XIII. *Some account of the Dugong. By Sir* THOMAS STAMFORD RAFFLES, *Governor of Sumatra; communicated in a Letter to Sir* EVERARD HOME, *Bart. V. P. R. S.*

Read May 18, 1820.

MY DEAR SIR,

I HAVE now the pleasure of communicating to you the desired information concerning the dugong. At Singapore, in June last, I had the good fortune to meet with one of these animals, and Messrs. DIARD and DUVAUCEL, two French naturalists, employed under my authority, undertook the dissection of it; and have sent a dissertation upon it to Sir JOSEPH BANKS. This does not interfere with my sending to you, as I promised, an account of it. I was present at the dissection; and the following observations, as far as they go, may be depended upon. I have read them over to Dr. WALLICK and General HARDWICKE, and they concur in opinion as to the correctness of the description. I have the pleasure to acquaint you, that General HARDWICKE has just now got a small dugong, four feet six inches long, which I have succeeded in persuading him to send home to you for dissection, and you will receive it by the next ships.

The dugong which we examined measured eight feet and a half in length, and afforded no less interest under the knife than satisfaction on the table, as the flesh proved to be most excellent beef. Our entertainment was truly marine;

for we had on the same day discovered those Neptunian sponges which General HARDWICKE has since described, and which served us as goblets.

In form the dugong resembles the common cetacea, having, like them, a broad horizontal tail, and two pectoral fins without nails. The skin is smooth, thick, bluish above and whitish beneath, with a few remote and scattered hairs. The mammæ (in the two male individuals examined) are small, and situated on the breast, immediately below the pectoral fins.

Head small in proportion, obtuse, and of a peculiar form. Upper lip very large, thick, and obliquely truncated, forming a short, thick, and nearly vertical kind of snout. The surface of the truncated portion is covered with soft papillæ, and is also furnished with a few bristles. Two short tusks project straight forward from the extremity of the upper jaw, and are nearly covered by the upper lip, which is very moveable, and tumid at the margin. The lower lip is much smaller, and resembles a round or oblong chin. The margin of both lips is furnished with strong coarse bristles. There are no incisors in either jaw (the tusks above mentioned being more properly defences), their place being supplied by the rough bristly surfaces of the palate and jaws, which serve as rasps, to

enable the animal to browse upon the algæ and other submarine vegetables. To facilitate this still farther, the anterior part of the jaw is bent downwards at an angle, in such a manner as to bring the mouth into nearly a vertical direction. There are no canine teeth. The molares are twelve in number, six in each jaw, placed far back on the horizontal part. They are cylindrical, with flat crowns; the first are somewhat oblique, and worn to a kind of point; the second are perfectly flat; but the last are composed of two parallel and adhering cylinders. They are short, and scarcely project from the gums. The tongue is small and short. The nostrils are situated on the summit of the upper jaw, where it makes its curvature downwards. They penetrate obliquely, in such a manner that the upper semilunar edge pressing upon the lower surface, forms a perfect valve. The eyes are small, and situated on the sides of the cranium. The aperture of the ears is so small as with difficulty to be perceived, and is situated at some distance behind the eyes.

Body rounded, diminishing to the tail, and without any vestige of dorsal or ventral fins. The place of the anterior extremities is supplied by fins, which offer no appearance of nails, but are somewhat verrucose on their anterior margin. They are thick and fleshy, and neither from their form nor size capable of supporting or assisting the animal out of the water.

Tail broad, horizontal, and of a crescent or semilunar form.

Dissection.

Skin three quarters of an inch thick, with little adipose matter, and yielding no oil.

The cavity of the abdomen large.

The stomach is large; and the relative position of the cardiac and pyloric orifices is nearly as in the human subject. It has two appendages, which open into it near the junction of the duodenum. Membrane of the stomach thick, internal surface smooth, and not corrugated into plicæ. The stomach and its appendages were distended with fucus or sea-weed, but little masticated or altered. Intestinal canal long. Small intestines uniform. Cæcum very large, somewhat curved, and containing a portion of partially digested sea-weed. Colon exceeding the small intestines in diameter by one third, very uniform, and with few or no contractions. Liver of moderate size, consisting of two large and distinct lobes, connected by a smaller one somewhat tongue-shaped, and a fourth which was very small, on the posterior side. Gall bladder little distended, and situated beneath the third and tongue-shaped lobe. Spleen very small, not exceeding three inches long and one inch thick, attached to the left side of the stomach. Pancreas lying below the duodenum. Kidneys in their usual place, and large. Bladder much contracted, not exceeding the size of an egg, but from the thickness of its coats, is probably capable of much greater distension.

Testicles situated a little below the kidneys, egg-shaped, flattened, partly embraced by a very perceptible epididymis.

Penis large; while collapsed entirely concealed within the prepuce. The glans consists of two lobes, separated or cloven above, in such a manner as to give the whole the appearance of the cloven foot of a ruminating animal. The urethra opens on a small tubercle or papilla between the lobes of the glans.

In the thorax, the thymus gland is particularly large, black and friable under the fingers, and occupying the space between the folds of the mediastinum.

Lungs two, distinct, of an elongated form, not lobulated, and situated posteriorly, one on each side; their substance of the usual mottled colour. The trachea bifurcates very high up, and the two branches diverge to their respective lungs.

Heart situated on the left side, double; that is to say, having the ventricles entirely separate at their points, and only connected at the upper part, or base. Each side possesses a ventricle and auricle, with the usual valves, and without any communication between the right and left sides. The left ventricle, which gives off the aorta, is stronger and more muscular than the right, whose cavity is larger, and coats thinner.

Of the skeleton, a few observations will suffice.—The skull is remarkable by the peculiar manner in which the anterior part of the upper jaw is bent downwards, almost at a right angle, so as to form a kind of beak. The lower jaw is truncated in such a manner as to

correspond, and become parallel with the elongated portion of the upper jaw. This portion of the lower jaw has eight alveolar excavations, which are sometimes empty, and sometimes contain the rudiments of teeth.

The vertebræ are fifty two in number, seven to the neck, eighteen to the back, and twenty seven to the tail.

Ribs, eighteen on each side.

Sternum nearly a foot long, bifurcate at the apex, and articulated to the cartilages of the upper ribs.

There is no pelvis or posterior extremities, but there are found opposite to the eighth or tenth lumbar vertebra two bones, one on each side, lodged in the flesh, which are narrow and flattened, and not above five or six inches in length. Scapulæ broad and thick; humerus short and strong, as is also the radius and ulna. The whole of these are firmly articulated to each other; and though externally the fins offer no appearance of fingers, all the corresponding bones are found complete even to the last phalanges.

The food of the dugong appears to consist exclusively of fuci and submarine algæ, which it finds at the bottom of shallow inlets of the sea. The position and structure of the mouth, enables the animal to browse upon these vegetables, much in the same manner as a cow in a meadow; and the whole structure of the masticating and digestive organs show it to be truly herbivorous. The flesh resembles young beef, and is very delicate and juicy. The individual, of

which the skeleton and intestines are now sent to England, was taken at Singapore, in June, 1819.

According to the information given by the natives, the dugong is never found on land, or in fresh water, but generally in the shallows and inlets of the sea, where the water is only two or three fathoms deep. During our short possession of Singapore, (not more than six months) four of these animals have been taken; but the greatest number is said to be caught during the opposite or northerly monsoon, when the sea is calmest, near the mouth of the Johore river, in the inlet of the sea between Singapore Island and the main. They are usually taken by spearing (at which the natives are particularly dexterous) during the night, when the animals give warning of their approach by the snuffling noise they make at the surface of the water. The first object is to secure and elevate the tail, when the animal becomes perfectly powerless, and at their disposal. They are seldom caught above eight or nine feet in length, but how much larger they grow is not ascertained, as when they exceed this size, their superior strength enables them to make their escape when attacked.

The Ikan dugong is considered by the Malays as a royal fish, and the king is entitled to all that are taken. The flesh is highly prized, and considered by them far superior to that of the buffalo or cow. They distinguish two varieties, the duyong *bumban*, and the duyong *buntal;* the latter much thicker and shorter in proportion. The breasts of the adult females are said to be large. The affection of the mother for its young is strongly marked; and the Malays make

frequent allusion to this animal, as an example of maternal affection. When they succeed in taking a young one, they feel themselves certain of the mother, who follows it to the margin of the sea, and allows herself to be speared or taken with the greatest ease. The young have a short sharp cry, which they frequently repeat; and it is said they shed tears. These tears are carefully preserved by the common people as a charm, the possession of which is supposed to secure the affections of those to whom they are attached, in the same manner as they attract the mother to her young. This idea is at least as poetic, and certainly more natural, than the fable of the Syren's song.

I remain, my dear Sir,

yours truly,

THOMAS STAMFORD RAFFLES.

Dimensions.

	Ft.	In.
Total length of the animal - -	8	6
Greatest circumference - - -	6	0
Length of the head from the nostrils to the occiput	1	3
——————— from the nostrils to the end of the snout - - -	0	$3\frac{1}{2}$
Width of the snout - - - -	0	$9\frac{1}{2}$
Depth of Do. - - - -	0	$4\frac{1}{2}$
Length of the chin - - - -	0	5
Breadth of Do. - - - -	0	$5\frac{1}{2}$
Distance from the nostrils to the eyes - -	0	$6\frac{1}{2}$
——————— the eyes to the ears - -	0	$6\frac{1}{2}$
——————— the eyes to the fin - - -	1	$5\frac{1}{2}$

	Ft.	In.
Length of the fins - - - -	1	4
Breadth of Do. - - - -	0	8
——— across the belly from fin to fin - -	1	11
Distance between the mammæ - -	1	5
Breadth of tail from tip to tip - - -	2	7
Circumference of the root of the tail - -	1	9
Distance from the anus to the centre of the tail	2	9
——— from the anus to the penis - -	1	2
Total length of the intestines - - -	115	0
—— Do. of small intestines including the cæcum	44	0
—— Do. of great intestines - - -	72	0

With this account, Sir T. S. RAFFLES sent me a copy of some observations in French, by Messrs. DIARD and DUVAUCEL, upon the stomach of the dugong. Sir T. S. RAFFLES mentioned that these observations formed part of a Memoir written by those Gentlemen; under these circumstances, I have not felt myself authorized to lay them before the Society, along with those made by Sir THOMAS STAMFORD RAFFLES, which I consider of too much importance to be delayed.

EVERARD HOME.