cat. Seals and Whales, Brit. Mus. p. 299, 1866.)

On April 12th, 1844, a Dolphin attributed to this species was stranded near Cageaux (Gironde)¹.

A skull is contained in the British-Museum collection, from the Isle of Wight, presented in 1845 by the Rev. C. Bury.

On July 22nd, 1867, a Dolphin was cast up by the sea on the shore of the Department of la Gironde, France, and taken to Arcachon, where, fortunately, it was examined by M. P. Fischer, who has given² an excellent, and evidently trustworthy, description of its external characters and skeleton, accompanied by a succinct history of the species, and of its relation to the so-called Risso's Dolphin, to which I shall afterwards have occasion to refer.

The specimen was young, measuring but 2.80 metres (9 ft. 2 $\frac{1}{4}$ in.). His description of the colour is as follows:—"Le corps est de couleur noire sur le dos et les flancs, blanche en dessous autour des parties génitales et de l'anus, d'un blanc teint de gris de fer en avant de la verge, blanche enfin au niveau et en avant de la base des nageoires pectorales. Le dessous de la tête et du cou est d'un gris noirâtre, marbré de taches blanchâtres, terminé en pointe noire dirigée vers le thorax; le dessus de la tête, le bord des lèvres, sont également marbrés de blanc sale. Les nageoires pectorales, caudale, et l'aileron dorsal, ont une coloration noire uniforme." The dental formula was $\frac{0-0}{4-4}$. There were sixty-eight vertebræ—seven cervical, twelve dorsal, forty-nine lumbar and caudal.

The second Dolphin alluded to above as having been brought into notice in Cuvier's 'Rapport' was known to him only by a notice and figure communicated to the Academy by M. Risso of Nice, the figure being reproduced in the same plate as that of the Grey Dolphin from Brest, and marked "*Delphinus aries?*" It was stated to be 3 metres long, and to have five teeth on each side of the lower jaw only. The figure shows numerous white lines on the surface, mostly in the longitudinal direction.

Delphinus (Phocæna) rissoanus, of Desmarest's Mammalogie (part 2, 1822), is founded on this description and figure.

Subsequently M. Risso published in his 'Histoire Naturelle de l'Europe méridionale,' 1826, tome iii. p. 23, a fuller description, under the name of "*Delphinus risso*, Cuv.," and a different figure (pl. 1. fig. 2), the accuracy of which may be estimated by that of the wretched caricature of the *Globicephalus* in the same plate.

The description runs thus:—

"*D. dorso lato; capite maximo, obtuso; maxilla superiore longiore.*

"Des mœurs douces, comme la zone tempérée qu'il habite, semblent être le partage de ce cétacé, qui n'approche de nos côtes que dans le temps des amours. Son corps est alongé, arrondi, renflé vers sa partie antérieure, diminuant insensiblement de grosseur

¹ Laporte: Actes de la Société Linnéenne de Bordeaux, 1853, t. xix. p. 215 (*fide* Fischer).

² "Note sur un Cétacé (*Grampus griseus*) échoué sur les côtes de France," Annales des Sciences naturelles, 5th ser. vol. viii. p. 363.

vers la queue, qui est déprimée; sa peau est mince, unie, de couleur grise, à nuances bleuâtres, traversée par des traits irréguliers et des raies inégales, droites ou flexueuses, blanchâtres; le ventre est d'un blanc mat; la tête fort grande; le museau arrondi, relevé en arc, obtus, percé vers la nuque par l'ouverture des événements; la bouche est ample, arquée; la mâchoire supérieure pourvue d'alvéole seulement, est plus avancée, et couvre l'inférieure, qui est garnie de chaque côté de cinq grosses dents coniques; aiguës, un peu courbées, distantes, fortement enchassés dans l'ossement de la mâchoire; ces dents sont solides, presque égales, d'un blanc jaunâtre, recouvertes d'un émail fort luisant; l'intérieur de la gueule est muni de tubercules émoussés; la langue est libre, unie sur ses deux bords; les yeux sont ovales oblongs, très-petits, avec l'iris doré; la nageoire dorsale, haute, élevée, à peu près en forme de triangle scalène, est située presque au milieu du dos; les nageoires paires sont grandes, épaisses, noirâtres; la caudale est forte, divisée en deux grands lobes par une échancrure assez profonde. Long. 3 mètres, larg. 1 mètre. Séj. Surface des eaux. App. Printemps, automne."

Another and somewhat better figure is given by Laurillard in Fr. Cuvier's 'Histoire Naturelle des Cétacés' (1836), taken from one stranded, with many others, in the Bay of Saint-Jean, near Nice, in June 1829. The length of these specimens is stated to have been about nine feet (French); and their peculiar colours are thus described by Laurillard:—"La couleur de ces dauphins différait suivant les sexes. Celle qui faisait le fond de la peau des femelles était un brun uniforme; les mâles, au contraire, étaient généralement d'un blanc bleuâtre; mais ce qui caractérisait les uns et les autres, c'étaient les singulières lignes semées irrégulièrement sur toutes les parties supérieures du corps, et qui ressemblaient, au premier coup d'œil, à des égratignures produites par des épines. Ces lignes, vues de près, se composaient de traces plus claires que le fond de la peau, et bordées d'une multitude de petites lignes perpendiculaires d'un brun foncé. De plus, les mâles, comme le montre la figure que nous donnons, avaient des taches irrégulières d'un brun foncé sous la moitié postérieure du corps, et les nageoires avaient la même couleur; mais la dorsale et la pectorale se trouvaient de plus ornées de lignes blanches. Deux lignes brunes garnissent le dessus et le dessous de la bouche, et un cercle de même couleur entoure l'œil." The name applied by F. Cuvier to these animals is "Le Marsouin Risso (*Phocaena rissonus*)."

A complete skeleton and a skull of animals from this shoal are preserved in the Paris Museum; the former is that above referred to as figured by Van Beneden and Gervais. The number of teeth is $\frac{0-0}{5-5}$.

Some time about 1854, a herd of these Dolphins came into Carry (Bouches-du-Rhône); and the skull of one of them which was killed is preserved in the Museum at Marseilles¹.

It thus appears that the so-called *Delphinus griseus* has been met with on five distinct occasions, the localities having been Brest, Aiguillon, Cajaux, and Arcachon, on the

¹ P. Gervais, "Cétacés des côtes Françaises de la Méditerranée," Comptes Rendus, tome lix. 28th Nov. 1864.

west coast of France, and the Isle of Wight; and the so-called *Delphinus rissoanus* three times, always at Nice or the Mediterranean coast of France, and, as Fischer has particularly pointed out, whenever the date has been recorded, the occurrence has in both cases always taken place in the spring or summer (April to July). From this circumstance he concludes that this species (for after a comparison of the osteological and other characters he has come to the conclusion that they are one and the same) is migratory, visiting the shores of Europe in the summer and passing the winter either to the south towards the coast of Africa or to the west towards the American continent.

Although the present examples (occurring in the mouth of the channel so early as the end of February) may be thought somewhat to shake this conclusion, it may on the other hand prove to be merely a case of an unusually early arrival in our seas. Further observations can alone determine the question¹.

Identity of G. griseus and G. rissoanus.

It has been mentioned that Fischer came to the conclusion that the two species (*D. griseus* and *D. rissoanus*) ought to be reunited, as had also appeared probable to Cuvier²—a conclusion founded on the following considerations:—

“1°. Que le Dauphin de Risso apparaît dans la Méditerranée à la même époque que le *griseus* sur les côtes océaniques de France.

“2°. Que sa dentition ne diffère pas sensiblement de celle du *griseus*, puisqu'on peut établir la série suivante:—

$$\frac{0-0}{2-2}, \frac{0-0}{3-3}, \frac{0-0}{4-4} \text{ (*griseus*); } \frac{0-0}{5-5}, \frac{0-0}{6-6} \text{ (*rissoanus*).$$

“3°. Que le nombre des vertèbres, des côtes, des phalanges, en un mot que tous les caractères ostéologiques sont identiques dans les deux espèces.

“4°. Que les seules différences relevées entre elles portent sur la coloration extérieure éminemment variable, et sur la forme plus ou moins ventrue du corps, qui peut tenir à l'embonpoint des individus ou à la distension de l'abdomen par des gaz après la mort.”

Gervais had previously expressed his opinion³ that “Le *D. griseus*, qu'on appelle quelquefois *Marsouin de d'Orbigny*, est très-peu différent du *D. rissoanus*; son système dentaire paraît néanmoins devoir l'en faire séparer;” and he gives the following diagnostic characters:—

“Dents supérieures caduques, les inférieures au nombre de cinq ou six paires, *Delphinus rissoanus*.

¹ It is possible that the Grampus, before mentioned, from the Cape of Good Hope, of which there is a skull in the British Museum, named *G. richardsonii*, may also prove to be of this species; if so, it would indicate that the South Atlantic may be its winter habitat. In size it perfectly agrees; but it is rather narrower in proportion to its length, and the anteorbital processes of the maxilla are more upturned at their edges, and less laterally and anteriorly expanded, and the anteorbital notch is less deep than in the other specimens. The teeth are $\frac{0-0}{4-4}$.

² Ossemens fossiles, edit. 1836, tome viii. 2^{me} partie, p. 98.

³ Zoologie et Paléontologie Françaises, p. 301.

“Dents caduques; deux paires à la partie terminale de la mâchoire inférieure seulement, *D. griseus*.”

It now remains to be seen whether Fischer's opinion is strengthened or the reverse by the new materials afforded by the two specimens described in the first part of this communication.

As has just been shown, the differences hitherto noticed between the supposed species have resolved themselves into those of habitat, colour, and number of teeth.

1. According to the previously observed habitats of the two species or varieties, the present specimens should be referred to *D. griseus*, as all the examples of *D. rissoanus* hitherto met with have been from the Mediterranean.

2. According to the coloration, they should be *D. rissoanus*: but additional light is thrown upon this part of the subject by these two specimens; for they show conclusively how extremely variable the species is in this respect. This might be inferred from the absence of bilateral symmetry in the markings of each individual, shown most strongly in the adult example, where the markings were more profuse and complicated in character. Laurillard speaks of the ground-colour of the females being of a “uniform brown,” and therefore quite different from that of the two specimens now described. Then, again, with reference to *D. griseus*, it must be remembered that the three descriptions all differ somewhat as to the colouring, and, especially, that in the figure of the type specimen from Brest numerous distinct irregular linear markings are indicated (as previously mentioned). These with the general “grisâtre” colour would appear to show that it was more nearly allied in external characters to Risso's Mediterranean Dolphin than to the black-and-white specimens described by D'Orbigny. If all the specimens of alleged *D. griseus* had been uniform in colour, and all those of *D. rissoanus* had presented another characteristic coloration, there would have been more grounds for keeping them distinct; but from the facts before us it is safer to conclude that we have here an example, very rare among Mammals, of a species of variable and irregular coloration.

As to the teeth, the new specimens completely break down the specific distinction previously drawn; for, with the colouring of *D. rissoanus*, the adult one has the number of teeth assigned to *D. griseus*, viz. $\frac{0-0}{3-3}$; and that this is not the result of loss by age is satisfactorily proved by the young individual, in which the teeth had not even cut the gum. This last-named specimen was also extremely important, as presenting an undoubted case of original unequal number on the two sides, viz. three and four, showing that the exact number of teeth is a variable character; and it also set at rest the question as to whether the absence of teeth in the upper jaw is a congenital peculiarity, or arises, as had generally been supposed, from their loss at an early age.

It appears then necessary, until any better diagnostic characters are made out, to sink the specific name of *rissoanus* in that of *griseus*, though it may be convenient to apply the term “Risso's Dolphin” to the peculiarly marked variety which was first made

known to science by that naturalist, or even to keep it as a vernacular appellation for the entire species, and thereby continue to associate his name with it.

Systematic Position.—In Baron Cuvier's time this species, with a vast number of others now generically separated, was included in the genus *Delphinus*. Mons. F. Cuvier constituted of a group of short-nosed Dolphins the genus *Phocæna*, embracing with the species now under consideration the Common Porpoise, the Killer (*Orca gladiator*), the Round-Headed Dolphin (*Globicephalus melas*¹), and even the Beluga (*Histoire des Cétacés*, 1836).

The genus *Globicephalus*² was formed by Lesson³ for a still more restricted group, from which Dr. Gray has separated the present animal and its most immediate allies under the name of *Grampus*⁴.

My first impression, obtained from an inspection of the external appearance of the animal, was that it resembled *Globicephalus melas* so nearly as hardly to warrant generic separation. There was the same rounded form of forehead, and the same elongated pointed pectoral fins placed low down on the sides of the thorax. It is true that these were developed in a less exaggerated degree than in *Globicephalus*, and the dorsal fin was more anterior in position and more elevated; but such characters can hardly be considered generic, unless accompanied by other and more important structural differences. The teeth, again, have much the same size and form as those of *Globicephalus*, and are also confined to the anterior part of the jaws; and I was not then aware that the absence of maxillary teeth was congenital, but supposed that it was due to their being deciduous, a circumstance frequently observed in *Globicephalus* at a late period of life. Consequently in the preliminary notice of the capture of this specimen⁵ the generic name of *Globicephalus* was assigned to it.

After a closer examination of the characters, especially of the skeleton and teeth, of both forms, I am now inclined to think that they may fairly be treated as distinct although closely allied genera, and subjoin the following comparative table of diagnostic characters:—

GLOBICEPHALUS.—*Teeth* in both jaws, 9 to 12 on each side, confined to the anterior half of the rostrum and corresponding portion of the mandible; sometimes deciduous in old age.

Vertebræ. C. 7, D. 11, L. 12 to 14, C. 27 to 29, total 58 or 59.

¹ This species was first correctly described and figured by Trail, under the name of *Delphinus melas* (Nicholson's Journ. xxii. 1809, p. 21). Cuvier, unacquainted with Trail's memoir, described and figured it again in the "Rapport sur divers Cétacés," frequently referred to above, as *Delphinus globiceps* (Annales du Muséum, t. xix. 1812). Lacépède's *Catodon svineval* (Hist. Nat. des Cétacés, 1804, p. 216) may have been founded on some vague idea of this animal; but the description is almost altogether inaccurate.

² Often spelt *Globiocephalus*.

³ Compl. de Buffon, i. 1828 (*vide* Agassiz, Nom. Zool.).

⁴ Zoology of 'Erebus' and 'Terror,' p. 30 (1846). *Grampus*, Gray, Spic. Zool. 2 (1828), was a heterogeneous group, comprising *Grampus griseus*, *Globicephalus melas*, *Delphinus acutus*, *D. heavisidii*, and *D. obscurus*.

⁵ P. Z. S. 1870, p. 128.

Skull. Rostrum and cranium proper of nearly equal length. Upper surface of rostrum very broad and flat¹, rounded in front. The præmaxillæ at the middle of the rostrum as wide as, or wider than, at the base, and very nearly or completely concealing the maxillæ in the anterior half of the rostrum. Upper surface of the præmaxillæ in front of the narial apertures strongly concave. Upper surface of the skull behind the narial apertures raised into a strong prominence, of which the nasal bones form the apex.

Manus very long and pointed, the number of phalanges (including the metacarpals) in the different digits being respectively I. 3-4, II. 13-14, III. 10, IV. 3, V. 1.

GRAMPUS.—*Teeth*, none in the upper jaw. In the mandible 3 to 7 on each side, confined to the anterior part of the ramus close to the symphysis.

Vertebrae. C. 7, D. 12, L. 19, C. 30, total 68.

Skull. Rostrum slightly shorter than cranium proper, its upper surface moderately broad and flat, slightly expanding laterally in front of the notch, then tapering gradually to the apex. The præmaxillæ not so wide at the middle of the rostrum as at the base. Upper surface of the præmaxillæ in front of the narial apertures convex. Upper surface of the skull behind the nasal apertures rounded.

Manus long and pointed, the number of phalanges (including metacarpals) in the different digits being I. 2, II. 10, III. 8, IV. 3, V. 1.

DESCRIPTION OF THE PLATES.

PLATE I.

Fig. 1. Adult female Risso's Dolphin, caught near the Eddystone Lighthouse, February 28th, 1870.

Fig. 2. Upper surface of the head of the same.

Fig. 3. Upper view of the tail of the same.

From drawings by Mr. R. W. Sherwin.

Fig. 4. Very young female Risso's Dolphin, bought in Billingsgate Market, March 30th, 1870.

From a drawing by Mr. E. Gerrard, jun.

All $\frac{1}{15}$ the natural size.

PLATE II.

Fig. 1. Side view of the skeleton of the adult Risso's Dolphin.

Fig. 2. Upper view of the same skeleton.

Fig. 3. The sternum of the same, from below.

Fig. 4. Skull of the young animal.

All $\frac{1}{8}$ the natural size.

¹ In the skulls of very young animals these special characteristics of the genus are but slightly developed, the rostrum being much more narrow in proportion to its length than in adults.

Fig. 1.

Fig. 4.

Fig. 2.

Fig. 3.

Fig 4

Fig 3

Fig 2