

THE
SKELETON OF THE HORSE.



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WELLINGTON.
BY AUTHORITY: JOHN MACKAY, GOVERNMENT PRINTER.

TWO SHILLINGS

1904.

NZC XL
599.725
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1904

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EPUB ISBN: 978-0-908329-84-7

PDF ISBN: 978-0-908332-80-9

The original publication details are as follows:

Title: The skeleton of the horse : with key and explanatory notes

Author: Wilkie, Henry C. (Henry Charles)

Published: Govt. Printer, Wellington, N.Z., 1904

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WITH KEY AND EXPLANATORY NOTES

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THE HISTORY OF

18 DEC 1986

THE SKELETON OF THE HORSE.

THE drawing of the skeleton of the horse has been made with the intention of giving as clear an idea of the general construction of the osseous framework of the animal as possible, omitting, however, such details as might tend to confuse those unacquainted with comparative anatomy.

The general outline or contour of the horse has been made in solid black, and shows to what extent this is determined by the bony structure. In the head, for instance, it will be seen that the well-known outlines are very largely governed by the shape of the skull, while in the contour of the neck the bones play but little part.

The bones of each side are symmetrically paired, and these pairs are in all essential particulars identical. Therefore, though a somewhat new departure in anatomical delineation, it has been considered of some possible advantage to omit structures which belong to the farther side, such as the ribs, &c.

The skeleton is made up of an axial portion and its appendages. The axial portion (axis, or trunk) consists of the skull and vertebral column or backbone which supports the ribs and sternum. The appendages are the two pairs of limbs which are attached to the trunk by means of what are termed girdles—the fore limbs by the pectoral or shoulder girdle, and the hind limbs by the pelvic or hip girdle.

The *vertebral column* forms a bony tube for the lodgement and protection of the spinal cord, and is divisible by its special anatomical characteristics into five portions.

The whole column consists of fifty-four bones, but as five of them are fused together there are fifty separate bones, each movable upon its immediate neighbours. These bones are bound together by powerful ligaments, and between the adjoining surfaces are thick cartilages which lessen the damaging effects of concussion.

The first or *cervical* portion of the vertebral column consists of seven bones, which are more or less cubical in form, and are so articulated as to allow of the greatest possible freedom of movement.

The second or *dorsal* portion is made up of eighteen bones which support the ribs, while the lumbar vertebræ are six in number, and by their extensive transverse processes form a kind of roof to that part of the abdomen.

The fourth portion of the vertebral column is the sacrum, which consists primarily of five bones fused into a single one, and which forms a kind of roof to the pelvis.

The *coccygeal vertebræ*, with a varying number of from fifteen to eighteen bones, complete the column.

The neural canal, for the reception of the great nervous axis or spinal cord, exists from the first cervical vertebra throughout the whole column, until the first few bones of the coccygeal region are reached, where it terminates. The actual termination of the neural canal varies in different horses at from the third to the fifth coccygeal vertebra.

Both the fore and the hind limbs of the horse may be primarily divided into three segments—a proximal (*femur and humerus*), a middle (*tibia and radius*), and a distal (*metapodials*, or, individually, *metacarpals and metatarsals*). Following the distal segments are the phalanges or digits, and it will be seen that the horse stands and moves upon the extremity of his third digit.

Being, therefore, an animal with a single toe, the horse belongs to the Perissodactyle or odd-toed group, a classification which includes all equine animals, the tapir, and the rhinoceros.

A notable feature of the skeleton of the horse is the total absence of the *clavicle or collar-bone*. This fact is the more interesting because it is a special anatomical characteristic of the ungulates or hoofed animals. The clavicle is well developed in birds, reptiles, and amphibians, and also in many orders of mammals, such as the primates, marsupials, edentates, and insectivores, while in rodents and carnivores it exists as a distinct rudiment.

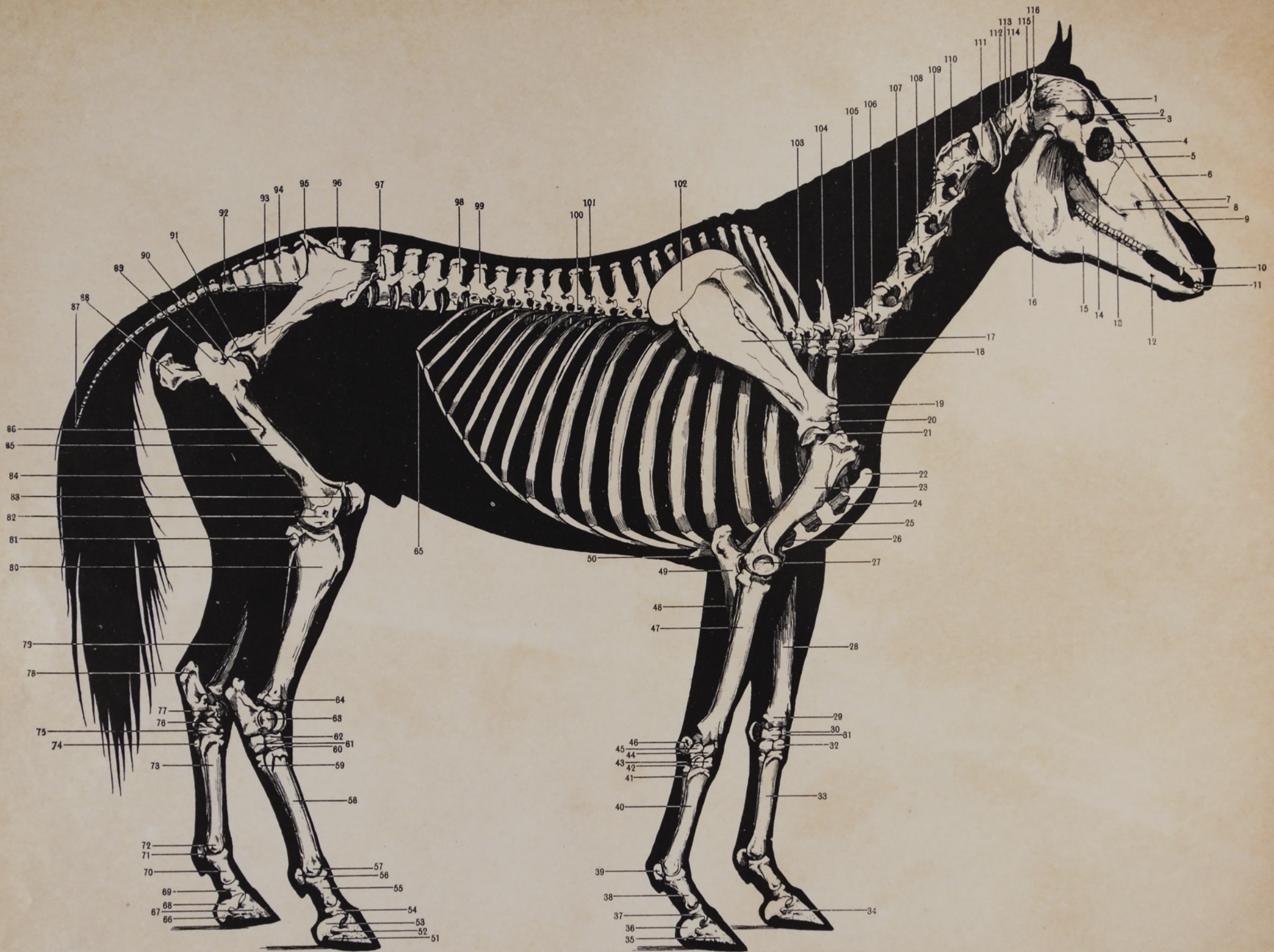
In some portions of the skeleton, where elasticity is specially needed, and where an unyielding material would be either inadmissible or liable to injury, bone is replaced by gristle or cartilage, or, it may be more correct to say, bones are continued by cartilage. As an essential part of the skeleton these have been included in the drawing.

The *cartilaginous extension* of the *scapula* is seen in the cartilage of elongation at No. 102.

The highly elastic cartilaginous extensions of the ribs are seen at No. 65, and form the extremity of every rib.

The osteo-cartilaginous mass called the *sternum* extends from No. 22 to No. 50, while the elastic wing-like extensions of the pedal bones are seen in the *lateral fibro-cartilages* at Nos. 34, 36, 53, 68.





THE SKELETON OF THE HORSE.

REFERENCES.

1. Parietal bone.
2. Zygomatic arch.
3. Supra-orbital foramen of the frontal bone.
4. Orbital cavity—a bony socket for reception of the eyeball.
5. Lachrymal bone.
6. Nasal bone.
7. The infra-orbital foramen, or supermaxillo-dental canal of the superior maxillary bone.
8. Zygomatic ridge of the superior maxillary bone.
9. Nasal peak.
10. Premaxillary bone. Immediately behind the termination of the pointer is seen the canine tooth or tush, that of the lower jaw being seen below it.
11. The corner incisor tooth (upper).
12. The foramen menti, or anterior maxillary foramen.
13. The molar teeth. The pointer here terminates on the upper third molar.
14. Malar bone.
15. Inferior maxilla.
16. Roughened surface of the bone for attachment of the masseter muscle.
17. The shoulder-blade, or scapula. The pointer here terminates on the postea-spinatus fossa, which is separated from the antea-spinatus fossa by a ridge called the spine of the scapula.
18. The first rib. In the horse there are eighteen ribs on either side, of which eight articulate by means of their cartilages with the sternum, and are called true or sternal ribs. The asternal or false ribs are prolonged by cartilages, each of which end in a point, and these cartilages are attached to each other by strong connective tissue. The head of every rib articulates with two vertebræ by means of an inter-vertebral articular cavity, while the tuberosity with which each rib is provided corresponds by its facet to a facet on the transverse process of the posterior vertebra.
19. The coracoid process.
20. Inferior extremity of the scapula, which articulates with the head of the humerus by means of a glenoid cavity.
21. Head of the humerus.
22. Cariniform cartilage of the sternum.
23. Shaft of the humerus, showing the twist on the body of the bone.
24. The first of the sternibræ.
25. The second " "
26. The third " "
27. Fossa for insertion of the external lateral ligament.
28. The inner aspect of the radius.
29. The inferior extremity of radius articulating with the carpus.
30. Lunar or semilunar.
31. Scaphoid.
32. The magnum, which articulates posteriorly with the trapezoid.
33. The large metacarpal bone.
34. The os pedis. The pointer here is on the basilar process of the bone.
35. The os pedis, or "coffin bone," of the right foot—the third phalanx.
36. The lateral fibro-cartilage.
37. The second phalanx, or os coronæ.
38. The first phalanx.
39. The external sesamoid bone.
40. The cannon bone, or large metacarpal.
41. The external small metacarpal, or splint bone.
42. The unciform.
43. The magnum.
44. Lunar.
45. Cuneiform.
46. Trapezium.
47. The shaft of the radius.
48. The radio-ulnar arch.
49. The ulna.
50. The ensiform cartilage of the sternum.
51. The retrorsal process of the os pedis.
52. The basilar process of the os pedis.
53. The lateral fibro-cartilage.
54. The second phalanx.
55. The first phalanx.
56. The external sesamoid bone.
57. The inferior extremity of the large metatarsal bone.
58. The large metatarsal bone.
59. The external small metatarsal bone.
60. Cuneiform magnum.
61. Cuboid.
62. Cuneiform medium or scaphoid.
63. Astragalus.
64. The external malleolus of the tibia.
65. The costal or rib cartilages—the pointer being on the last of these.
66. The retrorsal process of the os pedis.
67. The os pedis, showing its numerous foramina for the passage of blood-vessels.
68. The lateral fibro-cartilage of the inner side of the foot.
69. The second phalanx, or os coronæ.
70. The first phalanx.
71. The internal sesamoid bone.
72. The inferior extremity of the large metatarsal bone.
73. The shaft of the large metatarsal bone.
74. The internal small metatarsal bone.
75. Cuneiform parvum.
76. Cuneiform medium or scaphoid.
77. The internal aspect of the astragalus.
78. The calcis.

79. The inner aspect of the tibia.
80. The outer aspect of the tibia.
81. The fibula. The pointer terminates in the centre of the head of the bone.
82. Rough tuberosities for ligamentous insertion.
83. The patella.
84. The supra-condyloid fossa.
85. The shaft of the femur.
86. Trochanter minor externus.
87. The last coccygeal vertebra.
88. Ischium.
89. Trochanter major.
90. The external convexity of the trochanter major.
91. The head of the femur.
92. The first coccygeal vertebra.
93. Ilium.
94. Sacrum.
95. Superior spine of the ilium.
96. The last lumbar vertebra.
97. Anterior spine of the ilium.
98. The first lumbar vertebra.
99. Last dorsal vertebra.
100. The spinal foramen.
101. Transverse process of dorsal vertebra (13th).
102. Cartilage of elongation of the scapula.
103. Second dorsal vertebra.
104. First dorsal vertebra.
105. Seventh cervical vertebra, or prominens.
106. Sixth cervical vertebra, or tricuspid.
107. Fifth cervical vertebra.
108. Fourth cervical vertebra.
109. Third cervical vertebra.
110. Second cervical vertebra—the dentata, or axis.
111. First cervical vertebra, or atlas.
112. Condyle of the occiput.
113. Styloid process of the occiput.
114. Occipital bone.
115. Petrous temporal bone, showing the external auditory meatus.
116. Occipital protuberance forming the crest of the poll.

DERIVATIONS.

- PARIETAL.—Latin, *paries*, a side or wall; *parietis*, of a wall.
 ZYGOMATIC.—Greek, *zugoma*, a bar; from *zugon*, a yoke.
 SUPRA-ORBITAL.—Latin, *supra*, on the upper side; *orbitum*, the orbit.
 FORAMEN.—An opening for the passage of blood-vessels and nerves. Latin, *foramen*, an opening; *foro*, I bore.
 LACHRYMAL.—Latin, *lachryma*, a tear.
 INFRA-ORBITAL.—Latin, *infra*, below; *orbis*, a circle; *orbitum*, the orbit.
 MAXILLARY.—Pertaining to the jaw. Latin, *maxilla*, a jaw.
 PREMAXILLARY.—Latin, *præ*, before; *maxilla*, a jaw.
 MENTI.—Latin, *mentum*, the chin.
 MALAR.—Latin, *mala*, the cheek.

- INFERIOR MAXILLA.—Latin, *inferior*, lower; *maxilla*, a jaw.
 MASSETER.—Greek, *masseter*, one that chews; *massaomai*, I chew.
 STERNUM.—Greek, *sternon*, the breast.
 ASTERNAL.—Greek, *a*, without; *sternal*, of the sternum.
 VERTEBRÆ.—Latin, *vertebræ*, joints; from *verto*, I turn.
 INTERVERTEBRAL.—Latin, *inter*, between; Eng., *vertebral*.
 CORACOID.—Greek, *koraks*, a crow; *korakos*, of a crow; *eidos*, a resemblance—from the resemblance this process bears in human anatomy to a crow's beak.
 HUMERUS.—Latin, *humerus*, the shoulder.
 SCAPULA.—Latin, *scapula*, the shoulder-blade.
 GLENOID.—Greek, *glene*, a socket; *eidos*, a resemblance.
 CARINIFORM.—Latin, *carina*, the keel of a ship.
 RADIUS.—Latin, *radius*, a spoke or ray.
 CARPUS.—Greek, *karpos*, the wrist.
 LUNAR.—Latin, *luna*, the moon.
 SEMILUNAR.—Latin, *semi*, half; *luna*, the moon.
 SCAPHOID.—Greek, *skaphe*, a boat.
 TRAPEZOID.—Greek, *trapezion*, a small table; *eidos*, a resemblance.
 METACARPAL.—Greek, *meta*, beyond; *karpos*, the wrist.
 OS.—Latin, *os*, a bone.
 PEDIS.—Latin, *pes*, a foot.
 PHALANX.—Greek, *phalangx*, a line of battle. The term is applied to the digits, from their regularity.
 SESAMOID.—Greek, the grain sesame; *eidos*, a resemblance.
 UNCIFORM.—Latin, *uncinis*, a hook.
 CUNEIFORM.—Latin, *cuneus*, a wedge.
 TRAPEZIUM.—Greek, *trapezion*, a small table.
 ULNA.—Latin, *ulna*, the elbow.
 ENSIFORM.—Latin, *ensis*, a sword; *forma*, a shape.
 RETROSSAL.—Latin, *retro*, behind; *os*, a bone.
 BASILAR.—Latin and Greek, *basis*, a foundation.
 METATARSAL.—Greek, *meta*, beyond; *tarsos*, the sole of the foot. The three metatarsal bones of the horse correspond to the five of the human foot, which, being situated between the *tarsus*, or ankle, and the toes, constitute the bones of the soles of the foot.
 ASTRAGALUS.—Greek, *astragalos*, a die. Corresponding bones of the sheep and other animals being formerly used by the ancients as dice.
 MALLEOLUS.—Latin, *malleolus*, a small hammer.
 TIBIA.—Latin, a flute. The upper expanded end resembling the trumpet-like extremity of an ancient flute, and the smaller portion the mouthpiece.
 COSTAL.—Latin, *costa*, a rib.
 CUBOID.—Greek, *kubos*, a cube; *eidos*, a resemblance.
 FORAMINA.—Latin, *foramen*, an aperture or opening; *foramina*, plural.
 CORONÆ.—Latin, *corona*, a wreath.
 CALCIS.—Latin, *calx*, the heel. This bone, in human anatomy, forms the osseous structure of the heel.
 FIBULA.—Latin, *fibula*, a buckle. So named in human anatomy from the head of the bone being opposite to the part the buckle of the knee of the breeches was placed.
 PATELLA.—Latin, *patella*, a small pan. The knee cap or pan.
 SUPRA-CONDYLOID.—Latin, *supra*, on the upper side. Greek, *kondulos*, a knuckle or knob; *eidos*, a resemblance.
 FOSSA.—Latin, a ditch or depression.
 TROCHANTER.—Greek, *trochanter*, a runner.
 COCCYGEAL.—Latin, *coccygis*, a cuckoo. From the supposed resemblance of the four terminal bones of the vertebral column in man to the bill of the cuckoo.
 ISCHIUM.—Greek, *ischion*, the hip.
 FEMUR.—Latin, *femur*, the thigh.
 ILIUM.—Greek, *eileo*, I twist.
 SACRUM.—The sacred bone; from the Latin *sacrum* or *sacer*, sacred.
 LUMBAR.—Latin, *lumbus*, the loin.
 DORSAL.—Latin, *dorsum*, the back.
 CERVICAL.—Latin, *cervix*, the neck.
 PROMINENS.—From the prominent spinous process of this bone.
 TRICUSPID.—Latin, *tris*, three; *cuspis*, a point.
 AXIS.—Latin, *axis*, an axle-tree. This bone forming the pivot upon which the atlas and head rotate.
 DENTATA.—Latin, *dentatus*, tooth-bearing. So called from the tooth-like process this bone bears anteriorly.
 ATLAS.—Greek, *atlas*—*a*, intensive; *tlao*, I sustain. In the mythology of ancient Greece, Atlas was the giant who sustained the earth upon his shoulders as the first bone of the neck sustains the head.
 CONDYLE.—Greek, *kondulos*, a knuckle or knob.
 OCCIPUT.—Latin, *occiput*, the back of the head.
 STYLOID.—Greek, *stulos*, a style or pen; *eidos*, a resemblance.
 PETROUS.—Latin, *petrosus*, hard like a rock; from *petra*, a stone.
 TEMPORAL.—Latin, *temporalis*, for a limited time, mortal.
 AUDITORY.—Latin, *auditor*, one who hears; from *audio*, I hear.
 MEATUS.—Latin, *meatus*, a passage.

NOTE.—A large wall chart (half life size) of the diagram of Horse shown in this work can be purchased from the Government Printer, Wellington, New Zealand.

NZC XL
599.725
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