

PHILOSOPHICAL  
TRANSACTIONS,  
OF THE  
ROYAL SOCIETY  
OF  
LONDON.

FOR THE YEAR MDCCCXXI.

PART II.

LONDON,

PRINTED BY W. BULMER AND W. NICOL, CLEVELAND ROW, ST. JAMES'S;  
AND SOLD BY G. AND W. NICOL, PALL-MALL, BOOKSELLERS TO HIS MAJESTY,  
AND PRINTERS TO THE ROYAL SOCIETY.

MDCCCXXI.

XVIII. *An account of the skeletons of the dugong, two-horned rhinoceros, and tapir of Sumatra, sent to England by Sir THOMAS STAMFORD RAFFLES, Governor of Bencoolen. By Sir EVERARD HOME, Bart. V. P. R. S.*

Read March 22, 1821.

**J**UDGING from the exertions Sir THOMAS RAFFLES has already made in promoting the pursuits of Natural History and Comparative Anatomy, during the short time he has been in Sumatra, we may at no distant period expect to be furnished with materials sufficient to give a most satisfactory account of all the natural productions of the Island.

In the interval between his account of that extraordinary animal the dugong, being read before the Society, and its being inserted in the Transactions, he has afforded fresh proofs of his exertions, and has sent me the skull, the viscera, and the bones of that animal; so that, in addition to the account of its internal organs illustrated by drawings, I am now enabled to give an exact representation of the skeleton by Mr. CLIFT, upon the same scale as that of the external appearance of the animal, which has a place in a former paper, which is two inches to a foot.

Sir T. S. RAFFLES' description of this animal was so clear and distinct, that a Memoir since read to the Society, written by two French naturalists employed under his direction, was so nearly the same, as to make it superfluous to have it published.

The bones of the skeleton, when mounted, give us a form very different from what is met with in the whale tribe. It will be seen from the annexed drawing, that it may be compared to a boat without a keel, with the bottom uppermost; so that in the sea, the middle part of the back is the highest point in the water; and as the lungs are extended to great length on the two sides, close to the spine, they furnish the means of the animal becoming buoyant, and when no muscular exertion is made, the body will naturally float in an horizontal posture.

When we consider that this animal is the only one yet known that grazes at the bottom of the sea, (if the expression may be allowed), and is not supported on four legs, we must admit that it will require a particular mode of balancing its body over the weeds upon which it feeds.

The hippopotamus, an animal that uses the same kind of food, from the strength of its limbs supports itself under water; and the dugong, as a compensation for not being able to support its body on the ground, has this means of steadily suspending itself in the sea peculiar to itself, the centre of the back forming the point of suspension, similar to the fulcrum of a pair of scales. This peculiarity of position explains the form of the jaws, which are bent down at an angle with the skull, unlike the jaws of other animals. This new mode of floating, when compared with that of other sea animals, makes a beautiful variety. The *balæna mysticetus*, that goes to the bottom of unfathomable depths to catch in its whale-bone net the shrimps that live in that situation, is surrounded by blubber not unlike a cork jacket.

The enormous spermaceti whale, whose prey is not so

far removed from the surface, has the mass of spermaceti in a bony concavity upon the skull.

The shark tribe have the liver loaded with oil, placed in nearly the same situation as the lungs of the dugong.

As there are no vegetables (I believe) growing at the bottom of the sea in very deep water, the nice adjustment of the body of the dugong is confined to the shallows in the creeks near the land.

---

The external appearance of the rhinoceros with two horns, from Sumatra, is described in the *Philosophical Transactions* for 1793, by my much lamented friend Mr. BELL; and drawings are given both of the entire animal, and the skull with the teeth; but till now I have not had an opportunity of examining the rest of the skeleton. Upon comparing the bones with those of the single-horned species, there is no difference deserving of particular remark, except that in the two-horned the projection towards the front of the skull formed by the union of the nasal bones, is more nearly in a straight line, and more extended; this peculiarity may be required to give sufficient surface for two horns. A drawing of the skeleton, which Mr. HILLS has been so obliging as to make for me, is annexed.

In the internal viscera, there is not that close resemblance which is met with in the skeleton. Mr. THOMAS, in Vol. 91 of the *Philosophical Transactions*, describes the stomach of the species he dissected, to be, in its external appearance, as well as the intestinal canal, similar to that of the horse, only the cœcum was much larger; but the lining of the stomach was every

where villous. The small intestines, which were short, had oblong processes from the internal membrane. There was no gall bladder, and the kidneys conglomerate, large, and flattened, but less so than in the bear.

In the rhinoceros from Sumatra, which is four feet seven inches and a half high at the shoulder, and eight feet from the nose to the rump, the œsophagus enters the stomach ten inches from its cardiac extremity; the internal membrane is smooth round its great curvature; from the œsophagus to the pylorus five feet nine inches. The extent of the cuticular lining is shown in the drawing. In shape altogether the stomach is nearer that of the elephant, but in its cuticular portion is similar to the horse; and a bott, in all respects the same as those met with in this country in horses, was found in it.

The small intestines measured fifty-four feet six inches; the valvulæ conniventes are continued nearly through the whole extent, and in general circular, although not all so.

The cæcum is conical, two feet six inches long, one foot six inches wide, irregularly honey-combed, and has some of the conical processes delineated by Mr. THOMAS. The colon and rectum are twenty-six feet long. From the termination of the longitudinal bands to the anus is eight feet six inches of that length. The spleen is long, thin, and flat, two feet long, and at the broadest part eleven inches wide.

The kidneys are conglobate, and rather longer than common.

The heart is short and rounded; in other respects as usual in the class mammalia.

While this paper was printing, I was invited by the Trea-

surer of the Missionary Society, in the Old Jewry, to see the horns of a double-horned rhinoceros, brought from the interior of Africa by Mr. CAMPBELL, whose travels will soon be laid before the public. As far as respects the appearance of the horns, it is intirely a new species. The lowest horn does not, as in the other species of this animal, both single and double-horned, stand upon the upper surface of the nasal bones, pointing upwards, but it is set on upon a projection, as it were, on the end of these bones, standing with its base nearly horizontal, pointing forwards and a little upwards; in this respect a true unicorn. It is a yard long, very small at the point, and two feet in circumference at the base. The small horn is close to it, and stands up perpendicularly behind the base of the long one, as if it were to give it support, and is only twelve inches high, while the circumference of its base is twenty-four inches.

There can be no doubt of this being the animal that has given rise to various reports of a true unicorn having at last been discovered in Africa.

---

The tapir of Sumatra, as well as that of America, have a greater general resemblance to the rhinoceros than to any other animal.

When the bones of these two species of tapir are compared, they are found very closely to resemble one another. The skull of that of Sumatra has a broader frontal bone, and no middle ridge; the two nasal bones, which in both species have the shape of a heart on cards, stand higher, and are

broader, making the openings of the nostrils larger. In the American, the parietal bones are much compressed, and the os frontis has a considerable ridge.

When the bones of these tapirs are compared with those of the rhinoceros, they are in general alike, except the scapulæ and pelvis, which have a less comparative extent of surface.

The tapir has seven molares above and six below; the rhinoceros only six above and below. In the molares of the tapir the broad outside plate of those of the rhinoceros is wanting, but the deep indentations on the inside are nearly alike.

The large bony process projecting from the outside of the thigh bone, so conspicuous in the rhinoceros, is equally so in both species of tapir, and is much smaller in the horse.

The Sumatra tapir has a stomach in shape very much like that of the rhinoceros; it is one foot eight inches long. The œsophagus is smooth and cuticular, the cuticle terminating round the entrance into the stomach in an oval form; the stomach in its long axis resembles that of the hog; its greatest breadth nine inches; the internal membrane smooth and villous.

The small intestines are sixty-nine feet long. The valvulæ conniventes do not extend so far down as in the rhinoceros; the surface is villous towards the cœcum. The length and greatest breadth of the cœcum is one foot; internally it is honeycombed, and has conical projections like those found by Mr. THOMAS in the small intestines. The cœcum is shorter than in the rhinoceros, and conical. The colon is about three feet from the cœcum, dilates considerably, and for about

two feet is eight inches in diameter, resembling a stomach; it then becomes as small as before; the colon and rectum are nineteen feet six inches long. The rectum is one foot three inches of that length. The colon appeared to have only one longitudinal band, which was most distinct towards its termination.

The spleen is long and narrow, two feet three inches long, from two to three inches wide.

The kidneys are conglobate.

The lungs are composed of one principal lobe on each side of considerable length; and from this there are two projections, or smaller lobes, one passing upwards, the other rather downwards, on the inside of the large ones.

#### EXPLANATION OF THE PLATES.

##### PLATE XX.

The skeleton of a small female dugong. Upon a scale of two inches to a foot.

##### PLATE XXI.

The stomach of the rhinoceros from Sumatra inverted, to show the extent of the cuticular lining, in all respects exactly resembling that of the horse. Natural size.

##### PLATE XXII.

The skeleton of the rhinoceros from Sumatra, which closely resembles the species from India, except that the point in which the nasal bones of the skull terminate, is rather more prominent. On the scale of one inch to a foot.



PLATE XXIII.

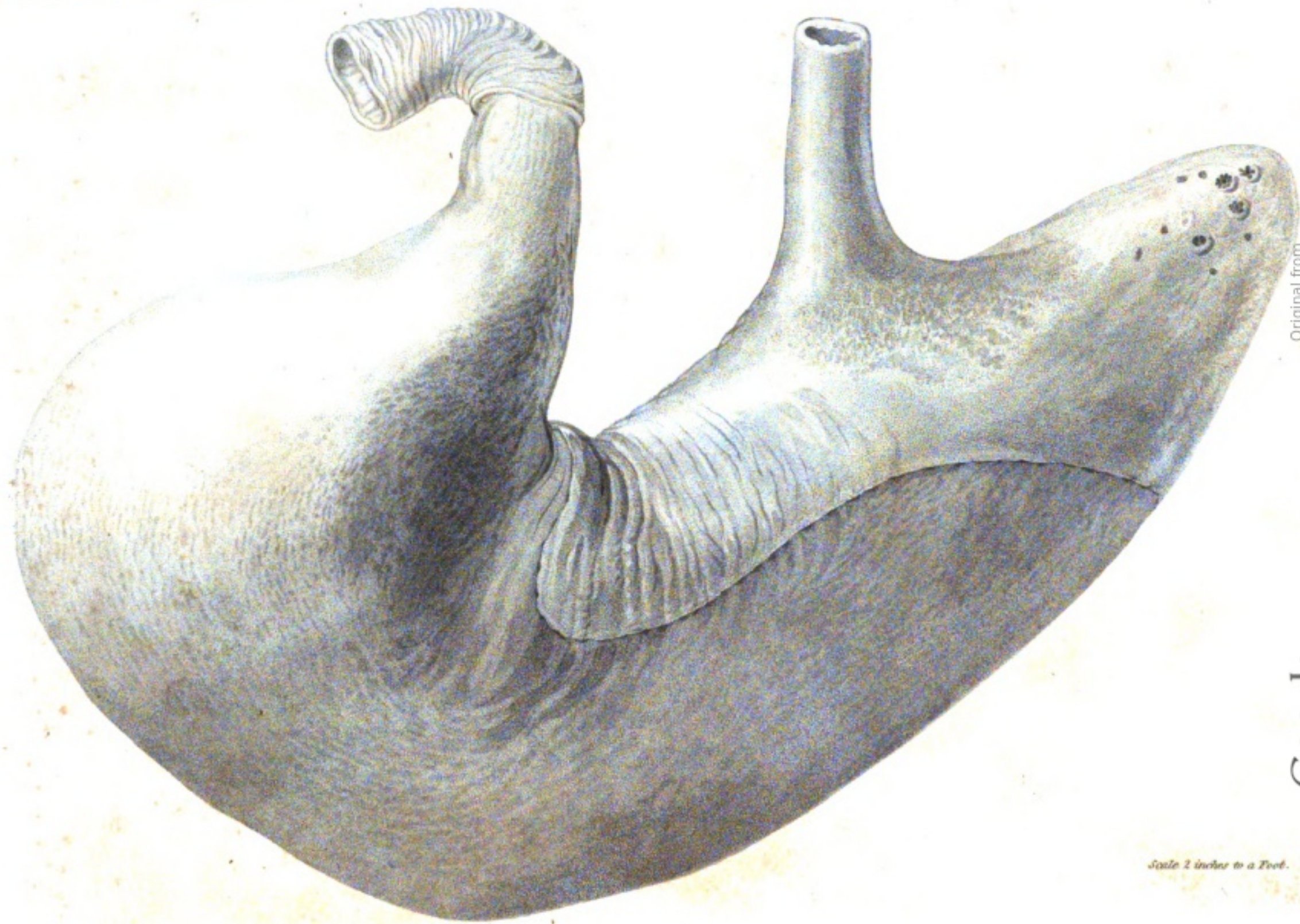
The skull of the tapir from Sumatra, which is a nearer approach to that of the rhinoceros than the hog, particularly in the termination of the nasal bones, although in this animal they are considerably broader. On the scale of four inches to a foot.

PLATE XXIV.

The skull of the tapir from America, to show in what it differs from that of Sumatra. On the same scale as plate XXIII.



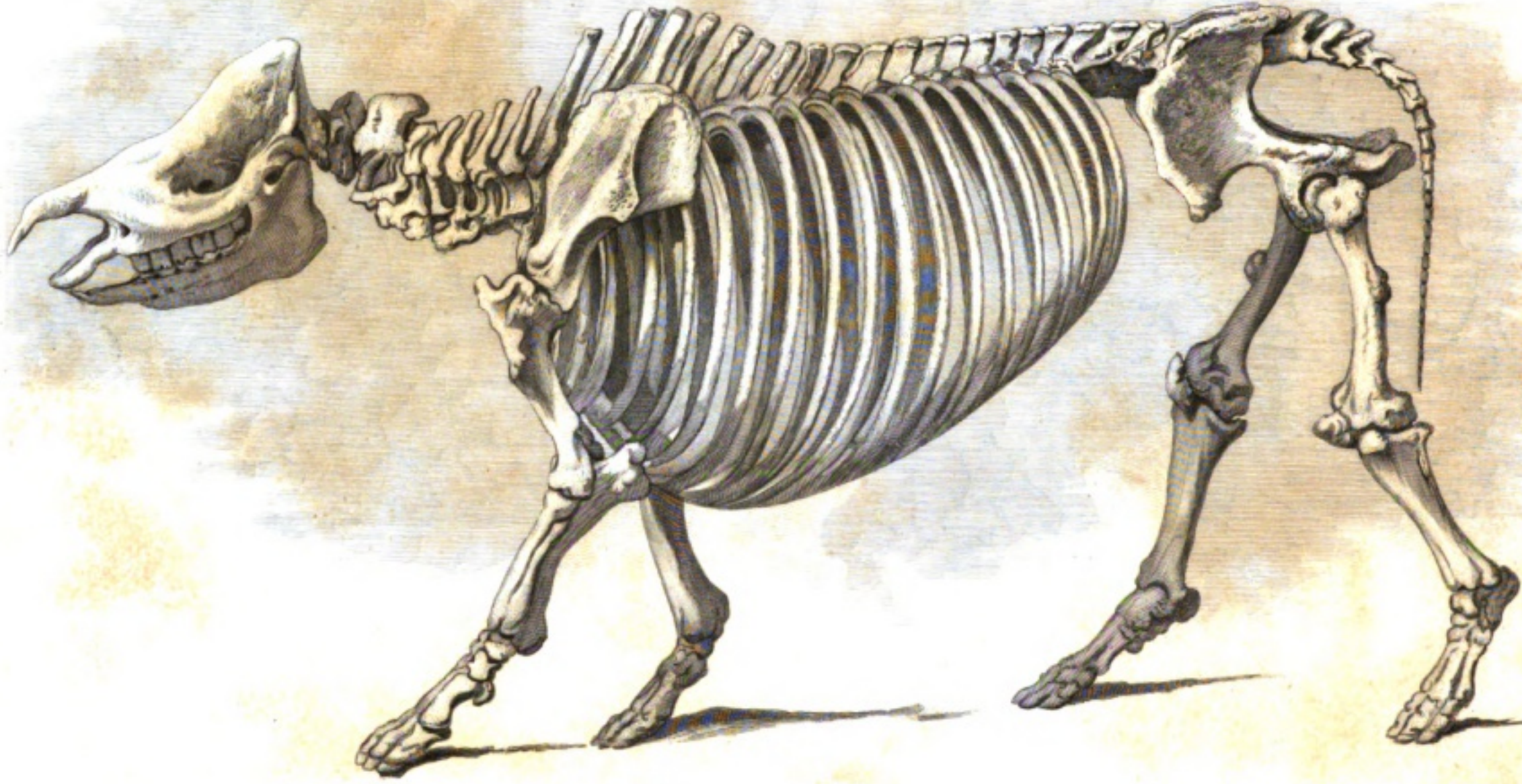


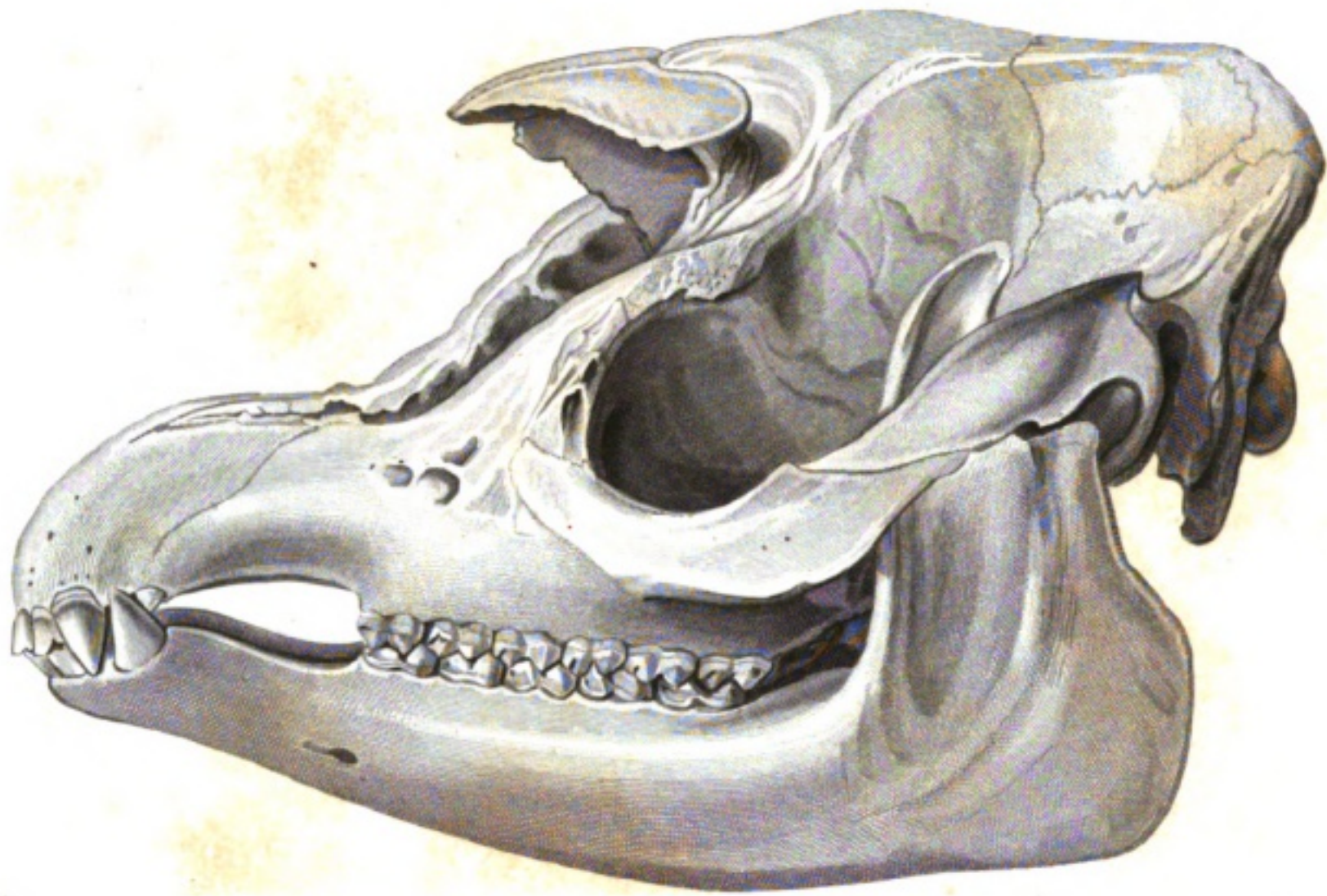


*Scale 2 inches to a Foot.*

Original from  
PRINCETON UNIVERSITY

Digitized by Google



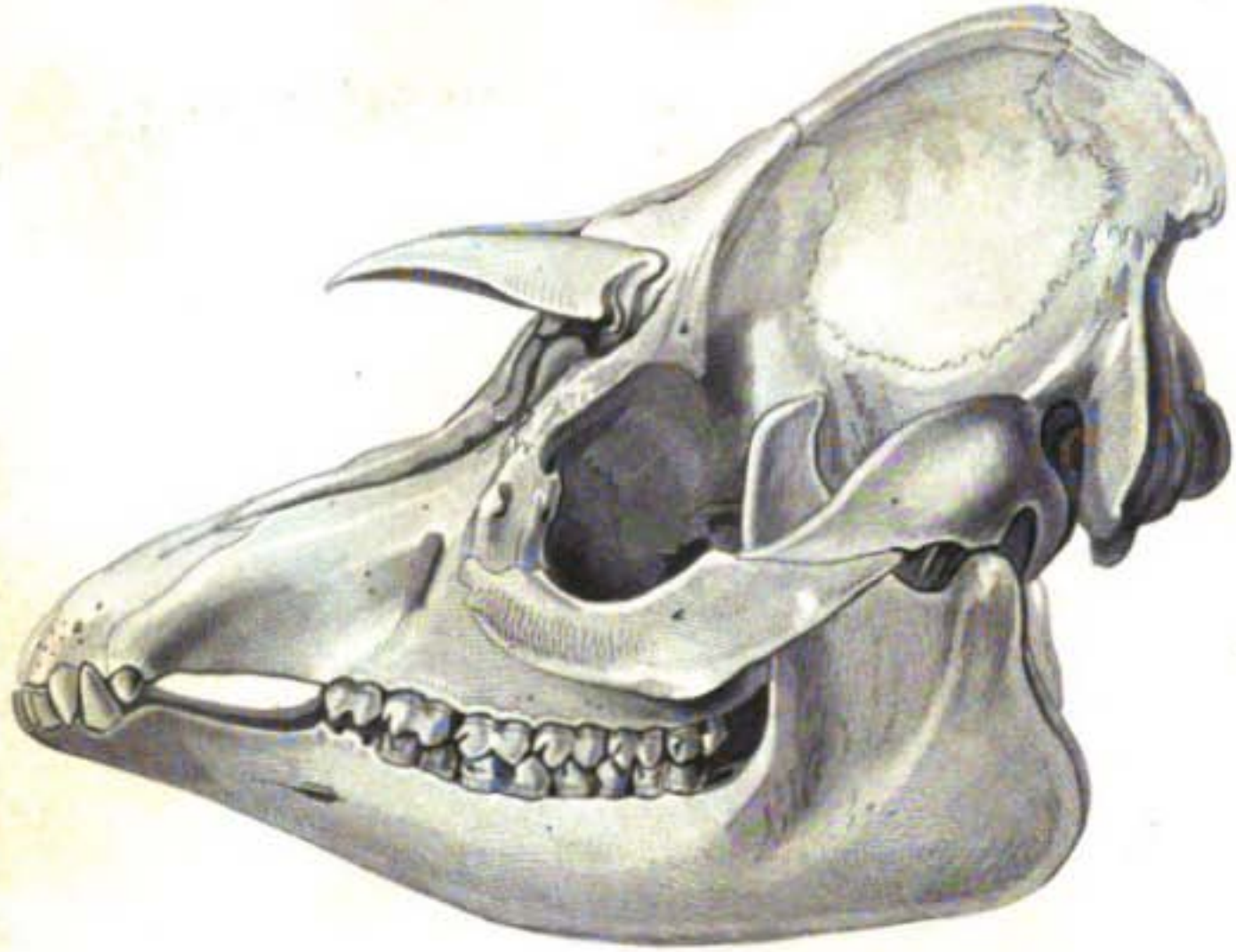


*Scale Four inches to a Foot.*

*W. H. L. S. del.*

Digitized by Google

Original from  
PRINCETON UNIVERSITY



*Skull. Four times its real size.*