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EXAMINATIONS

IN

ANATOMY, PHYSIOLOGY,

PRACTICE OF

PHYSIC, SURGERY, CHEMISTRY,

OBSTETRICS, MATERIA MEDICA,

PHARMACY, & POISONS;

FOR THE USE OF STUDENTS.

—
BY

ROBERT HOOPER, M. D.

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WITH

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QUESTIONS.

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EXAMINATIONS

IN

ANATOMY, PHYSIOLOGY, PRACTICE OF
PHYSIC, SURGERY, MATERIA MEDICA,
CHEMISTRY, PHARMACY,
AND POISONS.

For the Instruction of Students.

ANATOMY.

1. Question. WHAT are the divisions of the science of Anatomy?

Answer. The science of Anatomy is divided into Osteology, Syndesmology, Myology, Bursalogy, Angiology, Neurology, Adenology, Splanchnology, and Hygrology.

2. Q. What are the solids of the body?

A. The solids of the body are the bones, cartiliges, ligaments, muscles, cellular substance, membranes, vessels, nerves, glands, viscera, and adipose substance.

3. Q. How do anatomists divide the skeleton?

A. The human skeleton is divided into head, trunk, and extremities. The head is subdivided into cranium, or skull, and face. The upper extremities into brachium, antibrachium, carpus, metacarpus, and phalanges. The lower extremities into femur, crus, tarsus, metatarsus, and phalanges. The trunk is subdivided into spine, thorax, and pelvis.

4. Q. How many bones compose the cranium?

A. Eight; namely, one os frontis, two ossa parietalia, one os occipitis, two ossa temporalia, one os ethmoides, and the os sphenoides.

5. Q. What are the sutures of the cranium?

A. The sutures of the cranium are five in number, viz. the coronal, the sagittal, the lambdoidal, and the two squamous.

6. Q. What are the peculiarities of the frontal bone in the fœtus?

A. The frontal bone in the fœtus is divided down the middle; it contains no sinuses; and neither the orbital plates nor superciliary ridges are completely formed.

7. Q. Where is the os frontis situated?

A. The os frontis is situated in the anterior part of the cranium, and superior part of the face.

8. Q. Where is the lachrymal depression situated?

A. The lachrymal depression is situated on the orbital plate, and behind the external angular process.

9. Q. Describe the parietal bones.

A. The parietal bones are of a quadrangular shape, are externally convex, internally concave, and marked with grooves for the meningeal arteries. They form the lateral and superior part of the cranium.

10. Q. Describe the situation of the sphenoidal bone.

A. The sphenoidal bone is situated in the middle of the basis of the cranium, extending underneath, from one temple across to the other.

11. Q. Into how many portions is the temporal bone distinguished?

A. Generally into two portions, viz. a squamous portion and a petrous portion.

12. Q. In what bone is the organ of hearing situated?

A. In the petrous portion of the temporal bone.

13. Q. How many tables have the bones of the cranium?

A. Two: an external and an internal.

14. Q. What is the name of the substance which unites the two tables of the cranium?

A. It is called diploë, and medietullium.

15. Q. What is attached to the internal angular process of the frontal bone?

A. There are two muscles attached to the internal angular process: viz. the corrugator supercillii and the trochlearis, or obliquus superior.

16. Q. What is the union of the bones of the skull termed?

A. Suture.

17. Q. What is the name of the suture which connects the frontal with the parietal bones?

A. The coronal suture.

18. Q. By what suture is the occipital bone united to the parietal bones?

A. By the lambdoidal suture.

19. Q. What name is given to the suture which connects the parietal bones?

A. It is called the sagittal suture.

20. Q. Describe the occipital bone.

A. The occipital bone forms the posterior and inferior part of the skull, is of an irregular figure, externally convex, internally concave. It has many depressions and elevations, and is connected, at its inferior part, by means of a projection, called the basiliary process, to the sphenoid bone.

21. Q. Describe the sphenoid bone.

A. The sphenoid bone is divided into a body and wings. It has many processes, depressions, and foramina, and is connected to all the bones of the cranium.

22. Q. What are the processes of the sphenoid bone?

A. The principal processes of this bone are, the two pterygoid processes, the styliform process, the spinous processes, the orbital processes, the temporal processes, the ethmoidal process, the olivary process, and the anterior and posterior clinoid processes.

23. Q. What bones are united by the false sutures?

A. The temporal bones are united to the parietal bones by the false or squamous suture.

24. Q. Through what foramina do the olfactory nerves pass out of the cranium?

A. Through the foramina cribrosa, which are in the upper part of the ethmoid bone.

25. Q. Where is the foramen magnum occipitale situated?

A. In the occipital bone, at the inferior part between the condyles and behind the basillary process.

26. Q. To what bone does the crista galli belong?

A. To the ethmoid bone: it forms the projecting process within the cranium, to which the falciform process of the dura mater is attached.

27. Q. To what bone does the sella turcica belong?

A. To the sphenoid bone: it is placed in the middle, and projects into the cavity of the cranium.

28. Q. What does the foramen rotundum of the sphenoid bone transmit?

A. The foramen rotundum transmits the second branch of the fifth pair of nerves.

29. Q. Describe the frontal bone.

A. The frontal bone has some resemblance to a cockleshell: it is placed in the anterior part of the skull, and forms the forehead and upper part of the orbits. It receives the anterior lobus cerebri, forms a notch for the ethmoid bone, is externally convex, internally concave, and has several elevations and depressions.

30. Q. Where is the os ethmoides situated?

A. The os ethmoides is situated at the root of the nose, in a notch between the orbítar plates of the frontal bone.

31. Q. What bone separates the ethmoid from the occipital bone?

A. The os sphenoidum.

32. Q. Through what foramen does the third branch of the fifth pair of nerves pass?

A. The third branch of the fifth pair of nerves goes through the foramen ovale.

33. Q. At what angle of the parietal bone is the groove for the spinous artery?

A. The spinous artery of the dura mater runs in a groove at the anterior inferior angle of the parietal bone.

34. Q. What rests on the internal surface of the cuneiform process of the occipital bone?

A. The medulla oblongata rests upon the inner surface of the cuneiform or basillary process.

35. Q. What is attached to the lateral parts of the internal crucial spine of the occipital bone?

A. The tentorium, which separates the cerebrum from the cerebellum.

36. Q. In what bone is the foramen opticum?

A. The foramen opticum is in the sphenoid bone.

37. Q. Where is the foramen opticum found in the skull?

A. In the orbit, at the very bottom.

38. Q. What is the use of the foramen opticum?

A. It transmits the optic nerve to the eye.

39. Q. What are the eminences of the temporal bone?

A. The principal eminences are the mastoid process, the zygomatic process, the styloid process, vaginal process, and the ridge on the petrous portion.

40. Q. What is the use of the meatus auditorius internus?

A. The meatus auditorius internus transmits the portio dura and portio mollis.

41. Q. To what nerve does the fissura Glasseri give exit?

A. The chorda tympani.

42. Q. What is the name of the suture that connects the bones of the face to those of the cranium?

A. The bones of the cranium are connected to those of the face by means of the transverse suture.

43. Q. How many bones compose the face?

A. The face is formed by fourteen bones; two superior maxillary, two nasal, two palatine, two jugal, two inferior spongy, two lachrymal, the vomer, and the inferior maxillary bone.

44. Q. What is attached to the styloid process of the temporal bone?

A. Three muscles, viz. the stylo-pharyngeus, the stylo-glossus, and the stylo-hyoideus; also the ligament of the os hyoides, and the lateral ligament of the lower jaw.

45. Q. Enumerate the principal elevations of the occipital bone.

A. The principal elevations of the occipital bone are, its condyles, a longitudinal ridge, a superior and an inferior transverse ridge, a tuberosity in the centre of the superior transverse ridge; these are on the external

surface. On the internal surface is seen the crucial spine.

46. Q. To what bone does the mastoid process belong?

A. It is a part of the temporal bone.

47. Q. How many bones compose the orbit?

A. Seven; viz. os frontis, os ethmoides, os sphenoides, os lachrymale, os jugale, os palati, and the os maxillare superius.

48. Q. What passes through the foramen lacerum orbitale superius?

A. The third, the fourth, the first branch of the fifth and sixth pair of nerves.

49. Q. How many bones compose the lower jaw?

A. One, in the adult, the inferior maxillary bone.

50. Q. What bones form the septum narium?

A. The azygos process of the ethmoid bone, and the vomer.

51. Q. To what bone do the superior turbinated bones, as they are called, belong?

A. To the ethmoid bone, of which they are a part.

52. Q. In what bone is the antrum of Highmore situated?

A. In the superior maxillary bone, behind the cheeks.

53. Q. Is the body of the sphenoid bone hollow or solid?

A. Hollow: it contains the sphenoidal sinuses, which communicate with the nose.

54. Q. What separates the antrum of Highmore from the orbit?

A. The orbital plate of the superior maxillary bone.

55. Q. Is there any communication between the orbit and the nostril?

A. Yes: by the ductus ad nasum, to convey the tears into the nose.

56. Q. How many bones are there in the tympanum?

A. Four: the incus, stapes, malleus, and os orbiculare.

57. Q. To what bone of the cranium does the styloid process belong?

A. To the temporal bone.

58. Q. What are the foramina of the superior maxillary bone?

A. The foramina of this bone are, the infra-orbital foramen, the foramen incisivum, the sphenomaxillary fissure, and the foramen of the antrum maxillare.

59. Q. What bones form the foramen lacerum in basi cranii?

A. The temporal and occipital bones.

60. Q. What passes through the canalis carotideus?

A. The canalis carotideus transmits the carotid artery and the intercostal nerve.

61. Q. What are the processes of the sphenoid bone called, which forms the sides of the posterior nostril?

A. The pterygoid processes.

62. Q. What passes through the foramen lacerum in basi cranii?

A. The jugular vein, par vagum, glosso-pharyngeal nerve, and nervus accessorius.

63. Q. Do the ossa palati form any part of the orbit?

A. Yes: a portion of the palate bone rises into the inferior part of it.

64. Q. Where is the vomer situated?

A. In the centre of the nostrils, having the sphenoid and ethmoid bones at its upper part, the superior maxillary and palatine bones at its lower part, and the cartilaginous septum of the nose on the anterior part.

65. Q. Where is the Eustachian tube situated?

A. It passes from the tympanum of the ear obliquely forwards and inwards, and opens in the fauces, near the posterior nostril.

66. Q. How many foramina has the inferior maxillary bone?

A. It has only two, which belong to the canalis mentalis: one placed externally and anteriorly, the other placed posteriorly and internally.

67. Q. Point out the situation of the zygomatic process on the face.

A. It forms the lateral and superior part of the cheek, extending anteriorly from the extremity of the ear.

68. Q. Where is the os unguis situated?

A. The os unguis is situated in the orbit, at the in-

ternal angle immediately underneath the meeting of the eye-lashes.

69. Q. What is the name of the portions of the os ethmoides which hang down into the nostrils?

A. The superior turbinated bones and azygos process.

70. Q. What sinuses communicate with the cavity of the nostrils?

A. There are five sinuses which enter the cavity of the nostrils; viz. the frontal, ethmoidal, and sphenoidal sinuses at the upper part, and the two antral sinuses on the sides.

71. Q. What is the shape of the os malæ?

A. It is of a quadrangular shape.

72. Q. Enumerate the foramina of the sphenoid bone?

A. The foramina of the sphenoid bone are, the foramina optica, foramina lacera, foramina rotunda, foramina ovalia, foramina spinosa, and the foramina Viduana.

73. Q. What bones of the cranium are called ossa plana?

A. The orbital plates of the ethmoid bone.

74. Q. What are the elevations of the superior maxillary bone?

A. The elevations of the superior maxillary bone are, the alveolar process, the spinous process, the palatine process, the nasal process, the orbital process, the malar process, and the bulbous process.

75. Q. What are the projections of the inferior maxillary bone?

A. The principal projections of the inferior maxillary bone are the coronoid and condyloid processes; the angles; a ridge passing externally, and another internally, from the base of the coronoid process to the commencement of the chin; a projection on the inner and outer side of each angle; a projection behind the symphysis, and another on each side the base of the chin.

76. Q. What is the division of the internal ear?

A. The internal ear is divided into the tympanum

and labyrinth; and the labyrinth is divided into cochlea, semicircular canals, and vestibulum.

77. Q. How many teeth are there in the adult, and how are they divided?

A. In the adult there are sixteen teeth in each jaw; and they are divided into three classes on each side of the jaw; two incisores, one cuspidatus, two bicuspides, and three molares.

78. Q. On what vertebra is rotation of the head performed?

A. The head rotates upon the second cervical vertebra, by the intervention of the atlas.

79. Q. What are the bones called which compose the spine?

A. Vertebrae, of which there are twenty-four.

80. Q. Describe the spine.

A. The spine is a long, bony, and cartilaginous, hollow column, consisting of twenty-four bones, called vertebrae, which extend from the occipital bone to the os sacrum, and have many processes and foramina.

81. Q. What is there peculiar to the second vertebra?

A. It has an odontoid process at the upper part of its body.

82. Q. What is there peculiar to the atlas?

A. The atlas has no body nor spinous process: its transverse processes are longer than those of the rest, and terminate in an obtuse point. The superior articular processes are very large, and are hollowed out for the condyles of the occipital bone. There are two tuberosities within its large arch for the attachment of the transverse ligament; it has a groove behind each superior articular process, and there is a surface for the odontoid process to move on.

83. Q. How would you distinguish a dorsal vertebra from the rest?

A. The bodies of the dorsal vertebrae are larger than the cervical, and less than the lumbar; they are more flattened at the sides, more convex before, and more concave behind, than any of the other vertebrae; the spinous process terminates in a round tubercle; the

transverse processes are very thick; they have no foramen, as in the cervical; there is an articulating surface on the side of the body, and a superficial one in the points of the transverse processes.

84. Q. Where is the os sacrum situated?

A. The os sacrum is situated at the posterior and lower part of the trunk, below the lumbar vertebræ, and between the ossa innominata.

85. Q. How many foramina open upon the surfaces of the sacrum?

A. There are four pairs of holes on the anterior part of the sacrum, and the same number on its posterior part.

86. Q. How are the ribs divided?

A. They are divided into seven true ribs, situated superiorly, and five false, which are placed inferiorly.

87. Q. Into what parts is each rib distinguished?

A. Each rib is divided into middle part or body, an anterior and posterior extremity, an external and internal surface, and a superior and inferior edge.

88. Q. Do the anterior bony extremities of all the ribs reach the sternum?

A. No; only those of the true ribs.

89. Q. Where is the os hyoides situated?

A. It is situated at the root of the tongue, between it and the larynx.

90. Q. How is the os hyoides divided?

A. The os hyoides is divided into body, two cornua majora, and two cornua minora.

91. Q. Describe the scapula.

A. The scapula is a triangular bone, situated at the lateral and upper part of the back. It has three margins, a spine, the acromion and coracoid process, and an articular cavity for the head of the os humeri.

92. Q. What bone is fixed to the acromion scapulæ?

A. The clavicle, or collar-bone.

93. Q. How many bones has the fore-arm?

A. Two; the ulna and radius.

94. Q. Where is the ulna situated?

A. When the hand is supine, it is situated at the under and inner part of the fore-arm, between the humerus and carpus.

95. Q. What is situated in the groove at the lower internal edge of each rib?

A. The intercostal artery, vein, and nerve.

96. Q. How many portions of bone does the sternum consist of?

A. In the adult the sternum consists of three portions; a superior portion, which nearly resembles the ace of hearts; a middle portion, which is flat on each side, and larger below than above; and an inferior portion, which has attached to it the ensiform cartilage.

97. Q. How is the clavicle divided?

A. The clavicle is divided into a body, and an internal, or sternal, and an external, or scapular, extremity.

98. Q. On what bone do we lean when on our elbow?

A. The ulna.

99. Q. What is the process called on which we lean?

A. The olecranon.

100. Q. How many bones compose the shoulder-joint?

A. Two: the scapula and the os brachii.

101. Q. What bone unites the arm to the thorax?

A. The clavicle, or collar-bone.

102. Q. How many bones compose the carpus?

A. Eight: viz. os scaphoides, os lunare, os cuneiforme, os orbiculare, os trapezium, os magnum, and os unciforme.

103. Q. What receives the head of the os femoris?

A. The acetabulum, or cup-like cavity of the os innominatum.

104. Q. What ligament is attached to the bottom of the acetabulum?

A. The ligamentum teres of the thigh-bone, which confines the head in its socket.

105. Q. What bone supports the leg?

A. The astragalus, on which the tibia rests.

106. Q. How many bones compose the tarsus?

A. Seven; viz. astragalus, os calcis, os naviculare, os cuboides, and the three cuneiform bones.

107. Q. What is the situation of the os calcis?

A. The os calcis is placed at the posterior part of the tarsus, and forms the heel.

108. Q. Where is the os scaphoides situated?

A. The os scaphoides is placed immediately before the astragalus.

109. Q. What is the situation of the three cuneiform bones of the tarsus?

A. The cuneiform bones are situated before the os scaphoides, and internal to the os cuboides.

110. Q. Where is the trochanter major situated?

A. It forms the great projection at the superior and external part of the thigh-bone.

111. Q. On what bone is the linea aspera situated?

A. On the back part of the os femoris.

112. Q. What are the processes on the lower end of the os femoris called?

A. They are called condyles.

113. Q. What is there particular to be noticed on the os humeri?

A. In noticing the os humeri, we may observe its cylindrical shape, its body and two extremities, the head, neck, great and little tuberosity, the bicipital groove, the two condyles, and trochea.

114. Q. Enumerate the principal parts of the ulna.

A. The principal parts of the ulna are, its body and extremities, the olecranon and coronoid process, the great and little sigmoid cavity, the lesser head, and styloid process.

115. Q. What are the principal parts of the radius?

A. The principal parts of the radius are, its body and two extremities; its round head, which rolls on the ulna; the sigmoid cavity, at its lower extremity; and the styloid process.

116. Q. What are the principal parts of the os femoris?

A. The principal parts of the os femoris are, its body and extremities, the head, neck, the great and little trochanters, the linea aspera, the external and internal condyle, the notch between the condyles, and fossa for the patella.

117. Q. How many bones compose the knee-joint?

A. Three; viz. the patella, the os femoris, and the tibia.

118. Q. What are the bones of the leg called?

A. Tibia and fibula.

119. Q. What is the shape of the tibia?

A. It is long and triangular; larger above than below.

120. Q. What bone forms the inner ankle?

A. The inner ankle is formed of a projection from the lower part of the tibia.

121. Q. What bone forms the outer ankle?

A. The lower end of the fibula forms it.

122. Q. What are the names of the bones of the pelvis?

A. They are four in number; viz. the two ossa innominata, one os sacrum, and one os coccygis.

123. Q. How would you distinguish a male from a female pelvis?

A. In the female pelvis, the os sacrum is shorter and broader than that of the male, the ossa ilia are more expanded, the brim of the pelvis is nearly of an oval shape, it is wider from side to side than from the symphysis pubis to the os sacrum; whereas, in man, it is rounder, and every where of less diameter; the os sacrum is narrower, and the os coccygis more firmly connected.

124. Q. Into how many portions is the os innominatum distinguished?

A. Into three; viz. the iliac, the pubic, and ischiatic portions, which, in the fœtus, are three distinct bones, and become one in the adult.

125. Q. What separates the ossa innominata from each other behind?

A. The sacrum.

126. Q. What are the terminations of the crista of the ilium called?

A. The terminations of the crista of the ilium are called the anterior superior, and posterior superior, spinous processes of the ilium.

127. Q. What is attached to the crista of the ilium?

A. The aponeurosis of the fascia lata, the latissimus

dorsi, and obliquus externus abdominis, are attached to its external part, and posteriorly the gluteus maximus.

128. Q. Describe the tibia.

A. The tibia is situated on the inner side of the leg: it is divided into a body and an upper and lower extremity. The upper extremity is called the head, which has two articular surfaces for the condyles of the os femoris. The body has three surfaces and three edges: the lower extremity is smaller than the upper, and forms the malleolus internus.

129. Q. What is affixed to the apex of the patella?

A. A ligament is attached to the apex of the patella, which is also affixed to the tuberosity of the tibia.

130. Q. How would you distinguish the right patella from the left?

A. By attending to these circumstances:—the apex should be placed upwards, the articular surface turned inwards; then, by recollecting the deepest articular concavity is always externally situated, you may easily distinguish the patella of the right side from that of the left.

131. Q. Is there any bone between the ossa innominata anteriorly?

A. No: the public portion of each meets to form the pubes.

132. Q. Where is the os coccygis situated?

A. At the lower part, or apex, of the os sacrum.

133. Q. What is the name of the cavity that receives the head of the os humeri?

A. The glenoid cavity.

134. Q. To what bone does the acetabulum belong?

A. It belongs to the os innominatum.

135. Q. What bones form the hip-joint?

A. The head of the os femoris and the acetabulum of the os innominatum.

136. Q. Where is the tuberosity of the ischium situated?

A. At the inferior part of the os innominatum; we sit upon it.

137. Q. Of what bone is the ascending ramus of the pubes a part?

A. It is a part of the os innominatum.

138. Q. What bones form the thorax ?

A. Twelve dorsal vertebræ, the sternum, and twelve ribs ; in all, twenty-five bones.

139. Q. What is the use of the periosteum ?

A. To allow an attachment for muscles, and to afford a bed for the ramification of vessels to nourish the bone.

140. Q. How many kinds of cartilage are there ?

A. There are four kinds of cartilage : 1st, Diarthrodial cartilages, which cover the ends of the bones ; 2d, Synarthrodial cartilages, which are placed between several bones, as that of the symphysis pubis ; 3d, Interarticular cartilages, placed in some of the joints, as those in the knee-joint, &c. ; 4th, Those cartilages which supply the place of bone, as the cartilages of the nose, ears, &c.

141. Q. How many kinds of ligaments are there ?

A. There are two kinds of ligaments ; viz. the connecting and capsular ligaments.

142. Q. What are the ligaments of the lower jaw, and where are they situated ?

A. The lower jaw is articulated by two ligaments on each side, a capsular and lateral ligament : the capsular ligament is affixed around the articular surface of the temporal bone, and round the condyloid process of the lower jaw ; the lateral ligament goes from the root of the styloid process of the temporal bone to the inside of the angle of the lower jaw.

143. Q. What are the ligaments about the shoulder-joint ?

A. The capsular ligament of the head of the os brachii ; the triangular ligament, which extends from the coracoid process to the acromion ; the conoid and trapezoid ligaments, that extend from the clavicle to the coracoid process.

144. Q. What are the ligaments of the pelvis ?

A. The long and short sacro-ischiatic ligaments ; the ligamentum obturans ; the ligamentum Poupartii ; the tranverse ligaments, going from the spinous processes of the ilium to the fourth and fifth lumbar vertebræ ;

the annular ligament of the ossa pubis; the ligamenta vaga, which pass from the ilium to the sacrum; and the lacertus ligamentosus, that runs from the last lumbar vertebra along the ridge of the os innominatum to the pubes: besides these, there are the capsular and longitudinal ligaments of the sacrum and the os coccygis.

145. Q. What is the name of the ligament that connects the os femoris to the bottom of the acetabulum?

A. The ligamentum teres.

146. Q. What are the ligaments of the knee-joint?

A. The ligaments of the knee-joint are, the internal lateral, the long and short external lateral, the posterior ligament of Winslow, the ligament of the patella, the capsular ligament, the two ligamenta alaria, the ligamentum mucosum, the anterior and posterior crucial, the transverse ligaments of the interarticular cartilages, and the ligaments which fix these cartilages to the protuberance of the tibia.

147. Q. What is the most elastic substance in the body?

A. The most elastic substance in the body is cartilage.

148. Q. Are tendons elastic?

A. No; they are inelastic, otherwise the effect of muscles would be greatly diminished.

149. Q. Where is the ligamentum nuchæ situated?

A. The ligamentum nuchæ arises from the occipital bone, runs down on the back part of the neck, adhering to the spinous processes of the cervical vertebræ, and giving origin to the trapezius and other muscles.

150. Q. Describe the annular ligament of the wrist.

A. The annular ligament of the wrist consists of two parts: 1st, The ligament carpi transversale externum, which passes from the styloid process of the ulna and os pisiforme, over back of the wrist, to be affixed to the styloid process of the radius; 2d, The ligamentum carpi transversale internum, which passes across the fore part of the wrist; it arises from the os pisiforme and os unciforme, and is attached to the os scaphoides and os trapezium, on the outer edge.

151. Q. What parts of the body are free from adipose structure?

A. The skin of the scrotum, penis, and eyelids, has no adipose structure.

152. Q. What are the bones of the tarsus?

A. The bones of the tarsus are seven in number; viz. the astragalus, os calcis, os scaphoides, os cuboides, and the three cuneiform bones.

153. Q. What muscles are attached to the coracoid process of the scapula?

A. The coraco brachialis, the pectoralis minor, and the short head of the biceps flexor cubiti.

154. Q. Where is the diaphragm situated?

A. Between the thorax and abdomen, forming a vaulted arch or septum attached to the lower borders of the ribs.

155. Q. What are the muscles of the abdomen?

A. The obliquus externus, obliquus internus, transversalis abdominis, rectus abdominis, and pyramidalis, in pairs.

156. Q. What is the name of the muscle which has three foramina in it?

A. The diaphragm.

157. Q. How is the diaphragm divided?

A. The diaphragm is divided into the greater and less muscle.

158. Q. Describe the origin and insertion of the two muscles of the diaphragm.

A. The greater muscle of the diaphragm arises from all the cartilages of the false and of the last true rib, and is inserted into the centrum tendinosum; the less muscle arises from eight slips from the second, third, and fourth lumbar vertebræ, which form two crura; the muscle is then inserted into the centrum tendinosum opposite its fellow.

159. Q. Where is the longest crus of the diaphragm situated?

A. On the right side of the fore part of the loins.

160. Q. What tendon passes through the shoulder-joint?

A. The long tendon of the biceps flexor cubiti.

161. Q. How many muscles arise from the shoulder and are inserted into the fore-arm?

A. The muscles that are attached to the shoulder and fore-arm are two in number; viz. biceps flexor cubiti, and the long head of the triceps.

162. Q. How many muscles arise from the arm to be inserted into the fore-arm?

A. The muscles that arise from the arm and are inserted into the fore-arm are six in number; namely, the anconeus, the short heads of the triceps extensor cubiti, the brachialis internus, supinator radii longus, supinator radii brevis, and pronator radii teres.

163. Q. What muscles arise from the scapula and are inserted into the humerus?

A. The muscles which arise from the scapula and are inserted into the humerus, are the subscapularis, teres major, teres minor, supraspinatus, infraspinatus, coraco-brachialis, and the deltoides.

164. Q. What tendon passes over the hamular process of the sphenoid bone?

A. The tendon of the tensor palati passes over the hook-like process, to be inserted into the palatum molle.

165. Q. What forms the sheath of the rectus abdominis?

A. The sheath of the rectus is formed by the tendons of three muscles, viz. the obliquus externus, the obliquus internus, and the transversalis.

166. Q. What are the tendinous partitions called, which are sent betwixt muscles from the fascia covering them?

A. The partitions sent down from the fascia betwixt muscles are called intermuscular ligaments; they connect the muscles, and give origin to many of the fibres.

167. Q. What muscle is inserted into the os pisiforme?

A. The muscle which is inserted into the os pisiforme is called flexor carpi ulnaris.

168. Q. How many muscles are there that arise from the trunk, and are inserted into the scapula?

A. They are six in number : viz. trapezius, levator scapulæ, pectoralis minor, rhomboideus, serratus magnus, and subclavius.

169. Q. Do the external condyles of the humerus give origin to the extensor or flexor muscles of the forearm ?

A. To the extensors.

170. Q. What forms the linea alba ?

A. The meeting of the flat tendons of the abdominal muscles, along the centre of the abdomen, forms the ensiform cartilage to the symphysis pubis.

171. Q. What muscles are divided in amputation of the thigh ?

A. The muscles divided in amputation of the thigh are the biceps flexor cruris, semi-tendinosus, semi-membranosus, gracilis, sartorius, vastus externus, vastus internus, rectus femoris, and the long tendon of the abductor magnus.

172. Q. What muscles are inserted into the patella ?

A. The rectus femoris, the vastus externus, the vastus internus, and cruræus.

173. Q. What are the names of the muscles which are inserted into the os calcis ?

A. Gastrocnemius externus, gastrocnemius internus, and plantaris.

174. Q. What is the name of the tendon formed by the gastrocnemius externus, and soleus ?

A. The tendo Achillis.

175. Q. What muscle crosses the carotid artery and internal jugular vein ?

A. These two vessels have the omo-hyoïdes crossing them, to insert itself into the os hyoides.

176. Q. How many muscles are there on the anterior part of the neck ?

A. The muscles on the anterior part of the neck are sixteen in number : viz. platysma myoides, sterno-cleido-mastoïdeus, omo-hyoïdeus, sterno-hyoïdeus, sterno-thyroïdeus, thyro-hyoïdeus, crico-thyroïdeus, digastricus, stylo-hyoïdeus, stylo-glossus, stylo-pharyngeus, myo-hyoïdeus, genio-hyoïdeus, genio-hyo-glossus, myo-glossus, and lingualis.

177. Q. What forms the lineæ transversæ of the abdomen?

A. The lineæ transversæ are formed by the tendinous adhesions of the recti muscles, which produce three or four white lines that shine through the fascia covering each muscle.

178. Q. What forms the linea semilunaris?

A. The linea semilunaris is a semicircular white line which runs obliquely from the os pubis over the side of the abdomen, at the distance of about four inches from the linea alba; it is formed by the tendons of the two oblique and transverse muscles uniting at the rectum. S

179. Q. Is there any muscle which arises from one of the abdominal muscles and is inserted into the testicle?

A. Yes: the cremaster muscle arises from the internal oblique, passes through the abdominal ring, and descending upon the spermatic cord, is inserted into the tunica vaginalis of the testis.

180. Q. What are the most important fasciæ of the body?

A. The fascia covering the temporal muscle:—that given off from the biceps covering the fore-arm:—that covering the abdominal muscles and back:—the fascia of the lower extremities:—and the plantar and palmar fascia.

181. Q. From whence does the palmar aponeurosis arise?

A. The palmar aponeurosis arises from the tendon of the palmaris, and from the annular ligament of the wrist.

182. Q. What are bursæ mucosæ, and their use?

A. The bursæ mucosæ, are small bags placed under muscles and tendons that are frequently brought into action; they contain a fluid similar to synovia, the use of which is to lubricate the muscles and tendons.

183. Q. Where are bursæ mucosæ to be found?

A. The bursæ mucosæ are chiefly situated in the extremities, between tendons which rub against each other, or where they play on the surfaces of bones or

joints, and between the integuments and certain prominent points of bone, as at the knee, elbow, and knuckles.

184. Q. From which side of the tendon of the biceps is an aponeurosis sent off?

A. An aponeurosis is sent off from its inside, which assists in forming the fascia of the fore-arm.

185. Q. Describe the fascia covering the fore-arm.

A. The fascia covering the fore-arm is continued from the intermuscular ligaments which pass down to the condyles, covering the os humeri. It is attached to the condyles, and adheres firmly to the olecranon. On the posterior part of the arm it receives a great addition of fibres from the triceps extensor, and on the fore part of the arm it appears to be a continuation of the aponeurosis of the biceps flexor cubiti.

186. Q. What is the use of aponeuroses?

A. The use of aponeuroses is to brace the muscles, by keeping them in their proper place while in action, and to give origin to many muscular fibres of the muscles which lie immediately under.

187. Q. How many arteries are there?

A. Two; viz. the aorta and pulmonary artery: all the other arteries are branches of these two.

188. Q. What is the name of the vessels which nourish the heart?

A. Coronary arteries.

189. Q. What arteries are given off from the arch of the aorta?

A. Three branches; viz. the arteria innominata, the left carotid, and the left subclavian.

190. Q. What parts do the external and internal carotid artery supply?

A. The external carotid artery supplies the face and external parts of the head; the internal carotid artery supplies the brain.

191. Q. What branches does the external carotid artery give off?

A. The external carotid artery gives off eight branches; viz. 1. thyroidea superior; 2. lingualis; 3. facialis; 4. pharyngea inferior; 5. occipitalis; 6. au-

ricularis posterior; 7. temporalis; and 8. maxillaris interna.

192. Q. What are the branches of the internal carotid artery?

A. The internal carotid artery sends off the ophthalmic, the communicans, the anterior cerebri, and the media cerebri.

193. Q. What is the situation of the common carotid artery in the neck?

A. The common carotid artery lies on the side of the trachea, between it and the internal jugular vein.

194. Q. What are the arteries of the dura mater?

A. The arteries of the dura mater are the anterior, middle, and posterior meningeal.

195. Q. How many arteries has the thyroid gland?

A. The thyroid gland has four arteries, namely, the two superior thyroideal and the two inferior thyroideal.

196. Q. Through what foramen does the ophthalmic artery enter the orbit?

A. The ophthalmic artery enters the orbit by the foramen opticum; it sends its branches to the forehead, lachrymal gland, fat, muscles, and globe of the eye.

197. Q. What is the course of the arteria transversalis faciei?

A. The transversalis faciei, which is a branch of the temporal, proceeds transversely under the zygoma, over the masseter, and near the parotid duct.

198. Q. Describe the course of the internal carotid as it enters the cranium.

A. The internal carotid, at the base of the cranium, makes a sudden turn forwards, and enters the carotid canal of the temporal bone; it then passes upwards and forwards; after leaving the canal it again bends upwards and forwards by the side of the sella turcica, and perforates the dura mater at the root of the anterior clinoid process; it is suddenly reflected obliquely backwards and upwards; after which it divides into branches.

199. Q. Where does the anterior meningeal artery arise?

A. The anterior meningeal artery arises from the carotid.

200. Q. Where does the posterior meningeal artery arise?

A. The posterior meningeal artery arises from the vertebral.

201. Q. From whence does the middle meningeal artery arise?

A. The middle meningeal artery arises from the internal carotid artery.

202. Q. What is the course of the external maxillary artery over the jaw-bone?

A. The external maxillary artery passes before the edge of the masseter over the middle and lateral part of the jaw-bone.

203. Q. What are the branches which the subclavian artery gives off?

A. They are six in number; viz. arteria mammaria interna, thyroidea inferior, intercostalis, vertebralis, cervicalis profunda, and cervicalis superficialis.

204. Q. What are the muscles the subclavian artery passes between, in going over the first rib?

A. The subclavian artery, as it passes over the first rib, goes between the anterior and middle scalenus muscles.

205. Q. Where does the subclavian artery terminate?

A. The subclavian artery terminates in the axillary artery at the first rib, between the insertion of the scaleni muscles.

206. Q. What are the branches of the internal maxillary artery?

A. The internal maxillary artery gives off the arteria meningeal media, which goes to the dura mater through the foramen spinosum; the inferior maxillary, which enters the canal of the lower jaw; the alveolar, to the back teeth of the upper jaw; the infra-orbital, which gets upon the cheek, through the infra-orbital canal; the palato-maxillary, which ramifies on the palate; and the sphenopalatine, to the cavity of the nose.

207. Q. At what part is the brachial artery considered to begin?

A. The brachial artery begins immediately below the tendon of the latissimus dorsi.

208. Q. From what artery does the inferior thyroid arise?

A. The inferior thyroid artery arises from the subclavian.

209. Q. How many branches does the axillary artery send off?

A. The axillary artery generally gives off four arteries, viz. thoracica longior, thoracica superior, thoracica humeraria, and thoracica alaris.

210. Q. What is the course of the brachial artery?

A. The brachial artery descends behind the inner edge of the biceps, over the coraco-brachialis, covered by the tendinous aponeurosis of the arm, and having the triceps extensor cubiti on the back part of it; when it gets to the bend of the arm it divides into two principal branches.

211. Q. Between what tendons does the radial artery lie at the wrist?

A. The radial artery lies at the wrist, between the tendons of the flexor carpi radialis and supinator radii longus.

212. Q. What is the course of the ulnar artery?

A. The ulnar artery, having passed under the flexors of the hand and fingers to the inner part of the forearm, along the outer side of the flexor carpi ulnaris, near the wrist, runs between the tendons of the flexor carpi ulnaris and flexor digitorum profundus; it then passes over the annular ligament and under the palmar fascia, to form the superficial palmar arch.

213. Q. What is the course of the radial artery?

A. The radial artery passes over the pronator teres, and takes the direction of the radius; when it gets to the wrist it gives off several branches, and then forms the arcus profundus.

214. Q. At what distance from the elbow does the brachial artery divide?

A. At about an inch below the elbow the brachial artery generally divides into radial and ulnar.

215. Q. What artery forms the superficial palmar arch?

A. The superficial palmar arch is chiefly formed by the ulnar artery.

216. Q. What forms the profundal palmar arch?

A. The profundal palmar arch is chiefly formed by the radial artery.

217. Q. What are the arteries given off from the thoracic aorta?

A. The thoracic aorta gives off the bronchial, the œsophageal, and the inferior intercostal arteries.

218. Q. What vessels does the right pulmonary artery pass before it reaches the lungs?

A. The right pulmonary artery passes behind the aorta and superior cava.

219. Q. What course does the abdominal aorta take?

A. The aorta passes from the thorax into the abdomen between the crura of the diaphragm; as it descends on the fore part of the spine, it inclines a little to the left: it gives off branches in its way downwards, and bifurcates on the fourth lumbar vertebra.

220. Q. What is the course of the coronaria ventriculi?

A. The coronaria ventriculi passes from the cœliac artery towards the left side; it first attaches itself to the stomach near its left extremity, and sends a branch round the cardia, named ramus coronariæ dexter. The trunk is then continued along the lesser curvature, to inosculate with the pylorica or coronaria sinister.

221. Q. What are the branches of the abdominal aorta?

A. The abdominal aorta gives off the phrenic, the cœliac, the superior mesenteric, the renal, the spermatic, the lumbar, and the sacral arteries.

222. Q. What is the course of the arteria splenica?

A. The arteria splenica, after having left the cœliac artery, passes under the stomach and along the upper border of the pancreas, and enters the concave surface of the spleen.

223. Q. What does the cœliac artery supply?

A. The cœliac artery supplies the stomach, liver, and spleen.

224. Q. What are the arteries of the stomach called?

A. Coronary; they are four in number; viz. the arteria coronaria, gastrica dextra, gastrica sinistra, and pylorica. The veins are called gastric.

225. Q. Where is the ductus arteriosus situated in the fœtus?

A. It passes obliquely from the ascending aorta to the pulmonary artery.

226. Q. What are the branches of the superior mesenteric artery?

A. The superior mesenteric artery gives off, on the right side, three branches: the ilio-colica, the branches of which go to the cæcum, and to a portion of the ileum; the colica dextra, which supplies the right side of the colon; and the colica media, which divides on the mesocolon, and sends one branch to the right side and another to the left, that inosculates with the branch from the inferior mesenteric artery.

227. Q. What is the course of the hepatic artery?

A. It runs from the cœliac artery in a direction opposite to the splenic, towards the right side: after giving off several branches, it divides into the right and left hepatic. The right is distributed to the right lobe of the liver, and to the gall-bladder. The left supplies the whole of the left-lobe, the lobulus Spigelii, and part of the right lobe.

228. Q. What are the branches of the pancreatic artery?

A. The pancreaticæ parvæ, which go to the pancreas; the vasa brevia, which go to the great curvature of the stomach; the gastro-epiploica sinistra, which runs along the great curvature of the stomach, inosculating with the gastro-epiploica dextra.

229. Q. What are the branches of the hepatic artery?

A. The hepatic artery gives off the pylorica or coronaria dextra, which ramifies on the pylorus and lesser curvature of the stomach; the gastro-epiploica dextra, which passes under the pylorus to reach the

great curvature of the stomach: the pancreatico duodenalis, which is often a branch of the gastro-epiploica, goes to the pancreas and duodenum.

230. Q. What are the arteries called which supply the kidneys?

A. The renal or emulgent arteries.

231. Q. What is the course and distribution of the epigastric artery?

A. It arises from the femoral artery, just as it is about to pass under Poupart's ligament; it passes upwards and inwards at the upper and outer part of the abdominal ring, behind the spermatic cord, running along the edge of the transversus in an oblique manner to the pyramidalis; it then ascends under the middle of the rectus, furnishing branches to the abdominal parietes, and terminates above the umbilicus, anastomosing with the mammary.

232. Q. What is the course of the femoral artery?

A. The femoral artery passes over the head of the os femoris down into a hollow at the upper and inner part of the thigh, with the rectus and sartorius muscles upon the outside, and the adductor on the inner side; it descends along the inside of the thigh between the vastus internus and triceps, it then gradually bends backwards till it reaches the ham to become the popliteal.

233. Q. What are the names of the valves at the origin of the aorta?

A. They are called the semilunar valves, and are three in number.

234. Q. What are the branches of the inferior mesenteric artery?

A. The inferior mesenteric passes in the mesentery to the left side of the abdomen, and gives off—1. The colica sinistra, which ascends along the left side of the colon, to inosculate with the colica media; 2. branches which pass to the sigmoid flexure of the colon; 3. the arteria hæmorrhoidalis interna, which runs down behind the rectum, on which it ramifies.

235. Q. How far distant from the aorta and Poupart's ligament does the common iliac divide?

A. The common iliac artery divides at rather more than half way between the aorta and Poupart's ligament.

236. Q. Which is the largest branch of the internal iliac?

A. The arteria glutea, or iliaca posterior, which passes out of the pelvis at the upper part of the sciatic notch.

237. Q. What is the distribution of the spermatic arteries?

A. The spermatic arteries in men pass through the abdominal ring to be distributed to the testes; while in women they remain within the abdomen, and are dispersed upon the ovaria and uterus.

238. Q. What are the branches of the internal iliac artery?

A. The internal iliac gives off the obturator, the gluteal, the ischiatic, and pudical.

239. Q. How are the trunks of arteries nourished?

A. The arterial trunks are nourished by the vasa vasorum, which arise from the nearest small branches, and are every where dispersed on their surface.

240. Q. What are the terminations of the arteries?

A. One termination is in veins—another in secreting extremities—a third in glands—a fourth in cells, as in the penis—and a fifth termination is in anastomoses.

241. Q. What change do the collateral arteries undergo when a large arterial trunk is tied?

A. They dilate, their coats become stronger, and acquire additional capacity; they are also found to become tortuous.

242. Q. How are arteries distinguished from veins?

A. By their coats being whiter and more dense, and also more elastic. Their apertures gape, in the living body, and they pulsate. The arteries and veins of the lower extremity are very similar, in regard to the thickness of their coats; the popliteal artery and vein both gape.

243. Q. What is the course of the external jugular vein on the neck?

A. The external jugular vein being formed by branches from the temple, side of the face, and throat, crosses obliquely over the sterno-mastoideus muscle, passes behind its outer edge, and goes beneath the clavicle to enter the subclavian vein.

244. Q. On which side of the carotid artery does the internal jugular vein run ?

A. The internal jugular vein runs on the outer side of the carotid artery.

245. Q. How is the vena cava abdominalis formed, and what is its course ?

A. The vena cava abdominalis is formed by the junction of the two common iliac veins : it passes up through the abdomen on the lumbar vertebræ, and on the right side of the aorta.

246. Q. Do the superficial veins of the fore-arm lie above the fascia or below it ?

A. The principal veins of the fore-arm lie above the fascia.

247. Q. What are the veins at the flexure of the arm ?

A. The cephalic, the median-cephalic, the basilic, and the median-basilic.

248. Q. Have the veins of the dura mater any valves ?

A. No, they have none.

249. Q. Where is the torcular of Herophilus to be found ?

A. The torcular of Herophilus is to be found in the junction of the falx and the tentorium.

250. Q. What are the sinuses of the dura mater ?

A. The sinuses of the dura mater are, the cavernous, the circular, the superior and inferior petrosal, the occipital, the superior and inferior longitudinal, and the torcular Herophili.

251. Q. How are the veins of the extremities divided ?

A. The veins of the extremities are divided into deep-seated and superficial.

252. Q. What are the superficial veins of the lower extremity ?

A. The superficial veins of the lower extremity are the saphena major and saphena minor.

253. Q. Have the deep-seated veins the same names as the arteries they accompany ?

A. Yes ; as for example, you have in the upper extremity one axillary vein, two brachial veins, two radial, two interosseal, and two ulnar veins.

254. Q. What are the vessels which form the vena portæ ?

A. The superior and inferior mesenteric, and the splenic veins.

255. Q. On which side of the aorta is the longest emulgent artery situated ?

A. On the right, in consequence of the vena cava being placed on that side, and the artery having to pass behind that vessel.

256. Q. What is the situation of the intercostal or great sympathetic nerve in the neck ?

A. The intercostal nerve lies behind the carotid artery in the cellular membrane, betwixt that vessel and the muscles covering the vertebræ of the neck.

257. Q. What is the situation of the par vagum in the neck ?

A. On separating the internal jugular vein, and trunk of the carotid artery, the par vagum is seen lying in the same sheath of cellular substance with those vessels.

258. Q. What nerve lies upon the belly of the anterior scalenus muscle ?

A. The phrenic nerve lies upon the anterior scalenus muscle, and gets into the throax betwixt the subclavian artery and vein.

259. Q. What nerve is that which is seen ascending between the under surface of the trachea and œsophagus at the lower part of the neck ?

A. The recurrent of the par vagum.

260. Q. What nerves supply the diaphragm ?

A. The phrenic or diaphragmatic nerves.

261. Q. Where does the great sciatic nerve arise ?

A. From a plexus of nerves formed by the fourth and fifth lumbar nerves, joined by the first, second, and third sacrals.

262. Q. What is the name of the ganglion in the abdomen which supplies most of the abdominal viscera?

A. The semilunar ganglion.

263. Q. What does the foramen magnum occipitale transmit?

A. The spinal marrow with its membranes, the vertebral arteries, and the accessory nerves of Willis.

264. Q. What nerves form the great sympathetic?

A. A branch of the sixth pair of nerves with a recurrent twig of the second branch of the fifth pair of nerves.

265. Q. Do the olfactory nerves supply the nose with the sense of feeling?

A. No, but branches from the fifth pair do.

266. Q. From what part of the brain do the optic nerves arise?

A. They arise from the thalami nervorum opticorum.

267. Q. From what part of the brain do the olfactory nerves arise?

A. The olfactory nerves arise from the corpora striata.

268. Q. What part of the brain gives origin to the third and fourth pair of nerves?

A. The third pair of nerves arise from the crura cerebri, and the fourth pair from near the corpora quadrigemina.

269. Q. Whence do the fifth and sixth pair of nerves arise?

A. The fifth pair of nerves arise from the sides of the pons Varolii, and the sixth from between the pons Varolii and corpora olivaria.

270. Q. What do the seventh, eighth, and ninth pair of nerves arise from?

A. The seventh pair of nerves arise from the posterior and lateral part of the pons Varolii; the eighth pair arise from the corpora olivaria, and the ninth from the corpora pyramidalia.

271. Q. What nerves pass through the foramen lacerum orbitale superius?

A. The third, the fourth, the first branch of the fifth and sixth pair of nerves.

272. Q. Through what foramina do the fifth pair of nerves pass out of the cranium?

A. Through the foramen lacerum orbitale superius, foramen rotundum, and foramen ovale, in separate branches.

273. Q. Does the arm receive nerves from the brain, or from the spinal marrow ?

A. From the spinal marrow.

274. Q. What are the branches of the fifth pair of nerves ?

A. The branches of the fifth pair of nerves are the ophthalmic, the superior maxillary, and the inferior maxillary.

275. Q. What nerve supplies the nose with the sense of smelling ?

A. The olfactory, or first pair.

276. Q. What is the first ganglion formed by the intercostal nerve called ?

A. The cervical ganglion.

277. Q. What forms the chorda tympani ?

A. The chorda tympani is formed by the portio dura ; it is a reflected twig of that nerve which passes between the long processes of the malleus and incus, and over the membrana tympani.

278. Q. What are the nerves that form the lenticular ganglion of the eye ?

A. The lenticular ganglion is formed by a branch from the third and fifth pair of nerves.

279. Q. What nerve supplies the tongue for the organ of taste ?

A. A branch of the fifth pair, which is termed the gustatory nerve.

280. Q. What nerve perforates the sterno-cleido-mastoideus muscle ?

A. The sterno-cleido-mastoideus is pierced about its middle by the nervus accessorius.

281. Q. How is the axillary plexus formed ?

A. The axillary plexus is formed of the four inferior cervical and first dorsal nerves.

282. Q. Which is the largest nerve of the human body ?

A. The sciatic nerve is the largest nerve of the body.

283. Q. What plexus of nerves surrounds the axillary artery ?

A. The brachial plexus.

224. Q. Describe the course of the great sciatic nerve out of the pelvis.

A. This nerve is formed from the fourth and fifth lumbar, and three first sacral nerves; it passes betwixt the pyriformis and gemini muscles, and escapes from the back part of the pelvis by the sciatic notch.

285. Q. Describe the course of the anterior crural nerve while in the pelvis.

A. The anterior crural nerve at its origin lies under the psoas magnus muscle, &c. and as it descends, passes betwixt the psoas magnus and iliacus internus, till, having passed under Poupart's ligament, it emerges from betwixt those muscles, and appears on the outside of the inguinal artery.

286. Q. What forms the anterior crural nerve?

A. The three or four superior lumbar nerves.

287. Q. Describe the course of the obturator nerve and its origin.

A. The obturator nerve is formed by branches of the second, third, and fourth lumbar nerves: it lies under the inner border of the psoas magnus, descends into the pelvis, and goes obliquely downwards, accompanying the obturator artery through the thyroid hole.

288. Q. What forms the phrenic nerve?

A. The phrenic nerve is formed by the third and fourth cervical; it also receives a filament from the second.

289. Q. Where is the external cutaneous nerve situated at the head of the arm?

A. The external cutaneous nerve is situated at the bend of the arm, under the cephalic and the median cephalic veins.

290. Q. What is the situation of the internal cutaneous nerve at the bend of the arm?

A. The internal cutaneous nerve is situated under the median basilic nerve; it frequently sends a small twig over the vein.

291. Q. What is a gland?

A. A gland is an organic body, composed of blood-vessels, nerves, and absorbents, and destined for the secretion of some peculiar fluid.

292. Q. How are glands distinguished?

A. They are distinguished into four classes:—simple glands—compounds of simple glands—conglobate glands—conglomerate glands.

293. Q. Where are the mesenteric glands situated?

A. In the fat between the layers of the mesentery, near the branches of the blood-vessels.

294. Q. What is the name given to the absorbents entering a gland?

A. They are called vasa inferentia.

295. Q. Absorbent vessels go out from the opposite side of the glands, in the manner they entered them: what name is given to those vessels?

A. They are called vasa efferentia.

296. Q. Where is the pituitary gland situated?

A. In the sella turcica, a cavity in the sphenoid bone.

297. Q. Where is the lachrymal gland situated?

A. In a depression of the orbital process of the frontal bone within the orbit.

298. Q. What are the salivary glands called?

A. They are the parotid gland, the sublingual glands, the submaxillary glands, the glands of the cheek, the labial glands, and molar glands.

299. Q. Where does the excretory duct of the parotid gland open?

A. The excretory duct of the parotid gland, or Steno's duct, passes obliquely over the outside of the masseter muscle, and perforates the cheek, opening near the second molaris.

300. Q. What is the name of the excretory duct of the submaxillary gland, and where does it open?

A. The excretory duct of the submaxillary gland is called ductus Wartonii; it passes between the genio-glossus and mylo-hyoideus muscles, and opens on the side of the frænum linguæ.

301. Q. Where is the thyroid gland situated?

A. Upon the larynx and trachea, lying upon the cricoid cartilage, and horns of the thyroid cartilage.

302. Q. What are the glands called situated at the root of the lungs.

A. Bronchial glands ; they are of a dark colour.

303. Q. How are the absorbents divided ?

A. The absorbents are divided into lymphatic and lacteal vessels.

304. Q. Do absorbents exist in every part of the body ?

A. Yes : it is supposed that absorbents exist in every part of the body ; but they have not yet been observed in the cavity of the cranium, nor in the placenta.

305. Q. Where is the prostate gland situated ?

A. It lies directly under the symphysis pubis ; it embraces the neck of the bladder, and rests upon the rectum.

306. Q. Where are Cowper's glands to be found ?

A. Cowper's glands are situated near the bulb of the urethra, before the prostate gland.

307. Q. What is the line called that runs along the centre of the corpus callosum ?

A. The line in the centre of the corpus callosum is called raphe.

308. Q. Where is the fornix situated ?

A. The fornix is situated immediately under the septum lucidum.

309. Q. How do the posterior crura of the fornix terminate ?

A. The posterior crura of the fornix terminate by forming the corpora fimbriata.

310. Q. What forms the lyra ?

A. The lyra is formed by the medullary lines of the inferior surface of the fornix.

311. Q. Where is the hippocampus minor situated ?

A. The hippocampus minor is situated in the posterior horn of the lateral ventricle.

312. Q. Where is the hippocampus major situated ?

A. The hippocampus major is situated in the inferior horn of the lateral ventricle.

313. Q. Where is the third ventricle situated ?

A. The third ventricle is a space between the two thalami nervorum opticorum.

314. Q. Where is the commissura mollis situated ?

A. The commissura mollis is a short cord of soft sub-

stance, situated at the middle and anterior part, on the inner sides of the thalami nervorum opticum.

315. Q. Has the cerebellum convolutions?

A. No : there are on its surface deep sulci or grooves.

316. Q. At what part of the cerebellum are the appendices vermiformes to be found?

A. The appendices vermiformes are to be found at the anterior superior part, and the inferior part of the cerebellum.

317. Q. How many membranes has the brain?

A. Three : viz. the dura mater, the pia mater, and the tunica arachnoides.

318. Q. What vessel runs in the falciform process of the dura mater?

A. The superior longitudinal sinus is the principal vessel.

319. Q. Where is the tentorium situated?

A. Between the cerebrum and the cerebellum.

320. Q. How many lobes has the brain?

A. Six ; viz. two anterior, two posterior, and two middle or inferior lobes.

321. Q. How many hemispheres has the cerebrum?

A. Two ; viz. the right and the left.

322. Q. What are the cavities in the brain called?

A. They are called ventricles.

323. Q. What separates the lateral ventricles from each other?

A. The septum lucidum.

324. Q. From what part of the brain does the pineal gland arise?

A. From the thalamus nervi optici on each side by peduncles.

325. Q. What separates the thalamus nervi optici from the corpus striatum?

A. A white prominent line, called teania semicircularis.

326. Q. What are the processes of the dura mater called?

A. They are three in number, and are called the falciform process, the tentorium, and the septum cerebelli.

327. Q. How many laminæ has the dura mater?

A. The dura mater has two laminæ.

328. Q. What parts of the brain does the falx separate?

A. The falx separates the two hemispheres.

329. Q. What does the tentorium separate?

A. The tentorium separates the cerebrum from the cerebellum.

330. Q. How are the sinuses of the dura mater formed?

A. The sinuses of the dura mater are formed by the separation of the two layers of that membrane.

331. Q. Does the pia mater dip between the convolutions of the brain, or pass over them?

A. The pia mater dips between the convolutions; but the tunica arachnoidea passes over them.

332. Q. What membrane nourishes the internal table of the skull?

A. The external lamina of the dura mater nourishes the internal table of the skull.

333. Q. What are the contents of the cranium?

A. The cranium contains the cerebrum, cerebellum, and medulla oblongata;—the dura mater, the pia mater, and tunica arachnoidea;—nine pair of nerves, and the accessory nerves of Willis;—several sinuses,—the arteries that nourish the brain and its membranes, and the veins that return the blood into the sinuses; and also absorbent vessels.

334. Q. How is the pia mater nourished?

A. The pia mater is nourished by arteries from the brain.

335. Q. Where are the tubercula quadrigemina situated?

A. The tubercula quadrigemina are situated behind the thalami nervorum opticorum, and under the pineal gland.

336. Q. What canal passes under the tubercula quadrigemina?

A. The canal is called iter à tertio ad quartum ventriculum; it forms the communication between the third and fourth ventricle.

337. Q. What is situated at the anterior part of the third ventricle ?

A. At the anterior part of the third ventricle are situated the anterior crura of the fornix, the commissura anterior cerebri, and infundibulum.

338. Q. What forms the floor of the third ventricle ?

A. The commissura inferior.

339. Q. Where is the valvula magna cerebri situated ?

A. The valvula magna cerebri is situated over the iter à tertio ad quartum ventriculum, and the upper part of the fourth ventricle.

340. Q. What forms the arbor vitæ ?

A. It is formed by the medullary and cineritious substance of the brain, which are distributed in such a manner as to give the appearance of the branches of a shrub.

341. Q. What are the medullary tracts at the sides of the valvula magna cerebri called ?

A. These lines are called processus ad testes, or columnæ valvulæ Vieussenii.

342. Q. Where is the calamus scriptorius situated ?

A. The calamus scriptorius is situated in the fourth ventricle.

343. Q. What is to be observed on the medulla oblongata ?

A. On the medulla oblongata are seen the pons Varolii, the corpora olivaria, and corpora pyramidalia.

344. Q. Describe the eye.

A. The eye is divided into external and internal parts. The external parts are the supercilia, the palpebra, the cilia, lachrymal gland, lachrymal caruncle, nasal duct and muscles of the bulb, and the tunica conjunctiva. The internal parts are the sclerotic coat, the cornea, the choroid coat, iris, uvea, retina, hyaloid membrane, capsule of the lens and vitreous humours, three humours and two chambers.

345. Q. How many coats has the eye ?

A. Three; viz. the tunica sclerotica, the tunica choroides, and the retina :—the anterior portion of the sclerotica is transparent, and called the cornea trans-

parens: the anterior part of the choroid membrane forms the iris and the uvea; and there is, also, the membrane of the lens and of the vitreous humour: so that many anatomists make eight coats.

346. Q. What is the tunica conjunctiva?

A. The tunica conjunctiva is a reflexion of the inner membrane of the eyelid, over the surface of the eye; it prevents extraneous bodies passing deep into the socket.

347. Q. Which is the most dense coat of the eye?

A. The tunica sclerotica.

348. Q. What is the structure of the cornea?

A. The cornea is divisible into several lamellæ, between which a transparent fluid is noticed.

349. Q. Which is the most vascular coat of the eye?

A. The tunica choroidea is the most vascular coat of the eye: the ciliary arteries ramify copiously on it, and the veins are numerous and contorted.

350. Q. What separates the anterior from the posterior chamber?

A. The curtain formed by the iris and uvea.

351. Q. What is contained in the capsule of the crystalline lens?

A. The crystalline lens and a little water.

352. Q. What artery nourishes the crystalline lens?

A. The arteria centralis retinae.

353. Q. Where is the pigmentum nigrum of the eye situated?

A. Upon the uvea, behind the iris, and upon the surface of the tunica choroidea.

354. Q. Where is the lachrymal sac situated?

A. In the superior part of the lachrymal groove, or the commencement of the ductus ad nasum behind the tendon of the orbicularis.

355. Q. What part of the eye is the true organ of vision?

A. The retina.

356. Q. What secretes the pigmentum nigrum of the choroid membrane?

A. The pigmentum nigrum of the choroid membrane is secreted by the arteries of that membrane.

357. Q. How many chambers has the eye?

A. Two: an anterior and a posterior chamber.

358. Q. What gives the whitish blue colour to the bulb of the eye?

A. The whitish blue colour of the bulb of the eye is occasioned by the expanding tendons of the muscles shining through the transparent tunica conjunctiva.

359. Q. Where are the vasa vorticososa situated?

A. The vasa vorticososa are situated on the choroid coat of the eye; they are formed by a contortion of the veins of that membrane.

360. Q. What bones form the lachrymal groove or ductus ad nasum, and where does it terminate?

A. The lachrymal bone, the superior maxillary bone, and the inferior spongy bone. It terminates at the lower and lateral parts of the nose, at the inner and fore part of the antrum maxillare, under the os spongiosum inferius, in a straight line with the second dens molaris.

361. Q. What is the division of the external ear?

A. The external ear is divided into the pinna, lobus, and meatus auditorius.

362. Q. What are the eminences of the external ear?

A. There are four eminences on the external ear; viz. helix, antihelix, tragus, and antitragus.

363. Q. Have the depressions on the external ear any names?

A. Yes; they are distinguished into the fossa navicularis, fossa innominata, and the concha.

364. Q. What is the general division of the internal ear?

A. The internal ear is divided into the tympanum and labyrinth, which consists of the cochlea, vestibulum, and semicircular canals.

365. Q. Where does the Eustachian tube begin?

A. The Eustachian tube begins at the upper and fore part of the tympanum.

366. Q. What membrane lines the meatus auditorius externus?

A. The meatus is lined by a continuation of the skin.

367. Q. If a probe were passed to the bottom of the meatus auditorius, what would it rest on?

A. The membrana tympani.

368. Q. Where is the fenestra ovalis situated?

A. The fenestra ovalis is situated in the tympanum, above the promontory.

369. Q. Where do the cells of the mastoid process open?

A. They open at the upper and back part of the tympanum.

370. Q. Where does the fenestra rotunda lead to?

A. The fenestra rotunda leads to the cochlea.

371. Q. How many openings are there in the vestibulum?

A. Five foramina, which communicate with the semicircular canals;—the fenestra ovalis, and a round hole which communicates with one of the canals of the cochlea.

372. Q. What are the principal parts of the cochlea?

A. The principal parts of the cochlea are, the gyri, the modiolus, the infundibulum, the scala vestibuli, and the scala tympani.

373. Q. How are the semicircular canals distinguished?

A. The semicircular canals are three in number: they are distinguished into the superior or vertical, the posterior or oblique, and the exterior or horizontal.

374. Q. How is the palate divided?

A. It is divided into palatum durum and palatum molle.

375. Q. What forms the first arch of the palate?

A. The constrictor isthmi faucium, covered by the skin of the mouth.

376. Q. What are the papillæ minimæ and papillæ mediæ of the tongue formed by?

A. The papillæ minimæ and mediæ are formed by the extremities of nerves surrounded by a lace-work of blood-vessels.

377. Q. What forms the second arch of the palate?

A. The levator palati, covered by the skin of the mouth.

378. Q. What lies between the two arches of the palate?

A. The tonsil gland.

379. Q. What does the uvula consist of?

A. The uvula consists of the azygos uvulæ, enveloped in the membrane of the palate.

380. Q. Where is the pharynx, and what is it?

A. The pharynx is a large muscular bag in form of an irregular funnel, at the back of the mouth, which terminates in the œsophagus.

380. Q. What forms the inner membrane of the pharynx?

A. The inner membrane of the pharynx is formed by the continuation of the membrane of the mouth.

381. Q. What are the principal glands which secrete the saliva?

A. The saliva is secreted chiefly by the parotid, the submaxillary, and the sublingual glands.

382. Q. How is the tongue divided?

A. The tongue is divided into a basis and apex, a superior and inferior surface, and two edges.

383. Q. How many cartilages has the larynx?

A. The larynx has five cartilages; viz. the thyroid, the cricoid, the two arytenoid, and the cartilage of the epiglottis.

384. Q. What are the viscera of the thorax?

A. The pleura, the lungs, the thymus gland (in children), the œsophagus, the ductus thoracicus, the arch of the aorta, branches of the venæ cavæ, the vena azygos, the pericardium, the heart, the phrenic nerve, the par vagum, and the great intercostal nerves.

385. Q. How many lobes has the left lung?

A. It has two lobes.

386. Q. How many lobes has the right lung?

A. The right lung has three lobes.

387. Q. What do the bronchia terminate in?

A. The bronchia become membranous tubes, which terminate in the air-cells.

388. Q. What separates the chest into two cavities?

A. The mediastinum, which is formed by the pleura.

389. Q. What are contained in the posterior mediastinum?

A. The œsophagus, the bronchia, the large vessels of the heart, the par vagum, great intercostals, and the thoracic duct.

390. Q. What is there in the anterior mediastinum that disappears towards adult age?

A. The thymus gland.

391. Q. How many membranes has the pericardium?

A. The pericardium has two membranes; an external and an internal.

392. Q. What part of the thorax does the pericardium adhere most to?

A. The pericardium adheres most firmly to the tendinous part of the diaphragm.

393. Q. What arteries nourish the pleura?

A. The arteries that nourish the pleura are branches from the intercostal, mammary, diaphragmatic, bronchial, and œsophageal arteries.

394. Q. What is the heart?

A. The heart is a hollow, muscular viscus, situated in the pericardium, in the cavity of the thorax, resting upon the diaphragm.

395. Q. Has the external surface of the heart any membranous covering?

A. Yes: it has a membranous coat, which is a reflexion of the inner layer of the pericardium.

396. Q. Where are the muscoli pectinati situated?

A. In the right auricle of the heart.

397. Q. Where is the tricuspid valve situated?

A. The tricuspid valve is situated between the right auricle and right ventricle, hanging from the opening between them.

398. Q. Where does the pulmonary artery originate?

A. The pulmonary artery arises from the right ventricle.

399. Q. Do the auricles of the heart communicate before birth?

A. Yes: by the foramen ovale.

400. Q. Where is the Eustachian valve situated?

A. At the entrance of the inferior cava, within the right auricle of the heart.

401. Q. How many openings has the right auricle of the heart?

A. Four; viz. the opening of the vena cava superior, that of the vena cava inferior, that of the coronary vein, and the ostium venosum.

402. Q. What is the valve of Eustachius formed by?

A. The Eustachian valve is formed by a fold of the inner membrane of the right auricle.

403. Q. How many openings has the left auricle of the heart?

A. Five; viz. those of the four pulmonary vessels and the ostium venosum.

404. Q. What are the differences between the foetal and adult heart?

A. In the foetal heart, an opening exists between the auricles in the septum auricularum, called the foramen ovale; this is closed in the adult heart. An artery also passes from the pulmonary artery obliquely to the ascending aorta in the foetus, which is called canalis arteriosus: this becomes a ligament in the adult.

405. Q. What are the regions of the abdomen?

A. The abdomen is divided into three regions, each of which is subdivided:—1. The epigastric region, which is the superior: its sides are termed hypochondriac regions.—2. The umbilical region, situated in the centre of the abdomen, the sides of which are termed iliac or epicolic regions.—3. The hypogastric region, which is subdivided into three regions, one middle, termed regio pubis, and two lateral, named inguinal regions.

406. Q. What viscera are contained in the abdomen?

A. The omentum, the stomach, the large and small intestines, the liver and gall bladder, the mesentery, the lacteal vessels, the thoracic duct, the spleen, the pancreas, the kidneys and suprarenal capsules, part of the aorta descendens, and vena cava ascendens, and the abdominal nerves.

407. Q. What is the membrane called, that lines the cavity and covers the viscera of the abdomen?

A. The peritonæum.

408. Q. What are the four ligamentary cords seen upon the outside of the peritonæum at its anterior and inferior part?

A. They are the remains of parts peculiar to the fœtus; viz. the two umbilical arteries, the umbilical vein, and the urachus.

409. Q. What forms the mesentery?

A. The mesentery is formed by a doubling of the peritonæum.

410. Q. Where does the mesentery begin?

A. The mesentery begins at the termination of the duodenum.

411. Q. How is the colon fixed to the spine?

A. The colon is fixed to the spine by a continuation of the mesentery, which is called mesocolon.

412. Q. Which is the largest viscus of the abdomen?

A. The liver.

413. Q. Describe the liver?

A. The liver is the largest abdominal viscus, placed in the right hypochondriac region, and partly in the epigastric region. It is distinguished into three lobes, is suspended by five ligaments, and is composed of arteries, veins, nerves, absorbents, excretory ducts, and cellular membrane, and is covered by the peritonæum.

414. Q. Are the kidneys completely enveloped in the peritonæum?

A. No: only their anterior surfaces.

415. Q. Where is the great lobe of the liver situated?

A. The great lobe of the liver is situated in the right hypochondriac region, and rest upon the pylorus colon, and top of the right kidney.

416. Q. Where is the small lobe of the liver situated?

A. The small lobe of the liver is situated in the epigastric region, only a small portion of it lying in the left hypochondriac region.

417. Q. What are the vessels surrounded by the capsule of Glysson?

A. The vessels surrounded by the capsule of Glys-

son are the venæ portæ, the hepatic artery, the hepatic veins, the excretory ducts, and some absorbents.

418. Q. What forms the capsule of Glysson?

A. A reflexion of the peritonæum, which, with a quantity of cellular substance, surrounds the vessels and nerves of the liver just before they enter that viscus.

419. Q. What are the ligaments of the liver?

A. The ligaments of the liver are, the broad ligament, the round ligament, the right and left lateral ligaments, and the coronary ligament.

420. Q. What artery nourishes the liver?

A. The hepatic artery, which is a branch of the cœliac.

421. Q. What are the depressions of the liver?

A. The depressions are:—1. The great fissure:—2. a fissure for the vena portæ:—3. one for the venæ cavæ:—4. a furrow between the left lobe and lobulus Spigelii for the venal canal in the fœtus:—5. a depression for the gall-bladder:—6. a superficial cavity caused by the stomach:—and 7. a great sinus for the spine and œsophagus at the posterior part of the left lobe.

422. Q. What is the use of the liver?

A. To secrete bile.

423. Q. What are the excretory ducts of the liver called?

A. Pori biliiarii.

424. Q. Where is the gall-bladder situated?

A. The gall-bladder is situated in the right hypochondrium, attached to a depression in the right lobe of the liver.

425. Q. How many coats has the gall-bladder?

A. The gall-bladder has three coats; viz. an external or peritonæal, a middle or muscular coat, and an internal or villous coat.

426. Q. What is the appearance of the internal surface of the gall-bladder?

A. The internal surface of the gall-bladder is smooth and of a green colour, and appears every where perforated by the ducts of small follicles, which afford a mucus to defend the inner coat.

427. Q. Of what kind of structure is the outer surface of the peritonæum?

A. The outer surface of the peritonæum is cellular.

428. Q. What is the extent of the peritonæum covering the bladder?

A. The peritonæal coat extends over the fundus, sides, and back part, to near the termination of the ureters.

429. Q. Where is the spleen situated?

A. It is situated in the left hypochondrium, near the fundus of the stomach, under the ribs.

430. Q. What nerves supply the spleen?

A. The nerves of the spleen are branches of the great sympathetic and eighth pair.

431. Q. Where is the pancreas situated?

A. The pancreas extends from the fissure of the spleen across the spine, under the posterior surface of the stomach, and terminates at the duodenum.

432. Q. What arteries nourish the pancreas?

A. The arteries which nourish the pancreas are derived from the pylorica, duodenalis, and splenica.

433. Q. What is the elongation of process sent down from the right extremity of the pancreas called?

A. This process was called by Winslow, pancreas minus: it is also called head of the pancreas.

434. Q. Where is the pancreatic duct situated?

A. The pancreatic duct begins near the left extremity of the pancreas; it runs in the substance of the gland, and terminates obliquely in the duodenum, along with the ductus communis choledochus.

435. Q. What are the supra-renal capsules?

A. The supra-renal capsules are flat bodies, of a dark yellow colour; they rest upon the kidneys; they contain a dark-coloured fluid, and are larger in the fœtus than in the adult.

436. Q. What difference in situation is there between the right and left kidney?

A. The right kidney is much lower than the left, occasioned by the liver occupying so much space.

437. Q. What is the excretory duct of the kidney called?

A. The ureter.

438. Q. How many coats compose the ureter ?

A. Three : an external, consisting of a compact filamentary substance : the middle one of several fibres ; and the internal one, of the mucous kind.

439. Q. What does the substance of the kidney consist of ?

A. The substance of the kidney consists of an outer part, called cortical, and an inner, termed medullary.

440. Q. What viscera are in contact with the right kidney ?

A. The right kidney lies under the liver, and is very near to the duodenum.

441. Q. Is the cortical substance endowed with any peculiar function ?

A. Yes : that of secreting the urine.

442. Q. What forms the papillæ of the kidney ?

A. The terminations of the medullary substance with the uriniferous tubes.

443. Q. What is the name of the duct leading from the pelvis of the kidney to the bladder ?

A. The ureter.

444. Q. Describe the stomach.

A. The stomach is a membranous receptacle, placed in the left hypochondriac region, composed of three membranes. It has a superior orifice called cardia, and an inferior orifice called pylorus ; a lesser and greater curvature, and two surfaces distinguished into anterior and posterior.

445. Q. Where do the veins of the stomach go ?

A. The gastric veins empty themselves into the vena portæ.

446. Q. What are the arteries of the stomach ?

A. The arteries of the stomach are derived from the cœliac ; they consist of the coronaria, the gastrica sinistra, the gastrica dextra, and the pylorica.

447. Q. What viscera are attached to the great curvature of the stomach ?

A. The large omentum, the spleen, and transverse arch of the colon.

448. Q. What is the proper juice of the stomach called ?

A. The gastric juice.

449. Q. What is the beginning of the colon called ?

A. The commencement of the colon is called *caput coli*.

450. How would you distinguish the small from the large intestines ?

A. The large intestines have three longitudinal bands, running on their surface ; they are lobulated, and have the portions of fat adhering to them, called *appendiculæ epiploicæ* ; which circumstances are not noticed in the small intestines. There are the *valvulæ conniventes* in the small intestines, which do not exist in the large.

451. Q. Which is the broadest of the small intestines ?

A. The duodenum is the broadest of the small intestines.

452. How are the mucous glands of the intestines distinguished ?

A. The mucous glands of the intestines are distinguished into solitary and congregate, and from their describers *glandulæ Peyeri* and *glandulæ Bruneri*.

453. Q. What are the ducts that enter the duodenum ?

A. The *ductus communis choledochus*, and the *ductus pancreaticus*.

454. Q. By what means does the cavity of the omentum communicate with that of the abdomen ?

A. A communication is formed under the capsule of *Glysson* by means of the foramen of *Winslow*.

455. Q. In what intestines are the *valvulæ conniventes* found ?

A. In the small, chiefly in the duodenum and jejunum.

456. Q. Describe the situation and course of the colon.

A. The colon ascends on the right side of the liver ; passes under the liver and stomach to the left side, where it descends, by a sigmoid flexure, into the pelvis, and ends in the rectum.

457. Q. Where do the mouths of the lacteals open ?

A. Upon the internal surface of the small intestines.

458. Q. Where does the mesentery begin ?

A. Near the termination of the duodenum.

459. Q. How does the rectum differ from the colon?

A. The rectum differs from the colon in being covered only anteriorly and laterally by the peritonæum; its muscular fibres are stronger and thicker, and spread uniformly over the intestine.

460. Q. Describe the uterus.

A. The uterus is a spongy hollow receptacle, of a pear shape, placed in the pelvis between the urinary bladder and rectum, divided into fundus, cervix, and orifice or os tinæ: it has four ligaments, two Fallopian tubes, two ovaria, and the vagina hanging from its cervix.

460. Q. Of what do the legamenta lata uteri consist?

A. The ligamenta lata consist of two membranous productions or doublings of the peritonæum, which go from the sides of the uterus and vagina, to be affixed to the sides of the pelvis.

461. Q. What are the ligamenta rotunda uteri?

A. They are cords composed of vessels and ligamentous fibres, arising from the corners of the uterus.

462. Q. Through what tube does the ovum pass from the ovarium into the uterus?

A. Through the Fallopian tube.

463. Q. Where is the os tinæ situated?

A. The os tinæ, or mouth of the womb, is situated at the top of the vagina and inferior part of the uterus.

464. Q. What part of the vagina is covered by the peritonæum?

A. The upper and posterior part.

465. Q. What is the length of the urethra in females?

A. The urethra in females is about an inch in length.

466. Q. Where is the female urethra situated?

A. The female urethra is situated under the symphysis of the pubis, between the nymphæ and below the clitoris, just above the entrance of the vagina.

467. Q. Where is the bladder situated?

A. The bladder is situated within the pelvis, immediately behind the ossa pubis: in males before the rectum, and in females between the uterus and pubes.

468. Q. On which side of the vesiculæ seminales do the ureters enter into the bladder ?

A. The ureters perforate the bladder on the outside of the vesiculæ seminales.

469. Q. What muscle does the ureter pass in going to the bladder ?

A. The ureter descends from the kidney over the psoas muscle.

470. Q. Where is the epididymis situated ?

A. The epididymis is situated at the outer and back part of the testicle.

471. Q. How many dilatations are there in the urethra ?

A. There are generally three dilatations to be found in the urethra of men ; one at the point of the glans penis, another at the bulb of the urethra, and a third in the prostate gland.

472. Q. To what do the openings of the verumontanum belong ?

A. The orifices found on the verumontanum belong to the vesiculæ seminales.

473. Q. Where is the urethra most dilated ?

A. The urethra is most dilated at that part which is surrounded by the prostate gland.

474. Q. What forms the corpus pampiniforme ?

A. The corpus pampiniforme is formed by a plexus of veins that have a distant resemblance to the shoots of the vine.

475. Q. What forms the coni vasculosi ?

A. The coni vasculosi are formed by the vasa efferentia becoming convoluted into conical bundles.

476. Q. What does the corpus spongiosum urethræ consist of ?

A. The corpus spongiosum urethræ consists of a plexus of veins ; it is expanded at its anterior part to form the glans penis.

477. Q. Describe the situation and course of the corpora cavernosa penis ?

A. The corpora cavernosa arise by what are called the crura from the tubera ischii ; they ascend along the ischium and pubes, and are united immediately before

the cartilaginous arch of the pubes: they are covered by a ligamento-tendinous substance, which is very elastic; internally they are cavernous, and are separated from each other by the septum pectiniforme, so called from its numerous perforations.

478. Q. Where are the testicles situated in the fœtus?

A. The testicles in the fœtus before the sixth month are in the abdomen; they receive a covering of peritonæum, and are placed at the lower part of the kidneys.

479. Q. How many coats has the testicle?

A. It has two coats; viz. the tunica vaginalis and the tunica albuginea.

480. Q. Is there any difference in the manner in which the two coats surround the testicle?

A. Yes: the tunica vaginalis invests the testicle as the pericardium does the heart, adhering only at its posterior and superior part; while the tunica albuginea surrounds and is firmly attached to the testicle on every part.

481. Q. What is the excretory duct of the testicle called?

A. The excretory duct of the testicle is called vas deferens.

482. Q. Where do the corpora cavernosa penis arise?

A. The corpora cavernosa penis arise from the edge of the ramus of the ischium and os pubis.

483. Q. What forms the scrotum?

A. The scrotum is formed by a continuation of the common integuments.

484. Q. What forms the common integuments?

A. The common integuments are formed by the cuticle, rete mucosum, cutis, and adipose substance.

485. Q. What is the use of the cartilages of the surfaces of joints?

A. The uses of the articular cartilages are to give the bones a smoothness for easy motion, to assist motion by their elasticity, and to guard against the effects of concussion.

486. Q. What is the most elastic substance in the body?

A. The most elastic substance in the body is cartilage.

487. Q. Are tendons elastic?

A. Tendons are not elastic; for, if they were, the power of muscles would be greatly diminished.

488. Q. What is the use of the adeps?

A. The adeps guards against the effects of pressure; it lessens the specific gravity of the body, fills up the interstices of muscles, and is a reservoir for nourishment to the body.

PHYSIOLOGY.

1. Q. WHAT is the course of the circulation?

A. The blood is received from the arteries by the veins, and is returned by the superior and inferior cava to the right auricle of the heart, which, becoming distended, contracts and empties its blood into the right ventricle. The right ventricle then contracts and propels the blood through the pulmonary artery into the lungs, there to undergo a peculiar change, and to be conveyed by the four pulmonary veins into the left auricle. The left auricle being distended, evacuates its blood into the left ventricle. The left ventricle propels the blood through the aorta, to be circulated by the arteries, and again to be returned by the veins to the heart.

2. Q. What is the use of the tuberculum Loweri?

A. The use of the tuberculum Loweri is supposed to be that of preventing the blood of the one cava from rushing upon that of the other, and to direct it into the auricle.

3. Q. How is the blood prevented from returning back into the right auricle after it has got into the right ventricle?

A. It is prevented from returning by a valve called tricuspid, which is placed within the ventricle.

4. Q. What prevents the reflux of blood into the left auricle of the heart?

A. The blood is prevented from going back into the auricle from the left ventricle, by the valvula mitralis.

5. Q. How do you distinguish venal from arterial blood?

A. Venal blood is of a dark colour (excepting that which is in the venal system of the lungs). Arterial blood is of a florid red vermilion hue (excepting the blood of the pulmonary artery, which is dark.)

6. Q. What is the contraction of the heart called?

A. Systole.

7. Q. In what viscus does the change from arterial to venal blood take place?

A. In the lungs.

8. Q. What is the colour of the blood in the pulmonary artery?

A. It is of a dark colour, like venous blood.

9. Q. What is meant by digestion?

A. A function by which the food introduced into the stomach of animals, is subjected to a peculiar action, and a new compound formed, fitted to their nourishment and growth.

10. Q. What are the effects of protracted abstinence?

A. A wasting and diminution of weight of the body from the loss of fat; discoloration of the fluids, particularly the blood; excessive sensibility, sleeplessness, with painful sensations in the epigastric region.

11. Q. What is the chief agent in digestion?

A. The gastric juice.

12. Q. What is the use of the sphincter pylori?

A. The sphincter pylori, by contracting, prevents the grosser indigested parts of the aliment from escaping, and, by dilating, allows the digested pulp to pass into the duodenum.

13. Q. What is the use of the mesentery?

A. The use of the mesentery is to suspend and retain the intestines in their places, to furnish them with an external coat, and to form a bed for their glands, vessels, and nerves.

14. Q. What is the cause of the bile regurgitating into the gall-bladder.

A. When digestion is not going on, the opening of the ductus communis choledochus is shut; the bile, therefore, not finding an access to the duodenum, regurgitates into the gall-bladder.

15. Q. What is the use of the urinary bladder?

A. To receive, to retain for a certain time, and to expel, the urine.

16. Q. What is the use of the gastric juice?

A. To digest the food.

17. Q. What is the theory of ossification ?

A. First, the formation of a jelly ; this becoming cartilage, the absorbents remove a portion of the cartilage, forming a cavity, and the arteries next deposit the osseous matter in the cavity : it is, however, not always cartilage that the bony matter is deposited in ; for, in most of the flat bones, the deposition takes place between membranes.

18. Q. How is inspiration performed ?

A. The intercostal muscles contract, assisted by other muscles, and increase the transverse breadth of the cavity of the chest, whilst the diaphragm contracts and increases the length of the cavity of the chest ; the air then rushes down the trachea, and inspiration is performed.

19. Q. When the chest of an adult dilates, what quantity of atmospherical air does he take in ?

A. The quantity of air inspired by an adult at each period, is between thirty and forty cubic inches of atmospherical air.

20. Q. What changes has the air undergone which has been expired from the lungs ?

A. It differs from the air previous to inspiration in being diminished in quantity, in having its carbonic acid considerably increased, and by being loaded with aqueous vapour, besides at times containing hydrogen.

21. Q. What is meant by secretion ?

A. The formation of a solid fluid different from the blood, from the minute ends of the arteries.

22. Q. What change is produced on the blood in the lungs ?

A. The blood is changed from a dark colour to a florid red ; it is deprived of hydrogen and carbon, and absorbs oxygen, caloric, and a portion of nitrogen.

23. Q. What is the use of the palatum molle ?

A. The palatum molle acts like a valve, in preventing what we swallow from passing into the nose, and conducts the fluids of the nose into the mouth.

24. Q. What prevents the fæces from returning from the large intestines into the small ?

A. The valvuli coli, placed at the beginning of the

colon, allows the contents of the ileum to pass into the large intestines, but completely prevents their return.

25. Q. What causes the bile to pass from the gall-bladder into the duodenum?

A. The bile is discharged from the gall-bladder when the stomach is full, chiefly by the pressure of the surrounding viscera, and by the contractile power of the gall-bladder.

26. Q. What is the use of the bile?

A. The use of the bile is to excite the peristaltic motion of the intestines, to correct too great a disposition to acidity, and to assist in chylification.

27. Q. What is the use of the pancreatic juice?

A. The pancreatic juice is said to incorporate the bile with the alimentary mass, and to answer the same purposes.

28. Q. How is the urine expelled?

A. The urine is expelled partly by the contraction of the bladder itself, and partly by the action of the abdominal muscles and diaphragm, which press the intestines against the bladder.

29. Q. What is the use of the tunica vaginalis testis?

A. The use of the tunica vaginalis is to enclose the testicle, and to assist the cremaster in supporting the testicle; it also exhales a fluid, which lubricates the surface of the testicle.

30. Q. What are the powers engaged in expelling the fæces?

A. The powers engaged in expelling the fæces are, the muscular coat of the rectum, the levator ani, assisted by the action of the diaphragmatic and abdominal muscles.

31. Q. How is expiration performed?

A. By the relaxation of the intercostal muscles and diaphragm, and the thorax assuming its relaxed state.

32. Q. What is meant by animal heat?

A. The natural heat of an animal, which, in the human being, raises the mercury in Fahrenheit's thermometer to about 95° .

33. Q. Why does not the fluid exhaled to lubricate the different cavities of the body accumulate?

A. Because in a healthy state the inhalants or ab-

sorbents counterbalance the exhalants or secreting arteries.

34. Q. How is nutrition effected?

A. By the lacteals, the mouths of which open upon the internal surface of the small intestines, selecting the chyle from the excrementitious part of the food, and conveying it into the thoracic duct, which empties itself into the angle of the jugular and subclavian vein, thereby repairing the losses the blood continually sustains in nourishing the body.

35. Q. What membrane moderates the effect of light on the retina?

A. The iris, which diminishes or enlarges the pupil, according to the intensity of the light.

36. Q. What is the use of tears?

A. They prevent the effects of friction, and save the organ of sight from being dried, at the part which is exposed to the air.

37. Q. What is the use of the fluid which fills the labyrinth of the ear?

A. It preserves the nervous fibrils soft, and moderates the tremors of sound.

38. Q. Why does not the fat gravitate to the lower extremities after long standing, like the fluid of an anasarca person?

A. Because the fat is contained in vesicles which do not communicate like the cells of the cellular membrane.

39. Q. What is the use of the omentum?

A. The use of the omentum is supposed to be that of lubricating the viscera, and to prevent them from being injured by friction.

40. Q. How does the ovum get from the ovarium into the uterus?

A. The ovum, when impregnated, escapes from the ovarium through the Fallopian tube, which is grasping the ovarium at the time.

41. Q. What is the use of the prostate gland?

A. The use of the prostate gland is not well known; it affords a fluid, which is supposed to be of use in generation.

42. Q. Why does not the urine excite inflammation of the bladder?

A. Because the bladder is accustomed to its stimulus, and a great quantity of mucus is secreted by the internal membrane to defend it from the acrimony of the urine.

43. Q. Why do enlarged mesenteric glands cause an atrophy?

A. Because they obstruct the passage of the chyle through the lacteals to the thoracic duct.

44. Q. In what ages and sex is the pulse the most frequent?

A. In children and women the pulse is most frequent.

45. Q. What is the use of the anastomoses of arteries?

A. The use of arteries anastomosing is to allow of blood being conveyed to parts where its passage is prevented in the principal branch or branches that supply those parts with blood: another use is that of facilitating the passage of blood from one part to another, and prevent the distention of parts.

46. Q. Is the fat solid or fluid in the living body?

A. The fat in a living body is found in some parts in a state of semifluidity, and in other parts it is found absolutely fluid.

47. Q. What is the cause of the fainting that sometimes takes place under the operation of tapping?

A. Fainting takes place in tapping in consequence of the sudden removal of the pressure of fluid from the diaphragm and viscera.

48. Q. How does a compression of the thoracic duct, either by an aneurism of the heart or aorta, occasion so frequently a dropsy?

A. The compression of the thoracic duct prevents the lymph from the absorbent vessels being returned into the blood; the absorbents are therefore prevented performing their office, and an accumulation takes place.

49. Q. Why does a person troubled with calculus

find great difficulty in passing the urine when he leans forward ?

A. Because the calculus falling against the orifice of the urethra, thereby prevents the regular flow of urine.

50. Q. Why does not the urine flow back from the bladder to the kidney ?

A. The urine is prevented flowing back to the pelvis of the kidney by the valve formed by the inner coat of the bladder over the orifice of the ureter, produced by the ureter's piercing the bladder obliquely.

51. Q. Why is the spine composed of so many small bones ?

A. The reason why the spine is composed of so many bones is to allow of great strength, with a sufficient degree of mobility.

52. Q. Is there any alteration in the muscles of a paralytic limb ?

A. Yes : the muscles of a paralytic limb are paler and more flaccid.

53. Q. How is the voice performed ?

A. The voice results from the vibration the air suffers during its passage through the glottis, when expelled from the lungs.

54. Q. Which of the two has the greatest power in preventing luxations of the joint, the muscles that surround the joint, or its own ligaments ?

A. The muscles that surround joints defend them better and give them greater strength than their surrounding ligaments.

SURGERY.

1. Q. WHAT are the symptoms of compressed brain ?

A. The person is mostly insensible ; an apoplectic stertor of the breathing soon comes on ; loss of voluntary motion, tremors, and convulsions. The pupil is contracted, or dilated ; and, if the person can be roused from his stertorous sleep, he complains of giddiness and dimness of sight. Often there is hæmorrhage from the nose, eyes, and ears ; and the fæces and urine are discharged involuntarily ; and as the compression is generally produced by fractured skull, the finding a portion of skull depressed from the blow is sufficient. The pulse is irregular and slow.

2. Q. What are the symptoms of concussion of the brain ?

A. The patient is first in a state of insensibility, and the extremities usually become cold ; there is a great tendency to sleep, but the sleep is unattended by stertor. If the compression be not very great, the patient soon becomes more sensible, but vomiting takes place ; he is at times delirious : the pulse irregular and quick ; and phrenitis often succeeds the concussion. Should, however, the concussion be very great, the insensibility of the patient increases.

3. Q. How would you distinguish a fissure of the cranium from a suture ?

A. By the course of the fissure, by its appearance not being zigzag, and by the pericranium not adhering to it in the way it does to a suture.

4. Q. What practice would you adopt to relieve concussion of the brain ?

A. The most approved practice is to bleed according to circumstances ; to administer saline purges ; to put the patient on the antiphlogistic regimen. Should symptoms of phrenitis come on, large and repeated blood-letting is to be had recourse to, and blisters are to be applied to the head, or neck, in order to reduce the inflammation of the brain.

5. Q. When a portion of the cranium is depressed, what would you do to elevate it?

A. Apply the trephine.

6. Q. When a portion of the cranium is depressed, where would you apply the trephine to raise it?

A. On a part of the skull which would include a portion of the depressed bone, that the elevator may be introduced so as to raise the depressed portion.

7. Q. In wounds of the scalp, are sutures to be used?

A. The use of sutures is always to be avoided as much as possible. Most surgeons prefer sticking-plaster.

8. Q. When the scalp is much contused or torn, is it advisable to cut off the injured portion?

A. No; it is better to attempt to preserve the torn portion.

9. Q. What is the general treatment of a contused and lacerated scalp?

A. The treatment is to clean the injured portion of the scalp, as much as possible, from extraneous bodies; to retain it in its natural position, and apply cooling lotions or other applications to keep down inflammation.

10. Q. What are the consequences that sometimes take place from punctured wounds of the scalp?

A. In punctured wounds of the scalp an erysipelas frequently takes place; the inflammation and tumour often affect the whole head and face, the skin of which wears a yellowish cast, receives the impression of the finger, and a symptomatic fever is produced. If the wound be small, and have passed beneath the aponeurosis, worse symptoms than these even accrue.

11. Q. What is to be done when the scalp (after being injured) becomes tense, the pain great, and the symptomatic fever very high?

A. It is recommended to make an incision over the wounded part down to the bone, which in general removes all the bad symptoms.

12. Q. If there be doubt as to a fracture of the cranium, and it is thought not necessary to trepan, what plan of treatment should the patient be put on?

A. The antiphlogistic plan is the best under such circumstances.

13. Q. What are the symptoms that attend an inflamed state of the membranes of the brain, brought on by injury?

A. The symptoms are pain in the head, restlessness, want of sleep, frequent and hard pulse, hot and dry skin, flushed countenance, inflamed eyes, nausea, vomiting, rigor, and towards the end convulsion and delirium.

14. Q. What is meant by the term hernia?

A. By hernia is generally meant a preternatural tumour, occasioned by some of the viscera of the abdomen being displaced out of that cavity.

15. Q. In what parts of the body do herniæ most frequently appear?

A. Herniæ most commonly make their appearance at the groin, the navel, the labia pudendi, and the upper and fore part of the thigh.

16. Q. What names have been adopted to distinguish hernia by their contents?

A. When intestine alone is contained in the hernia, it is termed an enterocele; when omentum alone, epiplocele; and when both are included in the tumour, an entero-epiplocele. Sometimes the hernia contains a part of the stomach, liver, bladder, &c. then it is named accordingly, gastrocele, hepatocele, and cystocele.

17. Q. What do you mean by an exomphalos?

A. An umbilical hernia, or protrusion of the intestines, or omentum, through the umbilical ring.

18. Q. What is a bubonocele?

A. It is an inguinal hernia, formed by a protrusion of intestine or omentum through the abdominal ring.

19. Q. What is meant by a reducible hernia?

A. A reducible hernia is one that has its contents lying quietly in the sac, and admits of being readily put back into the abdomen.

20. Q. What is meant by an irreducible hernia?

A. An irreducible hernia is one which, from adhesions of the intestine to the sac, or thickened omentum, cannot be returned into the abdomen.

21. Q. How does incarcerated hernia differ from irreducible hernia?

A. An incarcerated or strangulated hernia not only cannot be reduced, but circulation is stopped, and the contents of the bowel are prevented passing onwards to the anus.

22. Q. In incarcerated herniæ, whether are those most easily reduced that contain small or large intestines?

A. An incarcerated small intestine is more easily reduced than an incarcerated large intestine.

23. Q. Which is the most dangerous, an intestinal or an omental hernia?

A. An intestinal hernia is the most dangerous, and especially if it is small and recent.

24. Q. How is a femoral hernia distinguished from an enlarged lymphatic gland?

A. The swelling of a femoral hernia comes on in a sudden manner; it is elastic, and may be reduced in size by pressure; whilst a gland, when inflamed, is inelastic, it cannot be reduced in size by pressure, and the swelling comes on gradually.

25. Q. What forms the sac in hernia congenita?

A. The sac in hernia congenita is formed by the tunica vaginalis.

26. Q. What are the symptoms of strangulated intestine?

A. The patient is seized with sickness; obstinate costiveness comes on; synochal fever takes place, and a vomiting of fæcal matter. The rupture remains stationary, and no effort can return it; the tumour of the part becomes very painful, and the pain extends to the abdomen, attended with a general tension.

27. Q. Describe the operation for strangulated inguinal hernia.

A. Having shaved off the hair from the tumour, and the patient being placed in a suitable situation for the operation, an incision should be made about an inch above the ring, which, if the tumour be not very large, should extend to the most depending part of the swelling, so that the skin and cellular membrane covering

the sac will thus be cut through. Perhaps the external pudical artery, that crosses the sac near the abdominal ring, will also be cut through; if so, it will be necessary to secure this artery before we proceed, to prevent further bleeding. Then, with a pair of forceps, a part of the fascia must be raised and divided, to allow the introduction of a director, on which instrument the fascia is to be divided upwards, to within an inch of the abdominal ring, and downwards, to the bottom of the tumour. The next thing to be attended to is the division of the stricture: with this view, the finger is to be passed into the sac, as far as the stricture, which will be found, either at the abdominal ring, or about an inch and a half from this aperture, inclining upwards and outwards, or in the mouth of the sac. If the stricture be at the ring, the finger is to be passed as far as the stricture, and then a probe-pointed bistoury must be conveyed over the front part of the sac into the ring, which is next to be divided in a direction upwards, opposite the middle of the sac, and to extend just sufficient to allow the protruded parts to be returned into the abdomen. By this division of the ring, the epigastric artery is not wounded, nor are the transverse tendinous fibres cut through that cross the upper part of the ring, by which the aperture of the ring is not so much weakened. The stricture being thus removed, the protruded parts are to be returned into the cavity of the abdomen. Should the intestine be gangrenous, it is not to be returned. The intestine may, however, have dark discolourations, and may be returned without harm: these states should be carefully distinguished. If the omentum be gangrenous, the dead part should be cut off, and the other part returned, if hæmorrhage is not likely to occur from its surface. When the omentum is indurated, the indurated portion may be cut off. The parts are now to be dressed in the usual way.

29. Q. Describe the operation for femoral or crural hernia.

A. An incision is to be made from the point where the hernia protrudes, just above Poupart's ligament, a little nearer to the symphysis pubis than the femoral

vessels are, and to be continued the whole length of the tumour. Any glands which may lie over the hernia should be avoided. The aponeurotic fibres which proceed from the femoral fascia and ascend obliquely over the front of the thigh are to be divided very cautiously. The hernial sac is to be opened by means of a pair of dissecting forceps and bistoury, the operator raising the part by taking hold of the cellular membrane attached to it, and is then to make a very small aperture by a horizontal cut; through this opening a director may be introduced, and the sac is to be divided nearly as high as Poupart's ligament, and quite to the bottom of the tumour. The sac being laid open, a director should next be introduced within the crural ring, on the side of the intestine which is nearest the symphysis pubis, and an incision should be made directly upwards, for the purpose of cutting the femoral ligament. The protruded parts are then to be returned.

30. Q. How would you treat a violent ophthalmia?

A. Bleed locally, and generally, according to the age of the patient. If there be great inflammation of the tunica conjunctiva, carefully scarify it; apply soft emollient poultices to the eyes, renewing them often; give saline purges and diaphoretics; keep the eyes shaded; and, as the chronic stage succeeds, alter the remedies in some degree, according to circumstances; apply astringent sedative lotions to the eyes, leaving off the poultices; make use of the tincture of opium, dropping in two or three drops, twice or thrice a-day, between the eyelid and ball.

31. Q. How would you treat gangrene in general?

A. With tonics, stimulants, and a generous diet.

32. Q. When a locked jaw arises from an injury, how would you endeavour to relieve it?

A. By making a free division of the injured part; and if this did not succeed, by amputating, if possible. Antispasmodics, as opium and ether, must be given internally.

33. Q. When a ball is lodged in the calf of the leg, and it is necessary to make an incision upon it, in what direction would you make that incision?

A. In a perpendicular direction.

34. Q. How does the complete division of a punctured artery (as the temporal) stop the hæmorrhage?

A. By the retraction of the extremities of the artery.

35. Q. What is the cause of the cold sensation and numbness of the leg and foot, generally felt from an aneurism of the popliteal artery?

A. Pressure upon the popliteal nerve, which supplies the leg and foot with nervous influence; it is also caused by obstructed circulation, the popliteal artery losing part of its power, and containing a quantity of coagulum.

36. Q. If necessary to take up the brachial artery, near the flexure of the arm, how will the circulation of the blood be carried on?

A. By the two profundals chiefly, which inosculate with the recurrents of the ulnar and radial arteries.

37. Q. How is amputation of the shoulder-joint performed?

A. As there is no room for the application of the tourniquet in this operation, the axillary artery is to be compressed by an assistant, by means of a pad, just where it passes over the first rib; or, to render the operation more safe, it is preferred to take up the axillary artery at once; then, with a large common bistoury, a semicircular incision is to be made with its convexity downwards, to across the integuments covering the deltoid muscle, about four inches below the acromion. The skin should not be detached, but the muscle is to be cleared from the bone quite up to the joint; then the tendons passing over the joint are to be cut through, also the capsular ligament, so as to allow the bone to be dislocated from the joint. Having done this, the skin, and other parts, underneath the joint, are to be divided with one stroke of the knife; after this, the circumflex, or any small vessel that may bleed, should be secured and tied. The flap of the deltoid muscle is next to be laid down, so that its edge will meet the margin of the wound below. The operation is then finished by dressing.

38. Q. What do you mean by hydrocele?

A. A collection of serous fluid in the tunica vaginalis testis.

39. Q. How many methods are there employed for the radical cure of hydrocele?

A. There are six different methods employed in the radical cure of hydrocele; viz. the incision, the excision, the application of caustic, the introduction of a tent, the employment of a seton, and injecting some stimulating fluid into the cavity of the tunica vaginalis.

40. Q. How many ways can the lower jaw be dislocated?

A. The lower jaw can only be luxated forwards on the zygomatic arches.

41. Q. How many species of white swelling are there?

A. Two: the scrofulous and the rheumatic species.

42. Q. What muscles are cut through in the operation of lithotomy on the male?

A. The transversalis perinæi, and generally a part of the accelerator urinæ, and sometimes a part of the levator ani.

43. Q. What are the peculiarities of a gun-shot wound?

A. Great contusion and laceration, which produce a deadened state of fibres immediately surrounding the wound, that require to be thrown off in the form of slough, before the wound can heal; they also frequently contain pieces of cloth or bullets.

44. Q. How is an aneurismal tumour distinguished from other tumours?

A. By its pulsating, and its receding, upon pressure, and soon returning again to its usual bulk.

45. Q. What is the substance generally found in aneurismal sacs?

A. The coagulable part of the blood, which is usually found in layers.

46. Q. How is amputation below the knee performed?

A. Having placed the patient in a proper position, and applied the tourniquet to compress the artery, one

assistant is to support the leg, while the other pulls up the integuments; a circular incision is then to be made round the leg, to divide the integuments; when these are divided, a portion of them is to be dissected back from the muscles, by means of a scalpel, sufficient to cover the stump; these being kept back, another circular incision is to be made by the knife, some way higher up than the first incision; by this incision, the soft parts are divided quite to the bone. The interosseous ligament is then to be thoroughly divided by the scalpel, or the catalene; the soft parts should be properly retracted, and the saw should next be applied, to divide the bones. After which, the spiculæ left by the saw, are to be removed by the pincers. The vessels are next to be secured by ligatures, slackening the tourniquet from time to time, lest any vessel should not be secured. To discover this, it is always necessary to sponge away the clotted blood from the wound. After these precautions are taken, the edges of the wound are to be brought together, by drawing the integuments over the surface of the wound; the ligatures are to be left out, and the wound covered with lint and cloth.

47. Q. What are the consequences that generally arise from lacerated or wounded nerves?

A. Inflammation of the lacerated or wounded part, locked jaw, and convulsions.

48. Q. What joint of the body is most subject to dislocation?

A. The shoulder-joint is most subject to dislocation.

49. Q. How many ways may the head of the thigh-bone be dislocated?

A. The head of the thigh-bone may be dislocated upwards and outwards on the dorsum of the ileum; upwards and forwards on the body of the os pubis; downwards and inwards on the foramen ovale; and downwards and outwards on the os ischium.

50. Q. What are the symptoms of lumbar abscess?

A. This kind of abscess generally forms in a very insidious manner: in the incipient stage of the disease the person cannot walk so well as usual, and feels a de-

gree of uneasiness about the lumbar region ; but in general there is no acute pain, even when the abscess has acquired such a size as to form a large tumour protruding externally.

51. Q. What is meant by a compound fracture ?

A. It is a fracture of the bone, attended with an external wound of the soft parts.

52. Q. What takes place when a bone is denuded of its periosteum ?

A. Generally exfoliation, to a certain degree.

53. Q. What bone is perforated in operating for fistula lachrymalis ?

A. The os unguis.

54. Q. Why are luxations of the shoulder-joint more frequent than luxations of the hip-joint ?

A. Because the glenoid cavity is very superficial, to allow of extensive motion to the head of the os brachii, which is very large. The joint is also more exposed to unguarded blows, or accidents, than any other joint. The hip-joint, on the contrary, is confined as to motion ; the acetabulum is also very deep in the fresh subject, so as almost to cover the head of the os femoris : and thus this joint is rendered very strong.

55. Q. What are the general causes of mortification ?

A. The general causes of mortification are—an impeded flow of blood from a part ; the stoppage of the flow of blood into the same ; and a disturbed state of this fluid, and of the nerves.

56. Q. How many kinds of fever attend mortification ?

A. There are three kinds of fever which may accompany mortification : 1. sympathetic inflammatory fever ; 2. one attended with extreme debility, of a typhoid nature ; and, 3. one depending upon derangement of the chylopoietic organs.

57. Q. Under what circumstances is amputation of an extremity necessary ?

A. Where the bone becomes much diseased ; where great laceration from gun-shot wounds has been pro-

duced; where great destruction of parts has taken place in compound fracture; and where, from other causes, the operation is required.

58. Q. What forms the sac in femoral hernia?

A. The fascia of the thigh, and the peritonæum.

59. Q. In what direction is Poupart's ligament to be divided, if necessary, to liberate strangulated femoral hernia?

A. That recommended by Mr. Hay, is to introduce a director within the crural ring on that side of the intestine, or omentum, which is nearest to the symphysis of the pubes, and to make the incision directly upwards. Gimbernat recommends the incision to be carried directly towards the symphysis pubis.

60. Q. How many ways are there of puncturing the bladder, to relieve suppression of urine?

A. First, from the perinæum; secondly, above the os pubis; thirdly, through the rectum in the male, and vagina in the female; fourthly, by dilating the meatus urinarius in the female.

60. Q. On what part of the arm is pressure to be made before amputation of the fore-arm?

A. As high up as convenient; placing the pad at the inner edge of the biceps, so as to compress the artery against the bone.

61. Q. At what part of the aorta do aneurisms most frequently occur?

A. At the arch of the aorta, just as it is about to descend.

62. Q. What are the unfavourable circumstances in compound fracture, that require the extremity to be amputated?

A. When the wound of the soft parts is large and lacerated, and the bone or bones very much splintered, together with a violent degree of contusion of the neighbouring muscles, amputation is necessary; but a prompt decision, in many cases of compound fracture, requires great discernment on the part of the surgeon, whether to amputate or not.

63. Q. What are the signs of a fractured cranium?

A. A depression of a part of the skull, and the sym-

toms of pressure on the brain, as coma, stertorous breathing, loss of voluntary motion, convulsions, tumours, involuntary discharge of the urine and fæces, dilatation of the pupil, irregular pulse, and sometimes hæmorrhage from the nose, eyes, and ears.

64. Q. What is the cause of stupour, or coma, in fracture of the cranium?

A. Pressure upon the brain.

65. Q. What is the medical treatment in fractures of the skull?

A. To bleed repeatedly, give saline purges, and order a low diet: the patient should be kept on the antiphlogistic regimen for near a month, to guard against subsequent inflammation of the brain.

66. Q. How many kinds of abscesses are there?

A. There are two kinds: the acute or phlegmonous, and the chronic abscess.

67. Q. What are the symptoms of suppuration?

A. When matter is formed in a tumour, there is a remission of all the symptoms, the throbbing pain goes off, and there is present a more dull heavy pain; a conical eminence is observed, which soon has a whitish or yellowish appearance, instead of a deep red: and a fluctuation is often felt by an examination with the fingers. Rigours are present in extensive suppurations, and accompany suppurations which take place in the viscera.

68. Q. How are fistulæ in perinæo produced?

A. Fistulæ in perinæo are generally produced by strictures in the urethra. The urine being impeded in its passage along the urethra, an ulceration takes place on the inside of that part of the urethra which is enlarged and within the stricture; the internal membrane having ulcerated, the urine readily gets into the loose cellular membrane and substance of the urethra; an abscess is the consequence, which bursts externally, and forms a fistulous opening.

69. Q. Why are fistulæ generally dilated?

A. To produce a new action in those ulcers, by which granulations take place from their bottom.

70. Q. How is the radical cure of hydrocele, performed?

A. By evacuating the fluid, and afterward exciting such a degree of inflammation of the tunica vaginalis and testicle as will cause adhesion to take place, and consequently an obliteration of the cavity: this is either done by caustic, seton, incision, or by injection.

71. Q. What is meant by epiphora?

A. By an epiphora is meant an accumulation of tears on the anterior part of the eye.

72. Q. What are the causes of epiphora?

A. An epiphora may be caused by a more copious secretion of tears than the puncta lachrymalia can absorb; and by an obstruction in the lachrymal canal.

73. Q. What are the symptoms of empyema?

A. The most pathognomonic symptom is hearing the fluid rattle upon shaking the person's chest; there is also a difficulty of lying on the opposite side, difficulty of breathing, and sometimes an enlargement of the side of the chest which contains the fluid.

74. Q. Where does a psoas abscess generally point?

A. In the groin, at the internal part of the thigh, and the loins.

75. Q. What are the signs of a wounded artery?

A. Effusions of florid blood, and its being thrown out by jerks from the vessel.

76. Q. What are the terminations of inflammation?

A. Resolution, suppuration, and mortification.

77. Q. What method is to be taken after a cannon-ball has torn off the limb?

A. To amputate the stump: sometimes it is necessary to perform the amputation above the nearest joint.

78. Q. What are the circumstances that prevent the dilatation of gun-shot wounds to extract the extraneous substance?

A. When it is likely to create a great irritation of the wound without gaining any advantage; when the ball enters far into the substance of a bone; where it enters any of the large cavities; where the ball cannot be discovered; and where the foreign bodies are less likely to create inflammation than their extraction.

79. Q. What is the treatment of gun-shot wounds?

A. First, when the wound is in any extremity to determine for or against amputation, which in many cases requires great judgment, the amputation should be performed before inflammation arises, or a disposition to gangrene takes place in the limbs: should, however, amputation be deferred for a day or two, and the wound be highly inflamed, it is to be brought to a state of suppuration, at which period amputation, if needful, should be performed, weighing in mind the constitution of the patient, and other circumstances. Extraneous substances are generally to be extracted, particularly when they press upon an important viscus or a considerable nerve. If haemorrhage take place from a large artery, it is to be exposed and tied. The external wound often requires dilating, but sometimes dilatation is improper.

Counter-openings are in some instances to be made, as when the ball lodges under contused skin that will probably slough; but if the skin remain uninjured, and the ball is scarcely perceptible to the feel, this operation is improper, as the wound heals better when it is left alone. When sloughing takes place on the surface of a wound, its removal is favoured by a plentiful suppuration.

The rest of the treatment is similar to that for contused wounds.

80. Q. How is chordee accounted for?

A. In chordee, the inflammation having affected the corpus spongiosum as well as the urethra, it produces in it an extravasation of coagulable lymph, as in the adhesive inflammation, which, uniting the cells together, destroys the power of distention of the corpus spongiosum, and makes it unequal, in this respect, to the corpora cavernosa penis, and therefore a curvature takes place.

81. Q. What is the treatment of contused wounds?

A. To prevent a high degree of inflammation, which often terminates in gangrene; this is to be affected by a strict antiphlogistic regimen, topical bleeding by leeches, &c. The formation of pus is to be promoted

by emollient poultices. Should gangrene succeed the inflammation, warm stimulating applications are to be used, and the patient is to take bark, wine, and a nourishing diet.

82. Q. What are the terminations of erysipelas ?

A. Resolution, gangrene, and suppuration.

83. Q. Does erysipelas generally terminate in suppuration ?

A. No ; true erysipelas seldom suppurates, it generally ends in resolution or gangrene.

84. Q. In what part is erysipelas attended with the greatest degree of constitutional disturbance ?

A. The face and head.

85. Q. Under what circumstances is an artificial anus to be formed ?

A. Where absolute gangrene of an incarcerated intestine has taken place.

86. Q. How is gastroraphe performed ?

A. Gastroraphe is employed to unite wounds of the abdomen in the following way ;—two needles are placed on the same ligature, and introduced through both lips of the wound from within outwards, including peritonæum, muscles, and integuments.

87. Q. What is the general treatment of the hip-joint disease ?

A. In the early part of the disease of the hip-joint, entire rest, the application of fomentations, and the employment of topical bleeding, particularly cupping, are highly proper. This plan of treatment is to be adopted to reduce inflammation ; when no inflammation is present, recourse should be had to blisters, or caustic issues.

88. Q. Where do surgeons generally recommend the application of a caustic issue to relieve an affection of the hip ?

A. In the depression just behind and below the trochanter major.

89. Q. How is emphysema produced from a wound of the thorax ?

A. By the lungs being wounded, and the consequent escape of air into the cellular membrane.

90. Q. What is the treatment of wounds of the joints?

A. The admission of air into their cavities is to be obviated, as this causes a high degree of inflammation to take place. If the capsular ligament is much torn, amputation becomes necessary; in other respects the joint is to be considered as under a high degree of inflammation, and the antiphlogistic regimen is to be adopted. If suppuration take place in the cavity of the joints, the pus should be carefully evacuated, so as not to allow the air to enter.

91. Q. What is meant by spina ventosa?

A. A disease affecting a bone, in which it becomes spongy and suppurates; and the pus escapes by several openings.

92. Q. What is the prognosis in wounds of the abdominal viscera?

A. Generally bad.

93. Q. How may an abscess of the liver rupture?

A. First, externally, by the liver forming an adhesion to the parietes of the abdomen, and the abscess pointing on its external surface. Secondly, by adhesive inflammation taking place between the liver, diaphragm, and lungs, and the abscess evacuating itself into the lungs. Thirdly, by adhesion taking place between the liver and alimentary canal, and the abscess making its way into the stomach or intestines. Fourthly, into the cavity of the abdomen.

94. Q. What symptoms accompany wounds of the abdominal viscera?

A. Profuse hæmorrhage from the external wound; the escape of the contents of particular viscera, attended with a small, feeble, and contracted pulse, pallid countenance, coldness of the extremities, great debility, hiccough, vomiting, spasm, and tension of the abdomen.

95. Q. How many kinds of wounds are there?

A. Wounds are distinguished by the terms of incised, lacerated, punctured, contused, and poisoned.

96. Q. How is the prognosis to be formed in wounds of the lungs?

A. If the lungs are wounded near the root, it is commonly fatal, from the hæmorrhage that will ensue; should the lower and anterior part be wounded, and that superficially, the prognosis may be more favourable.

97. Q. What symptoms will enable you to distinguish an enlarged prostate gland from stone in the bladder?

A. The symptoms attending a diseased prostate gland resemble those of stone in the bladder; but with this difference, that the motion of a coach or a horse does not increase the grievance when the prostate is affected, while it does so in an intolerable degree in cases of stone.

98. Q. Are the symptoms of calculus complained of by the person sufficient to convince a surgeon that there is a stone in the bladder?

A. No; the operation of sounding must be had recourse to, before a calculus can be ascertained to exist.

99. Q. How is the hip-disease distinguished from an affection of the knee-joint, as the fore-running symptoms of the hip-disease are generally pains about the knee, and no evident affection of the hip?

A. By a diminution of the circumference of the leg and thigh of the affected side, an elongation of the limb, and pressure upon the acetabulum, exciting pain.

100. Q. In taking up the brachial artery, what nerve are you to avoid including in the ligature?

A. The median nerve, which accompanies the brachial artery.

101. Q. What are granulations?

A. They are exudations of coagulable lymph from the vessels of the exposed surface, which soon become organized, possessing vessels, nerves, and absorbents.

102. Q. What forms the boundaries or cyst of an abscess?

A. A deposit of coagulable lymph, which becomes organized so as to form a cyst.

103. Q. How many modes are there of opening an abscess?

A. There are three principal ways of opening an abscess; 1. by lancet; 2. by caustic; 3. by seton.—Most surgeons prefer the opening to be made by the lancet.

104. Q. What is meant by a furunculus?

A. A circumscribed inflammatory tumour, which usually attains the size of a small walnut; it imperfectly suppurates, and the matter is contained in a cyst.

105. Q. In operating for encysted tumour, is it necessary to remove the sac?

A. Yes; and, during the operation, care should be taken not to wound the sac during the extirpation of the tumour.

106. Q. What is the cause of piles?

A. Pressure upon the vessels of the anus, which prevents the return of blood to the heart; as that from a gravid uterus, costiveness, tumours, and from long sitting; which last allows the abdominal viscera to press upon the blood-vessels.

107. Q. What is meant by meliceris?

A. Meliceris is a tumour of the encysted kind, the contents of which resemble wax or honey.

108. What is meant by condyloma?

A. Tumours or excrescences about the anus are called condylomata.

109. What is meant by couching.

A. Couching consists in removing the opaque lens out of the axis of vision by means of a peculiar-formed needle.

110. Q. How is the operation for fistula lachrymalis performed?

A. First, an opening is to be made at the most depending part of the tumour, by means of a lancet, which will discharge the sac of its contents; a probe is then to be passed forward in the natural passage with moderate force: should this be impracticable, an artificial opening is to be cautiously drilled on the anterior part of the os unguis by a trocar, or any other sharp instrument, in an oblique direction. When this has penetrated a sufficient depth, which may be ascertained by the want of resistance, and the discharge of

blood by the nose, the perforator is to be removed, and a silver tube introduced into the opening, where it should remain till the edges of the wound become callous. After this is effected, the tube is to be withdrawn, and the external wound heals readily.

111. Q. What is an exostosis ?

A. It is a tumour of bone formed upon bone.

112. Q. What is meant by sphacelus ?

A. It is a complete mortification of a part, whereby it loses its natural colour, and becomes black and soft.

113. Q. What is meant by sarcocele ?

A. A scirrhus enlargement of the testicle.

114. Q. What are the causes of fistulæ in ano ?

A. They are caused by the formation of abscesses about the anus, which spread among the interstices of the muscles, and between the integuments : these abscesses are produced originally by inflammation. There are also other causes giving rise to fistulæ, as condylomatous tumours, &c.

115. Q. If the carotid artery should be wounded, and assistance should be obtained in time to take up the vessel, what nerve are you to avoid including in the ligature ?

A. In taking up the carotid artery, the eighth pair of nerves, which runs close to the artery, should not be included in the ligature.

116. Q. What are the symptoms of a cataract ?

A. A cataract commences by a spot or speck in the pupil of the eye : it is most commonly of a gray or whitish colour. In the commencement of the disease it occasions a weakness or imperfection of the sight, and it terminates sooner or later in the almost total extinction of vision.

117. Q. How many kinds of cataracts are there ?

A. Cataracts are distinguished into : 1. firm cataract : 2. fluid, or milky cataract : 3. soft, or caseous cataract ; 4. membranous cataract ; and, 5. the congenital cataract.

118. Q. What is the treatment of a cataract ?

A. The treatment of a cataract consists in bleeding, cupping, scarifications, setons, issues, blisters, and fu-

migrations; and the principal internal remedies are aperients, emetics, cathartics, sudorifics and sternutatories.

119. Q. In a transverse wound of the trachea how is reunion effected?

A. The union of a transverse wound of the trachea is best effected by bringing the patient's head downwards and forwards to the sternum; the head should be maintained in this position, and the edges of the wound should be kept in contact until they have grown together. Ligatures are not recommended, as they create irritation in the trachea.

120. Q. What are the vessels generally divided when a person cuts his throat?

A. When suicide is attempted by cutting the throat, the vessels cut through are either the external maxillary, the lingual, or the thyroideal artery: the trunk of the carotid artery is seldom cut.

121. Q. How does a false aneurism take place?

A. A false aneurism is occasioned by an aperture of an artery allowing the blood to rush into the cellular structure.

122. Q. What veins are most subject to varix?

A. The superficial veins of the lower extremity; and the varix generally takes place in the situation of a valve.

123. Q. What are the indications of cure in varix?

A. There are two indications; viz. to remove every impediment to the free return of blood, and to restore the distended vessel to its former size.

124. Q. How is amputation of the fingers or toes accomplished?

A. In amputating the fingers or toes, a small semilunar incision is to be made on the back of the finger or toe, which should extend, forming a convexity about half an inch in front of the joint; the flap is next to be raised and reflected: having effected this, the skin in front of the finger over the joint is to be divided, and this incision must extend across the finger or toe, and meet the two ends of the first semilunar incision: then bending the finger the capsular ligament is to be divided, which will allow the head of the bone to be dislocated. Should the digital arteries bleed much, they

may be secured, but the hæmorrhage often stops without having recourse to ligature; the flap is to be brought over the wound, and the edges of the wound kept together by adhesive plaster.

125. Q. What diseases is the antrum of Highmore subject to?

A. Its membranous lining may inflame or ulcerate; polypi or other fleshy excrescences may grow in it; the mucous secretion may be of a bad quality, and the opening through which it passes into the nose may be closed: the bony cavity may be carious, or may form osseous funguses.

126. Q. What is the treatment of a carbuncle?

A. The treatment of a carbuncle is as follows. In the local treatment the grand thing is to make an early and free incision into the tumour, so as to allow the sloughs and matter to escape readily. As much of the matter as possible is to be at once pressed out, and then the part is to be covered with an emollient poultice.—With respect to the constitutional treatment, bark and camphire are the internal medicines most commonly needed. Sulphuric acid may also be given, as well as wine and aromatics, and opium when the pain is very severe.

127. Q. How is emphysema distinguished from anasarca?

A. Emphysema is distinguished from anasarca by the crackling noise produced upon pressure, and by the rapidity of the swelling.

128. Q. What is the general division of strictures?

A. The general division of strictures is into—spasmodic, which depends upon a spasmodic contraction of a part of the canal;—and permanent stricture, which is caused by a partial narrowness, forming a ridge.—There is also another kind of stricture, which depends upon a permanent contraction and an occasional spasmodic affection.

129. Q. How is the introduction of the male catheter effected?

A. The introduction of the male catheter is performed in the following manner. The penis should be

drawn upwards, and held by the left hand. Having oiled the catheter, it is to be introduced into the urethra with its concavity towards the abdomen, pressing its point downwards until it reaches the bulb of the urethra; when this has happened, the beak of the instrument has passed under the arch of the pubes; the handle of the instrument is then to be gradually brought forward between the patient's thighs, and during this action the beak of the instrument becomes elevated, and slips into the bladder. The operation may be performed either when the patient is standing, sitting, or on his back.

130. Q. What is the character of a scorbutic ulcer?

A. A scorbutic ulcer is one that affords a fetid, sanious, and bloody discharge; the edges are of a livid colour, and the surface is covered with a loose spongy flesh: there are generally other symptoms which establish its nature, such as loose spongy gums, and livid spots of the skin.

131. Q. What kind of treatment do gun-shot wounds require?

A. In general, gun-shot wounds require the antiphlogistic plan of treatment.

132. Q. What is meant by a polypus?

A. A polypus is a fleshy tumour of the cavities which communicate with the natural openings of the body, which is generally narrow where it originates, and then becomes wider, somewhat like a pear.

133. Q. What parts are most subject to polypi?

A. Polypi are most commonly met with in the nose, uterus, vagina, and antrum of Highmore.

134. Q. In the cure of polypus, which is to be preferred, extirpation or ligature?

A. As the extraction of polypus is invariably attended with hæmorrhage, ligature is generally preferred.

135. Q. What is the treatment of a fractured rib?

A. In a case of fractured rib, the action of the chest is to be confined, and the ends of the fractured ribs are to be kept as nearly as possible in apposition, which

may be effected by surrounding the body with a wide roller. It may also be necessary to bleed the patient, and adopt the antiphlogistic regimen, to guard against inflammation.

136. Q. What is a bronchocele ?

A. Bronchocele is an indolent enlargement of the thyroid gland.

137. Q. What method is to be taken, if, after liberating a strangulated intestine by operation, a great quantity of irreducible thickened omentum exists ?

A. The indurated omentum is to be cut off, unless hæmorrhage, or other circumstances, forbid it ; in such cases it may be left unreturned.

138. Q. What is the difference between a femoral and an inguinal hernia ?

A. In femoral hernia the intestine or omentum protrudes under Poupart's ligament, and in inguinal hernia they protrude through the abdominal ring.

139. Q. What are the circumstances by which you judge the operation necessary to liberate a strangulated hernia ?

A. If reduction of the hernial contents cannot be effected by the hand, aided by the position of the patient, and by bleeding, cathartics, clysters, cold topical applications, the warm bath, and tobacco-smoke introduced into the rectum, each of which having been judiciously tried without effect, the operation then is imperiously demanded.

140. Q. What means would you have recourse to in order to reduce a strangulated hernia, before you judge it necessary to perform the operation ?

A. First, the patient should be placed in a suitable position, with the pelvis elevated, the thigh bent and rotated inwards, and the reduction of the hernial contents skilfully attempted ; should this fail, bleeding should be had recourse to ; and it is recommended to take away the blood suddenly, so as to occasion fainting, at which time the taxis should again be attempted. Success not being obtained, cathartics and the warm bath should be speedily made use of. These with the taxis not having succeeded, then the united

effort of cold to the tumour, and tobacco, either in fume or decoction, must be tried; and if strangulation still continue after these means have been used, another attempt by the hand should be made; all these failing, the operation should be performed, the protraction of which beyond a certain time would endanger the patient.

141. Q. What is meant by scrofula?

A. Scrofula is a disease of the glands, with a peculiar constitution of body.

142. What are rickets owing to?

A. Rickets seem to consist in a want of due firmness in the bones, in consequence of a deficiency of phosphate of lime in their structure.

143. What are the best remedies for rickets?

A. A nourishing diet, dry air, the sea-side, cold bathing, and tonics, especially steel.

144. Q. What is meant by a sinus?

A. A sinus is a long hollow track, leading from some abscess or diseased bone.

145. Q. What are the symptoms of suppression of urine?

A. A swelling above the os pubis, a violent inclination to make water, tension and pain of the abdomen, cold perspirations, oppressed respiration; hiccough and fainting follow.

146. Q. How would you attempt to relieve a suppression of urine, in a medical point of view?

A. I would bleed copiously; apply leeches to the perinæum, or above the os pubis; exhibit opium by the mouth, and in glysters; use the warm bath, and apply fomentations to the hypogastrium and perinæum.

147. Q. When these means fail to evacuate the urine, what would you have recourse to?

A. To the catheter.

148. Q. What do you mean by a popliteal aneurism?

A. A dilatation of the popliteal artery forming a pulsating tumour in the ham.

149. Q. Describe the operation for popliteal aneurism.

A. An incision should be made about two inches and a half through the skin and fascia of the thigh, on the inner edge of the sartorius muscle ; as soon as the femoral artery is felt, a careful incision is to be made on each side of it, in order that the finger may be passed under it ; a double ligature is then to be introduced by means of a blunt needle under the vessel, leaving out the femoral vein and the accompanying branches of the anterior crural nerve ; one portion of the ligature is to be tied as high, the other as low, as the detachment of the artery will allow. The part of the vessel between the ligatures is to be divided, and after this the external wound is to be brought together and dressed in the usual way.

150. Q. What is meant by suppuration ?

A. Suppuration signifies a process by which a peculiar fluid, termed pus, is formed in the substance, or from the surface, of parts of the body, when such parts are particularly circumstanced.

151. Q. What is meant by ranula ?

A. By ranula is meant a tumour under the tongue, arising from an obstruction of the saliva in the ducts of the sublingual glands.

152. Q. What are hemorrhoids ?

A. Hemorrhoids, or piles, are generally varices of the hæmorrhoidal veins, but some surgeons consider them to be occasionally formed by effused blood which becomes organized.

153. Q. What are the symptoms of a phlegmon ?

A. A phlegmon is a tumour attended with heat, redness, pain, tension, and more or less of the synochal fever.

154. Q. How would you treat a phlegmon ?

A. First by endeavouring to effect a resolution by local or general bleeding, the antiphlogistic regimen, the exhibition of saline cathartics and diaphoretics, and the use of cold, astringent, sedative applications, warm emollient poultices, and fomentations, according to its nature. If suppuration should commence, by giving tonics and cordials, a generous diet, and forwarding the process by poultices. If mortification should ap-

pear likely to ensue, bark, acids, and wine, will be proper, also stimulating poultices of beer-grounds, and fomentations with bitter decoctions and camphorated spirit.

155. Q. How are issues made?

A. Issues are made by making an opening either with a lancet or caustic, large enough to admit a pea being introduced in it.

156. Q. How many ways may dislocation of the wrist occur?

A. The carpal bones may be luxated from the lower ends of the radius and ulna forwards, backwards, inwards, or outwards. The two first cases, especially the one backwards, are the most frequent.

157. Q. How many ways may the foot be dislocated?

A. The foot may be dislocated inwards or outwards, forwards or backwards.

158. Q. Why do dislocations of the foot inwards occur more frequently than dislocations outwards?

A. Dislocations of the foot inwards occur more frequently than outwards, from the malleolus internus not being so low as the malleolus externus.

159. Q. How are dislocations of the foot inwards or outwards to be reduced?

A. To accomplish this it is necessary to relax the strong muscles of the calf by bending the leg on the thigh. The case is afterwards to be treated as a fracture of the leg.

160. Q. What is the treatment after amputation?

A. The chief circumstances to be attended to after amputation are:—to adopt the antiphlogistic regimen, to prevent inflammation, which is to be regulated by the constitution of the patient; the first dressing ought to be removed the third or fourth day after the operation, and new dressings are to be applied as at first every day until the inflammation has entirely subsided. The ligatures are to be very gently pulled after the first week, until they come easily off.

161. Q. What is the treatment of a hernia humoralis, or inflammation of the testicle?

A. In hernia humoralis the patient should be kept in a horizontal position? if young and plethoric, bleeding should be adopted. It is generally necessary to apply leeches repeatedly; to administer saline purgatives; fomentations and poultices, or cold lotions, are to be had recourse to, and the testicle is to be supported by a bag truss. Should there be great pain in the loins, opiates will become necessary: if, after the inflammation has subsided, an induration should exist, friction with mercurial ointment will be found beneficial.

162. Q. When the parotid duct is wounded, what are the consequences which may be expected to arise?

A. When the parotid duct is wounded, if not united by the first intention, a salivary fistula is the consequence.

163. Q. What are the indications of cure in mortification?

A. The indications of cure in mortification are, to arrest the progress of the disease, and to promote the separation of the mortified part.

164. Q. How is the division of the frænum linguæ to be effected, and what are the arteries to be avoided?

A. The separation of the frænum linguæ consists in dividing the frænum as far as seems necessary with a pair of sharp scissors with blunt points:—the ranine arteries must be cautiously avoided in this operation.

165. Q. How many kinds of fractures are there?

A. There are two principal kinds of fractures:—1. simple fractures, or a division of one or more bones, without any external wound, caused by the protrusion of the ends of the bones: compound fractures, or those where there is a breach of one or more bones; and the integuments lacerated by the protrusion of one or both of the ends of the fracture.

166. Q. What is the general treatment of fractures?

A. In the general treatment of fractures, the limb is to be placed in such a position as will relax those muscles which tend to displace the ends of a fractured bone; this seems best effected by placing the limb in

a middle state between flexion and extension; the ends of the fractured bone are to be confined in a state of apposition; this is done by the aid of splints secured by straps:—to remedy the effects of pressure from the splints, compresses of tow or other soft substances are usually placed under the splints. An eighteen-tail bandage is generally made use of in fractures of the long bones, and is applied close to the limb. When there is much inflammation of the limb before the fracture is set, linen wetted with cold saturnine lotions is to be applied between the splints and limb, which should be kept cold and moist by repeatedly squeezing the lotion over the limb. It may be necessary to bleed or give opiates, according to circumstances.

167. Q. What is the situation of the protruded viscera in congenital hernia?

A. In congenital hernia the protruded viscera are situated in the tunica vaginalis in contact with the testicle; having descended into this position before the closure of the communication with the abdomen.

168. Q. In umbilical hernia, by what is the stricture formed when strangulation takes place?

A. In strangulated umbilical hernia the stricture is made by the tendinous opening in the linea alba.

169. Q. How is a ganglion to be cured?

A. A ganglion may often be removed by pressure; sometimes it may be necessary to remove it by the scalpel, or to make a perforation in it, and allow its contents to escape.

170. Q. How do aneurisms terminate if not cured?

A. Aneurismal swellings, if not cured, gradually increase in size; the skin over the tumour becomes pale; the pain increases, and the skin begins to grow livid; a degree of inflammation takes place; the skin cracks, and discharges for some time a bloody serum, until at length it becomes quite gangrenous, when all of a sudden the tumour bursts, and the patient dies from hæmorrhage.

171. Q. What is a steatoma?

A. Steatoma is a tumour containing a fatty sub-

stance, and surrounded by a cyst of indurated cellular membrane.

172. Q. What is meant by atheroma?

A. Atheroma is an encysted tumour containing matter of a doughy consistence.

173. Q. What is meant by tic doloureux?

A. Tic doloureux is a painful affection of the nerves, and mostly those of the face, particularly of the filaments of that branch of the fifth pair of nerves which comes out through the infra-orbital foramen.

174. Q. What is the most efficacious plan to be adopted for the relief of the tic doloureux?

A. The most effectual plan is to cut down and divide the nerve above where the pain is seated.

175. Q. What prognosis can be formed after the operation for hernia?

A. If the operation to liberate strangulated hernia be performed early, there is comparatively little danger. The danger is dependent upon the operation being delayed after necessity demands it. Mortification has ensued within twelve hours after strangulation; and in some few instances strangulation has been known to subsist for several days, and no mortification take place.

176. Q. What causes give rise to prolapsus ani?

A. The causes that give rise to prolapsus ani are costiveness, debility, hæmorrhoidal swellings, or the effect of stimulative substances that increase the action of the rectum.

177. Q. What are the signs of luxation in general?

A. In luxations the shape of the joint is altered; the motion of the limb is much impaired; a certain degree of inflammation takes place, the pain attending which is sometimes so acute as to occasion convulsions, or spasmodic affections, from the compression of nerves by the displaced bone.

178. Q. How are luxations of the collar-bone to be cured?

A. Luxations of the collar-bone are easily reduced by pressure with the fingers: but there is great difficulty in keeping the bone in this situation. The arm

should be raised and confined by bandages; a compress should be placed to the luxated bone, to prevent the action of the muscles drawing the bone out of its place.

179. Q. How is a venereal ophthalmy to be cured?

A. In the treatment of venereal ophthalmy mercurial frictions are to be made use of, and the decoctum sarsaparillæ compositum should be taken. A collyrium of the oxy-muriate of mercury is recommended. The eyelid may be also smeared with the unguentum hydrargyri nitrico-oxydi.

180. Q. What is a thrombus?

A. A thrombus is a tumour formed by a collection of extravasated coagulated blood under the integuments after bleeding.

181. Q. What are the causes of a thrombus?

A. A thrombus sometimes depends on the vein being completely divided; but it more frequently depends on the opening of the vein not corresponding to that of the skin.

182. Q. Where is the blood effused in thrombus?

A. Thrombus is caused by the blood being effused into the cellular membrane, by the side of the vein.

183. Q. In what directions do luxations of the head of the os brachii most commonly take place?

A. The dislocation of the head of the os brachii generally takes place into the axilla.

184. Q. How is dislocation of the thigh distinguished from a fracture of its neck.

A. Dislocation may be distinguished from fracture of the head of the femur by these circumstances:—In fracture, the leg is much shorter; the limb can be moved in many directions; the toes mostly turn outwards; by particular motions, a grating may be perceived, and a loss of continuity. In dislocations of the thigh joint, the leg is generally much lengthened, the toes are turned outwards, and it is almost impossible to turn them inwards, at least without giving the greatest pain; a vacancy is observed at the seat of the acetabulum, and a tumour is felt, which is caused by the head of the bone out of the acetabulum.

185. Q. Define a caries.

A. Caries is a mortification of a bone, attended with an ichorous fetid discharge.

186. Q. Why does the tooth-ache produce generally so acute and considerable a pain?

A. From the inflamed vessels of the nerve or pulp within the tooth being confined.

187. Q. What are the causes that give rise to ischuria?

A. Ischuria may arise from inflammation of the bladder, produced from various causes, spasms affecting the neck of the bladder, scirrhusities of the prostate gland; caruncles in the urethra; pressure of the uterus in the last months of pregnancy; tumours in the perinæum and vagina, as prolapsus of the uterus; polypi, or enlargement of the corpus spongiosum; the penis itself pressing the sides of the urethra together; ischuria may also arise from a loss of tone in the bladder itself, and from stones impacted in the urethra.

188. Q. How is cystocele distinguished from bubo-nocele?

A. Cystocele is always easily distinguishable by the regular diminution of the swelling whenever the patient makes water.

189. Q. What constitutes a phrenic hernia?

A. A phrenic hernia is constituted by the abdominal viscera occasionally protruding through the diaphragm, either through some of the natural apertures of this muscle, or deficiencies or lacerations in it.

190. Q. What is meant by hæmatocele scroti?

A. A tumour produced by blood being extravasated in the scrotum, tunica vaginalis, or in the spermatic chord; it is mostly occasioned by some external violence, as blows inflicted on the scrotum or surrounding parts, producing a rupture of vessels.

191. Q. What are the symptoms of a punctured nerve from bleeding?

A. In punctured nerve from bleeding the patient feels a more acute pain than usual under the operation; a numbness is communicated to the shoulder, and down to the fingers; these symptoms are often succeeded by

spasms of the neck and jaw, frightful dreams ; and the patient becomes extremely irritable and delirious.

192. Q. What is a cataract ?

A. An opacity of the crystalline lens or its capsule.

193. Q. What is meant by mollities ossium ?

A. A state of bones whereby they become soft and preternaturally flexible.

194. Q. If the head of the shoulder-bone is luxated upwards, what is the consequence ?

A. When the head of the shoulder-bone is luxated upwards, a fracture of the acromion process takes place.

195. Q. What is the direction in which luxations of the ulna most commonly happen ?

A. Luxations of the ulna most frequently take place upwards and backwards.

196. Q. What are the common causes of psoas abscess ?

A. The causes which give rise to abscess of the psoas muscle are, excessive fatigue from walking, and then exposing the back to cold while the body is still warm with exercise. It may also be brought on by strains, attempting to raise great weights, or by twists when carrying a heavy load on the back.

197. Q. On the first attack of inflammation of the psoas muscle, what is to be done ?

A. When inflammation has attacked the psoas muscle, the antiphlogistic plan is to be adopted ; and bleeding, the warm bath, purgatives, &c. must be had recourse to.

198. Q. How is a dislocation of the lower jaw reduced ?

A. A dislocation of the lower jaw is reduced by passing both thumbs, previously covered with a linen cloth, into the mouth ; the jaw is then to be pushed backwards, depressing the angles, and raising the symphysis of the jaw at the same time by gentle pressure ; the jaw immediately springs back into its natural situation by the action of the muscles.

199. Q. What is a fungus ?

A. A fungus is a soft fleshy excrescence rising out of an old wound or ill-conditioned ulcer, and preventing its healing.

200. Q. How are dislocations of the os femoris reduced ?

A. In dislocations of the thigh-bone, when the head is in the foramen ovale, the muscles of the thigh are first to be relaxed as much as possible, the limb is then to be extended to displace the end of the bone from its cavity ; when this is effected, the bone is to be drawn upwards and inwards into its socket ; this generally effects the reduction : but should the bone be above the acetabulum, a slight extension will effect its reduction. It happens occasionally that the head of the bone is not reduced, owing to the projection of the acetabulum preventing the necessary extension ; the bone must then be elevated a little over this projection, and the reduction will be effected.

201. Q. In mortification of a limb, what state are the arteries in near the diseased part ?

A. When mortification takes place at the lower part of an extremity, the diameter of the arteries is diminished near the diseased part, and they become stopped up with coagulated blood.

202. Q. When an artery is tied by ligature, how is a permanent obliteration of its channel effected ?

A. After an artery is stopped by ligature, coagulable lymph is separated near the fractured part ; this becomes organized, and unites the sides of the arteries together, and thus obliterates the artery.

203. Q. In injuries of the gall-bladder or liver, what prognosis is to be given ?

A. In wounds of the liver the prognosis is bad, by reason of the great quantity of blood flowing through that viscus and the soft texture of the liver itself, which renders it very apt to pour out a great quantity of blood from a small wound. Injuries of the gall-bladder are still worse ; as, in such cases, the bile is evacuated into the cavity of the abdomen, where its tendency to putrefaction soon produces the most fatal effects.

204. Q. What are the properties of pus ?

A. Pus is a fluid of a lightish colour, of the consistence of cream ; it has little smell, is void of acrimony, and consists of globules swimming in a transparent,

colourless fluid. Its specific gravity is greater than that of water.

205. Q. What are the differences between pus and mucus ?

A. Pus is distinguished from mucus by the following circumstances :—Pus sinks in water, mucus floats : pus gives to water an uniform white colour ; mucus has a ropy appearance in water. If pus and mucus are mixed with sulphuric acid, on the addition of water the pus is precipitated to the bottom, and the mucus forms swimming flakes. A solution of caustic alkali dissolves both pus and mucus ; but, on the addition of water, the pus is separated, and not the mucus.

206. Q. What are the symptoms which announce the formation of pus in inflammation of the hip-joint ?

A. The symptoms which point out the formation of pus in inflammation of the hip-joint are various, as the disease may be acute or chronic. When the former takes place, the parts surrounding the joint become tense and painful, the skin red, and inflammatory fever takes place : as the pain abates, rigors succeed, and a swelling is observed about the joint. When the abscess is the consequence of chronic inflammation, an increase of pain takes place previous to the occurrence of suppuration ; startings and catchings during sleep are noticed : the pus in the chronic species is a long while before it arrives at the surface ; at length a fluctuating tumour forms, but it does not immediately point.

207. Q. What is meant by hydrops articuli ?

A. By hydrops articuli is meant a collection of serous fluid in the capsular ligament of a joint.

208. Q. How is a fracture of the neck of the humerus distinguished from a luxation ?

A. When the neck of the humerus is fractured, a depression is observed at the superior extremity and external side of the arm : in luxation, downwards and inwards, of the head of the bone under the projection of the acromion, a deep depression is found in the part which the head of the humerus before occupied ; whereas, in fracture of the neck of that bone, the

shoulder retains its original form: the acromion does not project, and the depression is found below the point of the shoulder: besides, the unequal and fractured extremity of the bone will be easily felt; a crepitus may also be heard, by moving the arm in different directions.

209. Q. What is the character of cancerous ulcer?

A. Cancerous ulcer is irregular in its figure, and unequal on its surface; the edges are thick, serrated, and extremely painful; there are large chasms in its substance, produced partly by sloughing, and partly by an ulcerating process. The ulcer affords a very fetid sanious matter, it spreads with great rapidity, and in its progress produces frequent hæmorrhages.

210. Q. What prognosis is to be given of wounds of the œsophagus?

A. Wounds of the œsophagus generally are mortal.

211. Q. How is the removal of a tumour from the breast performed?

A. In removing a tumour from the breast, the operation is generally performed as the patient is in a sitting position. The pectoral muscle is to be made tense by keeping the arm back, and if none of the integuments are to be removed, a straight incision is to be made through them; the tumour is to be regularly dissected all round from the circumjacent parts, and its base is to be detached from its connexions from above downwards, till the whole is separated. If the tumour is of a malignant nature, and adhering to the skin and pectoral muscle beneath, an inch or two of the fat should be removed on every side of the diseased part; and after the removal of the tumour, the surface of the pectoral muscle, wherever it is adhering to the tumour, should be removed.

212. Q. What is a node?

A. A node is a swelling of a bone, the periosteum, or a tendon, mostly arising from a venereal cause.

213. Q. What parts of the scapula are most commonly fractured?

A. The parts of the scapula most liable to fracture are the acromion, inferior angle, neck, and coracoid process.

214. Q. What bad consequences may be apprehended from a fractured rib ?

A. The bad consequences of a fractured rib may be, that a spicula may be driven inwards, it may lacerate the pleura, wound the lungs, and cause the dangerous train of symptoms attendant on emphysema.

215. Q. What is the character of a venereal ulcer in the throat ?

A. A venereal ulcer affecting the throat is very deep ; it has a defined or thick edge, and is generally very foul, having a lardaceous slough adhering to it that cannot be detached.

216. Q. How is the vena saphena to be tied when in a varicose state ?

A. The vena saphena is to be tied by passing a ligature under the vessel ; the integuments are to be pinched up into a transverse fold, and the ligature is to be conveyed under the vessel by means of a blunt silver needle.

217. Q. Is there any danger in tying a vein for the cure of varix ?

A. Yes : sometimes inflammation and suppuration of the vein takes place, accompanied with considerable fever, which has been known to prove fatal.

218. Q. Where is the fluid in hydrocele situated ?

A. The fluid in hydrocele is situated between the tunica vaginalis and the tunica albuginea of the testicle.

219. Q. What is the object in the radical cure of hydrocele ?

A. The object to be effected in the cure of hydrocele is to excite such a degree of inflammation in the tunica vaginalis and tunica albuginea, forming the cavity, as shall end in a mutual and general concretion of those membranes with each other, so as to obliterate any cavity for the reception of fluid.

220. Q. How is hydrocele distinguished from other tumours ?

A. Hydrocele is distinguished from hernia by the tumour in hernia being somewhat elastic, and becoming more distended when the person coughs. The

swelling in hernia always begins at top, and extends gradually downwards. Hydrocele is distinguished from encysted dropsy of the chord by the swelling lying at the superior part of the scrotum, whilst in hydrocele it is at the inferior part. It may be distinguished from schirrous testicle, being firm, hard, and not yet yielding upon pressure, and from the great weight in proportion to its bulk. In hydrocele, a lighted candle, placed at the opposite side of the tumour, will make the contents of the sac seem transparent.

221. Q. What are the favourable symptoms that point out success from trepanning ?

A. The favourable symptoms which point out success from trepanning are, the patient becoming less stupid, his breathing less oppressed, and the pupils contracting upon exposure to strong light.

222. Q. If, after trepanning, a collection of fluid should be found between the dura and pia mater, how is it to be removed ?

A. Under such circumstances, a small incision may be cautiously made through the dura mater, to evacuate it.

223. Q. What is meant by a fissure of the cranium ?

A. It is a partial fracture, in which the bone is, as it were, cracked only.

224. Q. How many kinds of dislocations of the patella are there ?

A. The patella may be luxated outwards or inwards. The luxation outwards is most common, because the bone more easily slips in this direction off the outer condyle of the femur than inwardly.

225. How may the tibia be luxated ?

A. The tibia may be luxated forward, backward, or to either side.

226. Q. When the parotid duct is wounded, what is the consequence ?

A. The consequence of wounding the parotid duct is a fistulous opening, which discharges saliva, particularly during meals.

227. Q. What is ecchymosis ?

A. Ecchymosis is an extravasation of blood in the cellular membrane, occasioned by a rupture of the small vessels of the part.

228. Q. What is meant by exfoliation?

A. Exfoliation is a separation of a dead portion of bone from the living.

229. Q. What method is to be taken to prevent exfoliation that is likely to occur from a wound?

A. In attempting to prevent exfoliation that may take place from a wound, all that is to be done is, to cover the exposed bone as soon as possible with the flesh that has been detached.

230. Q. How are fistulæ in perinæo to be dressed after they have been laid open?

A. Fistulæ in perinæo, after being laid open, are to be dressed quite down to the end, to allow of granulations shooting up from the bottom before re-union of the parts takes place.

231. Q. What is meant by simple fracture?

A. By simple fracture is meant a breach of continuity of bone without an external wound.

232. Q. How is a luxation of the tibia reduced?

A. A luxation of the tibia is most easily reduced by making gentle extension, and pushing the head into its proper place.

233. Q. What is meant by extravasation?

A. Extravasation is a term applied by surgeons to fluids which are out of their proper vessels or receptacles.

234. Q. What is meant by fistula lachrymalis?

A. Fistula lachrymalis is a disease arising from an obstruction in the ductus nasalis, and preventing the tears and mucus of the lachrymal parts of the eye from descending into the nose.

235. Q. What regimen do gun-shot wounds require?

A. Gun-shot wounds generally require the antiphlogistic regimen.

236. Q. How is the operation for phymosis performed?

A. This operation is performed by introducing a directory under the prepuce, then passing a curve-pointed bistoury, and slitting open the prepuce.

237. Q. Where do strictures most frequently take place in the urethra ?

A. Strictures most commonly occur in the membranous part of the urethra, from its being more acted upon by the salts of the urine ; the urine, after being expelled from the bladder, remains at this part of the urethra to be thrown out by the acceleratores urinæ.

238. Q. From whence does the discharge of gonorrhœa flow ?

A. The discharge of gonorrhœa flows from the mucous lacunæ of the urethra.

239. Q. What muscles are divided in amputation of the thigh ?

A. The muscles divided in amputation of the thigh are the biceps flexor cruris, semitendinosus, semimembranosus, gracilis, sartorius, vastus externus, vastus internus, rectus femoris, cruræus, and the long tendon of the adductor magnus.

240. Q. At what part of the os femoris do fractures most frequently take place ?

A. Fractures of the os femoris most frequently take place at the middle or third of its extent.

241. Q. What part of the tibia is most liable to be fractured ?

A. The part of the tibia most liable to fractures is a little above the internal malleolus.

242. Q. What is meant by spina bifida ?

A. Spina bifida is a disease attended with an incomplete state of some of the vertebræ, and a fluid swelling, which is most commonly situated over the lower lumbar vertebræ, sometimes over the dorsal and cervical ones, and in some instances over the os sacrum.

243. Q. What prognosis is to be given in spina bifida ?

A. The prognosis in spina bifida is bad ; whether the tumour is opened or not, death always follows.

244. Q. What are the symptoms of stone in the urinary bladder ?

A. The symptoms of calculus are, a dull uneasy sensation about the neck of the bladder, with a simi-

lar sensation at the glans penis: this increases, and becomes more frequent. In voiding the urine the stream is frequently stopped, and great pain is produced at the neck of the bladder; in order to obtain ease, the patient changes his position: sometimes small pieces of stone are voided. The urine is occasionally charged with mucus, at other times limpid: sometimes it is tinged with blood, especially after violent exercise: but the most diagnostic sign is touching the stone with the sound.

245. Q. What sensation is communicated to the operator upon touching a stone in the bladder with the sound?

A. When a stone in the bladder is touched with the sound, a tremulous motion is communicated to the fingers of the operator.

246. Q. Why is the finger introduced into the rectum while sounding?

A. The finger is introduced into the rectum while sounding, in order to raise the undermost part of the bladder, and consequently to bring the calculus into such a situation that the sound may touch it.

247. Q. What disease is likely to be mistaken for stone in the bladder?

A. An enlarged prostate gland: this has symptoms resembling stone, but with the difference that the motion of a coach, or horse, does not increase the grievance as it does when there is stone; besides which, the fits of pain from stone come on at intervals, while in diseased prostate the pain is not so unequal nor so acute.

248. Q. After the operation for lithotomy, what disease is sometimes brought on?

A. Peritonitis is the disease which is mostly brought on from the operation of lithotomy; and the majority of patients who die after lithotomy perish from peritoneal inflammation.

249. Q. What treatments should be adopted if inflammation of the peritonæum succeed the operation for lithotomy?

A. Copious venesection should be put in practice.

At the same time eight or ten leeches should be applied to the hypogastric region. The belly should be fomented, and the bowels kept open with the oleum ricini. Together with the use of the warm bath, a blister on the lower part of the abdomen, and emollient glysters, are highly proper.

250. Q. What takes place in a luxation of the ankle, the foot being turned upwards and outwards?

A. When the ankle is luxated, the foot being turned upwards and outwards, the fibula is generally fractured.

251. Q. What change do the collateral branches undergo when a large arterial trunk is tied?

A. The collateral arteries, after a large arterial trunk is tied, dilate, their coats become stronger, and acquire an additional strength; they also are found to become tortuous.

252. Q. What is meant by cicatrization?

A. Cicatrization is that process by which wounds and sores heal, or by which the formation of new skin takes place over a wound or ulcer.

253. Q. How is castration performed?

A. Castration is performed in the following manner. The patient is to be laid on a table of convenient height. An incision is then to be made opposite the abdominal ring, and continued a good way down the scrotum, in order to lay bare the spermatic chord and testicle; the spermatic chord, thus laid bare, is to be detached from the surrounding membranous connexions; and then the surgeon, with his finger and thumb, separates the blood vessels from the vas deferens: he must next pass a ligature between them, and having tied the former only, he must cut through the whole chord at a quarter or half an inch from the ligature. The next thing to be done is, to dissect the testicle out from the scrotum. Should any vessels bleed, they are to be secured. The wound is then to be brought together to unite by the first intention, and the scrotum is to be supported by the T. bandage.

254. Q. What is meant by callus?

A. Callus is the ossific matter that forms the conjunction of a fractured bone.

255. Q. What is the theory of the formation of callus?

A. The theory of the formation of callus is this;—from the ends of a broken bone the arteries secrete a gelatinous matter; this very soon becomes organized by the elongation of the secreting vessel, which at length deposits bone in this new-formed animal substance, so as to produce a junction of the broken bone.

256. Q. What are the consequences that may arise from a fractured sternum?

A. The consequences that may result from a fracture of the sternum are, the fractured portion may be driven inwards, so as to produce a solid junction of the broken bone.

257. Q. How many kinds of ophthalmia are there?

A. Ophthalmia is distinguished into—1. acute; 2. chronic; 3. purulent; 4. scrofulous; 5. venereal; and 6. intermittent ophthalmia.

258. Q. What are the cases that require the operation for bronchotomy?

A. Bronchotomy has been proposed in the croup, to extract the coagulable lymph that would have caused suffocation. To remove foreign bodies that become impacted in the trachea. It has also been recommended to be performed on those recently suffocated or drowned; and in glossitis, where the tongue has so enlarged as to shut up the passage through the fauces.

259. Q. To what is prolapsus ani generally owing?

A. Prolapsus ani is mostly owing to a debility of the sphincter ani, and parts in its neighbourhood, which serve to support that intestine, and keep it in its proper place.

260. Q. When is paracentesis of the thorax required?

A. This operation is indicated when the heart or lungs are oppressed by any kind of fluid confined in the cavity of the chest.

261. Q. What causes the water to stop suddenly, which occasionally happens in drawing off the fluid in ascites?

A. This occurrence generally takes place from a piece of omentum or intestine obstructing the canula, which may be removed by introducing a probe, or any other blunt instrument, into the canula.

262. Q. In trepanning, a slight bleeding generally takes place from the diploë, when the saw has arrived at that part; what conclusion is to be formed when it does not take place?

A. When the saw has reached the diploë in trepanning, if an oozing of blood does not take place, an inference may be drawn that the dura mater is detached from the cranium at that part.

263. Q. What are the symptoms that sometimes attend luxations, besides an alteration in the shape of the joint?

A. In luxations some degree of inflammation takes place; occasionally there are convulsed motions and spasmodic affections of the muscles, from compression of the nerves by the displaced bone.

264. Q. How would you endeavour to unite a ruptured tendon?

A. A ruptured tendon is to be united, by bringing the ruptured ends of the tendon as nearly in contact as possible, and keeping the muscles of the part relaxed.

265. Q. What is the most common cause of a suppression of urine?

A. The most common cause of a suppression of urine, when a primary disease, is a paralytic affection of the coats of the bladder.

266. Q. What are the causes of incontinence of urine?

A. Incontinence of urine may be induced, from irritation on the neck of the bladder by stones, from a paralysis of the sphincter of the bladder, and from laceration of the parts in the extraction of large stones.

267. Q. At what period in suppression of urine, is puncturing the bladder to be had recourse to?

A. The operation is recommended to be performed on the third or fourth day from the commencement of the total obstruction, if milder modes have decidedly failed.

268. Q. How is the interrupted suture performed ?

A. The interrupted suture is performed by inserting two needles on one ligature, and introducing each of them at the bottom of the wound ; they are then to be pushed outwards at a proper distance from the edge of the wound, and the needles are to be taken off the ligature, which is to be pulled to bring the edges of the wound into contact. The number of ligatures is to be according to the extent of the wound.

269. Q. How is the twisted suture performed ?

A. The twisted suture is performed by introducing two or more pins, according to the extent of the wound through both its edges : when the edges of the wound are brought into contact upon the pins, a wax ligature is to be twisted round these, so as to form a figure of 8. This kind of suture is generally used in the operation for the hare lip.

270. Q. How is the glover's suture performed ?

A. The glover's suture is performed by passing a number of stitches in a spiral direction along the edges of the wound.

271. Q. For what is the glover's suture used ?

A. The glover's suture is used for wounds of the abdomen and intestines.

272. Q. For what is the interrupted suture used ?

A. The interrupted suture is made use of to bring the edges of large and deep wounds together.

PRACTICE OF PHYSIC.

1. Q. How many classes are there in the Cullenian arrangement of diseases?

A. There are four classes; viz. pyrexiaë—neuroses—cachexiaë—locales.

2. Q. How many orders are there in the class pyrexiaë?

A. There are five; viz. febres—phlegmasiaë—exanthemata—hæmorrhagiaë—profluvia.

3. Q. What are the divisions and genera in the order febres?

A. There are two divisions in the order febres; viz. intermittents and continued fevers. The genera of the intermittents are, quotidiana—tertiana—quartana. Those of the other division are, synocha—typhus—synochus.

4. Q. What are the stages that each paroxysm of an intermittent is characterized by?

A. The fits or paroxysms are marked by three different stages, which are called the cold, the hot, and the sweating stages.

5. Q. What is considered to be the exciting cause of an intermittent?

A. The effluvia arising from stagnant waters, or marshy ground, when acted upon by heat, called marsh miasmata.

6. Q. Are agues influenced by the time of year?

A. Yes: the tertian ague is most apt to prevail in the spring, and the quartan in autumn.

7. Q. What quantity of cinchona should be given during the intervals in the different species of agues?

A. In a quotidian, an ounce, at least, should be given between the fits; in a tertian, half as much more; and in a quartan, two ounces.

8. Q. What is meant by synocha?

A. Inflammatory fever ; a species of continued fever, characterized by increased heat, a frequent hard pulse, urine high-coloured, and senses not impaired.

9. Q. Is synocha often met with in large towns ?

A. No : it is prevalent in the country ; but is more particularly the disease of cold climates.

10. Q. What is the indication of cure in synocha ?

A. To lessen the excessive vascular action, by evacuations, and the antiphlogistic regimen.

11. Q. What disease is formed by a combination of the symptoms of synocha and typhus ?

A. Mixed fever, or synochus.

12. Q. What are the genera of the order phlegmasiæ ?

A. There are eighteen genera in this order ; viz. phlogosis—ophthalmia—phrenitis—cynanche—pneumonia—carditis—peritonitis—gastritis—enteritis—hepatitis—splenitis—nephritis—cystitis—hysteritis—rheumatismus—odontalgia—podagra—arthropuosis.

13. Q. What are the eruptive fevers in the order exanthemata ?

A. There are ten genera of eruptive diseases in the order exanthemata ; viz. variola—varicella—rubeola—scarlatina—pestis—erysipelas—miliaria—urticaria—pemphigus—aphtha.

14. Q. How many genera has the order hæmorrhagiæ ?

A. There are five genera in this order ; viz. epistaxis—hæmoptysis—hæmatemesis—hæmorrhoids—menorrhagia.

15. Q. What diseases belong to the order profluvia ?

A. Catarrhus and dysenteria.

16. Q. How many orders are there in the class neuroses ?

A. Four : comata—adynamiæ—spasmi—vesaniæ.

17. Q. What genera belong to the order comata ?

A. There are only two in this order, viz. apoplexiæ and paralysis.

18. Q. What are the diseases belonging to the order adynamiæ ?

A. Syncope—dyspepsia—hypochondriasis—chlorosis.

19. Q. What diseases belong to the order spasmi ?

A. Tetanus—trismus—convulsio—chorea—raphania—epilepsia—palpitatio—asthma—dyspnœa—pertussis—pyrosis—colica—cholera—diarrhœa—diabetes—hysteria—hydrophobia ; making seventeen in all.

20. Q. How many genera are there in the order vesaniæ ?

A. There are four genera in this order ; viz. amentia—melancholia—mania—oneirodynia.

21. Q. How many orders has the class cachexiæ ?

A. Three ; viz. marcores—intumescentiæ—impetigines.

22. Q. What genera belong to marcores ?

A. The genera of marcores are tabes and atrophia.

23. Q. What diseases belong to the order intumescentiæ ?

A. There are thirteen diseases that belong to this order ; viz. polysarcia—pneumatosis—tympanites—physometra—anasarca—hydrocephalus—hydrorachitis—hydrothorax—ascites—hydrometra—hydrocele—physconia—rachitis.

24. Q. What are the genera in the order impetigines ?

A. They are : scrofula—syphilis—scorbutus—elephantiasis—lepra—frambesia—trichoma—icterus.

25. Q. What are the orders of the class locales ?

A. Locales comprehends eight orders : dysæthesia—dysorexiæ—dyscinesiæ—apocenoses—epischeses—tumores—ectopiæ—dialysis.

26. Q. What do you understand by inflammation ?

A. By inflammation is understood that state of a part in which it is painful, hotter, redder, and more turgid than it naturally is. These local symptoms, when present in any great degree, or when they affect very sensible parts, are attended with fever.

27. Q. How many kinds of inflammation are there ?

A. There are two kinds of inflammation ; viz. the phlegmonoid and the erysipelatous ; each of which is

divided into the acute or active, and the chronic or passive.

28. Q. How do you distinguish phlegmonoid from erysipelatous inflammation.

A. Phlegmonoid inflammation may be distinguished by the tumefaction being circumscribed, and not diffused, as in erysipelatous inflammation. The redness of phlegmon does not disappear on pressure, as in erysipelas; nor is the sense of throbbing and darting pain so observable in erysipelas as in phlegmon.

29. Q. How would you distinguish chronic from acute inflammation?

A. Chronic inflammation may be distinguished from acute by its long continuance, the want of activity in the symptoms, and by the fever having abated, or assumed a new type.

30. Q. What treatment does active inflammation require?

A. Active inflammation requires powerful antiphlogistic measures; as blood-letting, purging, diaphoretics, and a low diet.

31. Q. Does active erysipelas give way to the same plan?

A. Active erysipelas in the country generally gives way to the same kind of treatment; but the erysipelas of large towns, being accompanied by typhus fever, soon requires bark, acids, wine, &c.

32. Q. What is the proper regimen and diet of inflammatory diseases called?

A. The proper regimen and diet of inflammatory diseases is called antiphlogistic.

33. Q. What food and drink do you consider antiphlogistic?

A. The food and drink which may be considered as antiphlogistic are, all kinds of vegetables especially the farinaceous, light puddings, barley-water, toast and water, &c.

34. Q. Which are the antiphlogistic purgatives?

A. The best are those which are refrigeratory, such as the sulphate of soda, the sulphate of magnesia, the sulphate of potass, and the tartrate of potass.

35. Q. What is meant by inflammatory diathesis ?

A. By inflammatory diathesis is meant a state of body that favours and attends inflammatory diseases, such as a redundancy of blood, an increased action of the heart and arteries, a fulness of habit, &c.

36. Q. What kind of urine is made when active inflammation exists ?

A. When active inflammation exists, the urine voided is of a high colour ; and when allowed to stand, deposits the lateritious or brickdust-like sediment.

37. Q. What is the composition of the lateritious sediment ?

A. The lateritious sediment is found to consist of uric acid, with phosphate of lime.

38. Q. What character has the pulse when inflammation is going on ?

A. The pulse, when inflammation is going on, is frequent, strong, and hard.

39. Q. What kind of delirium is most frequent in typhus fevers ?

A. The delirium most frequent in typhus is not of the violent kind, and is marked by low muttering, accompanied with stupidity.

40. Q. Is bleeding recommended in the cure of typhoid fevers ?

A. Bleeding is not recommended in typhus fevers, because it would weaken the energy of the powers necessary to life, the actions of which are already weaker than they ought to be.

41. Q. How many species of typhus fevers are there ?

A. There are four species of typhus fevers ; 1st, typhus nervosus, or nervous fever ; 2d, typhus mitior, the low fever, or mild form of typhus ; 3d, the typhus gravior, the severe species of typhus fever, or putrid fever ; 4th, the typhus icterodes, or typhus with symptoms of jaundice.

42. Q. What is the most common cause of typhus fevers ?

A. Contagion, a poison generated from putrid animal and vegetable substances ; by the human body under the disease ; by confined animal secretions, and other sources !

43. Q. What kind of a pulse have you in enteritis?

A. In inflammation of the intestines, or enteritis, the pulse is often peculiarly small and feeble.

44. Q. What are the symptoms of gastritis?

A. Pain in the epigastric region increased under pressure, frequent vomiting, particularly when any thing is taken into the stomach, occasionally hiccup, and a small and frequent pulse.

45. Q. How may inflammation of the trachea terminate?

A. It may terminate in suppuration, but more frequently it ends either in resolution or by the formation of coagulable lymph, so as to cause suffocation in many instances.

46. Q. What are the symptoms of trismus?

A. When trismus comes on gradually, the symptoms are—a slight stiffness is at first perceived at the back part of the neck, which, after a short time, becomes considerably increased, and at length renders the motion of the head both difficult and painful. With the rigidity of the head, there is likewise an uneasy sensation at the root of the tongue, together with some difficulty in swallowing; and a great tightness is perceived about the chest, with a pain at the sternum, shooting into the back; a stiffness next takes place about the jaws, which increases to such a height, that the teeth become closed together, and the disease trismus or locked-jaw is formed.

47. Q. To what diseases are muscles subject?

A. Muscles are subject to morbid contraction, which may be either spasmodic, or permanent; they are liable to inflammation, to have abscesses form in them, to become gangrenous, to become flaccid, to be diminished in bulk, to have bony matter deposited in their substance, and to rheumatism.

48. Q. What is a cramp or spasm?

A. A spasm or cramp is an involuntary contraction of the muscular fibres, or that state of the contraction of muscles, which is not spontaneously disposed to alternate with relaxation.

49. Q. How many species of scarlatina are there?

A. Three;—1. scarlatina simplex; 2. scarlatina anginosa; and, 3. scarlatina maligna.

50. Q. Is it proper to use cold ablution in rubeola?

A. No; if the eruption be repelled by cold, delirium, dyspnœa, or diarrhœa occurs, attended with considerable danger.

51. Q. On what day of the fever does the eruption of measles appear?

A. Generally on the fourth day.

52. Q. How many species of variola are there?

A. Two: viz. variola discreta, and variola confluens.

53. Q. What kind of fever attends confluent small-pox.

A. Typhoid, or malignant fever.

54. Q. After varicella has existed for four days, can you distinguish it from variola?

A. Yes; at this period you have often vesicles, pustules, and incrustations or scabs existing together, which distinguish its eruption from the firm and durable pustules of small-pox.

55. Q. What kind of habits are most liable to hæmoptysis?

A. Persons of a sanguineous temperament; and more frequently perhaps men than women.

56. Q. What is the colour of the blood usually coughed up in the hæmoptysis?

A. Generally a florid colour.

57. Q. What is the appearance of the blood brought up in hæmatemesis?

A. It is dark-coloured or black, generally fluid, and often mixed with portions of food; sometimes it has the appearance of coffee-grounds.

58. Q. What fever accompanies phthisis?

A. Hectic fever.

59. Q. What may be expected to take place in consequence of apoplexy not being cured?

A. If apoplexy is not removed entirely, it often leaves a state of mental imbecility behind, or terminates in hemiplegia or death.

60. Q. What persons are most subject to the serous form of apoplexy?

A. Those of a phlegmatic habit of body.

61. Q. What are the indications of cure in dyspepsia?

A. There are three indications of cure in dyspepsia; 1. to obviate the several exciting causes; 2. to relieve urgent symptoms; and, 3. to restore the tone of the stomach, or the general system.

62. Q. How is dropsy distinguished according to the situation of the fluid?

A. When it is diffused through the cellular membrane it is called anasarca; when it is deposited in the cavity of the cranium it is termed hydrocephalus; when in the chest, hydrothorax; when in the abdomen, ascites; in the uterus, hydrometra; and within the tunica vaginalis, hydrocele.

63. Q. How would you form a prognosis in vertigo?

A. When it arises as a symptom of hysteria or any other nervous disease, it is not attended with danger; but when it takes place in consequence of an overfulness of blood in the head, it becomes dangerous, as it may lead to apoplexy or palsy.

65. Q. What is the office of the liver?

A. The office of the liver is to supply a fluid called bile to the intestines, which is of the utmost importance in chylification.

66. Q. What are the characters of healthy bile?

A. Healthy bile is of a yellow-green colour, of a plastic consistence, like thin oil, and when very much agitated it froths like soap and water; its smell is somewhat like musk, and its taste is bitter.

Q. 67. What are its uses?

A. The uses of bile are—1st. to extricate the chyle from the chyme; 2d, by its stimulus it excites the action of the intestines; 3d, it imparts a yellow colour to the fæces; 4th, it prevents the abundance of mucus, and acidity, in the primæ viæ.

68. Q. Does bile ever get into the blood?

A. Yes: bile gets into the blood when its regular course is interrupted, as in jaundice, diseased liver, &c.

69. Q. How does it get into it?

A. Bile gets into the blood through the medium of the absorbents, which remove it from the bile ducts that are preternaturally distended, and convey it into the blood by means of the thoracic duct.

70. Q. What is the most common way in which the bile is prevented passing, as it ought to do, out of its ducts into the duodenum?

A. The most common way in which bile is prevented passing through its ducts into the duodenum, is from an obstruction in the ductus communis chole-dochus.

71. Q. In what way may the ductus communis chole-dochus be obstructed?

A. The ductus communis may be obstructed by spasm, by a calculus, by mucus from the duodenum, and by the pressure of adjacent tumours.

72. Q. How do you know when the bile is vitiated or unhealthy?

A. The stomach does not perform its function properly, the intestines are irritated, and the fæces are not of their healthy colour.

73. Q. Does a vitiated bile influence the formation of the blood?

A. Yes;—vitiating bile impairs digestion; the chyle is not properly separated from the chyme, or that which is separated is of a diseased quality; and when formed into blood, the blood is of an unhealthy nature, and improper for nutrition.

74. Q. What are the unhealthy appearances of the blood that you are acquainted with?

A. The unhealthy appearances of the blood that are usually met with are, an excess of crassamentum, an excess of coagulable lymph in the crassamentum, which shows itself by the white coriaceous crust on the surface; a loose flabby cruor; an excess of serum; a yellow serum.

75. Q. When too much coagulable lymph exists in the cruor, how does it affect the solids?

A. When there is too much coagulable lymph in the cruor, the solids are firmer than they should be, and there is a predisposition in the system to inflammatory diseases.

76. Q. When the crassamentum is loose, and the serum in excess, how are the solids influenced ?

A. The solids are loose and flabby, and there is a tendency to dropsy.

77. Q. What do you understand by excitement ?

A. Excitement is the property by which animals may be affected by external agents, as well as by certain powers peculiar to themselves, in such a manner, that the phenomena peculiar to the living state can be produced.

78. Q. In the commencement of fevers, when there is no diminution of vital energy, what means are the most likely to stop their progress ?

A. The means most likely to stop their progress, under such circumstances, are, an emetic, combined with a cathartic and blood-letting.

79. Q. What are the most proper remedies to check febrile action at the very commencement, when there is an evident diminution of vital power ?

A. When there is an evident diminution of vital power at the commencement of febrile action, a cordial diaphoretic, as the compound powder of ipecacuanha, spirit of sulphuric and nitric ether, are found the most successful ?

80. Q. What do you mean by tetanus ?

A. It is a rigid spasm of several muscles of the body.

81. Q. How would you treat inflammation of the bowels ?

A. By general and topical blood-letting, by the warm bath and fomentations, by the frequent exhibitions of purges, and by giving saline diaphoretics with mucilaginous drinks.

82. Q. What is a dysentery ?

A. It is a spasmodic constriction of the colon, with a retention of the natural fæces, and the frequent expulsion of mucous or sanguineous motions.

83. Q. What are the symptoms of enteritis ?

A. Fever, costiveness, a twisting around the umbilicus, tension and acute pain of the abdomen, increased pain upon pressure, tenesmus or vomiting, according to the seat of the inflammation: quick or slow, and

hard, contracted pulse ; great prostration of strength, and high-coloured urine.

84. Q. What are the symptoms of volvulus ?

A. Violent pain and distention of the abdomen, attended with a peculiar twisting around the navel, obstinate costiveness, slight febrile symptoms, and a frequent vomiting of a stercoraceous matter.

85. Q. What are the symptoms of nephritis ?

A. Pyrexia, pain in the region of the kidney, extending along the course of the ureter, accompanied with numbness of the leg and thigh of the affected side, nausea and vomiting, retraction of the testicle, high-coloured urine, sometimes mucous or bloody, frequent micturition, dysuria.

86. Q. How would you distinguish hepatitis from gastritis ?

A. From gastritis by the seat of the pain, by the sympathetic pains of the clavicle and shoulder, by the less prostration of strength, and greater fulness of the pulse, by the colour of the stools and urine.

87. Q. What purges would you give in nephritis ?

A. Oleaginous purges and frequent emollient clysters.

88. Q. What are the symptoms of pneumonia ?

A. Obtuse pain and sense of weight and oppression in the chest ; anxious breathing, and the pain is increased during inspiration ; hard, contracted, and frequent pulse ; the face is usually flushed, and of a purple hue ; the tongue is white, the urine is high-coloured, and there are other symptoms of synocha.

89. Q. How would you distinguish cystitis from enteritis ?

A. From enteritis by the seat of the pain ; the tension and tumour, which is above the pubes in cystitis ; by the micturition, and by the painful discharge of urine in small quantities, or the complete obstruction to its passage.

90. Q. When gangrene takes place in internal parts, what are the symptoms ?

A. A peculiar appearance of the countenance ; cold perspirations ; coldness of the extremities ; sudden cessation of pain ; hiccup ; subsultus tendinum ; suppres-

sion of urine ; convulsions, and the pulse scarcely perceptible.

91. Q. What are the symptoms of hydrocephalus ?

A. Languor, inactivity, loss of appetite, nausea, vomiting, parched tongue, dry skin, flushing of the face, and other symptoms of pyrexia ; pain over the eyes ; the pain in the head becomes extremely acute, and intermits, occasioning the patient to scream violently ; disturbed sleep, extreme restlessness, flushed countenance, costiveness, vomiting, stupor, convulsions, dilated pupils.

92. Q. What is a typhus fever ?

A. A very infectious fever, characterized by great debility, disturbed animal functions, languid circulation, furred tongue, aching pains in different parts of body, particularly the head and small of the back, and the evacuated fluids of the body undergoing speedy putrefaction.

93. Q. What are the indications of cure in a typhus fever ?

A. To excite a new action in the system, by rousing that of the brain and arteries ; to support the strength of the patient ; and to obviate the putrid tendency in the fluids.

94. Q. What is the best way of destroying the fetid smell of sick wards ?

A. By extricating nitrous fumes from a mixture of nitre and sulphuric acid placed in hot sand.

95. Q. What is meant by scrofula ?

A. A peculiar disease affecting people of a particular habit of body, and usually the glandular parts, causing them to swell.

96. Q. What is the best way of relieving inflammatory affections ?

A. By bleeding either locally or generally, by blisters exhibiting cathartics, diaphoretics, and a low diet.

97. Q. How is the colic distinguished from enteritis ?

A. The colic is distinguished from enteritis by the peculiar twisting and occasional pain ; by the absence of fever in the early part of the disease ; by the pain in

enteritis being increased, in colic alleviated, by pressure; by the irregular contraction of the abdominal muscles.

98. Q. How is a diarrhœa distinguished from dysentery.

A. Diarrhœa is distinguished from dysentery by being unattended either with fever, inflammation, contagion, or tenesmus; by the appearance of the matter evacuated, which in one disease is feculent or mixed with alimentary matter, in the other mucal, sanguineous, or putrid.

99. Q. How many species of diabetes are there?

A. There are two species of diabetes, viz. diabetes mellitus, and the diabetes insipidus.

100. Q. How is mania distinguished from phrenitis?

A. Mania is distinguished from phrenitis by the former being without fever, which the latter never is.

101. Q. What is meant by anasarca?

A. Anasarca is a preternatural collection of serum or watery fluid in the cellular membrane of the whole or part of the body.

102. Q. What are the indications in the cure of scurvy?

A. The indications in the cure of scurvy are—1st, to correct the septic tendency of the fluids; 2d, to palliate urgent symptoms; 3d, to restore the tone of the solids.

103. Q. What are the species of tympanites?

A. There are two species of tympanites, viz. tympanites abdominalis, or collection of air in the cavity of the peritonæum; and tympanites intestinalis, or collection of air in the cavity of the intestines.

104. Q. What are Dr. Cullen's species of paralysis?

A. His species of paralysis are, 1st, paralysis partialis, or palsy of a certain muscle or set of muscles; 2d, paralysis hemiplegica, or a total palsy of one side of the body; 3d, paralysis paraplegica, or a palsy of one half the body taken transversely; 4th, paralysis venenata, or palsy from poisons.

105. Q. How many species of catarrh are there?

A. Two, viz. catarrhus a frigore, or common cold, and catarrhus contagiosus, or the influenza.

106. Q. What are the species of apoplexy?

A. There are several; but the most useful distinction is into the sanguineous and the serous.

107. Q. What are the indications of cure in dropsy?

A. To evacuate the fluid, and to prevent a second accumulation.

108. Q. How many species of cholera are there?

A. Two, viz. cholera spontanea and cholera accidentalis.

109. Q. What are the species of syncope?

A. Three, viz. syncope accidentalis, syncope cardiaca, and syncope anginosa.

110. Q. What are the indications of cure in catarrh?

A. To reduce the febrile action of the system, and to allay the irritation of the affected parts.

111. Q. How is synocha distinguished from typhus?

A. From typhus by the more sudden accession of the disease; by its arising from common causes, as sudden alterations of temperature; the application of cold to a heated body; violent exercise, intemperance, &c., and not from contagion; by the strength of the body not being diminished; the hardness of the pulse; the whiteness of the tongue; and by the high colour of the urine.

112. Q. How is cynanche tonsillaris distinguished from cynanche maligna?

A. By the fever, which in the former is inflammatory, in the latter typhoid, and by the absence of ulceration in cynanche tonsillaris.

113. Q. How is rheumatism distinguished from podagra?

A. By it generally attacking the larger joints; by the pain shifting its seat, and following the course of the muscles in its translation to other parts; by the disease not having been preceded by symptoms of dyspepsia; by its occurring at any period of life, whereas gout is usually confined to the adult age.

114. Q. How is tympanites distinguished from ascites?

A. By the absence of fluctuation and of those symptoms which characterize the hydroptic diathesis.

115. Q. What are the indications of treatment in intermittent fever?

A. In the first place, to evacuate thoroughly the stomach and bowels with a view of removing the cause of disease; secondly, to shorten the duration of the paroxysm; and thirdly, to prevent its recurrence.

116. Q. How is the first indication to be accomplished?

A. By emetics and purgatives.

117. Q. In what stage of the disease are emetics most proper to be given?

A. A short time before the accession of the paroxysm.

118. Q. What is the best emetic to be used?

A. Tartarized antimony and ipecacuanha combined.

119. Q. How is the second indication of cure to be accomplished?

A. In the cold stage, by the external application of heat and warm diluent drinks; and in the hot stage, by general antiphlogistic treatment.

120. Q. How is the third indication to be accomplished?

A. By tonics.

121. Q. What tonics are best suited to this purpose?

A. Peruvian bark; sulphate of quinine; Fowler's solution; and the vegetable bitters generally.

122. Q. What is the dose of sulphate of quinine?

A. From one to two grains.

123. Q. What is Fowler's solution?

A. It is a solution of arsenic with sub-carbonate of potash.

124. Q. What is the dose in which it is given?

A. From five to ten drops.

125. Q. Is opium ever used in intermittent fever?

A. Given a short time before the paroxysm is expected to come on, it frequently prevents its access.

126. Q. What are the symptoms of yellow fever?

A. A slight rigour succeeded by great heat, pain in the forehead and over the eye-balls; in the back and

the calves of the legs ; oppression and heat about the præcordia, nausea, and retching. The pulse is full and quick, and sometimes natural ; tongue moist with red edges ; the eyes of a peculiar reddish tinge, and countenance looks depressed. After thirty-six or forty-eight hours these symptoms subside, and are soon followed by great prostration, increased nausea, vomiting of a dark flocculent matter with slate-coloured sediment, great pain in epigastico, intolerable thirst, dark yellow suffusion over the face, neck, and breast ; death.

127. Q. What is the usual duration of yellow fever ?

A. From three to seven days.

128. Q. What is black vomit ?

A. A hæmorrhage from the villous coat of the stomach.

129. Q. At what season of the year does yellow fever occur ?

A. During the summer and autumn.

130. Q. What effect has frost upon the spread of yellow fever ?

A. It puts a stop to it immediately.

131. Q. How is yellow fever to be treated ?

A. During the first two days of the disease, if the pulse be full and hard, bleeding may be resorted to ; after this purgatives ; sudorifics ; and blisters to the region of the stomach.

132. Q. What are the effects of emetics in yellow fever ?

A. They always increase the irritability of the stomach, and thus invariably prove injurious.

133. Q. What are the symptoms of bilious remitting fever ?

A. The symptoms resemble those of ordinary remittents, with the addition of great discharges of bile both upward and downward ; and they are more apt to prove speedily fatal.

134. Q. What is the mode of treating it ?

A. If the pulse requires it, venesection ; after this emetics, succeeded by purgatives and the antiphlogistic regimen. If the fever still continue, blisters, and calomel, so as to produce ptyalism.

135. Q. In what seasons of the year does typhus fever occur ?

A. At all seasons, but more especially during the autumn and winter.

136. Q. How is ophthalmia to be treated ?

A. By blood-letting, general and local ; active purging ; blisters to the neck, and sedative lotions to the eye.

137. Q. What are the symptoms of phrenitis ?

A. Acute pain in the head ; eyes red and painful ; face flushed ; great intolerance of light and sound ; general inflammatory fever, delirium, coma, and death.

138. Q. What are the causes of phrenitis ?

A. Injury to the brain from external violence ; intoxication ; great heat or cold ; intense study ; the suppression of habitual discharges.

139. Q. How is phrenitis to be treated ?

A. Copious venesection ; purging ; blisters, with strictest antiphlogistic regimen.

140. Q. How does phrenitis differ from mania ?

A. Mania is of longer duration, and unaccompanied by general fever.

141. Q. What are the different species of cynamche ?

A. Cynamche tonsillaris—cynamche maligna—cynamche laryngæa—cynamche trachealis—cynamche parotidæa.

142. Q. What are the symptoms of cynamche maligna ?

A. Tumour and redness of the fauces, ending in ulceration and sloughing of the parts. The fever accompanying it is of the typhoid character.

143. Q. Is cynamche maligna contagious ?

A. It is generally believed to be so.

144. Q. How is cynamche maligna to be treated ?

A. By emetics ; calomel blisters to the throat ; and stimulating and detergent gargles.

145. Q. What are the symptoms of cynamche laryngæa ?

A. Pain about the larynx, hoarseness and slight redness about the fauces, the epiglottis frequently erected and swollen, the breathing difficult, great mental agitation, and the circulation much hurried.

146. Q. What are the causes of cynanche laryngæa?

A. Cold is the principal exciting cause.

147. Q. How is cynanche laryngæa to be treated?

A. By general antiphlogistic means.

148. Q. In what patients does cynanche laryngæa generally occur?

A. In adults.

149. Q. At what period of life does cynanche trachealis or croup occur?

A. In infants, and young persons under twelve years of age.

150. Q. What are the symptoms of croup?

A. Difficulty of breathing, pain or uneasiness in the region of the trachea; shrillness of voice, and a dry cough resembling the barking of a dog; accompanied with general febrile symptoms.

151. Q. What are the appearances on dissection in croup?

A. A preternatural membrane lining the whole of the trachea, and extending frequently into the bronchiæ.

152. Q. What are the causes of croup?

A. Cold and a variable atmosphere.

153. Q. How is croup to be treated?

A. By emetics; repeated venesection; blisters, and other antiphlogistic remedies.

154. Q. How does Dr. Cullen define pneumonia?

A. Pyrexia, pain in some part of the thorax, dyspnoea and cough.

155. Q. Into how many species is it divided?

A. Two—peripneumony and pleurisy.

156. Q. What is the difference between peripneumony and pleurisy?

A. Peripneumony is an inflammation of the parenchymatous substance of the lungs, characterized by deep-seated pain, cough, expectoration of mucous and bloody matter; general fever. Pleurisy is an inflammation of the membrane investing the lungs; pain in the side; pulse hard and frequent; cough dry.

157. Q. What are the causes of pneumonia?

A. Cold and moist weather ; violent exercise ; violent coughing ; acrid vapours received into the lungs ; certain other diseases of the lungs, and even of the abdomen.

158. Q. What is the treatment proper in pneumonia ?

A. Blood-letting, free and repeated according to the circumstances of the case ; nauseating medicines, as tartar emetic ; blisters, and other antiphlogistic means.

159. Q. What is a stethoscope ?

A. It is an instrument by which the chest can be examined to ascertain the existence of disease in it. It is cylindrical in form, composed of wood of a light loose texture, twelve inches in length, and four and a half in circumference. It is perforated through its middle by a canal, lined with a brass tube, through which the sound is conveyed, and at the pectoral extremity it has a funnel-like excavation, which can be filled up. By applying one end of this instrument to the thorax of a patient, and the other to the ear, so that its canal will be opposite to the meatus, and causing the patient to speak, the vibration of peculiar sounds, characteristic of morbid conditions of the lungs, is rendered audible.

160. Q. What is the treatment proper in dysentery ?

A. If the pulse is full and hard, and pain very urgent, blood should be drawn from the arm and leeches applied to the abdomen. Calomel should then be given, combined with rhubarb, ipecacuanha, or opium, and alternated with the use of castor oil or sulphate of magnesia, according to the symptoms which prevail. Barley-water should be drank freely throughout the disease.

161. Q. How would you ascertain whether dropsy is attended by an inflammatory state of the system or not ?

A. By subjecting the urine of a dropsical patient to the action of heat : if a coagulum appears in the urine, it is considered a test of inflammation, and depletory means are indicated, and vice versa.

162. Q. What treatment has been found most successful in hydrocephalus internus ?

A. Before water is actually effused to any extent, the disease has been removed by large and repeated venesection, cathartics, blisters, and mercury given to the extent of inducing salivation.

163. Q. How would you treat a case of cholera morbus?

A. Diluents to be freely given at first to assist in clearing out the stomach; after this opiates and astringents, &c.

164. Q. What is the treatment proper in cholera infantum?

A. Calomel alone, or in combination with ipecacuanha, in small doses, so as to produce an alterative effect; where the bowels are too loose, opium must be interposed. In the later stages, mild astringents and tonics may become necessary. The warm bath, together with flannel next the skin, are proper.

165. Q. To what diseases is the spleen subject?

A. To acute and chronic inflammation, and to schirrus.

166. Q. How is diabetes to be treated?

A. By the use of animal food and by tonics.

167. Q. What are the symptoms of angina pectoris?

A. An acute pain or stricture at the lower part of the sternum, great anxiety, violent palpitation of the heart, difficulty of breathing, and a sense of suffocation.

168. Q. What is the treatment of angina pectoris?

A. Venesection, blisters, anodynes, a recumbent posture, and perfect quiet of mind and body.

169. Q. How is scurvy to be treated?

A. By the use of fresh vegetable diet, the free use of lemon juice, cleanliness and free ventilation, and tonics.

170. Q. How are cutaneous diseases divided by Dr. Willan?

A. Into eight orders, viz. 1. *papulæ*, (pimples); 2. *squamæ*, (scales); 3. *exanthemata* (rashes); 4. *bullæ*; 5. *pustulæ*, (pustules); 6. *vesiculæ*, (vesicles); 7. *tuberculæ*, (tubercles); 8. *maculæ*, (spots).

171. Q. How is the first order, *papulæ*, described?

A. *Papulæ* or pimples originate in an inflammation

of the papillæ of the skin, by which they are enlarged, elevated and indurated, and made to assume more or less of a red colour. Sometimes even a slight effusion of lymph takes place, which gives a vesicular appearance to several of the papulæ; but the fluid is absorbed without breaking the cuticle, and they terminate for the most part in scurf.

172. Q. How many genera are included under this order?

A. Three, viz. 1. *strophulus*, (red gum, white gum of children); 2. *lichen*,—affects adults, and embraces *tetters*, *ringworms*, *prickly heat*, &c.; 3. *prurigo*.

173. Q. How is the second order, squamæ, defined?

A. Opaque or thickened laminæ of the cuticle, called scales; commonly produced by some degree of inflammation of the true skin, over which they are formed; occasionally the cuticle alone, or with the rete mucosum, appears in a morbid state.

174. Q. What are the genera under this order?

A. 1. *Lepra*; 2. *psoriasis*; 3. *pityriasis*; 4. *ichthyosis*.

175. Q. How is the third order, the exanthemata, defined?

A. Patches of superficial redness of the skin, of various extent and intensity, occasioned by an unusual determination of blood into the cutaneous vessels, sometimes with partial extravasation. Some are contagious, others not; some are always febrile, others not manifestly attended with fever; some continue for a definite time, others are of an uncertain duration.

176. Q. What are the genera of this order?

A. 1. *Rubeola*, (measles); 2. *scarlatina*, (scarlet fever); 3. *urticaria*, (nettle-rash); 4. *roseola*; 5. *purpura*; 6. *erythema*.

177. Q. How is the fourth order, bullæ, described?

A. Large and often irregular vesications, which discharge a watery fluid when they break; the excoriated surface is sometimes covered with a flat yellowish or blackish scab, which remains till a new cuticle is formed underneath; sometimes it is converted into an obstinate ulcer.

178. Q. What are the genera of this order?

A. 1. *Erysipelas*; 2. *pemphigus*. 3. *pompholyx*.

179. Q. How is the fifth order, pustulæ, defined?

A. Pustules, originating from an inflammation of the skin, and the consequent partial effusion of purulent matter under the cuticle, by which the latter is elevated into small circumscribed tumours; often terminating in a scabby incrustation, varying in hardness according to the various tenacity of the contained fluid; and sometimes superficial ulceration: some contagious, others not; some acute, others chronic.

180. Q. What are the genera of this order?

A. 1. *Impetigo*; 2. *porrigo*; 3. *ecthyma*; 4. *variola*, (small pox); 5. *scabies*, (itch).

181. Q. How is the sixth order, vesiculæ, defined?

A. They are characterized by a small orbicular elevation of the cuticle, containing lymph, which is sometimes clear and colourless, but often opaque and whitish or pearl-coloured. It is succeeded either by scurf, or by a laminated scab.

182. Q. What are the genera of this order?

A. 1. *varicella*, (chicken pox); 2. *vaccinia*, (cow pox); 3. *herpes*; 4. *rupio*; 5. *miliaria*; 6. *eczema*; 7. *aphtha*.

183. Q. How is the seventh order, tubercula, defined?

A. Tubercles, small, hard, superficial tumours, circumscribed and permanent, or suppurating partially.

184. Q. What are the genera of this order?

A. 1. *Phisma*; 2. *verruca*; 3. *molluscum*; 4. *viti-ligo*; 5. *acne*; 6. *sycosis*; 7. *lupus*; 8. *elephantiasis*; 9. *frawbæsia*.

185. Q. How is the eighth order, maculæ, defined?

A. They comprise those discolourations of the skin which are permanent, and most of which are the result of an alteration of the natural texture of the part. It comprehends therefore several varieties of connate and acquired disfigurations of the skin, some of which are not capable of being removed, and most of them are removable only by surgical means.

186. Q. What are the genera of this order?

A. *Ephelis*, (freckles); 2. *nævus* and *pilus*, &c.

OBSTETRICS.

Q. WHAT are the bones of the pelvis ?

A. The bones of the pelvis are five ; viz. the two ossa innominata, the os sacrum, and the os coccygis.

Q. What are the general divisions of the pelvis ?

A. The pelvis for convenience is divided into three parts, called—the brim, or superior strait ; the cavity ; and the outlet, or inferior strait.

Q. What are the diameters of the two straits ?

A. In a well-formed pelvis, the diameters will be as follows : at the superior strait, the antero-posterior diameter, running from the superior part of the symphysis pubis to the projection of the sacrum, 4 inches ; the transverse diameter, running from side to side, 5 inches ; and the oblique diameter, running from one acetabulum to the opposite sacro-iliac junction, 5 inches ; at the inferior strait, the antero-posterior diameter is between 4 and 5 inches ; the transverse and oblique, each 4 inches.

Q. What is meant by a deformity of the pelvis ?

A. Any material variation in the diameters from those of a well-formed pelvis, constitutes a deformity.

Q. What inconvenience may be apprehended from a pelvis of augmented capacity ?

A. The uterus, in pregnancy, not ascending out of the pelvis at the usual time, produces uneasy sensations ; is liable to be prolapsed, when the bladder is distended, to be retroverted ; at the termination of gestation, to descend to the orifice of the vagina ; and during labour, if the pains are violent, and the os tincæ not dilated, to be forced, together with the child, out of the vagina.

Q. What are the most frequent causes of a diminution of the capacity of the pelvis ?

A. The diminution of the different diameters of

the pelvis is generally owing to rachitis, malacostion, exostosis, or tumours.

Q. What is the least capacity that will admit of a successful termination of labour at the full period?

A. Labour at the full time is impracticable if the antero-posterior diameter of the pelvis be less than 3 inches.

Q. What are the contents of the gravid uterus?

A. The gravid uterus contains the ovum, which consists of the following parts; viz. two membranes, called the chorion and amnion, closely attached to each other by cellular tissue, the inner one containing a quantity of fluid called the liquor amnii, in the midst of which lies the fœtus.

Q. How is the fœtus connected with the mother?

A. The fœtus, as suspended in the middle of the membranes, is attached to the mother by means of the funis umbilicalis, commencing at its navel and terminating in the placenta, which is attached immediately to the walls of the uterus.

Q. Where does conception take place?

A. At one of the ovaria; an ovum is excited into action, passes by means of the Fallopian tube to the uterus, where it is arrested and retained till the termination of gestation.

Q. What is the term of utero-gestation?

A. The process of gestation requires about forty weeks.

Q. What are the signs of pregnancy?

A. Suppression of the catamenia, nausea and vomiting, enlargement of the mammæ, the formation of an areola around the nipple, dyspeptic symptoms, and afterward enlargement of the abdomen and motion of the child.

Q. What is intended by the term quickening, and at what period does it occur?

A. At about the end of the fourth month of pregnancy the fundus uteri ascends out of the pelvis, when, for the first time, the motion of the fœtus is perceived; this is called quickening.

Q. What is labour?

A. Labour is the expulsive effort made by the uterus for the birth of the child, after it has acquired such a degree of maturity as to enable it to live independently of its uterine appendages.

Q. Into how many classes are labours divided?

A. Labours are divided into natural, difficult, preternatural, and complicated.

Q. What is a natural labour?

A. Natural labour is that in which the vertex presents, the head descends readily into the pelvis, taking such a direction as brings the occiput to emerge under the arch of the pubis. The labour terminates within twenty-four hours.

Q. What are the different stages of labour?

A. Labour is divided into four stages: during the first, the head of the fœtus passes through the superior strait of the pelvis, and the os uteri becomes dilated to the size of a dollar;—in the second stage the position of the head becomes changed, bringing the forehead into the hollow of the sacrum, and the occiput to emerge under the arch of the pubis;—the third stage produces the expulsion of the child through the os externum;—and the fourth stage, is accomplished by the delivery of the placenta.

Q. What are the precursory symptoms of labour?

A. Labour is usually preceded by a subsidence of the uterine tumour, a discharge of a glairy or mucous fluid from the vagina, frequent gripings or tenesmus, and an irritability of the bladder.

Q. How many varieties of natural presentation are recognised?

A. The presentation of the vertex admits of six varieties:—the first is where the posterior fontanelle is opposite to the left acetabulum, and the anterior fontanelle opposite to the right sacro-iliac junction; the second, where the anterior fontanelle answers to the right acetabulum, and the posterior to the left sacro-iliac junction; the third, where the anterior fontanelle is opposite to the pubes, and the posterior to the sacrum; the fourth is the converse of the first; the

fifth, the converse of the second; and the sixth, the converse of the third.

Q. Describe the manner of conducting a natural labour?

A. During the first and second stages, the patient may be allowed to sit or walk about, as she chooses; an occasional examination, per vaginam, to ascertain the progress of the labour, should be made: and all accumulations in the bladder or rectum obviated. Towards the termination of the second stage, she should be placed on the bed, lying on her left side, with her knees drawn up, her back towards and near to the side of the bed. So soon as the head of the child begins to protrude, the accoucheur, having covered his hand with a napkin, should endeavour to support, with the palm, the perineum, directing the head toward the pubis, but allowing it to advance by the effort of the mother alone. After the head is born, he should continue still to support the perineum until the delivery of the shoulders and trunk is effected. When respiration is completely established, a ligature should be applied around the funis, at about an inch from the belly, and the cord divided beyond the ligature. In the course of fifteen or twenty minutes, the pains are renewed, when the placenta becomes separated, and, together with the membranes, thrown into the vagina, from whence it is easily extracted. A bandage should now be applied to the abdomen of the patient, and she left to rest.

Q. What constitutes that variety of difficult labour, called lingering labour?

A. Labour in which the presentation is natural; which terminates without danger to the mother; which is effected principally by the natural pains; but which occupies a space of time exceeding twenty-four hours.

Q. What are the most frequent causes of lingering labour?

A. Original or accidental weakness of the patient, rigidity of the soft parts, a slight disproportion between the capacity of the pelvis and the head of the child, extreme distention of the uterus from an excess of the

liquor amnii, unusual thickness of the membrane, too early evacuation of the waters.

Q. Describe the manner of conducting a lingering labour.

A. Much must be trusted to time. Close attention must be paid to the state of the bladder and rectum; the patient's strength should be supported; if there is restlessness, opiates may be administered; in cases of great rigidity, venesection may be necessary, together with fomentations. Care must be taken to avoid every cause of fever or inflammation; and also to prevent the patient from exhausting herself by unavailing efforts to hasten the delivery. If the obstruction is owing to an over-distention of the uterus, or from an extreme thickness of the membranes, the remedy is to rupture the membranes. But this should not be resorted to while the head is above the brim of the pelvis; while the os uteri is undilated, or in a state of rigidity; or while the perineum is thick and firm.

Q. What course would be necessary where a labour becomes difficult from the exhaustion of the patient, the pains having become weak and inefficient?

A. In this case artificial assistance becomes necessary, as the safety of both mother and child is frequently endangered. If the soft parts are fully dilated, and the head still high up, the labour will be hastened by an exhibition of ergot; if, however, the head has descended so low, that the ear can be felt, the forceps or vectis should be applied.

Q. What are the most frequent malpositions of the head?

A. They are—first, presentation of the vertex with the forehead toward the pubis; second, presentation of the face; and third, where the position of the head is altered, by the descent of the hand or arm along with it.

Q. Describe the manner of conducting difficult labours of this class.

A. If these presentations are recognised before the rupture of the membrane, or in the early stage of the labour, the first variety may be remedied by altering

the position of the head; and the third, by keeping back the hand until the head has descended. If, however, the labour is far advanced, they must be left to the efforts of nature, which are generally sufficient.

Q. How would you proceed in a case of difficult labour, dependent on a malformation of the pelvis.

A. If the antero-posterior diameter of the pelvis is less than three inches, the labour can only be terminated by lessening the head of the child, or by the Cæsa-rean operation. If evident indications of the death of the child are present, the former may be immediately resorted to.

Q. What are the symptoms indicating the death of the child?

A. They are of two classes; the first showing the child to have been dead many days or weeks; viz. severe chills, followed by a sense of coldness in the abdomen, a feeling of a dead weight or lump in the uterus, subsidence of the abdomen, want of motion in the fœtus, flaccidity of the breasts, and a recession of the milk; the second, that, though the child was alive at the commencement of the labour, it has afterward been destroyed: viz. fetor and ill appearance of the discharges from the uterus, a want of pulsation in the umbilical cord; an adematous or emphysematous feel of the scalp, with the bones of the cranium loose and separate, and a want of motion in the child.

Q. Is a case ever rendered difficult by obstructions in the soft parts?

A. The passage of the child may be, and is, occasionally retarded by the presence of the hymen, or an adhesion of the labia, or the opposite sides of the vagina; by a polypus or other tumour growing from the organs of generation; by a diseased ovarium; by a protrusion of the bladder into the vagina; or by a hernia of a portion of intestine, &c. in the vagina.

Q. How are the difficulties of this kind to be overcome?

A. The existence of the hymen, or an adhesion of the labia, &c. is extremely rare, and would probably be overcome by the uterine action alone; if it were

not, a division may be made with the scalpel ; if the obstruction is owing to the presence of one or more tumours, and they of so large a size as to render assistance necessary, the forceps or vectis should be applied ; if they prove insufficient, either the tumour must be extirpated, or the head of the child lessened ; if the difficulty be occasioned by the pressure of an ovarian tumour, formed by an accumulation of fluid, the tumour may be punctured ; if by the pressure of the bladder, the catheter should be introduced ; if by the presence of a hernia, enemata will probably afford relief.

Q. How many species of obliquity of the uterus are recognised ?

A. There are three ; viz. where the os tinæ is inclined either to the right or left side ; when it is thrown backward toward the projection of the os sacrum ; and when it is projected forward over the symphysis pubis. By altering the position of the patient according to the kind of obliquity, the os tinæ may be restored to its natural situation.

Q. What is a preternatural labour ?

A. It is that in which any part of the child, except the head, presents.

Q. How should a breech presentation be managed ?

A. A case of breech presentation, though its progress through the first stage of labour is very slow, should be treated as a case of natural presentation until the nates have passed the os externum ; it should then be managed exactly like a footling case.

Q. Describe the manner of proceeding when there is a presentation of the lower extremities.

A. In order to allow full time for the perfect dilatation of the parts, and thus to remove the principal obstacle to the passage of the head, the membranes should be left entire so long as the pressure of the bag of water can be of any service, and the case left wholly to nature till the nates have passed the os externum. Then, if the toes point to either sacro-iliac junction, the child is already in the right direction, and the forehead will pass into the hollow of the sacrum ; if, how-

ever, they point to the symphysis pubis, the head will come in an unfavourable position. To remedy this, both thighs should be clasped; and, on the recurrence of pains, the body of the child gradually turned, so as moderately to incline the face toward the mother's back. When the labour has proceeded so far that the head only remains to be born, the finger of the left hand may be introduced into the child's mouth, and the chin depressed, the left arm forming a support for its body; the fore and middle fingers of the right hand should then be passed over the nape of the neck, one finger resting on each shoulder, and on a return of the pains, by a moderate degree of extracting force, the delivery will be accomplished. The danger to the child arises from the compression of the funis; therefore so long as pulsation is to be felt, there is no propriety in hastening the delivery; but, on the other hand, if the cord is thus pressed upon, life will be in danger until respiration is established.

Q. What are the most dangerous presentations?

A. The presentation of the superior extremities are attended with the most danger, and they are at the same time the most difficult to manage; for whether it be the hand, elbow, or shoulder, it is impossible for a full grown fœtus to pass without an alteration in the position.

Q. Describe the manner of proceeding in an arm presentation.

A. If it should be ascertained before the membranes are ruptured, that the arm is the presenting part, time must be allowed for the full dilatation of the os tincæ. So soon as this is accomplished, the operator must dilate the external parts till they no longer oppose any resistance to the introduction of his hand. Then slowly carrying it through the vagina, gently during the absence of pain, insinuate it into the os uteri, rupture the membranes, take hold of the feet, draw them down over the abdomen of the child, and terminate the labour as in a footling case. This is the safest and easiest case of turning, the liquor amnii being retained in the uterus by the hand of the operator.

Q. If the waters are already evacuated, and the arm and shoulder forced down into the vagina, what course must be pursued ?

A. Lessen the vigour of the system by bleeding or other depleting means, or diminish the action of the uterus by an opiate ; then gradually return the arm into the uterus, turn the child, and bring down the feet.

Q. How would you proceed when the funis presents ?

A. If pulsation is perceptible, showing that the child is still alive, endeavour to turn the prolapsed cord into the uterus ; if unsuccessful, either allow the labour to advance until the head is in the vagina, and then hasten its termination by the forceps, or turn and deliver by the feet.

Q. How would you conduct a labour of twins ?

A. The delivery of the first child should be managed as a case of single birth, then wait for a recurrence of the pains for the delivery of the second. Should they not come on within a reasonable length of time, rupture the membranes, and allow the labour to terminate by the efforts of the uterus. If the presentation of the second child is unfavourable, turn and deliver by the feet.

Q. What are the symptoms of laceration of the uterus ?

A. A consciousness of something giving way internally ; great languor and debility ; vomiting of a brownish or coffee-coloured fluid ; quick, weak, and fluttering pulse ; cold sweat ; difficult respiration, and a cessation of labour pains.

Q. What is the method of treating a laceration of the uterus ?

A. Endeavour to seize the feet and bring them down ; if impracticable, and the situation of the head will allow the application of the forceps, an attempt should be made to deliver by that means :—that also proving unsuccessful, the child having escaped into the abdomen, the case must be left to the natural efforts of the constitution.

Q. What are the causes of hæmorrhage, or flooding during labour?

A. Flooding during labour may be owing to a partial separation of the placenta; to the attachment of the placenta to the cervix uteri; or to its retention after the birth of the child.

Q. How would you treat a case of labour complicated with convulsions?

A. The treatment must depend upon circumstances:—It is generally necessary to bleed freely; to administer cathartics, with enemata; to shave the head and make cold applications to it. If the labour is progressing rapidly, trust to nature; but if the pains are unfrequent or inefficient, so soon as the head is within reach, deliver with the forceps. But if the danger to the mother should be increasing, and she appear to be sinking, the perforator must be resorted to.

Q. Describe the method of applying the forceps and vectis.

A. The forceps should never be applied unless the ear of the child can be felt. Then, having placed the patient on her left side, with the nates near the edge of the bed, pass the fore finger of the right hand to the child's ear, then with the left hand introduce one blade of the forceps, making the finger of the right the guide, and carry it forward over the ear; retaining the blade in this situation, in like manner introduce the other in the opposite side, bring the claws together and lock them. The extracting force should be gentle, and continued during the pains, until the object desired be attained. The vectis is applied in the same manner as a single blade of the forceps.

Q. Describe the manner of using the perforator?

A. The os tinæ being fully dilated, the operator should place his finger over the point of the perforator, and carry it forward until it reaches the head. After he has made an incision through the scalp, he must guard the instrument, to prevent it from slipping until he has drilled through the cranium, then enlarge the opening by drawing apart the handles.

MATERIA MEDICA.

1. Q. WHENCE does ammoniacum come ?

A. Ammoniacum comes from the East Indies ; the plant which affords this substance is also said to grow in Nubia, Abyssinia, and the interior of Egypt.

2. Q. What are the virtues of ammoniacum ?

A. The virtues of ammoniacum are stimulant, antispasmodic, and expectorant ; its dose is from ten to thirty grains. Externally applied, it is supposed to soften and ripen hard tumours.

3. Q. How many species of cinchona or Peruvian barks are there ?

A. There are several species, but only three in general use, viz. cortex cinchonæ cordifoliæ, or yellow bark ; —cortex cinchonæ lancifoliæ, or common quilled bark ; —cortex cinchonæ oblongifoliæ, or red bark.

4. Q. What are the virtues of cinchonæ bark ?

A. Tonic, antiseptic, and stomachic.

5. Q. What are the virtues of opium ?

A. Narcotic, antispasmodic, and stimulant, or sedative, according to the dose which is administered.

6. Q. What is the dose of digitalis ?

A. From one to three grains in the form of powder. †

7. Q. What are the virtues of aloes ?

A. Cathartic, emmenagogue, and anthelmintic.

8. Q. What do you mean by cathartics ?

A. Those medicines, which, when taken internally, increase the alvine evacuations.

9. Q. What do you mean by emmenagogues ?

A. Medicines which have the power of determining blood to the uterus, either by their local irritation, or by their exciting the action of the system generally.

10. Q. What are diaphoretics ?

A. They are medicines which augment the insensible perspiration.

11. Q. What are diuretics ?

A. Those medicines which increase the secretion of urine.

12. Q. What quantity of *confectio opii* of the London Pharmacopœia contains one grain of opium ?

A. About six and thirty grains.

13. What is meant by antispasmodics ?

A. Medicines which have the power of allaying or removing inordinate motion in the muscular system.

14. Q. What medicines come under the class of antispasmodics ?

A. *Moschus*, *castoreum*, *oleum animale*, *petroleum*, *ammonia*, *assafœtida*, *sagapenum galbanum*, *valeriana*, *oleum cajeputa*, *opium*, *camphor*, *æther*.

15. Q. What are the diseases in which *arnica* flowers have been exhibited ?

A. *Arnica* flowers are given on the Continent, but seldom in this country, in paralytic diseases, retention of the urine, amaurosis ; in putrid diseases, in typhoid inflammations ; in dysentery and diarrhœa, and to promote the uterine discharge.

16. Q. What are the virtues of *acetum*, or vinegar ?

A. Taken internally it acts as a refrigerant, promotes diaphoresis, and is a powerful anti-narcotic ; it acts externally as a discutient, and is moderately stimulant and astringent.

17. Q. What are the virtues of sulphuric acid ?

A. Sulphuric acid is a tonic, astringent, and antiseptic.

18. Q. What are the virtues of *arum* ?

A. *Arum* is given as a stimulant, in cachectic cases, supposed to arise from an accumulation of phlegm, and in some rheumatic affections, in the dose of ten or fifteen grains three times a day, in the form of bolus.

19. Q. What is meant by sialogogues ?

A. Those medicines which promote a discharge of saliva from the salivary glands.

20. Q. What are tonics ?

A. Medicines which give tone to the system or muscular fibre.

21. Q. What medicines come under the class of tonics ?

A. Peruvian bark ; quassia ; camomile ; gentian ; oak bark ; calumba ; lesser centaury ; pomegranate ; cascarilla ; wormwood ; southernwood ; tansy ; buckbean ; elm bark ; agrimony ; ferruginous preparations ;

sulphate of copper; oxide of zinc; sulphate of zinc; alum; and most of the mineral acids.

22. Q. What is the dose of *confectio opii*?

A. From five grains to half a drachm.

23. Q. In a fluid ounce of the *liquor antimonii tartarisati* how much *antimonium tartarisatum* is contained?

A. Two grains.

24. Q. What quantity of mercury is contained in three grains of the *pilula hydrargyri*?

A. One grain.

25. Q. How many kinds of aloes are now used in medicine?

A. Two; viz. the extract of the aloes *spicata*, called *Socotrine aloes*, and the extract of the aloes *vulgaris*, called *Barbadoes aloes*.

26. Q. What is the dose of the *nitras argenti*?

A. From gr. fs. to gr. iij: it has been given in a much larger dose.

27. Q. What are *expectorants*?

A. Such medicines as promote the secretion from the lungs.

28. Q. What are *stimulants*?

A. Those medicines which increase the action of the nervous and vascular system.

29. Q. How much mercury is contained in two drachms of the *unguentum hydrargyri fortius*?

A. One drachm.

30. Q. What is *musk*?

A. Musk appears to be a peculiar secretion, having certain properties, which is deposited in a small sac, situated near the umbilicus of the male *mosch* animal.

31. Q. In ten grains of the *pulvis ipecacuanhæ compositus* how much *opium* is contained?

A. One grain.

32. Q. What is the dose of the *oxidum hydrargyri rubrum*?

A. From half a grain to two grains.

33. Q. What is the dose of the *submurias hydrargyri*?

A. From one to twelve grains, to act as a purgative; and from one eighth of a grain to one grain, to act as an alterative.

34. Q. What is meant by *antiseptics*?

A. Those medicines which are capable of resisting a tendency to putrefaction.

35. Q. What are the substances that come under the class of antiseptics ?

A. All the acids ; Peruvian bark ; quassia ; calumba ; wormwood ; southernwood ; alkohol ; æther ; wine ; seneka root : opium ; camphor.

37. Q. What is meant by anthelmintics ?

A. Such substances as have the power of destroying worms.

37. Q. Enumerate the principal anthelmintics ?

A. Worm-seed ; tin-filings ; assafœtida ; tansy ; Indian pink ; male fern ; tobacco ; cowitch ; cabbage-tree bark, savine ; aloes ; camboge ; hedge-hyssop ; jalap ; castor oil ; almond oil ; and most of the cathartics.

38. Q. In what part of the root of the polygala senega does the active part reside ?

A. The active part of the root of the polygala senega resides in the bark.

39. Q. From what part of the world do we obtain the polygala senega ?

A. The polygala senega grows wild in North America.

40. Q. What is the name of the plant that affords the radix bistorta ?

A. Polygonum bistorta.

41. Q. What do you mean by alteratives ?

A. Alteratives are those medicines which so change the state or the solids and fluids as to effect the cure of a disease without producing any evacuation, or suddenly influencing the animal functions.

42. Q. What are astringents ?

A. They are medicines which have the power of constringing the animal fibre.

43. Q. What are the substances that come under this class ?

A. Alum ; superacetate of lead ; preparations of iron ; opium ; logwood ; oak-bark ; pomegranate ; galls ; tormentil ; simarouba ; red roses ; balaustine flowers ; rhu-barb in small doses ; catechu ; oxide of zinc ; acetate of zinc ; sulphate of copper ; sulphuric acid ; the calcareous earths ; and bistort.

44. Q. What are the virtues of the nitras argenti ?

A. It is used externally as an escharotic ; internally it is given as an antispasmodic in epilepsy and chorea Sancti Viti.

45. Q. What are the virtues of the antimonium tartarisatum ?

A. It acts as a diaphoretic in the dose of one-eighth of a grain to one grain, and as an emetic from one grain to six.

46. Q. In cases where poison has been taken, what emetic would you select ?

A. The sulphate of zinc, as it is more speedy in its operation than most of the other emetics.

47. Q. What are the virtues and dose of the pulvis ipecacuanhæ compositus ?

A. It is given as a diaphoretic from four grains to a scruple.

48. Q. What are the virtues of myrrh ?

A. Myrrh is given internally as a stimulant ; it occasions a mild diaphoresis, and promotes the fluid secretions in general : it proves serviceable in cachectic diseases, arising from inactivity of the system ; it acts also on the uterine system, and resists putrefaction.

49. Q. What is the systematic name of the tree that affords the chian turpentine ?

A. It is called Pistachia terebinthus, and it grows abundantly in the islands of Chios and Cyprus.

50. Q. What are the virtues of the sulphuretum hydrargyri rubrum ?

A. It is given as an alterative from two grains to a scruple ; and it is also used to fumigate venereal ulcers of the throat and other parts.

51. Q. What are the virtues of the acetas potassæ ?

A. It is given as a diuretic and purgative from ten grains to three drachms.

52. Q. What are the virtues of the tartras potassæ ?

A. It is given as a purgative from a scruple to three drachms.

53. Q. What are the virtues of the pulvis antimonialis ?

A. It is given as an alterative and diaphoretic from three grains to fifteen.

54. Q. What is the dose of the oxy-murias hydrargyri ?

A. From the sixteenth part of a grain to half a grain.

55. Q. What are styptics ?

A. They are medicines which possess a power of stopping hæmorrhages.

56. Q. What is meant by errhines ?

A. Those medicines which, when applied to the membrane of the nose, excite sneezing, and increase the secretion therefrom.

57. Q. What do you mean by epispastics.

A. Substances which blister the skin, that is, which increase the action of the vessels of those parts of the body to which they are applied, producing an afflux of fluid there, and a collection of serum between the cuticle and cutis.

58. Q. What is catechu ?

A. A reddish-brown substance of an astringent taste, prepared in India by boiling the wood of the acacia catechu, and evaporating the decoction by the heat of the sun.

59. Q. What are the virtues of juniper oil ?

A. Juniper oil is given internally as a stimulant, carminative, diaphoretic, and diuretic.

60. Q. What are the virtues of gum acacia ?

A. Gum acacia is exhibited internally as a mucilaginous demulcent and astringent ; and is employed in diarrhœa, dysentery, chincough, hoarseness, strangury, &c. It is also used to give form to some remedies, and correct the acrimony of others.

61. Q. What is the medical use of elaterium ?

A. Elaterium, in a few grains, operates as a drastic cathartic, and emetic, and is extremely useful in dropsy of the chest and belly.

62. Q. What is scammony ?

A. A concrete gummi-resinous juice, of a light gray colour, and rather an unpleasant smell and bitterish sub-acid taste, brought from Aleppo and Smyrna. It exudes from the cut root of the *Convolvulus scammonia*.

63. Q. What is myrrh ?

A. A substance of a black-red colour, solid and heavy, of a peculiar smell and bitter taste, brought from Arabia.

64. Q. What is ipecacuanha ?

A. A small root, wrinkled and contorted, of a grayish or ash colour, of a bitter sub-acid taste, and very little

smell, the produce of the *Callicocca ipecacuanhã*, growing in South America.

65. Q. What is camphor ?

A. A substance which is white and pellucid, somewhat unctuous to the touch, of a bitterish, aromatic, acrid taste ; of a fragrant smell, resembling that of rosemary : it is found in concrete lumps between the bark in the interstices of the wood and pith of the *Laurus camphora*, which grows in Japan ; it undergoes two sublimations before we receive it in England.

66. Q. Is camphor the produce of one tree only ?

A. No : camphor is obtained from the *Laurus camphora*, but it is contained in many plants, especially those of the aromatic kind : besides which it is often deposited from some essential oils that have been long kept.

67. Q. From whence do we obtain opium, and what is the name of the plant that affords it ?

A. It is obtained from Persia, Arabia, and Turkey, where incisions are made into the capsule or head of the *Papaver somniferum* ; the juice flows, and becomes concrete by the heat of the sun.

68. Q. What is the character of bad opium ?

A. Opium is regarded as bad when it is either very soft or friable, of an intensely black colour, or mixed with any impurities.

69. Q. Are you obliged to give a larger quantity of Turkey than Indian opium to produce the same narcotic effect ?

A. The Turkey opium is the best, consequently a smaller dose will be sufficient to produce the same effect as a larger dose of the other.

70. Q. Does the *Papaver somniferum* afford any other officinal preparations besides opium ?

A. There are two preparations made from the capsules of the white poppy, besides opium, viz. the *syrupus papaveris*, and the *extractum papaveris*.

71. Q. What are the officinal preparations of opium ?

A. The preparations of opium are, the *pilula saponis cum opio*, *pulvis opiatus*, *tinctura opii*, *tinctura camphoræ composita*, *pulvis ipecacuanhæ compositus*, *confectio opii*, and the *pulvis cretæ compositus*.

72. Q. What is considered to be the narcotic principle of opium?

A. According to Stertuérner an alkaline salt, which he has called morphia.

73. Q. What animal affords castor, and what part of the animal does it form?

A. The animal that affords this substance is the castor fiber, which inhabits the northern countries of Europe and America: the substance so called is found in two bags, situated in the inguinal regions of the male beaver, distinct from the testes.

74. Q. What is quassia?

A. A wood afforded by the *Quassia excelsa*, which grows abundantly at Surinam.

75. Q. What plant affords the jalap root?

A. The *Convolvulus jalapa*, which grows in South America.

76. Q. From whence do we obtain cetaceum?

A. From the head of the *Physeter macrocephalus*, a species of whale that inhabits the northern seas.

77. Q. What are the virtues of linseed, and what plant affords it?

A. The virtues of linseed are emollient and demulcent; it is used in cataplasms. The infusion is much given as a pectoral drink, in ardor urinæ and nephritic pains. The plant that affords linseed is called *Linum usitatissimum*.

78. Q. What are the virtues of willow bark?

A. Tonic and astringent: it has been given as a substitute for cinchona.

79. Q. What are the virtues of soap?

A. Soap is considered as a purgative and lithontriptic; it is given in habitual costiveness, jaundice, calculous cases; and is also regarded as an antidote in decomposing some metallic poisons when taken into the stomach.

80. Q. What are the virtues of the different kinds of turpentine?

A. They are all of them stimulant, cathartic, diuretic, and anthelmintic, and externally they are rubefacient.

81. Q. What preparation does the *Pinus sylvestris* afford?

A. Common turpentine, oil of turpentine, resin, black pitch, and tar.

82. Q. What is the name of the tree that affords the Venice turpentine?

A. The larch or *Pinus larix*.

83. Q. What turpentine does the *Pinus balsamea* afford?

A. The Canada turpentine.

84. Q. What does the *Pinus abies* afford?

A. Thus, or *abietis resina*; and Burgundy pitch.

85. Q. What are the virtues of carbonic acid?

A. It has been used with success in the cure of typhus, and is of great service in irritability and weakness of the stomach, producing vomiting: it is also used externally, as an antiseptic.

86. Q. What is the dose of sulphate of quinine?

A. From one to two grains.

87. Q. What is the black drop, and what its dose?

A. It is a combination of a vegetable acid (the citric or acetic) with opium, by which a salt of morphia, an alkali contained in opium, is obtained. Its medium dose is ten drops.

88. Q. What are the virtues of the *croton tiglium*?

A. Purgative, even in the small quantity of a single drop.

89. Q. What is ergot?

A. It is the diseased seed of the rye, called *spurred rye*; of a black colour externally, light and brittle in texture, and long and cylindrical in its form, and generally curved.

90. Q. What is its most remarkable effect on the system?

A. To increase the force of the uterine contractions, and hasten the delivery of the child.

91. Q. What are the circumstances which should regulate its use.

A. The *os tincæ* should be dilated; the soft parts somewhat relaxed, and there should be no malformation.

92. Q. In what doses is it administered?

A. From ten grains to half a drachm in decoction, to be repeated if necessary.

CHEMISTRY AND PHARMACY,

1. Q. WHAT is meant by effervescence ?

A. Effervescence is the escape of a gas which is separated during the action of bodies on each other.

2. Q. How is distillation performed ?

A. Distillation is performed in three ways : 1st, per ascensum ; 2d, per descensum ; 3d, per latus.

3. Q. Explain the three methods, and the apparatus made use of.

A. The distillation per ascensum is performed generally with the common still, which has affixed to it a head and refrigeratory. The still is for the purpose of containing the materials to be distilled ; the head for the vapour to ascend. From the head a tube is continued in a circular manner through a tub of cold water : this last constitutes the refrigeratory ; the use of which is to condense the vapour into a fluid by abstracting heat.—Distillation per descensum is performed in the following way : a perforated tinned iron plate is fixed within any convenient vessel, so as to leave a space beneath it ; on this the substance to be distilled is laid, and over it is placed another plate, accurately closing the mouth of the vessel, and strong enough to bear the fuel. The heat is thus applied at top, and the vapour is forced to descend into the inferior cavity, where it is condensed.—Distillation per latus is performed in a retort with a receiver ; the fluid to be distilled is introduced into the body of the retort, the receiver is then adjusted, and heat is applied to the retort ; the fluid is thus raised to a state of vapour, that becomes condensed into a fluid, which runs down the side of the neck into the receiver.

4. Q. What is the composition of the vinegar of commerce ?

A. The vinegar of commerce contains, besides the pure acetic acid, a quantity of water, tartaric acid, tar-

trate of potash, mucilaginous matters, and sometimes phosphoric acid.

5. Q. How do we get alkohol ?

A. Alkohol is produced by distillation from wine and vegetable infusions that have undergone the spirituous fermentation.

6. Q. What is meant by solution ?

A. Solution is the diminution of the aggregation of a solid ; so as to cause it to lose the solid form, and to enter into chemical combination with a fluid.

7. Q. What is the difference between infusion and decoction ?

A. Infusion consists in pouring upon any substance a cold or hot menstruum, and suffering it to stand a certain time, and then straining it off. Decoction consists in boiling the substance with the menstruum, and then straining off.

8. Q. What is meant by precipitation ?

A. That process by which a solid is obtained from a solution.

9. Q. What substances are generally used to deprive rectified spirit of its water ?

A. The sub-carbonate of potash has been used ; but muriate of lime is thought preferable, because its affinity for water is not only very great, but, by being soluble in alkohol, it comes in contact with every particle of the fluid.

10. Q. In what respects does crystallization differ from precipitation ?

A. Only that the particles in the solvend, on separating from the solution, assume certain determinate arrangements.

11. Q. To what is the transparency of crystals owing ?

A. To a quantity of water that they hold, which is called water of crystallization.

12. Q. When crystals part with their water of crystallization, what are they said to do ?

A. To effloresce.

13. Q. What is meant by deliquescence ?

A. It is a term given to express a property in some

salts by which they absorb the moisture of the atmosphere, and become fluid.

14. Q. What is meant by attraction ?

A. A term given to denote the power by which bodies unite with each other, or remain in contact with each other, until a superior force is exerted to separate them.

15. Q. What is the difference between attraction of aggregation or cohesion, and chemical attraction or affinity ?

A. Attraction of aggregation denotes that power which is exerted between particles of a similar nature, as those of mercury, glass, wood, &c. On the contrary, chemical attraction denotes the power exerted between particles of a dissimilar nature, as salt and water, muriatic acid and soda, nitric acid and potash, &c.

16. Q. How many kinds of affinity are there ?

A. Affinity is divided into—1. affinity of aggregation ; 2. compound affinity ; 3. simple affinity ; 4. double affinity ; 5. divellent affinity ; 6. quiescent affinity ; 7. intermediate affinity ; and, 8. reciprocal affinity.

17. Q. What is meant by repulsion ?

A. It is a peculiar property, inherent in the particles of matter, by which they have a constant tendency to recede from each other.

18. Q. What is the result of a chemical combination ?

A. A new substance is formed, in which the particles combined have assumed new properties.

19. Q. What do you mean by the term salt ?

A. By salt is meant a combination of an acid with an alkali, an earth, or a metallic oxide.

20. Q. What is understood by neutral salts ?

A. Where there is no excess either of acid or base, the salt formed is called a neutral salt.

21. Q. When a compound is resolved into its constituent parts, what process is it said to have undergone ?

A. The process of analysis.

22. Q. How is the analysis of compounds effected ?

A. Either by the power of heat, or by the power of a superior affinity.

23. Q. Which is heaviest, platinum or gold ?

A. Platinum is the heaviest.

24. Q. What gives the peculiar character to mineral waters ?

A. Mineral waters derive their peculiarity of character in general, either from containing carbonic acid or soda not neutralized, sulphuretted hydrogen, purging salts, earthy salts, or iron, or from the temperature exceeding in a greater or less degree that of the atmosphere.

25. Q. What is meant by synthesis ?

A. The formation of a compound (possessing new properties) by the combination of two or more simple substances.

26. Q. What is caloric ?

A. A substance, the evolution of which produces the sensation of heat ?

27. Q. How many sources of caloric are there ?

A. There are six sources which afford caloric ;—1. the rays of the sun ;—2. combustion ;—3. percussion ;—4. friction ;—5. the mixture of different substances ; and ; 6. electricity and galvanism.

28. Q. What is the difference between latent and sensible caloric ?

A. Latent caloric is that which exists in bodies, and makes no sensible addition to their temperature. Sensible caloric is the matter of heat disengaged, and is denoted by an increase of temperature.

29. Q. What are the general effects of caloric upon substances ?

A. 1st, Substances are expanded, and thus increase in bulk by their combination with caloric (excepting alumina, which is contracted). 2d, It is the cause of fluidity. 3d, It produces vaporization. 4th, It effects ignition ; and its combination with some substances is said to be the cause of their elasticity.

30. Q. What is oxygen ?

A. The acidifying principle ; a peculiar gas, colourless, invisible, and elastic : it supports life and flame,

31. Q. When oxygen enters into combination, what are the classes of compounds that it forms ?

A. Two classes ; viz. oxides and acids.

32. Q. What is an oxide ?

A. A metal, or a combustible, combined with oxygen, that does not possess acid properties.

33. Q. What are the properties of hydrogen ?

A. It is an invisible elastic gas, which has a peculiar smell, extinguishes flame, burns in contact with oxygen, explodes when mixed with oxygen, and is about twelve times lighter than common air.

34. Q. What are the compounds of hydrogen ?

A. Sulphurated, phosphorated, and carbonated hydrogen gas.

35. Q. What are the purging salts usually contained in mineral waters ?

A. The purging salts usually found in mineral waters are, muriate of magnesia, of soda, of lime, and the sulphates of soda and magnesia.

36. Q. To what is the sparkling of mineral waters owing ?

A. It is owing to the carbonic acid which they contain.

37. Q. What is the composition of water ?

A. Oxygen and hydrogen in chemical combination.

38. Q. What is meant by a hydrate ?

A. A combination of water with a salt or other substance ; the crystals are hydrates, and the sulphur præcipitatum is an hydrate of sulphur.

39. Q. What is nitrogen ?

A. An elastic, invisible gas, exceedingly irrespirable, and which extinguishes flame.

40. Q. What are the compounds of nitrogen ?

A. In a state of mechanical combination with oxygen, it forms atmospheric air ; and when chemically combined with different proportions of oxygen, it forms two oxides and one acid, viz. nitrous oxide, or gaseous oxide of azot ; nitric oxide, which possesses a greater proportion of oxygen than the preceding ; and nitric acid, which is fully saturated with oxygen.

41. Q. How is it that nitrogen, which is injurious

to animal life, should be present in such large quantities in the atmosphere?

A. Nitrogen gas has the effect of neutralizing, in some degree, the properties of oxygen gas, and rendering it fit for respiration and combustion.

42. Q. What are the component parts of atmospheric air?

A. Atmospheric air is chiefly composed of oxygen, nitrogen, and carbonic acid.

43. Q. How is a combination of a combustible with a metal or an earth designated?

A. The combustible is terminated by the syllable *uret*, but the metal or earth retains its original name; for example, if sulphur and lime were combined, it would be called *sulphuret* of lime; phosphorus and iron, *phosphuret* of iron; and so forth.

44. Q. What is phosphorus?

A. A very inflammable substance, of a white semi-transparent colour, and of the consistency of wax.

45. Q. What are the compounds of phosphorus?

A. It combines with certain combustibles, earths, and metals, forming phosphurets; it forms an oxide, and two acids, viz. the phosphorous acid and the phosphoric acid.

46. Q. In what does pure carbon exist?

A. The diamond is pure carbon.

47. Q. What is charcoal?

A. An oxide of carbon.

48. Q. What are the other compounds of carbon?

A. Gaseous carbonic oxide, carbonic gas, and the carburetted hydrogen gas.

49. Q. How would you exhibit carbonic acid gas internally?

A. Either by the saline draught in the state of effervescence, or by giving yeast mixed up in a convenient vehicle, or by the double soda water.

50. Q. What is sulphur?

A. A simple inflammable substance.

51. Q. From what kingdom of nature do we obtain sulphur?

A. From the mineral kingdom. It is found in va-

rious forms ; in a native state, mixed with gypsum and limestone ; it is also thrown out from volcanoes, and it is found combined with several metals : sulphur likewise exists both in the vegetable and animal kingdoms.

52. Q. What are the preparations of sulphur directed by the London Pharmacopœia ?

A. Sulphur lotum, sulphur præcipitatum, oleum sulphuratum, and sulphuretum potassæ.

53. Q. How is the sulphur præcipitatum made ?

A. By boiling quick lime, sulphur, and water, together, for a certain time ; filtering the solution, and adding muriatic acid in order to throw down the sulphur, which is separated and washed.

54. Q. What takes place during this operation ?

A. During the boiling the sulphur combines with a portion of hydrogen from the water ; it afterward unites itself to the lime, forming an hydroguretted sulphuret of lime ; this is held in solution by the water, and passes through the filter : upon the addition of muriatic acid, the muriatic acid combines with the lime, the hydrogen is evolved from the sulphur, and the sulphur is precipitated.

55. Q. To what is the pale colour of sulphur præcipitatum owing ?

A. The pale colour of the sulphur præcipitatum is said by some to be owing to its more minute division ; but by Dr. Thomson it is suspected to be caused by its containing a little water.

56. Q. When sub-carbonate of potash is made to unite with sulphur by means of fusion, what takes place ?

A. When the combination takes place, the carbonic acid is expelled.

57. Q. In what respects do the sulphur lotum and the sulphur præcipitatum differ from the sulphur sublimatum ?

A. The sulphur sublimatum contains a small portion of sulphuric acid ; the other preparations are free from this acid, and are considered to hold a portion of water in a state of chemical combination : they are therefore hydrates of sulphur.

58. Q. What combinations does sulphur form with oxygen?

A. It forms an oxide, the sulphureous acid, and the sulphuric acid.

59. Q. Are there any other compounds of sulphur?

A. Yes: it combines with hydrogen, phosphorus, the metals, the earths, and alkalis.

60. Q. When sulphur is dissolved in hydrogen gas, what does it form?

A. A fetid elastic gas is formed, somewhat heavier than atmospheric air, called sulphuretted hydrogen gas, which is soluble in water.

61. Q. What are the properties of sulphuretted hydrogen?

A. Sulphuretted hydrogen has many of the characters of an acid; it combines with earths, alkalis, and several metallic oxides, and forms compounds which are called hydro-sulphurets.

62. Q. Is sulphuretted hydrogen used in medicine?

A. Yes: in the form of medicinal waters: those of Harrowgate, Aix-la-Chapelle, and others of a similar nature, owe their virtues to sulphuretted hydrogen gas.

63. Q. If sulphur is burnt in oxygen gas, what acid will be formed?

A. Sulphuric acid.

64. Q. What are the properties of sulphuric acid?

A. It is very ponderous and corrosive, is destitute of colour and smell, and has a very acid taste; it has a great attraction for water, and combines with earths, alkalis, and metallic oxides.

65. Q. What are acids?

A. They are substances of a sour taste, possessing a power of changing vegetable blues to red, and of combining with earths, metals, and alkalis.

66. Q. What does an acid consist of?

A. An acid consists of a base or bases combined with oxygen; the base is called the acidifiable principle, and the oxygen the acidifying principle.

67. Q. How do chemists distinguish the acids according to the proportion of oxygen with which they are combined?

A. If an acid basis is perfectly saturated with oxygen, the acid produced is said to be perfect, and is distinguished in English by the syllable *ic*; as, sulphuric acid: but if the base predominates, the acid is considered as imperfect, and is distinguished by the English *ous*; as, sulphurous acid. When an acid has an excess of oxygen, it is called oxygenated, and hyper-oxygenated.

68. Q. What are the acids employed medicinally?

A. The acetic, tartaric, citric, benzoic, carbonic, boracic, muriatic, nitric, sulphuric, phosphoric, succinic.

69. Q. How is benzoic acid made?

A. A quantity of gum benzoin and lime is rubbed together and boiled with a quantity of water for half an hour; it is then filtered, and to the solution muriatic acid is added, as long as any precipitate is formed; the precipitate is then collected and dried, to undergo the process of sublimation.

70. Q. What is the theory of the formation of benzoic acid in this way?

A. The lime during the boiling takes the benzoic acid from the gum benzoin; the benzoate of lime thus formed is held in solution by the water; upon the addition of muriatic acid, the lime abandons the benzoic acid, to combine with the muriatic acid; the benzoic acid, from its insolubility, is precipitated, and the muriate of lime remains in the solution.

71. How is citric acid made?

A. A quantity of lemon-juice is made boiling hot, and a sufficient quantity of prepared chalk is added, until it is saturated: the powder that forms is to be washed and dried; dilute sulphuric acid is then to be boiled upon the powder; the fluid is next filtered off and evaporated with a gentle heat, so that crystals may form as it cools. The crystals are further purified by repeated crystallization.

72. Q. How is the formation of citric acid effected, as directed by the London College?

A. When the lemon-juice and prepared chalk are mixed together, the citric acid and lime combine, while the carbonic acid escapes in effervescence: the citrate of lime is decomposed by the sulphuric acid which is

added, for it takes to the lime, and sets the citric acid at liberty.

73. Q. How is the strength of muriatic acid ascertained?

A. Half an ounce of limestone should be dissolved in a fluid ounce of muriatic acid.

74. Q. What salt is taken into the stomach when the common saline draught is given?

A. The citrate of potash.

75. Q. In what respects do the nitric and nitrous acids differ?

A. The nitrous acid holds in solution a quantity of nitric oxide, which is continually escaping; this gas gives the acid an orange colour, and is the cause of its fuming: the nitric acid is colourless, and does not evolve nitric oxide.

76. Q. How is muriatic acid made?

A. A quantity of sulphuric acid diluted with water is put into a glass retort: to this is added a quantity of muriate of soda; one third of the water directed to be used is put into the receiver, to absorb a quantity of gas that may be suddenly evolved; the receiver is then luted to the retort, and the muriatic acid is distilled over by the heat of a sand-bath.

77. Q. What is the new name given to oxy-muriatic acid?

A. Sir Humphrey Davy has given it the name of chlorine, from its yellowish-green colour.

78. Q. What are the discoveries that Sir H. Davy has made with respect to muriatic acid and oxy-muriatic acid?

A. He asserts that the muriatic acid consists of hydrogen and chlorine, and that chlorine or oxy-muriatic acid is a simple undecomposable substance.

79. Q. If this be true, what becomes of the oxygen which the black oxide of manganese appears to give to the muriatic acid in making of chlorine?

A. The oxygen decomposes the muriatic acid, absorbs its hydrogen, and forms water.

80. Q. In the formation of muriatic acid, what are the decompositions and combinations?

A. The muriate of soda is decomposed by the sulphuric acid, which combines with the soda; the muriatic acid, thus let loose in the state of gas, is dissolved by the water.

81. Q. What salt remains after the distillation of muriatic acid?

A. The residuum in the retort consists principally of sulphate of soda.

82. Q. In what state does muriatic acid exist when deprived of its water?

A. When muriatic acid is deprived of water, it exists in the state of gas.

83. Q. Does nitric acid absorb humidity, or not?

A. Nitric acid has a great affinity for humidity, for it attracts the water from the atmosphere.

84. Q. What vapour is used by the French chemists to destroy contagion?

A. The vapour of the oxy-muriatic acid.

85. Q. How is nitric acid made?

A. Equal parts of dried nitrate of potash and sulphuric acid are put into a glass retort; distillation is then to be carried on in a sand-bath, until a red vapour arises; the nitric acid that is distilled over is to be re-distilled from a fresh portion of dried nitrate of potash.

86. Q. In making nitric acid, what takes place?

A. The sulphuric acid combines with the potash of the nitrate of potash, forming sulphat of potash, and the nitric acid is distilled over.

87. Q. How is boracic acid obtained?

A. By adding sulphuric acid to a hot solution of borax: this combines with the soda of the borax, forming sulphat of soda, and the boracic acid is crystallized upon the solution cooling.

88. Q. How is the oxy-muriatic acid obtained?

A. It is obtained from a mixture of muriate of soda, black oxide of manganese, and sulphuric acid.

89. Q. Why is the oxy-muriatic acid required to be kept in the dark?

A. Because it decomposes the water by the agency of light; that is, it is resolved into muriatic acid.

90. Q. Has this acid the property of changing vegetable blues to a red ?

A. No : it deprives vegetable substances of colour ; hence its utility in bleaching.

91. Q. What is the composition of nitric acid ?

A. Oxygen and nitrogen.

92. Q. What are the properties of phosphorous acid ?

A. Phosphorous acid is a white fluid of an oily appearance : it has a fetid odour and disagreeable taste ; it gives out a thick white smoke and vivid flame, when strongly heated ; and it is decomposed by ignited charcoal.

93. Q. What compound of phosphoric acid is used in medicine ?

A. The officinal preparations of phosphoric acid is phosphate of soda, or the combination of phosphoric acid and soda.

94. Q. What is the composition of phosphoric acid ?

A. Phosphorus and oxygen.

95. Q. In what state do we obtain hyper-oxymuriatic acid ?

A. Combined with an alkaline base ; as forming the hyper-oxymuriate of potash. This is the only state in which it exists.

96. Q. What is the composition of carbonic acid ?

A. Carbon and oxygen. By heating potassium or the metal of potash in carbonic acid, the potassium combines with the oxygen of the carbonic acid, and charcoal, or oxide of carbon, is deposited.

97. Q. What are the acids that have not hitherto been decomposed ?

A. The fluoric acid, and the boracic acid.

98. Q. What is the composition of the vegetable acids ?

A. Varied proportions of carbon and hydrogen acidified by oxygen.

99. Q. What are alkalis ?

A. They are substances that possess an acrid taste, and a urinous smell ; they convert most vegetable blues to a green, and they render oils miscible with water.

100. Q. What is the composition of the alkalis?

A. A metal and oxygen.

101. Q. What is the general distinction of alkalis?

A. Into fixed and volatile: they are also distinguished into vegetable alkali, or potash; mineral alkali, or soda; and volatile alkali, or ammonia. Potash and soda are considered as fixed alkalis, because they are not volatilized but by a very intense heat; whereas ammonia, which is the volatile alkali, requires only the temperature of the atmosphere to change its state of aggregation.

102. Q. How is the potash of commerce obtained?

A. From the lixivium of wood ashes:—the ashes of all wood afford this alkali, but the harder woods most abundantly. Another method of obtaining potash is by burning the impure tartar of commerce, and lixiviating it.

103. Q. How are salts distinguished according to the quantity of acid they contain?

A. If the salts should contain an excess of acid, the preposition *super* is prefixed to its name; and when the acid contained is not sufficient to saturate the base, the preposition *sub* is added: thus we have super-sulphat and sub-sulphat of mercury.

104. Q. How is the sub-carbonas potassæ obtained?

A. By mixing a quantity of impure potash of commerce with a stated quantity of water; by boiling these for a certain time, filtering the solution, and finally evaporating the water from the salt, while stirring it.

105. Q. How are the extraneous or more crystallizable salts of the impure potash got rid of?

A. Sub-carbonate of potash being very soluble in water in comparison to the extraneous salts contained in impure potash, an advantage is taken of this, for only a sufficient quantity of water is added to dissolve the sub-carbonates; the extraneous salts, therefore, not being dissolved, remain upon the filter. They consist chiefly of sulphat of potash, muriate of potash, with a quantity of earthy impurities.

106. Q. What is the difference between sal tartari, sal absinthii, and sub-carbonas potassæ?

A. Very little difference, excepting in the proportion of carbonic acid with which they are combined: they are all sub-carbonates of potash, but are differently obtained.

107. Q. What are the preparations of potash directed to be used by the London College?

A. *Acetas potassæ*, *sulphas potassæ*, *super-sulphas potassæ*, *tartras potassæ*, *sub-carbonas potassæ*, *carbonas potassæ*, *liquor sub-carbonatis potassæ*, *liquor potassæ*, *potassa fusa*, *potassa cum calce*.

108. Q. What nitrates are used in medicine?

A. The nitrates used in medicine are the nitrate of potash and the nitrate of silver.

109. Q. How are the nitrates known?

A. The nitrates yield oxygen, they give out a white vapour when acted on by sulphuric acid, and when mixed with combustible substances, produce, at a red heat, detonation or inflammation.

110. Q. How would you know the muriates?

A. The muriates, when acted upon by concentrated sulphuric acid, yield muriatic acid in the form of vapour.

111. Q. How are the carbonates known?

A. They are decomposed by all the acids, producing an effervescence: and they preserve their alkaline properties in some degree.

112. Q. What carbonates are used in medicine?

A. The carbonates used in medicine are, carbonate of barytes, carbonate of lime, of magnesia, of potash, of soda, of ammonia, of zinc, and of iron.

113. Q. How is the *potassa fusa* obtained?

A. By evaporating the water from the *liquor potassæ*, melting the salt, and casting it into proper moulds.

114. Q. How is the *liquor potassæ* made?

A. By putting together sub-carbonate of potash, quick lime, and hot water, suffering them to remain a length of time, then filtering.

115. Q. Why is the lime added?

A. To abstract the carbonic acid from the sub-carbonate of potash.

116. Q. What is the composition of *cremor tartari*?

A. It is a super-tartrate of potash ; that is, potass combined with an excess of tartaric acid.

117. Q. How is the tartras potassæ made ?

A. It is made by adding a quantity of sub-carbonate of potash to a quantity of super-tartrate of potash dissolved in water, evaporating to a certain extent, and crystallizing the salt.

118. Q. What effect has the sub-carbonate of potash in this preparation ?

A. It parts with its carbonic acid to combine with the excess of tartaric acid in the super-tartras potassæ, to form a neutral salt.

119. Q. How is the perfect carbonate of potash formed ?

A. By adding carbonate of ammonia to sub-carbonate of potash dissolved in water. This solution is exposed to a certain degree of heat until all the ammonia is expelled, and the sub-carbonate of potash becomes a perfect carbonate by taking carbonic acid from the carbonate of ammonia.

120. Q. Why is the carbonate of potash preferred to the sub-carbonate for a saline draught, to be taken in the state of effervescence ?

A. Because it affords most carbonic acid.

121. Q. What remains in the retort after the distillation of nitric acid ?

A. A super-sulphat of potash.

122. Q. What is the character of the acetates ?

A. Acetates are very soluble in water, are decomposed by heat, by exposure to air, and by the stronger acids.

123. Q. What acetates are used in medicine ?

A. There are four acetates used in medicine ; viz. acetate of potass, of lead, of zinc, and of mercury.

124. Q. What is the composition of nitre crystals ?

A. Nitric acid, potash, and water.

125. Q. Why is the nitras potassæ made use of in forming sulphuric acid ?

A. To supply the sulphur when burning with a greater quantity of oxygen.

126. Q. What are the states of combination that potash enters into with tartaric acid ?

A. Two states, so as to form an acidulous salt and a neutral salt.

127. Q. How is the tartras potassæ made ?

A. By adding a sufficient quantity of sub-carbonate of potash to neutralize the super-tartrate of potash, which is previously to be dissolved in hot water ; it is afterward to be evaporated, filtered, and then put by in order to crystallize.

128. How is impure soda obtained ?

A. It is generally obtained by lixiviating the ashes of burnt plants, that have grown on the sea shore, particularly the herb called *Salsola kali*.

129. Q. How is the sub-carbonas sodæ obtained ?

A. By boiling a stated quantity of impure soda of commerce in a quantity of distilled water, filtering the solution, evaporating it, and crystallizing the salt.

130. Q. How is the carbonas sodæ obtained ?

A. By adding sub-carbonate of ammonia to sub-carbonate of soda, dissolved in a quantity of distilled water ; exposing this solution to heat for a certain time, in order to expel the ammonia ; then crystallizing the carbonate of soda.

131. Q. What salt remains after the distillation of muriatic acid ?

A. Sulphat of soda, which is directed to be reserved and prepared for use.

132. Q. What is the composition of common table salt ?

A. It consists principally of muriatic acid and soda.

133. Q. Why does it deliquesce ?

A. Because it contains a little muriate of magnesia.

134. Q. How are salts crystallized ?

A. A certain portion of the water of solution is evaporated, and the remainder left in a proper temperature at rest ; the salts will after a time be found dispersed through the mother water at the bottom and sides of the vessel.

135. Q. How is ammonia obtained ?

A. In a variety of ways : it is abundantly formed by animal decomposition ; it exists in soot in combination with an acid ; it is obtained by distilling hartshorn, or

bones ; but it is generally obtained from the sal ammoniac of commerce.

136. Q. What is the composition of ammonia ?

A. Hydrogen and nitrogen : but Sir Humphrey Davy has made it appear to be a compound of a metal, which he has named ammonium.

137. Q. What compounds of ammonia are directed to be kept by the London College ?

A. Carbonas ammoniæ, liquor acetatis ammoniæ, liquor carbonatis ammoniæ, and the liquor ammoniæ.

138. Q. How is the formation of carbonate of ammonia effected ?

A. By sublimation, from a mixture of dried prepared chalk and muriate of ammonia ; a double decomposition takes place ; the lime of the prepared chalk combines with the muriatic acid, forming muriate of lime, while the carbonic acid, the other constituent of the chalk, combines with the ammonia, and forms carbonate of ammonia, which is sublimed.

139. Q. Is this a perfect carbonate ?

A. No : it is a sub-carbonate : the carbonate of ammonia is void of smell.

140. Q. How is the liquor ammoniæ made ?

A. By abstracting the muriatic acid of muriate of ammonia by means of lime, and causing the ammoniacal gas to be absorbed by water.

141. Q. How is the liquor ammoniæ acetatis made ?

A. By saturating acetic acid with sub-carbonate of ammonia.

142. Q. What is an earth ?

A. A substance that is nearly insoluble in water ; that has little or no smell ; that is incombustible ; and, when pure, assumes the form of a white powder. The specific gravity of an earth should not exceed 4.9. All the earths are supposed to have metallic bases, but are at present considered as simple substances.

143. Q. How many earths are at present known to chemists ?

A. Nine ; viz. silex, argil, magnesia, lime, barytes, strontian, zircon, glucine, and yttria.

144. Q. What are the earths that are used in medicine ?

A. They are four in number: viz. magnesia, lime, argil or alumina, and barytes; which last is not admitted into the London Pharmacopœia.

145. Q. What substances afford argil?

A. It exists in many fossils, and forms the basis of common clay.

146 Q. What is there peculiar to this earth?

A. It contracts when exposed to heat, and becomes so hard as to be capable of striking fire with steel.

147. Q. Is argil ever found pure in nature, or used in medicine in its pure state?

A. No.

148. Q. What substances afford gallic acid?

A. Gallic acid is afforded by nut-galls and most astringent substances.

149. Q. What compounds of argil are directed to be kept in the shops by the London College?

A. The alumen exsiccatum, and the liquor aluminis compositus.

150. Q. What is the composition of alumen?

A. Sulphuric acid in excess, alumina, a small portion of potash, and often ammonia.

151. Q. Why is potash always put in to form alum?

A. To facilitate crystallization. The sulphat, or super-sulphat of argil alone, crystallizes in very small quantities, and that with great difficulty.

152. Q. Is alum ever found in nature?

A. Yes: it is often found in a species of slate denominated alum slate, which is mixed with the layers of coal.

153. Q. From whence do we obtain magnesia?

A. It is never found in the pure state, but in combination in many fossils; it is also found combined with acids in many springs, and in sea-water: from these several sources the earth is obtained.

154. Q. What preparations of magnesia does the College direct to be used?

A. The carbonas magnesiæ and the sulphas magnesiæ, and magnesia.

155. Q. How is the carbonas magnesiæ made?

A. By mixing together a solution of sub-carbonate

of potash, and of sulphat of magnesia, boiling for a certain time, and filtering. The carbonate of magnesia remains upon the filter, and is to be well washed with hot water, to deprive it entirely of the sulphat of potash; it is afterward dried.

156. Q. What takes place in this process?

A. A double decomposition takes place; the potash loses its carbonic acid to combine with the sulphuric acid, while the magnesia loses its sulphuric acid to combine with the carbonic acid; and thus a carbonate of magnesia is obtained, and a sulphat of potash remains in solution.

157. Q. When the carbonate of magnesia is exposed to an intense heat for some time, what takes place?

A. It loses its carbonic acid, and pure magnesia is obtained.

158. Q. Which is lightest, the carbonas magnesiæ or magnesia?

A. Magnesia.

159. Q. How would you keep pure magnesia?

A. In a bottle well stopped to prevent the absorption of carbonic acid: it however attracts carbonic acid but slowly.

160. Q. How is sulphat of magnesia obtained?

A. It used to be made by evaporating the water of the mineral springs at Epsom; but it is now generally obtained by evaporating the bittern, or the fluid that remains after the crystallization of salt from sea-water.

161. Q. What are the sources of lime?

A. It is a constituent of chalk-stone, lime-stone, marl, shells, bones; it is found combined with many acids, as carbonic, fluoric, boracic, and sulphuric acid: it exists in small portions in sea-water, in spring and river water, and it is found in vegetables.

162. Q. What preparations of lime do the London College direct to be kept?

A. Calx, liquor calcis, creta præparata.

163. Q. How is calx, or lime, to be obtained?

A. By burning chalk-stone with a white heat, until it ceases to effervesce, or give off carbonic acid, when thrown into acetic acid.

164. Q. Is this pure lime which remains ?

A. Sufficiently pure for medical purposes, but not for chemical.

165. Q. What takes place, if lime-water is exposed to the air for any length of time ?

A. The lime that is held in solution soon combines with carbonic acid, and precipitates, leaving the water pure.

166. Q. What takes place in the slacking of lime ?

A. The water is absorbed with a hissing noise, the lime cracks and falls into powder, a great quantity of caloric is evolved, so as to convert one portion of water into a vapour, while the other portion of the water enters into combination with the lime, and becomes solidified.

167. Q. Which of the earths used in medicine is a poison ?

A. Barytes is a violent poison ; in an overdose it produces nausea, vomiting, diarrhœa, vertigo, and death.

168. Q. What preparation of barytes is used in medicine ?

A. The muriate of barytes is admitted into the Edinburgh Pharmacopœia ; and has been given in scrofula, and to remove tumours, worms, and cutaneous diseases.

169. Q. What is a metal ?

A. It is a simple substance, possessed of great tenacity and hardness, opacity, the property of reflecting light, a certain specific gravity, and of combustibility, when raised to a certain temperature, in contact with oxygen.

170. Q. Are all the metals opaque ?

A. Yes, all except gold-leaf, which, when beat extremely thin, transmits green light.

171. Q. What is the difference between ductility, malleability, and tenacity ?

A. Malleability is that property by which a metal may be pressed or beat into thin leaves, or plates ; ductility, the property by which a metal may be drawn into wires of certain diameters ; and tenacity, the pow-

er of cohesion of the particles of metals, by which they allow of ductility and malleability.

172. Q. What is the cause of expansion in metals?

A. Caloric, which is supposed to cause the metallic particles to assume greater distances.

173. Q. Do metals conduct caloric?

A. Yes: they are the best conductors of that principle.

174. Q. Do metals differ much in fusibility?

A. Yes: Mercury melts at a very low temperature, even the coldest atmosphere; on the contrary, platinum requires the most intense heat for its fusion.

175. Q. Are these the chief properties of metals?

A. Yes, excepting that they are the best electrical conductors, and generate galvanism by contact.

176. Q. When a metal combines with oxygen, what change has it undergone?

A. It has become oxydized, and the compound formed is called an oxide.

177. Q. When a metal combines with an acid, so as to form a salt, what change does the metal first undergo?

A. It becomes oxydized, either by decomposing the water, or part of the acid, and is then dissolved by the remaining acid.

178. Q. When two metals are combined, what is the compound called?

A. An alloy; excepting the combination of a metal with mercury, which is termed an amalgam.

179. Q. What is the number of metals at present known?

A. They amount to twenty-one, if the new metals of the alkalis, &c. are excluded.

180. Q. Enumerate the metals.

A. Gold, platinum, silver, mercury, copper, iron, tin, lead, nickel, zinc, bismuth, antimony, tellurium, arsenic, cobalt, manganese, tungsten, molybdenum, uranium, titanium, chromium.

181. Q. What are the metals that are used in medicine?

A. Silver, mercury, copper, iron, tin, lead, zinc, bismuth, arsenic, antimony.

182. Q. In what state is silver found in nature ?

A. Native and mineralized.

183. Q. What are the preparations of silver used in medicine ?

A. Only the nitras argenti, which is made with silver, nitric acid, and distilled water. The nitric acid and water are mixed ; the silver is then added, which speedily becomes dissolved by the application of a gradual heat ; when this is effected the solution is evaporated, in order to obtain a dry nitrate of silver. The nitrate of silver is then melted in a crucible, with a gentle heat, and is cast into proper moulds.

184. Q. What takes place during the melting of the nitrate of silver ?

A. It loses part of its nitric acid, and becomes reduced to a sub-nitrate.

185. Q. What are the sources of mercury ?

A. It is found native ; it is found in combination with muriatic acid ; and it is found in combination with sulphur, constituting an ore called native cinnabar ; from this ore the quicksilver of commerce is generally obtained.

186. Q. What are the properties of mercury ?

A. Mercury is a fluid metal in the temperature of our atmosphere, and has the appearance of melted silver, in which state it is neither ductile nor malleable, is very volatile when heated, and extremely divisible ; it combines with other metals and forms amalgams.

187. Q. What preparations of mercury are directed to be used by the London Pharmacopœia ?

A. Oxymurias hydrargyri, liquor oxymuriatis hydrargyri, hydrargyrus cum creta, submurias hydrargyri, nitrico-oxydum hydrargyri, oxydum hydrargyri cinereum, oxydum hydrargyri rubrum, hydrargyrus præcipitus albus, hydrargyrus purificatus, and sulphuretum hydrargyri rubrum, &c.

188. Q. How is the oxymurias hydrargyri formed ?

A. Mercury and sulphuric acid are first boiled together, in a glass vessel, until a dry salt is obtained ;

by this process the mercury first becomes oxydized, and then dissolves in the remaining acid; this is evaporated, until a dry salt is procured, which is an oxy-sulphat of mercury; this is mixed with a quantity of dried muriate of soda, and sublimed: the order of affinities is now changed; the muriatic acid combines with the oxide of mercury, forming an oxy-muriate of mercury, which is sublimed, and the sulphuric acid combines with the soda, forming sulphat of soda, which is not sublimed.

189. Q. In what state of oxidizement does the mercury exist in this preparation?

A. In the state of red oxide.

190. Q. How is the *hydrargyrus cum creta* made?

A. By rubbing creta and mercury together, until the globules of the mercury disappear.

191. Q. What is the composition of this preparation?

A. It is composed of an oxide of mercury combined with carbonate of lime.

192. Q. In what state is the mercury that is present in the *unguentum hydrargyri fortius*, *emplastrum hydrargyri*, and *pilula hydrargyri*?

A. It is in the state of protoxide or gray oxide.

193. Q. How is the *submurias hydrargyri* made?

A. A quantity of oxy-muriate of mercury is rubbed with a quantity of purified mercury, until the globules of the mercury are extinguished; it is then to be sublimed, and the sublimation and rubbing are to be repeated three times; after which it is to be reduced to a very subtile powder.

194. Q. What is the use of the purified mercury in this preparation?

A. It abstracts from the oxy-muriate of mercury a portion of its oxygen; by which the oxide of mercury that existed in the oxy-muriate is converted into an imperfect black oxide; this imperfect oxide requires less muriatic acid to saturate it than the perfect oxide does: the compound formed is therefore a muriate, but the London College have thought proper to call it a sub-muriate, to prevent mistakes.

195. Q. What are the characters of calomel?

A. Calomel is inodorous, insipid, and has a light yellow or ivory colour, which deepens by long exposure to the light. Lime-water and the alkalis, when triturated with it, instantly render it black, which is one test of its purity; for, if it contains any oxy-muriate, a yellow tint is mingled with the black on the addition of lime-water.

196. Q. Is there any other mode of obtaining calomel besides that directed by the London College?

A. Yes: Mr. Howard has proposed the following improvement; instead of subliming the calomel in a concrete form, the vapour as it rises is thrown into a vessel containing water, where it instantly condenses into the form of a white impalpable powder.

197. Q. How is the nitrico-oxydum hydrargyri made?

A. By boiling mercury, nitric acid, and water, to dryness, and then raising the heat gradually until the red vapour ceases to arise.

198. Q. What colour does the oxide of gold give to glass?

A. Glass is coloured purple by the oxide of gold.

199. Q. What compound is formed with the oxide of gold and ammonia?

A. This compound is called fulminating gold.

200. Q. What takes place during the formation of nitric oxide of mercury?

A. The mercury decomposes a portion of the nitric acid by attracting oxygen; it becomes converted into an oxide, and nitric oxide gas is evolved; the oxide of mercury thus formed, is then dissolved by the undecomposed nitric acid, and a nitrate of mercury is formed. When the dried nitrate of mercury is exposed to heat, the greater part of the nitric acid is driven off, and a perfect oxide of mercury remains, holding a very small portion of nitric acid.

201. Q. How is the red oxide of mercury made?

A. By exposing mercury in a glass vessel, with a broad bottom, a long neck, and a narrow mouth, to a heat of 600° , until the mercury is converted into red

scales, which are to be reduced to a very fine powder.

202. Q. What is the theory of this process?

A. The mercury, when exposed to a heat of 600° , rises in vapour up the neck of the vessel; the vapour of the mercury combines with a maximum of oxygen, by decomposing atmospheric air, and falls back into the vessel in the state of dark red scales, which become of a deeper red as the process goes on.

203. Q. Why does not the mercury escape when exposed to this temperature?

A. Because the vessel is provided with a long narrow neck, that is drawn out into a capillary opening, which prevents the escape of the mercury, but allows a free admission of air.

204. Q. How is the gray oxide of mercury prepared?

A. It is prepared by boiling sub-muriate of mercury with lime-water, constantly stirring, until a gray oxide of mercury is separated; it is then to be washed with distilled water, and dried. During the preparation, the lime combines with the muriatic acid of the muriate of mercury, and its oxide is separated.

205. Q. Why are iron filings directed to be used in purifying mercury?

A. Because the iron has a greater attraction for the metals with which mercury is often amalgamated, than for the mercury.

206. Q. How is the sulphuretum hydrargyri made?

A. It is made by mixing mercury with melted sulphur over the fire; when this is effected, the mass is cooled, reduced to powder, and sublimed.

207. Q. How is the hydrargyrus præcipitatus albus made?

A. By dissolving muriate of ammonia and oxy-muriate of mercury in water, and pouring into this solution a quantity of liquid sub-carbonate of potash. The powder that is thrown down is washed until it becomes insipid, and dried.

208. Where is iron found?

A. It is found abundantly in the earth, under a variety of forms, mineralized by sulphur, combined with earths, alloyed with metals: it exists in the waters of

many springs ; it is contained in vegetables ; it gives colour to the blood, and to many fossil substances.

209. Q. What preparations of iron are directed to be kept by the London College ?

A. Ferrum ammoniatum ; carbonas ferri ; sulphas ferri ; ferrum tartarizatum ; liquor ferri alkalini ; tinctura ferri muriatis ; tinctura ferri ammoniati ; vinum ferri.

210. Q. How many oxides of iron are there ?

A. Two : the black or protoxide, and the red or peroxide.

211. Q. Would you order the preparations of iron to be combined with astringent decoctions for medical use ?

A. No : because most of such decoctions contain gallic acid and tannin, which, combined with iron, form ink.

212. Q. If sulphate of iron is burnt in a white heat, what will remain after the process has been continued some time ?

A. The peroxide or red oxide of iron.

213. Q. What is the composition of ferrum ammoniatum ?

A. It is composed of muriate of iron and muriate of ammonia.

214. Q. How is it made ?

A. By subliming equal parts of carbonate of iron and muriate of ammonia.

215. Q. How is the carbonate of iron made ?

A. By dissolving sub-carbonate of soda and sulphat of iron in two separate portions of water, mixing the solutions, suffering the green powder to subside, then washing and drying it.

216. Q. What change of affinities is produced by mixing these solutions ?

A. The carbonic acid combines with the iron, leaving the soda to combine with the sulphuric acid ; a sulphat of soda therefore remains in solution, and a carbonate of iron is precipitated. This new compound consists of the black oxide of iron, combined with carbonic acid, but, upon exposure to the air, passes very soon to the state of red oxide.

217. Q. How is the ferrum tartarizatum made ?

A. It is made by mixing iron filings, supertartrate of potash, and water together ; they are exposed to the air in a broad glass vessel, for eight days ; the compound is then dried in a sand-bath, and reduced to powder ; after this is done, it is to be mixed with another portion of water, and exposed for eight days longer.

218. Q. What is the theory of the formation of this compound ?

A. During the exposure to the air, the iron becomes oxydized by abstracting oxygen both from the air and the water with which it is mixed ; and the oxide of iron combines with the superabundant tartaric acid of the supertartrate of potash ; the compound formed is therefore a tartrate of potash and iron.

219. Q. When iron wire is burnt in oxygen gas, what compound is formed ?

A. When iron is burnt in oxygen gas, the compound formed is the black oxide of iron.

220. Q. When iron is heated, in contact with air, what is formed ?

A. In this process a black oxide of iron is formed.

221. Q. When carbon is united to iron, what is formed ?

A. Steel.

222. Q. What is the composition of the liquor ferri alkalini ?

A. It is considered as composed of nitric acid, red oxide of iron, with potash, forming a triple compound.

223. Q. How is it made ?

A. It is made with iron, nitric acid, distilled water, and solution of sub-carbonate of potash. The acid and water are first to be mixed, and poured on the iron ; when the effervescence has ceased, the acid solution is to be poured off, and added gradually to the solution of sub-carbonate of potash, occasionally shaking it until it has assumed a deep brown-red colour, and no further effervescence takes place ; it is then to be set by for six hours, and its clear solution poured off.

224. Q. How is the tinctura ferri muriatus made?

A. Carbonate of iron is put with muriatic acid for three days; during which time the carbonic acid is displaced from the red oxide of iron, and the red oxide combines with the muriatic acid, and forms an oxy-muriate of iron, which is afterward combined with a quantity of rectified spirit.

225. Q. What compound of iron exists in the vinum ferri?

A. A tartrate of iron and potash.

226. Q. In what state in nature is lead found?

A. It is found oxydized, forming a variety of ores; combined with sulphur, forming an ore called galena; combined with muriatic and carbonic acids. It is found in the state of carbonate, phosphate, arseniate, arsenic phosphate, molybdate, and sulphat.

227. Q. What is plumbago?

A. Plumbago is a carburet of iron, or iron combined with carbon, in its first degree of oxidizement.

228. Q. What are the compounds of lead admitted into the new London Pharmacopœia?

A. Liquor acetatis plumbi; super-acetas plumbi; and liquor acetatis plumbi dilutus.

229. Q. How is the super-acetate of lead made?

A. It is made by boiling the carbonated oxide of lead in acetic acid, which displaces the carbonic acid and combines with the oxide of lead; the solution is to be filtered, evaporated to a certain extent, and set aside to crystallize.

230. Q. What are the substances which ought not to be given internally with super-acetate of lead?

A. Alkalis, and their carbonates, most of the acids and neutral salts, lime and magnesia.

231. How is the liquor acetatis plumbi made?

A. By boiling acetic acid and vitrified oxide of lead together, to a certain extent; then setting the solution by, that the feculencies may subside.

232. Q. What is the theory of this process?

A. The oxide of lead combines with the acetic acid, and a sub-acetate of lead is formed.

233. Q. How is the cerusse of commerce prepared?

A. Small sheets of lead are rolled up in a spiral form; these are placed perpendicularly on a support, over a vessel containing vinegar; several of these vessels covered are placed together, and surrounded with dung, the heat of which raises the vinegar in vapour, which converts the surface of the lead into a white oxide, or rather a carbonate; at length the whole of the lead is thus converted; it is then taken out and ground to powder.

234. Q. What form of lead is litharge?

A. Litharge is the yellow oxide of lead in a kind of triform state, and combined with a little carbonic acid.

235. Q. How many oxides of lead are there?

A. Lead is considered at present as capable of forming four different oxides.

236. Q. What oxide is minium?

A. The tritoxide or red oxide of lead.

237. Q. In what state is copper found in nature?

A. It is found mineralized by oxygen; combined with carbonic acid, forming malachite and mountain blue; in combination with phosphoric acid, with muriatic acid, with sulphuric acid, with arsenic acid; and it is abundantly found mineralized with sulphur, forming all the varieties of copper pyrites.

238. Q. What preparation of iron exists in the *mistura ferri composita*.

A. A carbonate of iron.

239. Q. How many oxides of copper are there?

A. There are two oxides of copper, viz. the protoxide of a red, or orange colour, and the peroxide of a black colour.

240. Q. What form of copper is *æruugo* or *verdigris*?

A. Verdigris is a sub-acetate of copper.

241. Q. What are the compounds of copper directed to be used by the London Pharmacopœia?

A. They are the *cuprum ammoniatum*, and the *liquor cupri ammoniati*.

242. Q. How is the ammoniated copper made?

A. It is made by rubbing sulphat of copper and sub-carbonate of ammonia together, in a glass mortar,

until the mixture ceases to effervesce ; it is then to be wrapped in bibulous paper, and dried by a moderate heat.

243. Q. From whence do we obtain arsenic ?

A. It is found in nature among the ores of cobalt, antimony, tin, iron, copper, and silver ; it is found in combination with sulphur, forming an ore called orpiment ; and it is found combined with oxygen, forming an ore called the white oxide of arsenic.

244. Q. What preparations of arsenic are used in medicine ?

A. The oxydum arsenici præparatum, and liquor arsenicalis.

245. Q. How many oxides of arsenic are there ?

A. There are two oxides of arsenic, viz. the protoxide, or what is called white oxide, and the peroxide, which is generally called arsenic acid.

246. Q. How is the prepared oxide of arsenic made ?

A. By reducing common oxide of arsenic to powder, and placing it in a crucible, covered by an inverted crucible ; into which the oxide of arsenic is sublimed.

247. Q. How is the liquor arsenicalis made ?

A. By taking sixty-four grains of prepared oxide of arsenic, and sixty-four grains of the sub-carbonate of potash from tartar ; these are to be boiled in a glass vessel, with a pint of water, until they are entirely dissolved, to which are to be added four fluid drachms, with as much water as will make the whole exactly fill a pint measure.

248. Q. What is the compound formed in this preparation ?

A. An arseniate of potash.

249. Q. Has the oxide of arsenic any peculiar properties ?

A. Yes ; instead of being insipid, as most other oxides are, it is acrid and corrosive to the taste, it is soluble in water, and can be crystallized in octaedrons ; it reddens the infusion of litmus, and combines with alkalis ; it has therefore been considered, by some chemists, rather as an acid than an oxide, and has been called arsenious acid.

Comp. Sp. Lavender

250. Q. What are the sources of antimony?

A. Antimony is found native, in combination with oxygen, with sulphur, and with muriatic acid.

251. Q. What preparations of antimony does the London College direct to be kept?

A. The oxydum antimonii, sulphuretum antimonii præcipitatum, antimonium tartarizatum, pulvis antimonialis, and the liquor antimonii tartarizati.

252. Q. How is the oxide of antimony made?

A. A quantity of sulphuret of antimony is to be added to a mixture of muriatic acid and nitric acid; which is to be digested for an hour, in a boiling heat; the solution is then to be strained, and poured into a quantity of water, in which is dissolved a portion of sub-carbonate of potash; a precipitate is then formed, which is to be well washed and dried on bibulous paper.

253. Q. What is the theory of the formation of this oxide?

A. The antimony of the sulphuret first becomes oxydized by the nitric acid, which is decomposed; the oxide of antimony is then dissolved by the muriatic acid, and a muriate of antimony is obtained; when this is added to the sub-carbonate of potash, the sub-carbonate of potash is first decomposed, the carbonic acid escapes, and the potash unites itself to the muriatic acid and forms muriate of potash; the muriatic acid having thus combined with the potash, the oxide of antimony is precipitated.

254. Q. When zinc is exposed in the state of fusion to the action of air, what is formed?

A. The zinc, under these circumstances, catches fire, and forms the white oxide.

255. Q. What metals are generally employed to decompose water?

A. The metals generally made use of to decompose water, are iron and zinc.

256. Q. What preparations of zinc are used in medicine?

A. The oxide and sulphat of zinc.

257. Q. What is calamine?

A. Calamine is an impure oxide of zinc.

258. Q. What part of the world does zinc come from ?

A. Zinc is obtained from most of the mining countries of Europe ; Derbyshire affords it in great abundance.

259. Q. How many oxides will zinc form ?

A. Two : the protoxide of a flesh colour, and the peroxide of a white colour.

260. Q. How is the sulphuretum antimonii præcipitatum made ?

A. Sulphuret of antimony, solution of potash, and distilled water, are mixed and boiled over a slow fire ; the mixture is kept stirred, and as much distilled water is added as evaporates ; when this part of the process is finished, the solution is to be strained through a double linen cloth, and while it is yet hot, sulphuric acid is to be dropped in, as may be required, to precipitate the powder, which is afterward to be well washed, to free it of the sulphat of potash ; then dried.

261. Q. Explain what takes place in this process.

A. Potash, sulphur, antimony, and water, are boiled together ; the water becomes decomposed into its constituents, oxygen and hydrogen ; the potash unites to the greater part of the sulphur, and attracts hydrogen from the water, so that a hydro-sulphuret of potash is formed ; the antimony combines with the oxygen of the water, and the sulphur which it retains attracts the other portion of hydrogen, with which the sulphuret of potash has not combined ; an hydro-sulphuretted oxide of antimony is thus formed, which is held in solution ; when the sulphuric acid is added, the hydro-sulphuret of potash is decomposed ; the sulphuric acid and potash combine, and form sulphat of potash ; the hydrogen escapes, and the sulphur intimately mixed with the hydro-sulphuretted oxide of antimony is precipitated.

262. Q. What acids dissolve the oxides of mercury ?

A. The oxides of mercury are dissolved by the sulphuric, nitric, and oxymuriatic acids.

263. Q. How is the antimonium tartarizatum made ?

A. It is made with sulphuret of antimony, nitrate of potash, super-tartrate of potash, sulphuric acid, and distilled water. The acid is to be mixed with the water, and heated in a sand-bath; when this is moderately warm, the sulphuret, of antimony and nitre, previously mixed, are to be added; they are next to be strained and boiled until all the moisture is consumed. The residue is then to be washed with distilled water, until it becomes tasteless, and while moist the super-tartrate of potash is to be added; it is, lastly, to be put into distilled water, boiled, and set aside to crystallize.

264. Q. What takes place in the formation of this compound?

A. It is considered, that during the process the nitrate of potash is decomposed by the sulphuric acid, as is shown by the extrication of nitrous gas, and part of its oxygen being expended upon the oxide of the sulphuret. This last is converted into protoxide of antimony, while perhaps, also, at the same time, the sulphur is partly converted into an acid. Subsulphat of antimony is then formed by the action of part of the acid on the protoxide; in this state the tartaric acid of the super-tartrate of potash acts upon it so as to form the triple compound of tartrate of antimony and potash.

265. Q. How is antimonial powder made?

A. By mixing one part of sulphuret of antimony and two parts of hartshorn shavings, throwing them into a broad iron pot, heated to a white heat, and stirring the mixture constantly until it acquires an ash colour; having taken it out, it is to be reduced to powder, and put into a coated crucible, upon which another inverted crucible, having a small hole in its bottom, is to be luted; the fire is now to be raised to whiteness, and kept so for two hours. The mass is then to be reduced to a very fine powder.

266. Q. What does this compound consist of?

A. It consists of oxide of antimony and phosphate of lime.

267. Q. Describe the phenomena that take place during its preparation.

A. When the sulphuret of antimony and hartshorn

shavings are exposed to a white heat, the sulphuret of antimony is decomposed, its sulphur is driven off, and the antimony remains oxydized, while the gelatine of the hartshorn shavings is destroyed, and nothing is left but phosphate of lime, which becomes mixed with the oxide of antimony.

268. Q. What is the active ingredient of the yeast cataplasm?

A. The carbonic acid gas which is evolved, and which is the product of fermentation.

269. Q. What are the chemical compounds that exist in the *mistura ferri composita*?

A. Carbonate of iron and sulphat of potash.

270. Q. What is meant by fermentation?

A. The spontaneous change of vegetable substances by which their properties become altered.

271. Q. What circumstances are required for fermentation to go on?

A. A certain degree of fluidity; a degree of heat between 55° and 65° Fahrenheit, and the contact of air.

272. Q. What are the species of fermentations?

A. Fermentation is divided into the spirituous, the acetous, and the putrefactive; besides which, Dr. Thomson has added two others, viz. the panary and the saccharine fermentation.

273. Q. What ingredients are necessary for fermentation?

A. Water, sugar, and mucilage.

274. Q. Can a fluid, after it has undergone the acetous fermentation, be made to undergo the vinous?

A. No: the fermentations will only take place in their regular succession; first from the acetous to the vinous, and then from the vinous to the putrefactive.

375. Q. What are the products of the spirituous fermentation?

A. Ardent spirits, wines, and beers.

276. Q. What do the acetous and putrefactive fermentations produce?

A. The acetous fermentation produces vinegar, and the putrefactive fermentation produces ammonia.

277. Q. What gas escapes during fermentation ?

A. Carbonic acid gas.

278. Q. In forming the medicated wines, what wine does the London College direct to be used ?

A. Sherry wine.

279. Q. How is alkohol obtained ?

A. Alkohol may be obtained by distilling any spirituous liquor. Brandy affords the greatest quantity, but in this country it is usually obtained from malt spirit, when it is termed rectified spirit.

280. Q. How does the London College direct alkohol to be made from rectified spirit ?

A. A quantity of heated sub-carbonate of potash is added to a quantity of rectified spirit : these are macerated together for twenty-four hours : the alkohol is then distilled off by means of a water-bath.

281. Q. What is the use of the sub-carbonate of potash.

A. It abstracts the greater part of the water from the rectified spirit. Alkohol appears always to contain a portion of water.

282. Q. How is the strength of alkohol ascertained ?

A. The strength of alkohol is known by taking its specific gravity, which according to the London College, ought to be 815, water being 1000.

283. Q. What is the solvent of a resin ?

A. Alkohol ; but rectified spirit is generally used.

284. Q. In what menstruum is gum soluble ?

A. Water, and not in alkohol.

286. Q. What menstruum should be used to dissolve a gum resin ?

A. A mixture of spirit and water.

286. Q. What use is made of rectified spirit in medicine ?

A. To make ethers, different spirits, and tinctures ?

287. Q. When arsenic is exposed to heat, what smell does it emit ?

A. Arsenic, when exposed to heat, emits a smell like garlic.

288. Q. Of what are the different medicinal spirits composed ?

A. A particular volatile oil, a quantity of alkohol, and water.

289. Q. What are the elements of alkohol ?

A. Oxygen, hydrogen, and carbon.

290. Q. What is an ether ?

A. A compound formed by the action of an acid upon alkohol ; it is the lightest fluid known ; it is highly volatile, pungent, odorous, and inflammable.

291. Q. How are ethers designated ?

A. They are named from the acid by which they are obtained : that obtained by sulphuric acid and alkohol, is called sulphuric ether ; by acetic acid, acetic ether ; by nitric acid, nitric ether, and so forth.

292. Q. What is the composition of ether ?

A. Oxygen, hydrogen, and carbon.

293. Q. How does ether differ from alkohol, as its constituents are the same ?

A. The proportions of its constituents are different : it is supposed to contain more hydrogen and less carbon than alkohol.

294. Q. Is the acid decomposed in the formation of ether ?

A. In some degree ; but its presence seems chiefly to predispose to an alteration of the affinities of the elements of the alkohol.

295. Q. What will ether dissolve ?

A. Ether will dissolve phosphorus and sulphur in small portions ; it also dissolves muriate of gold and the oxymuriate of mercury : likewise it readily dissolves ammonia and nitrous gas, besides which it will dissolve the fixed and volatile oils and bitumen.

296. Q. Will ether combine in every proportion of water ?

A. No : ether combines only in a small proportion with water ; ten parts of that liquid dissolve about one part of ether.

297. Q. What proportion of water does nitric ether require for its solution ?

A. Nitric ether dissolves in about 48 parts of water, and gives to that liquid an odour like that of apples.

298. Q. What ethereal compounds are directed to be kept in the shops by the London College ?

A. The sulphuric ether, the rectified ether, ethereal oil, aromatic spirits of ether, compound spirits of ether, spirit of nitric ether.

299. Q. How is the æther sulphuricus made ?

A. By distillation from equal quantities of rectified spirit and sulphuric acid. There are several precautions necessary in the making of ether : it is to be distilled from a glass retort into a double receiver, or two receivers luted together ; they are to be kept cold by ice or cold water : the distillation is to be carried on until a heavier fluid passes over, that sinks to the bottom of the ether.

300. Q. How is æther rectificatus made ?

A. Sulphuric ether is distilled from a certain quantity of fused potash and water ; if fourteen fluid ounces are used, twelve ounces are to be distilled over.

301. Q. Of what use is the potash in this preparation ?

A. It combines with the sulphurous acid and ethereal oil, which the sulphuric acid contain ; these remain behind in the retort.

302. Q. How is the oleum æthereum made ?

A. After the distillation of sulphuric ether, the distillation is to be carried on until a black froth begins to rise, when the retort is to be immediately removed. The oil is then to be separated from the fluid in the receiver, and washed with lime-water, to free it of the adherent acid.

303. Q. What is the spiritus ætheris aromaticus made with ?

A. It is made with cinnamon-bark, cardamom-seed, long pepper, ginger-root, and spirits of sulphuric ether.

304. Q. Of what is the spiritus ætheris compositus formed ?

A. It is formed of spirits of sulphuric ether and ethereal oil.

305. Q. How is the spiritus ætheris nitrici made ?

A. By distillation from a mixture of nitric acid and rectified spirit.

306. Q. How are essential oils obtained ?

A. Essential oils are obtained either by expression or distillation.

307. Q. Why are not essential oils distilled with alcohol instead of water?

A. Because the volatile oils are volatile at the temperature of boiling water: but there are many of them not volatile at the temperature at which alcohol boils; consequently the alcohol would pass over weakly impregnated with their odour and properties.

308. Q. How would you ascertain if a volatile oil was adulterated with a fixed oil?

A. This may be ascertained by heating a small portion of the oil on a piece of clean paper; if there is present any fixed oil, a greasy spot will remain; whereas, if the volatile oil be pure, the paper will be left clean.

309. Q. What takes place when volatile oils are exposed to the air and light?

A. They become more viscid, alter their colour, lose part of their odour, redden the tincture of turnsole, and gradually assume the form of resins.

310. Q. What are these changes owing to?

A. These changes depend upon the absorption of oxygen; and hence the necessity of preserving volatile oils in small phials completely full and well corked.

311. Q. Are volatile oils soluble in any degree in water?

A. Yes: in the distillation of the aromatic herbs the water retains a small portion of the volatile oils in solution, which gives the taste and odour of the vegetable.

POISONS.

1. WHAT is a poison?

A. A poison is any substance capable of altering or destroying some or all of the functions necessary to life.

2. Q. What are the principal mineral poisons?

A. Arsenic; antimony; copper; lead; and mercury.

3. Q. What are the symptoms of poisoning by arsenic?

A. An austere taste, constriction of the pharynx and œsophagus, hiccup, nausea, and vomiting of brown or bloody matter; great anxiety; heat and severe pain at the pit of the stomach; black and fœtid stools; small, frequent, and irregular pulse; palpitation, and difficult breathing; great thirst; burning heat; delirium, convulsions, and death.

4. Q. How is the case of poisoning by arsenic to be treated?

A. Vomiting is to be immediately excited by an emetic, of zinc, or ipecacuanha, aided by the liberal use of diluents. If vomiting is not speedily induced by these means, the stomach should be washed out by Jukes's syringe. After the stomach has been thus cleared of the poison, the next indication is to counteract the secondary symptoms. This is to be accomplished by venesection, fomentations, emollient glysters, as circumstances may require.

5. Q. Is there any known *antidote* to the poison of arsenic?

A. Sulphuret of potash, alkaline salts, charcoal, sulphur, &c. have all been recommended, but are of doubtful efficacy. Carbonate or magnesia is perhaps entitled to the most credit as an antidote.

6. Q. What are the tests of arsenic?

A. The following are the most important: viz.

1. The ammoniaco-nitrate of silver dropped into

a solution of arsenic, produces a copious yellow precipitate, which in the course of a few hours turns to a dark brown.

2. The ammoniaco-sulphate of copper produces a copious green precipitate, well known under the name of Scheele's green.

3. If a stream of sulphuretted hydrogen be passed through a solution of arsenic, it causes a yellow precipitate.

4. If arsenic be thrown upon hot coals, it burns with a garlic smell.

5. If arsenic be surrounded with a circle of charcoal, between two copper plates, and subjected to heat for a few minutes, on separating the plates a silver-like stain will be left upon the plates.

6. Another test is the reduction of the metal, by calcining the dried suspected matter in a glass tube, with equal parts of charcoal and potash, when, if arsenic be present, even in very minute quantity, it will be sublimed, in the form of a shining metallic coating.

7. Take a little recent wheat starch, add to it a sufficient quantity of *iodine* to give it a blue colour, mix a little of this blue matter with water so as to have a blue-coloured liquid. If into this liquid a few drops of an aqueous solution of arsenious acid be put, the blue colour is immediately changed to a reddish brown, and is gradually dissipated entirely. If a few drops of sulphuric acid be now added, the blue colour is again restored.

8. Take a few drops of the solution of *chromate of potash* to the filtered solution, or to a grain of white arsenic in substance, and in half an hour a bright grass-green colour will be produced.

7. Q. What are the appearances on dissection of a person who has been poisoned by arsenic?

A. The stomach is the principal seat of morbid appearances. The villous coat of that organ is most generally found in a state of high inflammation, frequently with erosions upon its surface. The villous

coat may not unfrequently be separated. The intestines are also inflamed, but in a less degree. The lungs are also usually affected—they are livid, or have livid spots on their surface. The other viscera are generally in a healthy condition.

8. Q. What are the effects of tartar emetic, when taken in a large dose?

A. Severe pain in the stomach; excessive vomiting; profuse liquid stools; face pale; great prostration of strength; pulse small and feeble; cramps in the extremities.

9. Q. What are the appearances on dissection?

A. Inflammation of stomach and intestines. The lungs are also frequently inflamed.

10. Q. How is poisoning by tartar emetic to be treated?

A. Vomiting, if not already present, to be excited by tickling the throat with the finger or a feather, and diluting with large draughts of mild fluids. The inflammatory symptoms afterward to be subdued by the usual antiphlogistic means.

11. Q. What are the best *antidotes* to tartar emetic?

A. Decoction of bark is the best. If this cannot be obtained, strong tea, or a decoction of nut-galls, or any other astringent herb will answer.

12. Q. What are the tests of tartar emetic?

A. 1. Sulphuretted hydrogen and the hydro-sulphurets, when used in small quantities, throw down an orange-yellow precipitate; when used in larger quantities, a deep brown red.

2. Sulphuric acid produces a white precipitate.

3. Lime-water, water of barytes, and alkalis give a thick white precipitate.

4. Infusion of galls causes a copious white precipitate, and is the most delicate test of all.

5. When heated red hot with the black flux, all the preparations of antimony are reduced to the metallic state.

13. Q. What is the preparation of copper which is most usually poisonous?

A. Verdigris, or the sub-acetate of copper.

14. Q. What are the symptoms of poisoning by copper?

A. An acrid, styptic, coppery taste in the mouth; parched and dry tongue: a sense of strangulation in the throat, coppery eructations, constant spitting, nausea, copious vomitings, or vain efforts to vomit, shooting pains in the stomach, which are often very severe; horrible gripings; frequent alvine evacuations, sometimes bloody and blackish, with tenesmus and debility; the abdomen inflated and painful; the pulse small, irregular, tight, and frequent; syncope, heat of skin, ardent thirst, difficulty of breathing, anxiety about the præcordia, cold sweats, scanty urine, violent head-ache, vertigo, faintness, weakness in the limbs, cramps of the legs, and convulsions.

15. Q. What are the appearances on dissection?

A. The stomach and intestinal canal are found inflamed, and sometimes gangrenous.

16. Q. How is poisoning by copper to be treated?

A. For the purpose of expelling the poison, vomiting is to be excited by copious draughts of milk and water. After this inflammatory symptoms are to be subdued by the usual means, and nervous symptoms by opium and antispasmodics.

17. Q. What is the antidote to copper?

A. Whites of eggs mixed up with water, which must be taken freely.

18. Q. What are the tests of verdigris?

A. 1. Mix the verdigris with charcoal, and heat it to redness in a crucible, and metallic copper will be formed.

2. Sulphuretted hydrogen precipitates a black sulphuret of copper.

3. Ammonia gives a blue precipitate; but if added in excess, the precipitate re-dissolves, and the liquor is of a beautiful blue colour.

4. A clean plate of iron immersed in the solution, becomes covered in a few hours with a portion of the copper, and the blue colour of the solution grows first green, and then turns to red.

19. What are the symptoms of poisoning by lead?

A. When taken in large quantities, a sweetish astringent, constriction of the throat, pain in the region of the stomach, obstinate and often bloody vomitings, hiccup, convulsions, and death. When taken in small quantities and long-continued doses, it causes colica pictonum and paralysis.

20. Q. What are the *antidotes* to lead?

A. Sulphate of soda and sulphate of magnesia.

21. Q. What is the treatment proper for cases of poisoning by lead?

A. A weak solution of Glauber's or Epsom salts to be drank very freely, for the purpose of vomiting and purging, as well as to neutralize the poison. Inflammatory symptoms to be afterward subdued in the usual manner.

22. Q. What are the chemical tests of lead?

A. 1. All the preparations of lead are easily reduced to the metallic state by calcination with charcoal.

2. The *acetate of lead*, dissolved in water, is precipitated white by sulphuric acid.

3. By chromate of potash and chromic acid, it is precipitated of a canary-yellow colour.

4. By sulphuretted hydrogen and the hydro-sulphurets, a black precipitate.

5. By sulphate of soda, a white precipitate.

6. Gallic acid gives a yellowish-white precipitate.

23. Q. What preparation of mercury is generally used as a poison?

A. The muriate of mercury, or corrosive sublimate.

24. Q. What are the symptoms of poisoning by corrosive sublimate?

A. An acrid, astringent, metallic taste in the mouth; stricture and burning in the throat; anxiety and rending pains in the stomach and intestines; nausea and vomiting, which is sometimes bloody; diarrhœa, sometimes dysentery; pulse small, hard, and frequent; fainting; great prostration of strength; diffi-

culty of breathing ; cold sweats ; cramps in the limbs ; insensibility ; convulsions, and death.

25. Q. What are the appearances on dissection ?

A. Inflammation of the stomach and intestines, sometimes ending in gangrene.

26. Q. What is the antidote to corrosive sublimate ?

A. Albumen or the whites of eggs.—Lately wheat flour has been recommended.

27. Q. What is the treatment in cases of poisoning by corrosive sublimate ?

A. The whites of eggs to be mixed with water, and one given every two or three minutes to promote vomiting as well as to decompose the poison. Milk, sugar and water, or water to be taken liberally at the same time. Symptoms of inflammation to be overcome by venesection, &c.

28. Q. What are the chemical tests of corrosive sublimate ?

A. 1. By mixing corrosive sublimate with charcoal and water, and subjecting it to heat in a close vessel, metallic mercury is obtained.

2. By exposing it to heat without any admixture in a glass tube, it will be sublimed, and found lining the top of the tube in the form of a white shining crust.

3. By ammonia, a white precipitate is produced.

4. Carbonate of potash causes a precipitate like brick dust.

5. Caustic potash produces a yellow precipitate.

6. Lime water produces an orange-coloured precipitate.

7. Nitrate of silver occasions a white curdy precipitate.

29. Q. What are the symptoms of poisoning by opium ?

A. Stupor, numbness, heaviness in the head, pupil of the eye dilated, sometimes furious delirium, pain, convulsions of different parts of the body, or palsy of the limbs. The pulse is variable, but at first generally strong and full : the breathing is quick, and there is great anxiety, coma, death.

Smith

30. Q. What is the treatment in cases of poisoning by opium?

A. The stomach is first to be effectually evacuated, by emetics of tart. emetic of sulphate of zinc; large injections to clear the bowels, and assist in getting rid of the poison. When as much of the poison as possible has thus been expelled, the patient may drink, alternately, a tea-cup full of strong hot infusion of coffee and vinegar diluted with water. If the drowsiness and insensibility bordering on apoplexy be not remedied by these means, blood may be taken from the jugular vein, blisters may be applied to the neck and legs, and the attention roused by every means possible. If the heat declines, warmth and frictions must be perseveringly used. Vegetable acids are on no account to be given before the poison is expelled.

THE END.

Colman





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