

A description of plate the first [-the seocnd], exhibiting a longitudinal section of the head of the horse, of its natural size / [Anon].

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A DESCRIPTION OF PLATE THE FIRST, EXHIBITING A LONGITUDINAL SECTION OF THE HEAD OF THE HORSE, OF ITS NATURAL SIZE.

ON VIEWING this Section of the Head as a whole, we shall be forcibly struck with the vast length and dimensions of the Face, exceeding perhaps, in this respect, any animal at present known, formed principally by the nostrils, the cells and cavities leading to and communicating with them; these are partitioned and occupied by light flexile bones which support this bulky exterior, without materially adding to its weight: the prodigious extension of the upper and lower jaws is also remarkable, as is the capacious opening of the fauces, whilst the actual cavity of the skull receiving the brain is not a tenth part of this voluminous structure.

From observing this formation, the Anatomist would be led to infer that great sagacity would not be found with the horse; and in this, if all circumstances are considered, he would not be wrong, for the horse is really less so than most other quadrupeds. From structure alone, it is true, congenial dispositions will ever be traced; if nature erred in this, her work must be soon destroyed.

The horse, we may observe, is ever acting with precipitation and fear, circumstances not favourable for reflexion and judgment; his courage, it is true, may be excited on some occasions, as in the case of sexual desire and rivalry; and in this the most timid animals will do the same; in battle it will be perhaps observed, he shows his courage; this, we believe, ought not to bear that name, if he fights, it is through the medium of a delusive education, by which he is carefully instructed that there are great rewards, but no danger attending the use of its weapons; his proper weapons of defence are his heels, which he uses in his flight; and by his swiftness, his best protection, he escapes his foes of the field, but is still liable to fall by insidious attack, for which he is ever on the watch; his acute smell of far distant objects, his eyes, placed prominent in the face, that he may see on all sides, would alone almost lead us to such conclusions. This we state, as it would, if rightly understood, lead to important consequences, in the instructing him and using him; for let it not be thought, in thus deviating from the romantic expressions in general use, in describing the form and manners of the horse (which savour more of poetic fiction than a careful observance of nature), that we would desire to decry this noble object of our studies and researches, far from it, but to point out that his cause and our own will be best served by a strict attention to his natural character and make: from them may be learned how to make him what we want, and how to proportion his labour to his forces, without injuring him or destroying him, as is too much the case at present; it is from hence that disappointment springs, and then cruelty, and incalculable numbers are yearly thus destroyed with horrid circumstances of barbarity, that might be easily saved to old age with great advantage to their possessor. Certain it is that those who are ignorant of, and offend against nature, will in some way or other meet with disappointment; either they do not obtain at all the object they seek, or they obtain it, and nature suffers; disease, disappointment, ill-usage and premature death naturally follow. Among quadrupeds his form is of the noblest order, his disposition cheerful, his deportment, when unrestrained and entirely free from disease, most animated; he is ever ready to obey when he rightly understands the wishes of his master; his extraordinary bulk, joined with extraordinary speed, his ready forgiveness of injuries are qualities sufficient to make him an object of great interest and admiration through all ages, without any metaphor or fiction whatever.

With the reader's pardon for this digression on his natural character, we proceed to describe the parts brought into view in the section before us.

A longitudinal division of the horse's head must almost necessarily be made on one side or the other of the *septum narium*, so that the two parts or halves have very different appearances, exhibiting together nearly all that is interesting in the structure of the head, but which renders two plates necessary for this purpose, the present one exhibits that half or portion in which the *septum* is preserved; with the figures 1. and 2. is seen a view of the brain of the horse consisting of two separable masses.

1. The *Cerebrum*.

2. The *Cerebellum*, placed one behind the other not directly over one another, as in the human. The *cerebellum* has a white matter every where in knotted branches ramifying through its substance from a common center 2. This has been termed the *arbor vita* by anatomists. The *cerebrum* also is similarly composed, of white matter in larger proportion, called medullary, with a darker substance surrounding, and interposed, having irregular obtuse processes, every where passing into the white or medullary matter: this has been called the *cortical* substance, which conveys an erroneous idea, as it is not the property of bark to enter the substance of the tree, the white matter in both extends to, and is connected with the white matter passing to form the spine.

At 3. Is a portion of this, being a division of the right lobe or tubercle of the *corpora quadrigemini*, and

At 4. Is seen the origin of the spine and nerves, or *crus cerebri*.

5. The spinal matter passing out of the head to form the dorsal spine. In the *cerebrum*,

At figure 6. Is seen an irregular indented arch of a more indurated matter than the rest of the brain, which is termed the *corpus callosum*, and serves to cover and support the middle *ventricle*, or water cavity, which lies beneath it; below this,

At 7. Is seen a red spot like a gland, which is a collection of blood vessels, termed the *plexus choroides*;

At 8. Is seen the point under which, and nearer the center of the brain, is situated the pineal gland.

9. Exhibits the pituitary gland, lodged in a simple indentation of the bone, and not defended by rising processes of bone, as in the human, where it has been called the *cella turcica*.

10. The optic nerve.

It is difficult however, either singly or by connexion of these parts, to convey an idea to the mind of the student of the actual form of the brain; we shall venture by another means therefore to impress the mind with an idea of this organ and the distribution of its principal parts in the following way, which will we trust be easily imagined and convey a sufficiently correct notion of it for general purposes. Let us figure to ourselves, for a moment, a vegetable of any kind, as a tree, for instance, every way inverted, the roots and soil being the uppermost parts, the stem and branches growing downwards.—Keeping this idea before us, we shall show how familiarly it exhibits the general circumstances of cerebral and spinous structure.

The *medulla oblongata*, or spinal marrow, we shall consider as the trunk of the tree; every where as it passes down the course of the spine it sends off

nerves which are its branches and their extreme ramifications; the twigs of the tree, the ganglions, they form are its knots; upwards the stem grows thicker, and entering the cavity of the skull, it becomes lobed irregularly, and divides into two portions or stems, each of which sends off from its side, 1st. a fibrous root of the same white matter of which itself is composed, which every where shoots into this darker matter of the *cerebellum*, as a vegetable fibrous radicle into the soil of the earth.

Each division of the trunk having given forth this fibrous root, is then continued on till it arrives beneath the center of the *cerebrum*, where it forms a knobbed or bulbous termination which, from its sides, spreads, extends, and unites itself to the white parts of the brain, being lodged as it were in the darker matter of the cerebrum, forming interposed layers of the white matter in the darker or nutrient principle; for the darker parts of both masses of the brain, we should observe, seem to serve the same office with respect to the white or medullary parts, viz. that of receiving, supporting, and nourishing them, as the soil supports the vegetable growing in it, and in conformity to this analogy the trunks of the blood vessels conveying this nutrition are every where observable in the dark part, passing through its substance, to supply the white parts by their fine capillary extremities.

In pursuing this exemplification of the cerebral structure of animals with the vegetable, let us, that we may form a general notion of the whole figure of the brain, suppose that the root we have been indicating was of the lobed kind, examples of which may be easily found, as in the testiculated roots of the orchis tribe, which seem more particularly in many ways to mimic the exterior of animal structure. In some of these the roots are bilobate, each lobe flattened on one side and convex on the other, these with their flat sides being brought into easy contact will represent the two lobes of which the brain is composed; and as each root or lobe is communicating with the main stem by its own proper process, it affords us a lively idea of the manner of the two lobes of the *cerebrum* and two lobes of the *cerebellum*, forming, as it were, a quadrilobate root each lobe communicating by its proper process with the trunk, only that the two first lobes given off are more resembling the fibrous roots, and the two last the bulbous or the lamellated, and are much larger. And in further illustration, by this vegetable parallel, let us consider these lobes not every where meeting with their flat sides in equal contact, but with interstices between them, admitting convenient spaces for the reception of superfluous water, for the access and return of blood, for the position of various glands, being partly necessary to animal structure, &c. and the idea so obtained will not indifferently represent the actual structure of the brain, whose functions and physiology, if we were to descend into greater minutiae, would afford but little information that would be satisfactory or useful.

The nerves immediately proceeding from the substance of the brain itself may be compared to the radical twigs of the plant and the *par vagum* and *intercostal* nerves to the tendrils and runners observable in vegetables.

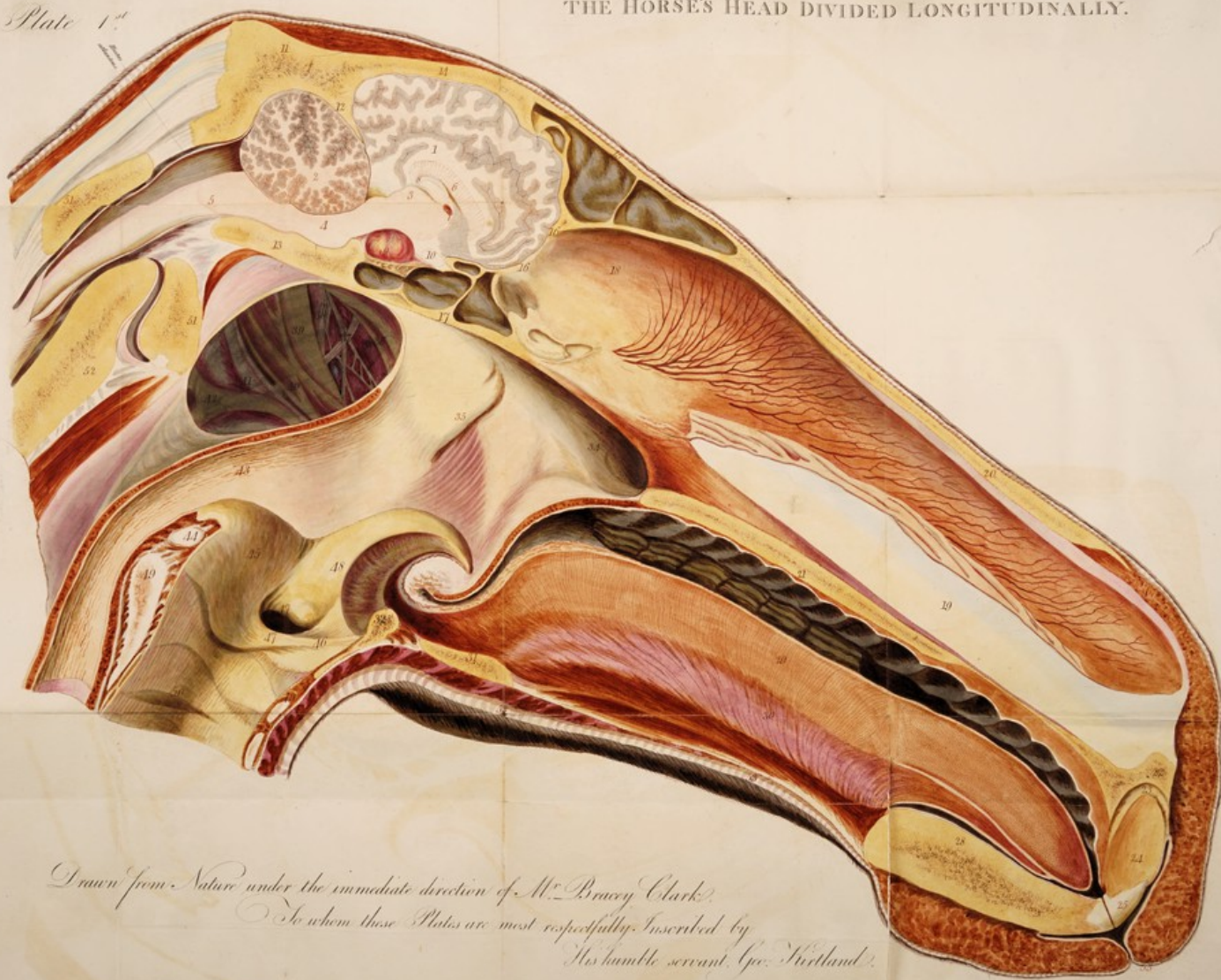
Though something approaching to the exterior of vegetable structure has been found convenient in the construction of this part of the body, there should also end the comparison, as the idea of any further similitude, in respect to functions, would only mislead.

It may be fairly inferred that the fibres passing from the trunk of the spine into the *cerebellum*, acquire some more vital and energetic quality from it,



Plate 1st

THE HORSE'S HEAD DIVIDED LONGITUDINALLY.



*Drawn from Nature under the immediate direction of Mr. Bracey Clark.
To whom these Plates are most respectfully Inscribed by
His humble servant, Geo. Sherrin.*



than does the white matter entering or connected with the *cerebrum*, from the precautions taken to preserve it in all animals, either by stronger coverings, or a more inaccessible situation.

The bones inclosing the brain are

11. The *occipital* bone, forming in this animal the top of the head, and greatly strengthened for the defence of the *cerebellum*. 12. Its spinous process sustaining the *tentorium*. 13. The *basillary* process of the occipital bone.

14. The *parietal* bone.

15. The *os frontis*, with its cells or rather cavities: the figure of the bony partition, which here is straight, is found to vary in different subjects.

16. The *ethmoidal* bone.

17. The *sphenoidal* bone and its variously constructed cavities, forming the base of the skull.

Of the face.

18. The *septum narium* covered with the *schneiderian* membrane.

19. A part of the *septum* denuded by the saw.

20. *Os nasi*.

21. *Os palati*, or palatine process of the *maxilla superior*.

22. The *intermaxillary* bone, containing the upper incisor teeth.

23. The passage leading to the *foramen incisivum*.

24. The alveolar process.

25. The enamel of the middle incisor tooth.

26. The upper lip.

27. The lower lip.

28. The *symphysis* of the lower jaw.

29. The tongue and its *frænum*.

30. Muscular fibres.

31. The *symphysis* of the fork of the *os hyoides*.

32. The osseous *symphysis* of the thyroid cartilage

Of the fauces.

33. The *velum palati* having no distinct *uvula*, though the glandular openings called *tonsillæ* are abundant.

34. The opening of the nostril.

35. An extraordinary cartilage closing the mouth of the eustachian trumpet. For a more particular description of this part, see Plate 2. The parts 36 to 42 are shown by the removal of a loose floating membrane connected with the offices apparently of the eustachian tube, and along with it is removed a portion of the muscular coat of the pharynx.

36. Is the open slit or canal of the eustachian tube.

* *Levator Palati* and *circumflexus palati* muscles.

37. *Chorda tympani*, underneath which is seen a branch of the internal maxillary artery forming the *Arteria Meningea*, and various small nerves.

38. *Portio dura* of the 7th pair of nerves going to form the facial nerve.

39. The long branch of the *os hyoides*.

40. Muscular fibres.

41. The immense trunk of the inferior maxillary nerve.

42. The external carotid artery.

43. The *oesophagus*.

44. The *symphysis* of the arytenoid cartilage.

45. The arytenoid cartilage covered by membrane.

46. The *chorda vocalis*, or *ligamentum glottidis*.

47. The *sacculus laryngis*, supposed to deaden the sound of the voice.

48. The *epiglottis*.

49. 49. Section of the cricoid cartilage.

50. The first ring of the *trachea*.

51. 51. The *atlas*, or first *vertebra* of the neck.

52. The second cervical *vertebra*.

53. 53. The skin, at the lips, thinner, and inseparably united to the muscles beneath, giving the tangent property of the fingers.

DESCRIPTION OF PLATE THE SECOND OF THE HEAD OF THE HORSE.

IN This second Plate is represented the other division of the head of the Horse, with the *septum narium*, brain, tongue, larynx, skin and lips removed. By this means parts are brought into view not visible in the former.

1. The cavity of the skull containing the *cerebrum*, with its investing membranes.

2. The situation of the olfactory nerve.

3. The cavity for the *cerebellum* and spinal marrow, the membranes which line this canal conceal the right condyle of the occipital bone, as though there was no bony connexion with the spine.

4. 5. Great foramen for the passage of the optic nerve.

6. Foramen for the sixth pair, or *motores oculi*.

7. Opening for the *portio mollis* and *dura* of the seventh pair, or auditory nerves.

8. One, sometimes two origins, of the *par vagum*, or eighth pair, going to the stomach, &c.

9. The *accessorius* going to the muscles of the neck.

10. The 3, sometimes 4, origins of the ninth series of nerves which are sent to the tongue.

11. The *occipital* bone. 12. Its spinous process sustaining the membranes which divide the two masses of the brain.

13. The *parietal* bone.

14. The *frontal* bone, with its cavities called sinuses in the human, and which are said to communicate with the ethmoidal and sphenoidal cavities. These cells or cavities serve to lighten the weight of the bone, to retain odours long after their first impression, and to give strength and character to the voice.

15. The *nasal* bones.

16. The *basillary* process of the occipital bone.

17. The sphenoidal bone and its cavities.

18. The hollow beak or termination of the *sphenoidal* bone applied to the *os vomeris*.

19. The *ethmoidal* bone. 20. 20. The claviform processes of the ethmoidal bone.

21. The anterior or great spongy or turbinate bone.

22. The posterior or lesser turbinate bone. The great spongy bone with the claviform processes, are parts of the ethmoidal bone, being applied to or connected with its cribriform *lamella*, while the posterior turbinate bone is attached at its upper part with the nasal portion of the palatine bones. These bones contain within them others of a similar structure, and similar cartilaginous processes obliquely descending through their cavities, till near the nose these cavities become almost obliterated; a red membrane covers every where these crustaceous bones through whose surface is spread the extensive ramifications of the olfactory nerve. Catarrhs, various undescribed gonorrhæas and glanders, are here principally situated.

23. 23. A long canal or space between the great spongy bone and the nasal bones terminating in a blind end, and having opposite it a protuberant knot in the ethmoidal bone.

24. A cavity like the former for the admission of air between the two bones.

25. The palatal process of the *maxilla superior*, with the bars of the palate, grinder teeth, and lower jaw. The opening of the parotid duct is exactly opposite the figures. 26.

27. The *velum palati*.

28. The *oesophagus*.

29. The faucial opening of the Eustachian tube, or, in the horse, more properly trumpet, which is closed with a broad convex cartilage having proper muscles for its elevation. This trumpet opens by an oblique aperture

facing the opening of the nostrils, the better to receive the impression of sounds. This cartilage is attached to the internal wing of the pterygoid process at its fixed extremity, the loose extremity being fixed to the membrane which covers the fauces; this opening leads to a large membranous sac, as large as the human fist, situated behind the angle of the lower jaw, and above the *oesophagus*, its upper surface being in contact with the basis of the skull, a flat layer of muscular fibres arise from the posterior edge of this cartilage, and which terminate in the fauces, and are evidently destined to close this opening. The two cartilages are joined together about their middle by a ligamentous band. It appears that, upon opening the jaw, as in yawning, the central parts of these two cartilages will be drawn together by the stretching of the membrane of the posterior fauces, and therefore the opening be made to gape.

An oblique fissure, composed of cartilage on one side, and the *salpingo pharyngeus* muscle on the other lies within this sac, on its upper part, and proceeds onward to the osseous part of the eustachian tube, where, after proceeding three-fourths of an inch in the form of a slit, it becomes the eustachian tube, a flattened canal, capable of receiving the eyed end of a surgeon's probe; this extending about an inch, enters the cavity of the *tympanum*.

30, 31, 32. Branches of the *os hyoides*.

33. Long branch of the *os hyoides*.

34, 35. Muscles of the neck.

36. The thyroid gland.

37. Muscles of the neck covered by the membrane of the pharynx.

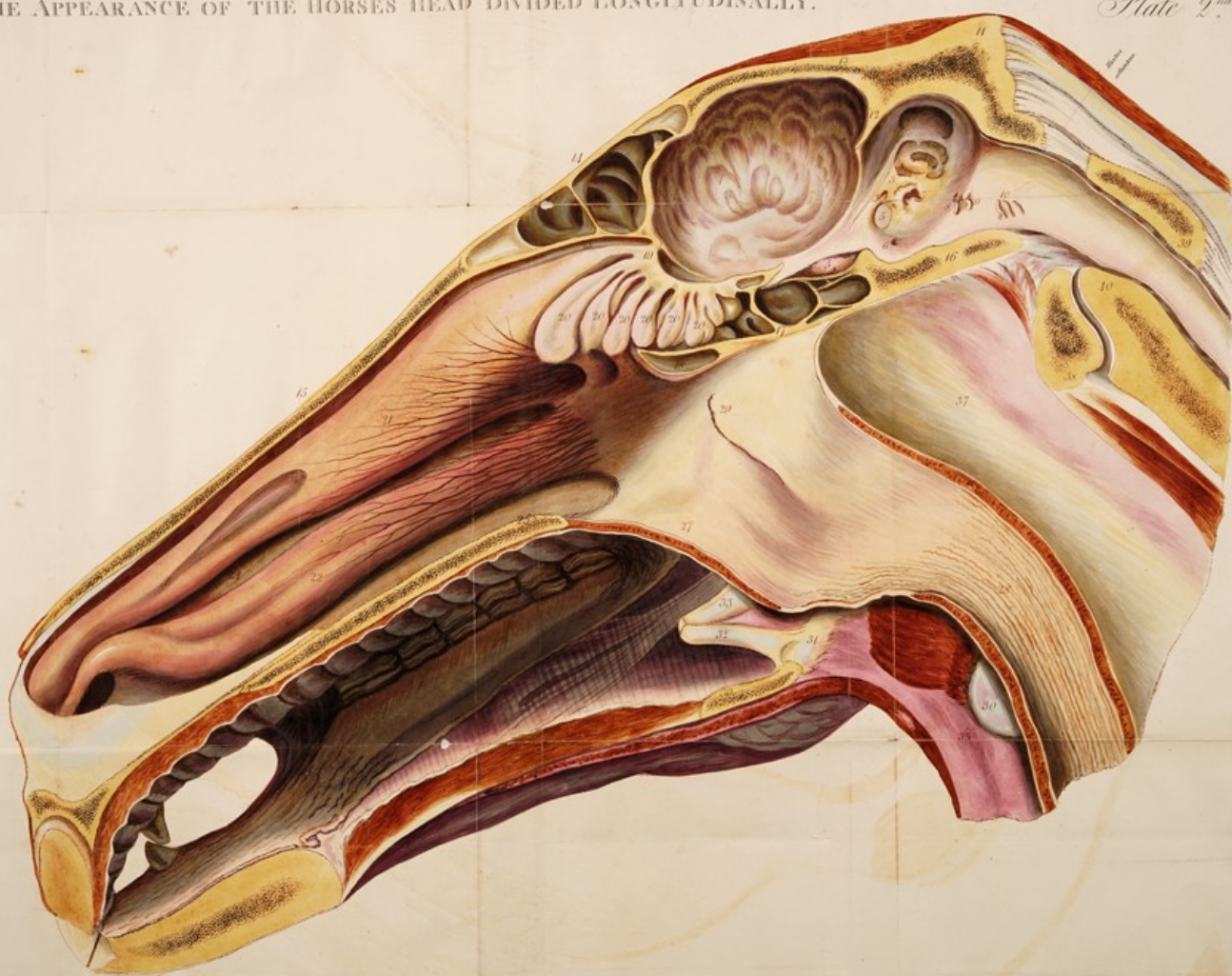
38, 39. The first *vertebra* or atlas.

40. The second *vertebra*.



THE APPEARANCE OF THE HORSE'S HEAD DIVIDED LONGITUDINALLY.

Plate 2nd



Drawn from Nature and Engraved by George Stubbs

