

**A synopsis of a course of lectures on comparative anatomy and physiology
/ [Sir Busick Harwood].**

Contributors

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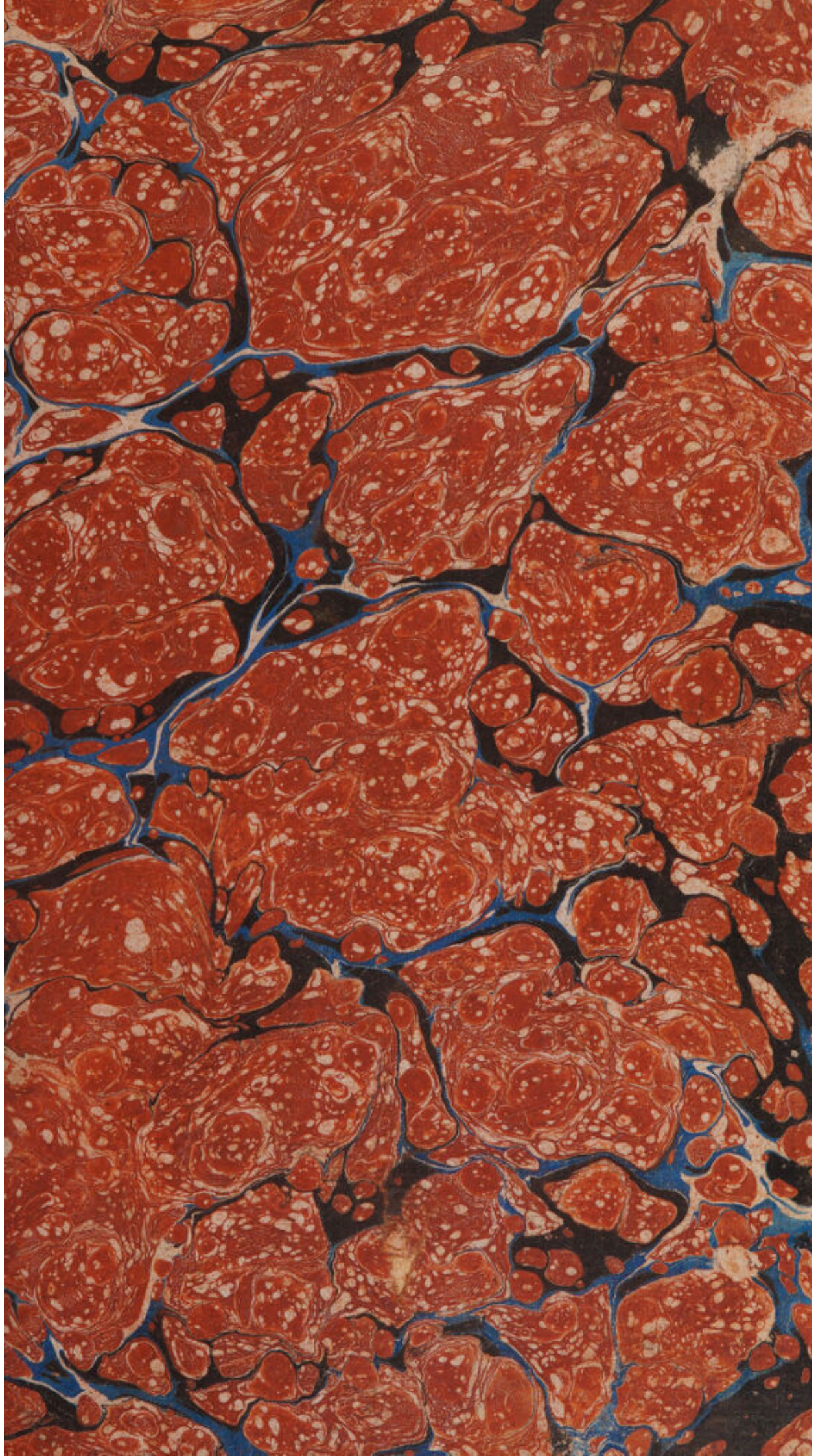


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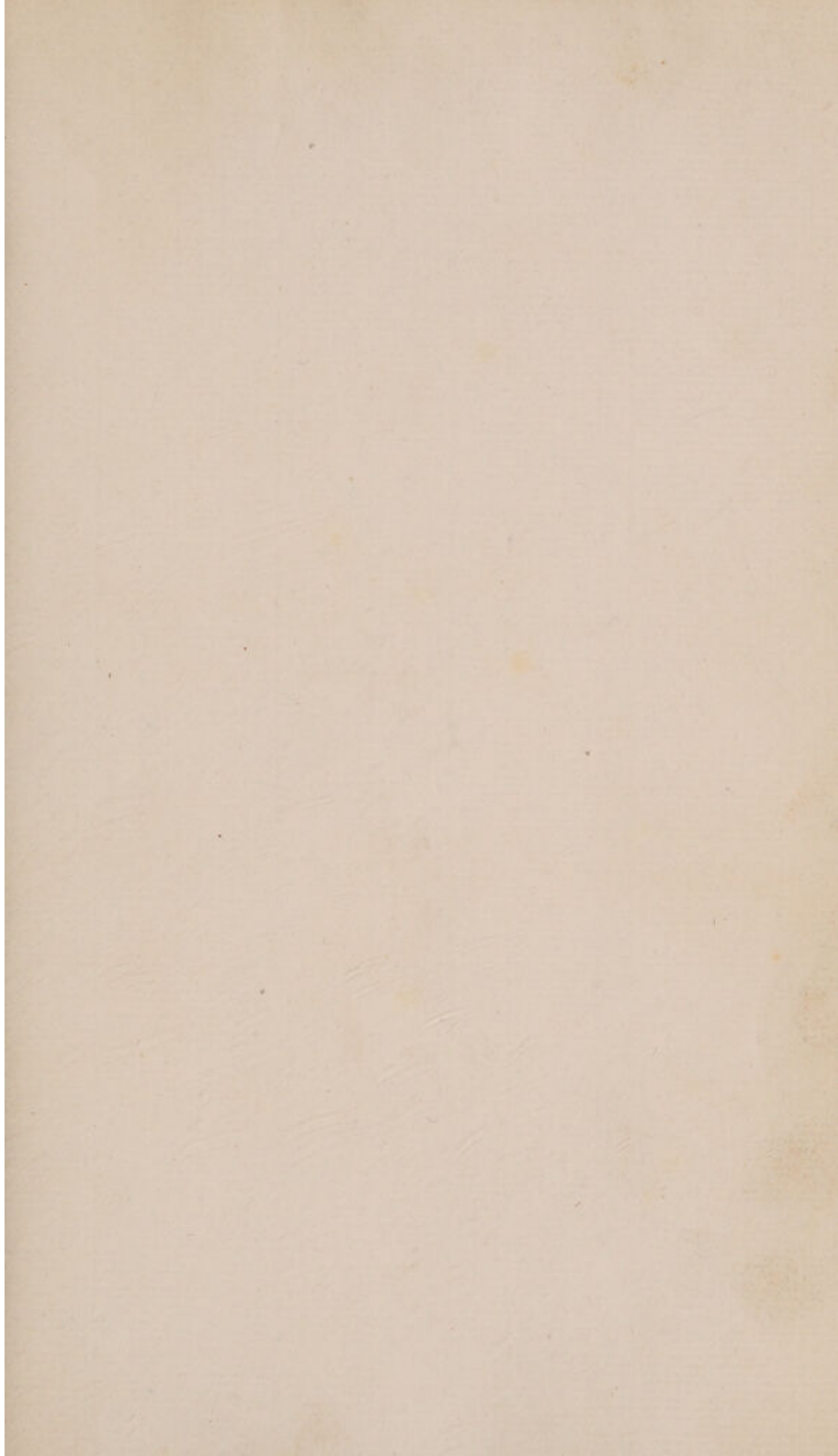


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SYNOPSIS

OF

SYNOPSIS

A COURSE OF LECTURES

A

SYNOPSIS,

&c. &c.

SYNOPSIS

A COURSE OF LECTURES

SYNOPSIS
COMPARATIVE ANATOMY AND

PHYSIOLOGY

By SIR BUSICK HARWOOD, KNT.

M.D. F.R.S. and F.A.

General Professor of Medicine and Professor of Anatomy at the
University of Cambridge.

CAMBRIDGE

PRINTED BY TRAVIS & SON

1867.

A
SYNOPSIS
OF
A COURSE OF LECTURES
ON
COMPARATIVE ANATOMY and
PHYSIOLOGY.

By SIR BUSICK HARWOOD, KNT.

M. D. F. R. S. and S. A.

*Downing Professor of Medicine and Professor of Anatomy in the
University of Cambridge.*



CAMBRIDGE:

PRINTED BY FRANCIS HODSON.

—
1807.



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AND ONE OF THE REPRESENTATION IN PARLIAMENT FOR THE UNIVERSITY
OF CAMBRIDGE

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M.D. 1852 and 1853

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By his Lordship's

Markwood and others

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CHANCELLOR OF THE EXCHEQUER

*And one of the Representatives in Parliament for the University of
Cambridge*

&c. &c. &c.

THIS SYNOPSIS

OF

A COURSE OF LECTURES

ON

COMPARATIVE ANATOMY and PHYSIOLOGY

Which were honoured by his Lordship's attendance during his
Residence in the University

With sentiments of esteem and gratitude

Is respectfully inscribed

By his Lordship's

Most faithful and obedient servant

Busick Harwood

February 2, 1807.

TO THE RIGHT HONOURABLE

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CHANCELLOR OF THE EXCHEQUER

And one of the Representatives in Parliament for the University of Cambridge

MANY years have elapsed since the Professor of Anatomy in the University of Cambridge found it expedient to transgress the limits of Human Anatomy, to which he had hitherto confined himself. And to take a more comprehensive view of the Science under the title of Comparative Anatomy. By the term Comparative Anatomy he means to include not only an enquiry into the Organization of Men and of other Animals, with their respective relations and distinctions, but also into such Analogies as are found to exist between the Animal and the Vegetable kingdoms. It is moreover his intention that this plan of Lectures should comprehend a succinct account of the progressive scale of Animal and Vegetable existence, so as to impress the minds of his hearers with the sublime truths deducible from the Philosophy of Natural History.

ADVERTISEMENT.

MANY years have elapsed since the Professor of Anatomy, in the delivery of public Lectures in this University, found it expedient to transgress the limits of *Human Anatomy*, to which he had originally confined himself, and to take a more comprehensive view of the Science under the title of *Comparative Anatomy*. By the term *Comparative Anatomy* he means to include not only an enquiry into the Organization of Men and of other Animals, with their respective relations and distinctions, but also into such Analogies as are found to exist between the Animal and the Vegetable kingdoms. It is moreover his intention that this plan of Lectures should comprehend a succinct account of the progressive scale of Animal and Vegetable existence, so as to impress the minds of his hearers with the sublime truths deducible from the *Philosophy of Natural History*.

This alteration in his Course of Lectures has not been made without mature deliberation; and he looks for the indulgent acquiescence of the few medical students for whose use the Synopsis was originally intended.

The Professor laments that a long and severe illness has delayed for a time the completion of a descriptive Catalogue of Preparations to which reference will be made in the course of his Lectures.

INTRODUCTION.

History of Comparative Anatomy.

1. **R**ISE, Progress, and present state of the Science.

Of its general utility.

Of the various kinds of preparations for investigating the more obscure parts of an animal body, and the Instruments made use of for the purpose of preparing and preserving them.

Cautions concerning the use of anatomical preparations.

2. Explication of the general Terms of Anatomy.

OF THE

ANIMAL *and* VEGETABLE *Kingdoms.*

3. Linnæus's definition of Stones, Plants, and Animals.

4. General analogies subsisting between the *Animal and Vegetable Kingdoms*, and the imperceptible gradations by which we pass from one *kingdom* to the other.
5. Of the external coverings of Animals and Vegetables, and the changes produced in them by bleaching.
6. Of Bones, Wood, and Pith.
7. Of the nourishment of Plants and Animals.
Of their digestive Organs.
Of *Chyle* and *Sap*.
Nourishment of the Fœtus.
8. Of the Circulation of the *Sap* in *Vegetables*.
Of Animals destitute of Hearts.
9. *Of the Respiration of Vegetables*.
Of the Lungs of Animals and Vegetables, and the Gills of Fishes.
Of the Suffocation of Plants and Insects.

10. Of Hybernation.
Of the Perspiration of Plants.
Why Plants improve the air by day and injure it by night.
11. Of the secretory organs of Plants and Animals.
12. Of the Sleep of Plants.
13. Animal *Sensation* compared with vegetable *Irritability*.
Of vegetable muscular motion.
Of the locomotion of Plants and Animals.
Of their power of re-production.
Of amphibious Plants and Animals.
- Of the Diffemination, natural Duration, Decay, and Decomposition of Plants and Animals.*
14. Of the Sexual System.
Various modes of Impregnation in Plants and Animals

Propagation of Plants and Animals by Eggs, Seeds, Buds, Cuttings, and Ingrafting.

Of the *Seminal* Leaves and *Placentation* of Plants and Animals.

Of androgynous Plants and Animals.

Of Mules, Monsters, and Varieties.

15. Of annual Plants and Animals.

Of their puberty, old age, and diseases.

Of Poisonous Animals and Plants.

16. Of the decomposition of Animal and Vegetable Substances.

Of Animals in general.

17. Progressive scale of Animated Beings.

Of the imperceptible gradations by which the various classes of Animals pass into each other.

18. Of the Society, Habitations,
Hostilities, Migration, &c. of
Animals.

Of the Armour of Animals, and
the Instruments with which they
are furnished for procuring food,
and seizing their prey.

19. Of the Transformation which
some species undergo.

Of their Duration and the natural
Changes which Animals undergo.

Of the longevity of Man in the
earlier ages.

Effects of Climate, Diet, &c. in
prolonging Life.

Instances of extraordinary lon-
gevity.

Age of Fishes discoverable by
their scales, &c.

20. Observations on the comparative
size and strength of Animals.

Of Intellect and Instinct.

21. Examples of pure Instinct.

Of Animals endowed with Instincts, which can accommodate themselves to peculiar circumstances.

22. Of Instincts improveable by experience and observation.

Some Animals endowed with a greater number of Instincts than others.

The superiority of Man over all other Animals depends upon the greater number of his natural Instincts.

Of the progress of Instinct in Children.

23. Education of Children and Domestication of Animals.

Of the Influence of Habit.

*Of the Nature and Properties of the
Blood of Animals.*

24. Of recent Blood drawn from the
vein of an Animal.

Of the separate Parts of the Blood.

SERUM.

25. The properties and use of this
fluid.

CRASSAMENTUM.

26. Composed of two parts.
Separation of these parts by wash-
ing in water.

*Particular Examination of each of these
Parts.*

RED GLOBULES.

27. Supposed cause of their red co-
lour.

- Various opinions concerning their nature and formation.
28. Theories of Lewenhoec, Hewson, and others.

COAGULABLE LYMPH.

29. Its peculiar properties.
30. Theory of the formation and regeneration of parts, by means of the *Coagulable Lymph*.
31. Difference between arterial and venous blood.
32. Priestley's Doctrine and Experiments.
33. Human Blood compared with that of Animals.

History of Transfusion.

34. Method of performing the operation.
35. Effects of *Transfusion* on various Animals.

Of Animal Fibres.

36. Their gradual increase and elongation.

Observations on the preternatural growth of giants.

37. Cicatrices, how formed.

OF MEMBRANES.

38. General idea of their structure and various use.

Their different degrees of sensibility, in a healthy, and in a morbid state.

OF BONES.

39. The beginning and progress of *Ossification*.

Of the variety of this process in the flat, cylindric, and spherical bones.

- 40. General structure of bones.
- 41. Chemical analysis of bone.
- 42. Of their nerves and blood-vessels.
- Exquisite sensibility of bones in some diseases.
- Evident effect of diet on the bones.

Of the PERIOSTEUM.

- 43. Manner in which it is connected with the bones.
- Texture and uses of this membrane.

Of the MARROW.

- 44. Its nature and use.
- 45. Of the *pori medullares*.
- 46. General effects of the *Lues Venerea* upon Bones.
- Exhibition of the different appearances produced in them by this disease.

Callus, how formed, &c.

47. Use of the bones in general.

Of CARTILAGES.

48. Their structure, situation, and manifold uses.

Of LIGAMENTS.

49. Of the structure and use of ligaments in general.

50. Of capsular ligaments in particular.

Of the Human Skeleton.

51. Of the different kinds of Skeletons, and methods of preparing them.

52. General division of the Skeleton.

Bones of the Head, Trunk, and Extremities, separately considered.

Of the CRANIUM.

53. The skull composed of several bones.
54. *Particular description of the *Sutures*, by which these bones are connected with each other.
55. Advantages arising from this mode of connexion.
- Sutures often obliterated.

Of the *Offa Triquetra*.

56. View of the external basis of the skull.

Of the various *processes* observable in this part of the cranium.

57. General view of the internal cavity of the cranium.
58. Marks of the longitudinal and lateral sinuses, &c.
59. Division of it's internal basis.

* The principal Sutures are SUTURA $\left\{ \begin{array}{l} \text{CORONALIS.} \\ \text{SAGITTALIS.} \\ \text{LAMBDOIDALIS.} \\ \text{SQUAMOSA.} \end{array} \right.$

60. Description and use of the *Processes*, &c. in the cavity of the skull.
61. Remarks on the attachment of the *Dura Mater*.
62. Varieties in the structure of this important membrane in different Animals.
63. Of the different *foramina* for the passage of blood-vessels and nerves.
64. Remarks on the entrance of the *carotid* and *vertebral* arteries into the skull.
65. Of the *Rete Mirabile*, or Plexus of Blood-vessels on each side of the *Sella turcica* in Quadrupeds.
66. Remarks on the curious structure of this Plexus, and observations concerning it's use.

Of the Bones of the Face.

67. Of their connexion with the proper bones of the skull.

68. Of the formation and use of the Lachrymal Duct.

69. Of the lower Jaw.

Of its Articulation.

70. The Human Countenance compared with that of other Animals.

Remarks on Phyiognomy.

71. Of the alveolar processes.

Of the absorpion of these processes in old age.

72. Of the human teeth in general.

Of the structure and form of the different classes of teeth.

Of their enamel, and it's uses.

73. Observations on the passage of the nerves into the teeth.

Of the original formation of the teeth, &c.

74. Of the structure of the teeth in various animals.
- Of the difference between the teeth of *carnivorous* and those of *herbivorous* and *granivorous* Animals.
75. Of the teeth of Fishes, and their extraordinary situation in some species.
76. Of the teeth of Serpents, and the canal for the transmission of the poisonous fluid through them.
77. The mode of ascertaining the age of some Animals, (particularly Horses,) by inspecting their teeth.
78. Of Animals destitute of teeth.
79. Of the Beaks and Talons of *carnivorous* and *granivorous* Birds.

Of the SPINE.

80. Of the vertebræ in general.

81. Of the large canal for the transmission of the spinal marrow.
 82. Of the lateral holes for the passage of the nerves.

Of the Vertebrae of the Neck.

83. Of the ATLAS and EPISTROPHEUS. Observations on their peculiar form and articulation.
 84. Of the perforations of the cervical vertebrae for the passage of the vertebral artery.

Of the Dorsal Vertebrae.

85. Of their substance, size, &c.
 86. Of their articulation with the ribs.

Of the Lumbar Vertebrae.

87. Of their situation and strength.

88. Of the ligaments connecting the
vertebræ.

Of their intervening cartilages.

89. Of the natural incurvations of
the spine.

90. Of it's mechanifm and uses.

Of the PELVIS.

Of the Os Sacrum.

91. Of the false vertebræ and holes
for the paffage of the nerves.

92. Of the Os COCCYGIS.

It's ftructure and ufe.

Of the Os Innominatum.

93. Composed of the *Ilium*, *Ischium*,
and *Pubis*.

94. Of the Symphyfis Pubis.

95. Remarks on the structure, and different capacities of the Pelvis, in the male and female Skeleton.

96. Deformities of the Pelvis considered as the cause of difficult births.

Of the THORAX.

97. Of the Ribs and Sternum.

98. Of the cartilages of the ribs.

99. Remarks on the general structure, and use of the thorax.

100. Observations on the motion of the ribs and sternum, in respiration.

Of the Upper Extremity.

101. Of the SCAPULA.

102. Its situation, structure, and uses.

103. Of the RADIUS and ULNA.

104. Of their particular uses, and the variety of their motions.

105. Of the eight bones of the carpus.

106. Of the Metacarpus and bones of the Fingers, &c.

107. General Observations on the mechanism, and uses, of the bones of the upper extremity.

Of the Lower Extremity.

108. Of the Os FEMORIS.

Its form and situation in general.

109. Of the TIBIA and FIBULA.

General description of their structure and shape.

110. Of the femilunar cartilages, crucial ligaments, &c.

111. Of the PATELLA, and its uses.

112. Of the TARSUS, METATARSUS, and TOES.

113. SKELETON of a FŒTUS examined, and compared with that of the adult subject.

114. Observations on the peculiar advantages of the cartilaginous appendages affixed to the bones of a fœtus.

The Human Skeleton compared with those of other Animals.

115. Of the Skeletons of Apes, Bears, Squirrels, &c.

116. Remarks on the peculiarities observable in the Skeleton of the Horse and other Animals.

117. Observations on the structure and use of the Tails of various Animals.

118. Of the Skeletons of Birds, Fishes, and Amphibia.

Of the Muscles in general.

119. Of voluntary and involuntary Muscles.

120. Of Tendons, Aponeuroses, &c.

121. Of the great importance of the abdominal Muscles, &c.

OF THE CONTENTS OF THE
THORAX.

122. *Of the Pleura.*

It's situation and attachments.

Of the structure and uses of the Pleura.

123. Of the *Mediastinum*, and it's uses.

Of the Thymus.

124. Different states of this gland in the adult subject, and in the foetus.

Opinions concerning it's use.

Of the Pericardium.

125. It's structure, &c.

Of the Human Heart.

126. Of the situation and structure of the Heart.

Remarks on the disposition of it's muscular fibres.

127. Division of the heart, into auricles and ventricles.

Of the septa between the auricles and ventricles.

128. Of the *foramen ovale*.

Observations on it's being sometimes found pervious in the adult subject.

Of the Right Auricle.

129. It's form, substance, and situation.

Of the opening of the two *venæ cavæ* into it.

Of it's communication with the right ventricle.

Of the Right Ventricle.

130. It's particular structure, situation, and capacity.

131. The *columnæ carneæ*, how formed.

Their particular uses explained.

132. Of the *valvulæ tricuspidales*, placed between the right ventricle and auricle.

Their structure and use.

133. Of the communication of the right ventricle with the pulmonary artery.

134. Of the *valvulæ semilunares*.
Their use, &c.

Of the Left Auricle.

135. It's structure, &c.

Of the entrance of the pulmonary veins into it.

136. Of its communication with the left ventricle.

Of the Left Ventricle.

137. It's substance, situation, &c.

138. Of the *valvulae mitrales*, placed between this ventricle and it's corresponding auricle.

Of the office of these valves, and their manner of acting.

139. Of the communication of the left ventricle with the AORTA.

Valves of the aorta.

140. Of the coronary veins and arteries.

141. Remarks on the different capacities and strength of the two ventricles.

142. Observations on the involuntary action of the heart.

143. Of the use of the heart in general.

144. Particular description of the *Aorta* and *Vena Cava*.

OF THE CIRCULATION OF THE BLOOD.

145. Of the ancient doctrines concerning it.

146. Of the discovery of it by Harvey.

Particular Description of the manner in which the Circulation is performed in the human subject.

147. Of the passage of the blood from the right ventricle to the lungs.

- 148. Of it's return from the lungs to the left side of the heart.
- 149. Of it's exit from the left ventricle, and the distribution of it to every part of the body by the *Aorta* and it's branches.
- 150. Of it's return to the right auricle of the heart by the *vena cava*.
- 151. Remarks on the quantity of blood, and the velocity with which it circulates in a healthy state.
- 152. Of the valves in the veins, their situation and use.
- 153. Of the *systole* and *diastole* of the arteries.

Of the Human Lungs.

- 155. Their situation and figure.
Their general structure, and division into lobes.

156. Of the BRONCHIÆ, or air vessels.

157. Of the *Pulmonary Artery and Vein.*

158. Of the *trachea*, or *aspera arteria*.
It's structure, situation, and use.

OF RESPIRATION.

*Of the Diaphragm, and Muscles
employed in Respiration.*

159. Situation, figure, and attachments of the *diaphragm*.

160. Of it's *crura*, and *centrum tendinosum*.

161. Of the situation and office of the intercostal muscles.

Of expiration and inspiration.

162. Effects of these opposite actions on the pulmonary vessels.

163. Of the changes produced in the blood in it's passage through the lungs.

Various opinions of authors on this subject.

164. Priestly's theory and experiments.

165. Of the secondary uses of the organs of respiration.

166. General remarks on the peculiarities of the circulation in a foetus.

Of the general distribution of the Blood-Vessels throughout the body.

167. Of the course of the principal arteries and veins.

Of their names, origin, and respective uses.

Of Phlebotomy, and the dangerous consequences of unskilful venæsection.

Of the Classification of Animals.

168. The *human* Heart and Lungs compared with the corresponding organs in Quadrupeds, Birds, Fishes, and Amphibia.
169. Anatomical peculiarities of these Organs, upon which the Classification of Animals chiefly depends.
170. Of the double Hearts of *Quadrupeds* and *Birds*.
171. Air necessary to the existence both of Animals and of Vegetables.
172. Of the Lungs of Quadrupeds and Birds.
173. Peculiarities in the Lungs of Birds.

Of the membranous Diaphragm of Birds, and the communication of the Lungs with the Cavities in the Bones, and the Air Bags in the Abdomen.

Advantages arising from this singular structure.

174. *Of the Circulation of the Blood in Quadrupeds and Birds.*

175. Of the single Hearts of *Fishes* composed of one auricle and one ventricle.

176. The Gills of *Fishes* compared with the Lungs of terrestrial Animals.

Of the Circulation of the Blood in Fishes.

177. Of the Passage of the Blood from the Heart to the Gills.

178. Of the union of the bronchial veins in the Gills performing the office of Arteries.

179. Of the return of the Blood to the Heart.

180. Remarks on this mode of circulation.

181. Of the swimming Bladder in Fishes.

182. Of the structure of the Heart in the *amphibious Animals*.

Of the transverse canals in the Septum between the ventricles.

183. *Of the circulation of the Blood in the Amphibia.*

Of the Pulmo Arbitrarius enjoyed by this class.

184. Of the three Hearts of the Sepio Loligo or Cuttle Fish, and the peculiarities attending the

circulation of the Blood in that Animal.

185. Of the Lungs and Respiration of Insects.

186. Of the circulation of the Blood in this class of Animals.

187. Of hybernating Animals.

OF GLANDS.

188. Of glandular Secretion.

Of the salival Glands.

189. Of the situation and office of the *parotid*, *maxillary*, and *sublingual* glands.

Disagreeable consequence of wounds in these parts.

190. Of the nature and use of the *Saliva*.

191. Of the effect of Fear and other passions upon the secretion of this fluid.

Of the poisonous quality of the
Saliva in some enraged Ani-
mals.

Of the Mouth in general.

192. Of the *Os Hyoides* and Tongue.
Remarkable variety in the struc-
ture of the *Os Hyoides* of the
Monkey.

Peculiarities in the Tongue of
various Animals.

193. Of the *Papillæ* of the Tongue
and the sense of tasting.

194. Of the *Velum pendulum Palati*,
and *Uvula*.

Of the want of the *Uvula* in
Quadrupeds.

Of the destruction of these parts
by disease.

195. Of the *Pharynx* and *Œsophagus*.

196. Phœnomena attending the passage of the aliment from the mouth to the stomach.
197. Remarks on the structure of the *Œsophagus* in ruminant Animals.
198. Of the LARYNX, and the cartilages which compose it.
199. Of the *glottis* and *epiglottis*.
200. Of the structure of the Glottis in the different classes of Animals.
201. Of the formation of articulate sounds.

Of the ABDOMEN.

202. Of the *peritonæum*.
203. Of the *abdominal Rings* in the human subject, and the openings for the passage of the Testes to the Scrotum in Quadrupeds.

Of the ABDOMINAL VISCERA.

*Of membranous, intermediate, and
muscular Stomachs.*

204. Of the *human* Stomach.

It's structure, size, situation, &c.

205. Of the nerves and blood-vessels
of the Stomach.

206. Of the *cardia* and *pylorus*.

Remarks on the entrance and
exit of the food by these ori-
fices.

OF DIGESTION.

207. Examination of the principal
hypotheses which have been
formed to explain the nature
of this process in the human
stomach.

Objections to each of these.

208. Of the discoveries lately made on this subject.

209. Of the *succus gastricus*.

210. Examination into the nature and properties of this fluid in men and other animals.

211. Why the Stomach itself is not acted upon by the solvent power of the *succus gastricus*.

212. Of parasitical Insects inhabiting the stomachs of different Animals.

213. Of hunger and thirst.

214. Of diet in general.

215. Of substances which promote or retard digestion.

Remarks on the pernicious effects of excessive drinking.

216. Of the causes and effects of vomiting.

217. Of the comparative powers of digestion in the *Laplander*, the *Hindoo*, and the *European*.

218. Of the Food of Animals.

219. Of the stomachs of *carnivorous* and *herbivorous* Animals.

220. Of the four stomachs of *ruminant* Animals.

221. Of the manner in which *Rumination* is performed.

222. Of the structure of the four stomachs of the Camel, and the Reservoir for containing water sufficient for the consumption of many days.

The Honey-Bee considered as a ruminant Animal.

223. Of the powers of digestion, and the different degrees of strength of the *succus gastricus* in the *carnivorous*, *herbivorous*, and *omnivorous* Quadrupeds.

224. Of the stomachs of *carnivorous*, *granivorous*, and *omnivorous* Birds.
225. Of the *membranous* stomachs and the digestive powers of the carnivorous Tribe.
226. Of their faculty of regurgitation of indigestible substances.
227. Of the *intermediate* stomachs of the *omnivorous* Birds.
228. Of the mode in which their food is prepared for digestion.
229. Of the *muscular* stomachs or Gizzards of the *granivorous* Birds.
230. Of the *Crop* or Reservoir for the Food before it passes into the stomach.
231. Of the secretions in the crops of breeding Pigeons for the nourishment of their young.

232. Of the *Ventriculus succenturiatus* and it's office.
233. Of the triturating power of the Gizzard, and the manner in which the food is digested in the *granivorous* Birds.
234. Of the stomachs of *Fishes*.
235. Of the *succus gastricus* and the faculties of digestion in this class of Animals.
236. Of the *muscular* stomach of the Gillaroo Trout, or Irish Trout.
237. Of the stomachs of *amphibious* Animals.
238. Of the process of digestion in the *amphibia* and *hybernating* Animals.
239. Of the digestive faculties of *Insects*.

Of the PANCREAS.

- 240. The structure, situation, &c. of the *human* Pancreas.
- 241. Of it's excretory duct, and the entrance of it into the *duodenum*.
- 242. Of the nature and properties of the *pancreatic* juice.
- 243. The human Pancreas compared with that of other Animals.

Of the SPLEEN.

- 244. The structure and situation of the human Spleen.
- Of the blood-vessels and nerves of the spleen.
- 245. Conjectures concerning it's use.
- 246. Theories of HEWSON and others.

247. Of animals who have been deprived of the Spleen.

248. The human Spleen compared with that of other Animals.

249. Of Animals who are destitute of this organ.

Of the LIVER.

250. Form, situation, and general structure of this viscus in the human subject.

Of it's nerves and blood-vessels.

251. Of the *vena portarum*.

It's origin, distribution, and extraordinary office.

252. Of the branches of the *cava* returning the blood from the liver.

Of the hepatic artery.

253. Of the *pori biliarii*.

254. Of the *Gall Bladder*.
It's form, situation, and office.
255. Of the *Cystic Duct*.
It's union with the hepatic duct,
forming the *ductus communis
choledochus*.
256. Entrance of the *ductus com-
munis* into the *duodenum*.
257. Of the use of the liver.
258. Of the difference between the
cystic and *hepatic* biles.
259. Examination into the nature
and uses of each.
260. General account of *Chylification*.
261. Of concretions in the gall blad-
der, &c.
262. The *human Liver* compared
with that of other Animals.
263. Of the variety of it's form, situa-
tion, and structure in *Quadru-
peds, Birds, Fishes, &c.*

264. Of the extraordinary size of this organ in some Animals.

265. Remarks on the structure of the Liver in those Animals who are destitute of the Gall Bladder.

266. Of the great importance of this organ to all the different classes of Animals.

267. Of the *Omentum* and it's uses.

268. Of the *omentum* in Quadrupeds compared with that of the human subject.

Of the HUMAN INTESTINES in general.

269. Division of the intestines into large and small.

270. Of the *succus intestinalis*.

271. Of the peristaltic motion of the intestines.

272. General description of the *Mesentery* and it's blood-vessels.

Of the DUODENUM.

273. Entrance of the *ductus communis* and *ductus pancreaticus* into it.

274. Of the *valvulæ conniventes*, their structure and use.

275. The mistakes of some authors concerning the use of the *valvulæ conniventes* pointed out.

276. Of the variety of their structure in different Animals, and the probable cause.

Of the JEJUNUM and ILEUM.

277. Remarks on the decrease of the *valvulæ conniventes* in the Ileum.

278. Of the entrance of this intestine into the *Colon*.

Of the mechanism and use of the valve of the *Colon*.

Of the CÆCUM.

279. It's figure, situation, and supposed uses.

280. Of the *Appendicula vermiformis cæci*.

Conjectures concerning it's use.

Of the COLON.

281. Of it's circumvolutions, ligamentary bands, and other peculiarities.

Of the RECTUM.

282. It's structure and situation.

283. General observations on the use of clysters.

284. Remarks on the difference of the structure and use of the large and small Intestines.

The human Intestines compared with those of other Animals.

285. Of the peculiarities in the Intestines of the *carnivorous*, *herbivorous*, and *omnivorous* Animals.

286. Man considered as an *omnivorous* Animal.

287. Of the different structure of the *Cæcum* in the *Monkey* compared with that of the human species.

288. Of the size and extent of the *Cæcum* in some Animals compared with the *Cæcum* and *appendicula vermiformis Cæci* of the human subject.

289. Of the Bags found at the extremity of the Rectum of the Dog, &c.
290. Of the *chylopoetic canal* in Fishes.
291. Of the *Intestinula cæca*, and their terminations in this class of Animals.
292. Of the intestinal canal of Insects, &c.

Of the LACTEAL VESSELS.

293. Of the general structure of the *laeteals* and *lymphatics*.
Description and use of their numerous valves.
294. Of the distribution of the Lacteals over the internal surface of the small Intestines.
295. Of the *ampullulæ* of the laeteals.
296. Demonstration of the laeteals on the intestines of an animal recently killed.

Of their passage to the *thoracic duct*.

297. Of the *Receptaculum Chyli*.

298. Of the *Thoracic Duct*.

299. Of it's termination in the angle between the *jugular* and *sub-clavian* veins on the left side.

Important use of this duct.

300. Remarks upon it's passage, and the manner in which the *chyle* and *lymph* are propelled through it.

301. Observations on the manner in which animals are nourished.

Of the *Lymphatics*.

302. General history of the *absorbent system*.

303. Discovery of this system in Birds, Fishes, and Amphibia.

Remarks on the importance of this discovery.

304. Of the universality of this system, and it's termination in the thoracic duct.

305. Modus operandi of the lymphatic vessels.

306. Ancient opinions concerning absorption by the *meseraic* veins.

Refutation of this doctrine by the experiments of HUNTER and others.

307. The absorbent powers of these vessels, how promoted, &c.

308. Of nutritive Baths, Clysters, &c.

309. Peculiarities in the *absorbent* system of Fishes and Amphibia.

Of *Lymphatic Glands*.

310. Their structure explained.

311. Of the fluid secreted by them.

Uses attributed to them.

312. Of the absorption of morbid matter from abscesses, ulcers, &c.

313. Of the methods of discovering and injecting the lymphatic vessels.

Of the HUMAN KIDNEYS.

314. Of the situation and general structure of the kidneys.

315. Of the cortical and medullary substances of the kidneys.

316. Of the *papillæ* and their orifices.

317. Of the *infundibula* and pelvis of the kidneys.

318. Remarks on the quantity of blood sent to the kidneys.

319. Fœtal peculiarities of the kidneys.

320. Of the use of the kidneys.

321. Of the URETERS.

Their structure, office, and course.

322. Of their entrance into the bladder.

323. Of the Kidneys of *Quadrupeds*.

324. Peculiarities in the structure of the kidneys of some of this class.

325. Of the Kidneys of *Birds*.

Their structure and situation.

326. Of the passage of the urinary secretion from them.

327. Remarks on the nature of this secretion.

Of the HUMAN BLADDER.

328. It's situation, structure, and use.

329. Evacuation of the urine, how performed.

330. Analysis of urine.

331. Peculiarities in the urine of some animals.

332. Of *Calculi* in the kidneys.

333. Of *Calculi* in the urinary bladder.

334. Analysis of calculi.

335. Observations on the various kinds of solvents made use of for the removal of the stone.

Of the Male Organs of Generation in the Human Species.

336. Of the SCROTUM.

It's structure and uses.

Of the TESTES.

- 337. Coats of the testis.
- 338. Of the spermatic artery and vein.
- 339. Of the *tubuli testis*.
 The *Epidydimis*, how formed,
 &c.
- 340. Of the use of the testes.
- 341. Of the nature and properties of the Semen.
- 342. Theories and experiments of LEWENHOEC and others.
- 343. Of the *Vasa deferentia*, and spermatic cord.
- 344. Observations concerning Eunuchs.
- 345. Of Quadrupeds and Birds who have been deprived of the Testes.
- 346. Of the situation of the Testes, external or internal, in the different tribes of Animals.

347. Varieties in the structure of these organs.

348. Of the change which takes place in them at different seasons.

349. Of the *Vesiculæ seminales*.

Their structure, situation, &c.

Their use disputed by JOHN HUNTER.

350. Observations concerning them.

351. Peculiarities and varieties in the form, situation, and structure of these Bags in the different classes.

352. Of the want of the *Vesiculæ seminales* in the canine tribe.

353. Remarks on the cause and consequences of the protracted copulation of the Wolf, Dog, Fox, &c.

Of the structure of the human Penis.

354. Of the *Corpora cavernosa*, &c.
355. Of the *Urethra*, and the *Lacunæ* situate in that passage.
356. Of the situation, structure, and office of the *Prostate Gland*.
357. Of the blood-vessels, nerves, and lymphatics of these parts.
358. Of the separate and combined uses of the above-mentioned organs.
359. Of the peculiarities in the structure of the Penis in the different species of Quadrupeds.
360. Of the small bone in the Glans Penis of the Monkey.
361. Of the situation, structure, and probable uses of the bones in the Penis of the Dog, Fox, Wolf, Seal, Rackoon, Rat, Mouse, and other Quadrupeds.

362. Of the male parts of Generation in Birds.

363. Of the Double Penis of some individuals of this class.

364. The Double Penis and male parts of Generation of the *Ornithorhynchus paradoxus* compared with the corresponding parts in the feathered tribe.

365. Of the male parts of Generation in the *Amphibia* and *Fishes*.

Of the Female Organs of Generation in the Human Subject.

366. Of the *Urethra*.

367. Of the *Vagina*.

368. Of the *Uterus*.

369. Of the *Tubæ fallopianæ*.

370. Their situation and connexion with the *ovaria*.

371. Of the *Ovaria*.

Their structure, situation, &c.

372. Of the *Ovula* and *Corpora lutea*.

373. Of the particular functions, and combined uses of the above parts.

374. Of the female parts of Generation in *Quadrupeds*.

375. Of the Uterus and it's cornuæ, &c.

376. The female parts of Generation of the *viviparous* compared with those organs in the *oviparous* tribe of Animals.

377. Of the *Vitellarium*, *Infundibulum*, and *Uterus* of the *oviparous* Animals.

378. Of the phænomena attending the passage of the Egg to the Uterus.

379. The structure of the Egg explained.

380. Of the female parts of Generation of the *Amphibia*, some of which are *ovi-viviparous*.

381. Of the corresponding organs in the *Ornithorhynchus Paradoxus* and *Ornithorhynchus Hystrix*.

382. Peculiarities of these organs and the mode of Generation of the Kangaroo, &c.

Of Impregnation and Conception.

383. Of the state of the *Ova* and *Ovaria* of Quadrupeds after impregnation.

384. Alteration in the appearance of these parts soon after impregnation in the Rabbit.

385. Examination of the Fallopian Tubes after impregnation.

- 386. Of extra-uterine conceptions.
- 387. Of false Conceptions, Mules, Monsters, &c.
- 388. Of *Hermaphrodites* in general.
- 389. Of the *Roman Tauræ* or *Free Martins*.

Of the HUMAN FŒTUS in
UTERO.

- 390. Of the state of the Uterus after conception.
- 391. Of the *Placenta* and the *umbilical cord*, and the vessels which compose them.
- 392. Of the membranes which invest the fœtus.
- 393. Of the *Allantois* in Quadrupeds.
- 394. Of the manner in which the Fœtus in Utero is supplied with nourishment.

Various opinions of authors on this subject.

395. Of the progressive changes which the foetus undergoes during the usual term of pregnancy.
396. Of the *Impregnation* of the *Ova* in the *oviparous* Animals.
397. A set of incubated Eggs examined to shew the progressive changes which take place during Incubation, from the first twenty-four hours to the exclusion of the chicken.
398. Of the nourishment of the foetus of oviparous Animals before and after hatching.
399. Of the various modes of *Coition* and *Impregnation* in the amphibious Animals and in Fishes.
400. Of the *Impregnation* of the *Ova* of some Animals after their exclusion from the body of the female.

401. Experiments of SPALLANZANI
and others on this subject.

402. Of the variety of modes employed by nature in the generation of Worms, Insects, &c.

Of the HUMAN BRAIN.

403. Of the *Dura Mater*.

It's structure, processes, and uses.

404. Of the longitudinal and lateral sinuses, &c.

405. Of the *Tunica Arachnoidea*.

406. Of the *Pia Mater* and it's uses.

407. Of the circulation of the Blood
in the Brain.

408. Of the CEREBRUM.

409. Of the *cortical* and *medullary*
substances of the Brain.

410. Of the *tubercula quadrigemina*
pineal gland and other remarkable parts of the Brain.

- 411. Of the four Ventricles of the Brain and their communication with each other.
- 412. Of the *Cerebellum* and *Medulla oblongata*.
- 413. Of their connexion with each other and with the *Cerebrum*.
- 414. Various hypotheses concerning the uses and functions of the Brain and Nerves in general.
- 415. The human Brain compared with that of other Animals.
- 416. Remarks on the different quantities of Brain in the different species of Animals.

Of the ten pair of Nerves which pass out of the ENCEPHALON.

- 417. Of the first pair or *Olfactory* Nerves, and their distribution over the organ of smell

Of the HUMAN NOSE.

418. It's external parts, bones, muscles, and cartilages.

419. Of the *Septum Narium*, *Ossa spongiosa*, and posterior openings of the Nose.

Description of the sinuses which communicate with the Nose, and their uses.

420. Of the *lachrymal sac*.

421. Of the *membrana schneideriana* or *pituitaria*, and it's uses.

422. Of the sense of smelling.

423. Curious structure of the *Proboscis* and the organ of smell in the Elephant.

424. Of the remarkable difference in the structure of the Noses of

the *carnivorous* and the *herbivorous* Quadrupeds.

425. Of similar varieties in the noses of the *carnivorous* and *granivorous* Birds.

426. Of the means employed by nature to extend the sense of smelling in the *carnivorous* Birds.

427. The sense of smelling of the *carnivorous* compared with that of the *herbivorous* and *granivorous* Animals.

428. Conjectures concerning another sense superadded to that of *smelling* in Ducks and other Birds who search for their food under water.

429. Of the Nose and Beak of the *Ornithorhynchus paradoxus*.

430. Remarks on the faculty of smelling in Insects, &c.

431. Of the second pair of Nerves,
or *Optic* Nerves.

Of the HUMAN EYE.

432. Of the external parts of the eye.

433. Of the lachrymal gland, and
it's excretories.

434. Structure and uses of the *puncta*
lachrymalia, *caruncula lachrymalis*,
and lachrymal duct.

Of the Globe of the Eye.

435. Of the *Tunica conjunctiva*, or *ad-*
nata.

Of the *Tunica albuginea*.

436. Of the fix muscles subservient
to the eye.

Explanation of their structure,
situation, and action.

Of the three proper coats of the eye.

437. General explanation of the manner in which the coats of the eye are formed.

438. Of the *Sclerotica* and *Cornea*.

Particular examination of the structure and uses of this coat.

Of it's connexion with the *Choroides*.

439. Of the *Choroides* and *Uvea* or *Iris*.

Peculiarities of this coat.

440. Of the manner in which the *Uvea* is formed.

441. Of the *Ligamentum Ciliare*.

442. Of the *Pigmentum nigrum*

443. Of the *Pupil*.

444. Of the expansion and contraction of the pupil.

445. Several phœnomena hence accounted for.

446. Of the *Retina* and *Optic Nerve*.

447. The entrance of the optic nerve into the orbit described.

448. Opinions concerning the manner in which the optic nerves are conjoined.

449. Of the structure and distribution of the *Retina*.

Of the three humours of the eye.

450. General remarks on the situation, transparency, &c. of these humours.

451. Of the Chambers of the eye.

452. Of the *Aqueous Humour*.

Of it's different degrees of transparency at different periods.

453. Remarks on the effect of the Jaundice upon this humour.

454. Of the evaporation of the aqueous humour; and the regeneration of it after it has been artificially evacuated.

455. Of the *CrySTALLINE Humour*.

Of the structure and situation of the CrySTALLINE Lens, and it's Capsule.

456. Of it's shape and density.

Observations on it's want of visible attachment, &c.

Different states of it at different periods of life.

457. Of the *Vitreous Humour*.

Remarks on the quantity and density of this humour.

458. Of the cellular structure of the membrane which contains it.

Of the cavity for the lodgement
of the cryftalline, &c.

*Of the ſtructure of the eye in the
different claſſes of Animals.*

- 459. Of the *Musculus ſuſpenſorius* in
the eyes of Quadrupeds.
- 460. Of the *membrana niſtitans* in the
eyes of various Animals.
- 461. Of it's ſtructure and uſe in the
eyes of Birds.
- 462. Of the Figure of the Pupil in
different claſſes of Animals.
- 463. Of it's extreme dilatability and
contraction in ſome Animals.
- 464. Of the different colours of the
choroid coat or *Tapetum* in
Quadrupeds.
- 465. Why ſome Animals are enabled
to ſee with very little light.

466. Of the *Marfupium nigrum* or *Bourse noir* in the eyes of Birds.
467. Peculiarities in the sclerotic coat of the eyes of Birds.
468. Of the eyes of Fishes.
469. Peculiarities observable in the coats and humours of the eye in this class of Animals.
470. Of the eyes of Insects.
471. Their number, situation, &c.
472. Of the structure of the eye in this class.
473. Curious peculiarities in the structure of the eye of the Dragon Fly, discovered by the Author.

OF VISION.

474. Of the refracting powers, &c. of the different humours of the eye.

475. Of the respective uses of the three coats of the eye.

476. Observations on the use of the *ligamentum ciliare*.

477. Of the change produced in the eye, that objects may appear distinct at different distances.

478. Of the manner in which the pictures of objects are formed upon the Retina.

479. Of ocular *Spectra*.

480. Of the *punctum cæcum*, and MARRIOTTE'S experiment to prove the insensibility of the Retina at that part.

481. Of the causes and effects of the contraction and dilatation of the pupil.

Why we see best from a dark place to a light one, and *vice versa*.

482. Observations on the use of the
pigmentum nigrum.

483. Remarks on the cause of *Myopia*,
or short sight.

484. Of *Presbyopia*, or weak sight.

Observations on the use of
glasses to remedy the above
imperfections.

485. Of the mode in which vision is
performed in Birds, Fishes,
&c.

486. Of the third and fourth pair of
Nerves.

487. Of the fifth pair of Nerves, and
the distribution of it's branches.

488. Of the sixth pair of Nerves.

Of the seventh pair of Nerves.

489. It's division into two portions.

490. Of the *Portio dura*.

491. Of the *Portio mollis*, or AUDITORY NERVE, and its distribution over the organ of hearing.

Of the HUMAN EAR.

492. Of the external parts of the ear, and it's muscles.
493. Of the *Meatus auditorius externus*.
494. Of the *Glandulæ Ceruminosæ*.
495. Of the *Membrana Tympani*.
It's structure, situation, attachments, &c.
496. Of the *Officula Auditus*, and the small muscles attached to them.
497. Of the *Labyrinth* of the ear.
498. *Vestibulum*, *semicircular canals*, and *cochlea*.

Of the two *Fenestræ*.

Of the mastoid cells, &c.

499. Of the *Tuba Eustachiana*.
 Of the *Chorda Tympani*.
 500. Of the separate and combined
 uses of all these parts.
 501. Of the sense of hearing.
 502. Of deafness, and it's causes.
 503. Of the Ears of *Quadrupeds, Birds,*
Fishes, &c.
 504. Of the sense of hearing in *Qua-*
drupeds and Birds.
 505. Of the sense of hearing in
Fishes and Amphibia.
 506. Conjectures concerning this
 sense in *Insects.*
 507. Of the *eighth pair of Nerves, or*
Par Vagum.
 508. It's distribution and importance
 to the Animal *Œconomy.*
 509. Of the *ninth pair or Gustatory*
Nerves.

- 510. Of their distribution over the organs of taste.
- 511. Of the nature of this sense in the different classes of Animals.
- 512. Of the *tenth pair of Nerves*, their exit from the skull, distribution, and office.
- 513. Of the *Teguments* of the human body.
- 514. Of the *Cuticula* or *Epidermis*.
- 515. Of the *Rete mucosum*.
- 516. Observations on the colour of Negroes, &c.
- 517. Of the *Cutis* or Skin.
- 518. Of insensible transpiration.
- 519. Of perspiration.
- 520. Remarks on the extraordinary quantity of this evacuation in some Animals, and the total want of it in others.

521. General observations on the
sense of Feeling.

522. Of Nails and Hair.

523. Of the *Plica Polonica*, and Hair
found in abscesses, &c.

524. Of Warts, Corns, and other ex-
crescences.

525. Of the *Panniculus Carnosus*.

526. Of the Horns and Hoofs of
Animals.

527. Of the external covering and
Mucus Ducts of Fishes.

528. RECAPITULATION.

529. Concise account of the ANIMAL
Œconomy.

530. CONCLUSION.

201. General observations on the
State of Beijing.
202. Of the River and the
203. Of the River and the
204. Of the River and the
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