

MIECZYSŁAW STELMASIAK, M. D.

PROFESSOR OF HUMAN ANATOMY
MEDICAL ACADEMY, LUBLIN

ANATOMICAL ATLAS
OF
THE HUMAN BRAIN
AND
SPINAL CORD



WARSAW — 1956

POLISH STATE MEDICAL PUBLISHERS

TRANSLATED BY F. STAŃSKI, M. D.

THIS TRANSLATION HAS BEEN MADE
FROM THE SECOND REVISED AND
SUPPLEMENTED POLISH EDITION
PUBLISHED BY THE POLISH STATE
MEDICAL PUBLISHERS

PRINTED IN POLAND
AT
WROCŁAWSKA DRUKARNIA NAUKOWA
WROCŁAW

CONTENTS

	Page
The nerve cell and the development of the brain (schematic)	1
The spinal cord, medulla oblongata and pons (Varoli)	11
THE CEREBELLUM — <i>CEREBELLUM</i>	31
Topographic sections of the cerebellum in the horizontal plane .	37
Topographic sections of the left hemisphere of the cerebellum and the brain stem in the sagittal plane	46
THE CEREBRUM — <i>CEREBRUM</i>	59
Topographic sections of the cerebrum in the horizontal plane . .	83
Topographic sections of the cerebrum in the sagittal plane . .	102
Topographic sections of the cerebrum in the frontal plane . .	115
Arteries of the brain, spinal cord and venous sinuses of the dura mater	151
Membranes of the brain	159
THE HEAD — <i>CAPUT</i>	171
Topographic sections of the head in the frontal plane	173
Topographic sections of the head in the sagittal plane	188
Nerve paths	197
Index	219

LIST OF ILLUSTRATIONS

Figure	Page	Figure	Page
1. Types of nerve cells (scheme)	3	38. The distribution of nuclei of cerebral nerves (dorsal view, scheme)	21
2. A protoplasmatic astrocyte (scheme)	4	39. The distribution of nuclei of cerebral nerves (lateral view, scheme)	23
3. A fibrous astrocyte (scheme)	4	40. Topographic sections of the brain stem in the horizontal plane	24
4. Oligodendrocytes (scheme)	4	41. The transversal section of the spinal cord below the pyramidal decussation A	25
5. Microglial cells (scheme)	4	42. The transversal section of the medulla oblongata through the pyramidal decussation B . .	25
6. Layers of the cerebral cortex — isocortex (scheme)	5	43. The transversal section of the medulla oblongata above the pyramidal decussation C	26
7. A cerebellar lobule in the transverse section after Cajal and others (scheme)	6	44. The transversal section of the medulla oblongata through the inferior part of the olive D . .	26
8, 9. The formation of cerebral vesicles (scheme) .	7	45. The transversal section of the medulla oblongata through the central part of the olive E . . .	27
10, 11. The formation of parts of the brain from 5 vesicles (scheme)	7	46. The transversal section of the medulla oblongata near the pons F	27
12. The brain of a human embryo in a median section	8	47. The transversal section of the pons G	28
13, 14. The brain of a human embryo (lateral view)	8	48. The transversal section through the posterior colliculi of the mesencephalon and the superior part of the pons H	28
15. The brain of a human embryo (posterior view) .	8	49. The transversal section of the mesencephalon I	29
16. The brain of a human embryo (superior view)	8	50. The transversal section of the mesencephalon J	29
17. The brain of a human embryo (inferior view)	8	51. The transversal section of the mesencephalon K	30
18. The brain of a human embryo (lateral view)	8	52. The sagittal section through the cerebellum, the pons, the medulla oblongata and the lamina tecti	33
19. The brain of a human embryo in a median section	8	53. The inferior surface of the cerebellum — <i>Facies cerebelli inferior</i> . The subdivision of the cerebellum (scheme)	34
20, 21, 22, 23, 24. The formation of the neural tube (scheme)	9	54. The inferior surface of the cerebellum — <i>Facies cerebelli inferior</i>	34
25. A section of the embryonic cerebrum in the frontal plane through the caudate nucleus and the lentiform nucleus (scheme)	10	55. The cerebellum viewed from the side of the anterior incisure. The subdivision of the cerebellum (scheme)	35
26. A section of the embryonic cerebrum in the frontal plane through the optic thalamus and the hypophysis (scheme)	10	56. The cerebellum viewed from the side of the anterior incisure	35
27. The spinal cord (scheme)	13	57. The superior surface of the cerebellum — <i>Facies cerebelli superior</i> . The subdivision of the cerebellum (scheme)	36
28. The spinal cord in the dura mater	14	58. The superior surface of the cerebellum — <i>Facies cerebelli superior</i>	36
29. The spinal cord, the dura mater removed . . .	15		
30. A segment of the spinal cord with the dura mater and the arachnoidea cut (posterior view)	16		
31. A segment of the spinal cord, the membranes removed (anterior view)	16		
32. The lumbo-sacral part of the spinal cord . . .	17		
33. The nerve roots of the lumbar and sacral plexus or cauda equina	17		
34. Three sagittal sections through the pons (Ventrali) and the medulla oblongata	18		
35. The spinal cord in the transverse section . . .	18		
36. The spinal cord in transverse sections	19		
37. The floor of the fourth ventricle	20		

Figure	Page	Figure	Page
59. Horizontal sections of the cerebellum	37	101. The system of the fornix (scheme)	76
60. A section of the cerebellum (superior view) . .	38	102. The callosal body and the fornix (scheme) . .	76
61, 62. Horizontal sections of the cerebellum (1,2)	38	103. The optic chiasm — <i>Chiasma opticum</i>	77
63. Horizontal section of the cerebellum (3)	39	104. The optic part of the hypothalamus and the section of the midbrain (scheme)	77
64. Horizontal section of the cerebellum (4)	40	105. The callosal body, the brain stem and the cerebellum (median section) ,	78
65. Horizontal section of the cerebellum (5)	41	106. Nuclei of the hypothalamus. After <i>Le Gros Clark</i> and others (scheme)	79
66. Horizontal section of the cerebellum (6)	42	107. The subdivision of the brain (scheme)	79
67. Horizontal section of the cerebellum (7)	43	108. The base of the skull (cerebral nerves exposed)	80
68. Horizontal section of the cerebellum (8)	44	109. The base of the brain	81
69. Horizontal section of the cerebellum (9)	45	110. The brain stem (from below)	82
70. Sagittal sections of the cerebellum	46	111. Table of topographic sections of the cerebrum in the horizontal plane at different levels	83
71. A section of the cerebellum viewed from the left side	47	112. The horizontal section A	84
72. Sagittal section of the cerebellum (1)	48	113. The horizontal section B	85
73. Sagittal section of the cerebellum (2)	49	114. The horizontal section C	86
74. Sagittal section of the cerebellum (3)	50	115. The horizontal section D	87
75. Sagittal section of the cerebellum (4)	51	116. The horizontal section E	88
76. Sagittal section of the cerebellum (5)	52	117. The horizontal section F	89
77. Sagittal section of the cerebellum (6)	53	118. The horizontal section G	90
78. Sagittal section of the cerebellum (7)	54	119. The horizontal section H	91
79. Sagittal section of the cerebellum (8)	55	120. The horizontal section I	92
80. Sagittal section of the cerebellum (9)	56	121. The horizontal section J	93
81. Sagittal section of the cerebellum (10)	57	122. The horizontal section K	94
82. Sagittal section of the cerebellum (11)	58	123. The horizontal section L	95
83. Cranial bones — <i>Ossa crani</i>	61	124. The horizontal section M	96
84. Montage photograph of the brain and the cranial bones	61	125. The horizontal section N	97
85. The dorso-lateral surface of the left cerebral hemisphere	62	126. The horizontal section O	98
86. The dorso-lateral surface of the left cerebral hemisphere	63	127. The horizontal section P	99
87. The dorsal surface of the cerebrum	64	128. The horizontal section Q	100
88. The dorsal surface of the cerebrum	65	129. The horizontal section R	101
89. The medial surface of the cerebrum	66	130. Table of topographic sections of the right cerebral hemisphere in the sagittal plane	102
90. The medial surface of the cerebrum	67	131. The sagittal section A	103
91. The insula, the callosal body and the lateral ventricle of the cerebrum — <i>Insula, corpus callosum et ventriculus lateralis cerebri</i>	68	132. The sagittal section B	104
92. Lateral ventricles and the insula — <i>Ventriculi laterales et insula</i>	69	133. The sagittal section C	105
93. The nuclei of the endbrain — <i>Nuclei telencephali</i> viewed dorso-laterally (model)	70	134. The sagittal section D	106
94. The arrangement of nuclei in the endbrain in the horizontal section (scheme)	70	135. The sagittal section E	107
95. The right lateral ventricle and the insula — <i>Ventriculus lateralis dexter et insula</i> viewed from the lateral side	71	136. The sagittal section F	108
96. Ventricles of the brain viewed from the lateral side (model)	72	137. The sagittal section G	109
97. Ventricles of the brain (model)	73	138. The sagittal section H	110
98. The arrangement of the nuclei of the optic thalamus in the frontal section (scheme)	74	139. The sagittal section I	111
99. The lateral ventricles, the third and the fourth ventricles — <i>Ventriculi laterales, ventriculus tertius et quartus</i> (superior view)	75	140. The sagittal section J	112
100. The fornix	76	141. The sagittal section K	113
		142. The sagittal section L	114
		143. Table of topographic sections of the cerebrum in the frontal plane	115
		144. The frontal section seen anteriorly	116
		145. The frontal section (1)	117
		146. The frontal section (2)	118
		147. The frontal section (3)	119
		148. The frontal section (4)	120
		149. The frontal section (5)	121

Figure	Page	Figure	Page
150. The frontal section (6)	122	196. Table of topographic sections of the head in the frontal plane	173
151. The frontal section (7)	123	197. The frontal section A ₁ . The dura mater preserved, the brain removed	174
152. The frontal section (8)	124	198. The frontal section A ₁ (posterior view)	175
153. The frontal section (9)	125	199. The frontal section A ₂ . The dura mater preserved, the brain removed	176
154. The frontal section (10)	126	200. The frontal section A ₂ (anterior view)	177
155. The frontal section (11)	127	201. The frontal section B. The dura mater preserved, the brain removed	178
156. The frontal section (12)	128	202. The frontal section B (anterior view)	179
157. The frontal section (13)	129	203. The frontal section C. The dura mater preserved, the brain removed	180
158. The frontal section (14)	130	204. The frontal section C (anterior view)	181
159. The frontal section (15)	131	205. The frontal section D. The dura mater preserved, the brain removed	182
160. The frontal section (16)	132	206. The frontal section D (posterior view)	183
161. The frontal section (17)	133	207. The frontal section E. The dura mater preserved, the brain removed	184
162. The frontal section (18)	134	208. The frontal section E (anterior view)	185
163. The frontal section (19)	135	209. The frontal section F. The dura mater preserved, the brain removed	186
164. The frontal section (20)	136	210. The frontal section F (anterior view)	187
165. The frontal section (21)	137	211. The sagittal section of the head	188
166. The frontal section (22)	138	212. The sagittal section of the head through the lateral angle of the left palpebral fissure. The dura mater preserved, the brain removed	188
167. The frontal section (23)	139	213. The sagittal section of the head through the lateral angle of the left palpebral fissure	189
168. The frontal section (24)	140	214. The sagittal section of the head through the centre of the left palpebral fissure. The dura mater preserved, the brain removed	190
169. The frontal section (25)	141	215. The sagittal section of the head through the centre of the left palpebral fissure	191
170. The frontal section (26)	142	216. The sagittal section of the head through the medial angle of the left palpebral fissure. The dura mater preserved, the brain removed	192
171. The frontal section (27)	143	217. The sagittal section of the head through the medial angle of the left palpebral fissure	193
172. The frontal section (28)	144	218. The sagittal section of the head through the centre of the left nasal cavity. The dura mater preserved, the brain removed	194
173. The frontal section (29)	145	219. The sagittal section of the head through the centre of the left nasal cavity	195
174. The frontal section (30)	146	220. The transverse section of the spinal cord — <i>Sectio transversa medullae spinalis</i> . Spinal tracts (scheme)	199
175. The frontal section (31)	147	221. The spinal nerve in connection with the brachial plexus and the sympathetic division of the nervous system (scheme)	200
176. The frontal section (32)	148	222. The pathways of the sympathetic division of the nervous system (scheme)	201
177. The frontal section (33)	149	223. Intralobar and interlobar associative pathways of the cerebrum — <i>Viae intralobares et interlobares cerebri</i>	202
178. The frontal section (34)	150		
179. The frontal section (35)	150		
180. Arteries on the base of the brain	153		
181. Arteries on the base of the brain (scheme)	154		
182. Arteries of the spinal cord (scheme)	155		
183. Arteries of the external capsule, the internal capsule, the claustrum, the corpus striatum, the globus pallidus and the optic thalamus (scheme)	156		
184. Venous sinuses of the dura mater of the brain. The skull-cap removed (superior view, scheme)	157		
185. Venous sinuses of the dura mater of the brain (lateral view, scheme)	158		
186. The arachnoidea and pia mater of the brain (dorsal view)	161		
187. The arachnoidea and pia mater of the brain (lateral view)	162		
188. The arachnoidea and pia mater of the brain (medial view)	163		
189. The pia mater of the brain (posterior view)	164		
190. The superior surface of the cerebellum with the arachnoidea and pia mater	165		
191. The falx cerebri and the tentorium cerebelli	166		
192. The falx cerebri, the falx cerebelli and the tentorium cerebelli	167		
193. The dura mater of the brain (lateral view)	168		
194. The dura mater of the brain (dorsal view)	169		
195. The subarachnoid cisterns	170		

Figure	Page	Figure	Page
224. Intralobar and interlobar associative pathways of the cerebrum — <i>Viae intralobares et interlobares cerebri</i>	203	232. The pathways of the cerebellum — <i>Viae cerebelli</i>	209
225. The commissural pathways of the cerebrum — <i>Viae commissurales cerebri</i>	204	233. The olfactory pathway (scheme)	210
226. The thalamic radiation — <i>Radiatio thalami</i> . .	204	234. The olfactory pathway (scheme)	211
227. The course of the sensory pathways of the spinal nerves (scheme)	205	235. The optic pathway and paths of the oculomotor (III), the trochlear (IV) and the abducent (VI) nerves (scheme)	212
228. The motor pathways: the corticospinal and the corticobulbar tracts — <i>Tractus corticospinalis et corticobulbaris</i> (scheme)	206	236. The pathways of the trigeminal nerve (V), (scheme)	213
229. The extrapyramidal pathways — <i>Viae systematis extrapostpyramidalis</i>	207	237. The pathways of the abducent nerve (VI) and the facial nerve (VII), (scheme)	214
230. Intracerebellar pathways — <i>Viae intracerebellares</i>	207	238. The auditory pathway (scheme)	215
231. The extrapyramidal pathways — <i>Viae systematis extrapostpyramidalis</i>	208	239. The pathway of the static sense (scheme)	216
		240. The pathway of the sense of taste — (IX nerve), (scheme)	217
		241. The pathways of the vagus nerve (X) and the hypoglossal nerve (XII), (scheme)	218

All the illustrations in this atlas are original with the exception of schemata, reproduced from textbooks written by: A. Brodal, I. Broman, M. Clara, F. J. Fulton, O. Larsell, A. T. Rasmussen, F. Rauber-Kopsch, H. Rouvière, S. Rózycki, J. Sobotta, F. Toldt-Hochstetter, E. Villiger, W.P. Worobiev, R. D. Sinielnikov, M. W. Woerdeman and other authors. Some of the drawings are for didactic or technical reasons magnified or diminished.

THE
NERVE CELL
AND THE
DEVELOPMENT
OF THE
BRAIN
SCHEMATIC

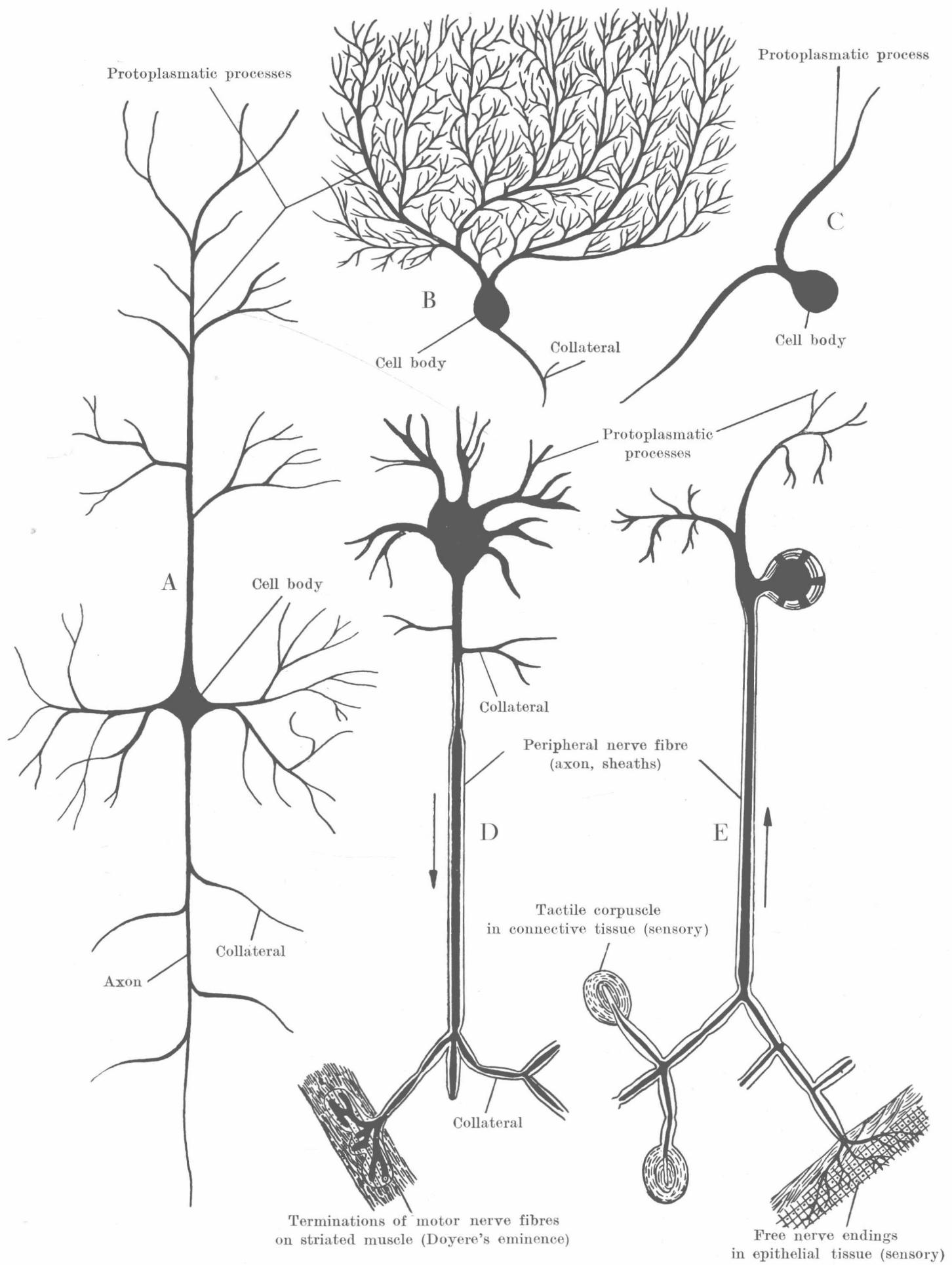


FIG. 1. Types of nerve cells (scheme):

- A. A pyramidal neuron of Betz (from the cerebral cortex). B. A Purkinje's cell (from the cerebellar cortex).
 C. An unipolar neuron (pseudounipolar). D. A multipolar neuron (from the spinal cord). E. A ganglion cell.

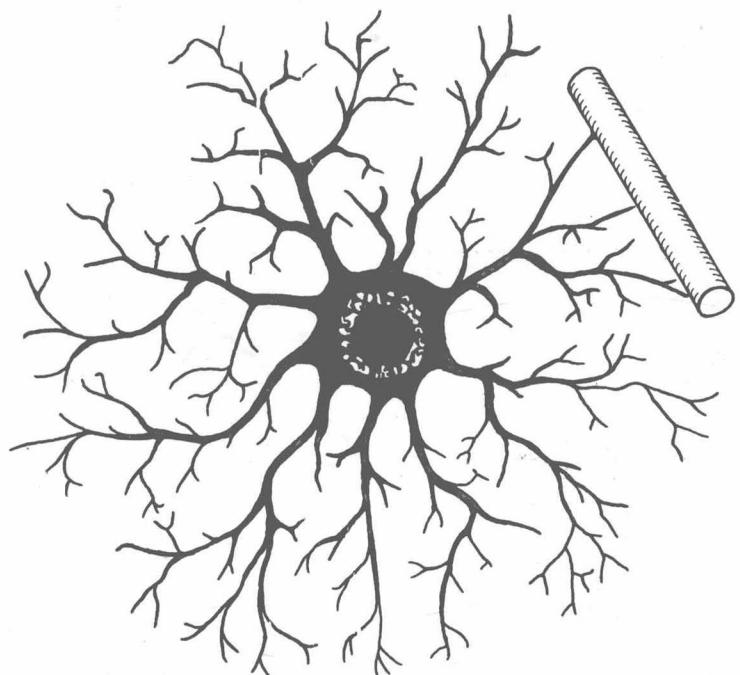


FIG. 2. A protoplasmatic astrocyte (scheme).

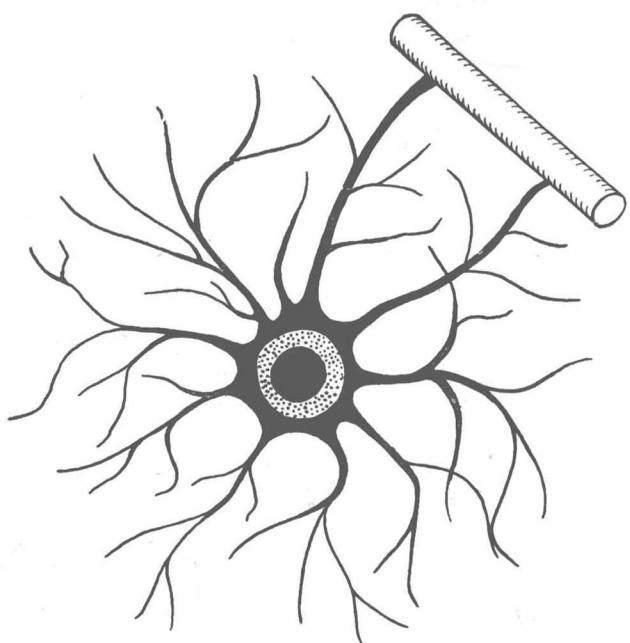


FIG. 3. A fibrous astrocyte (scheme).

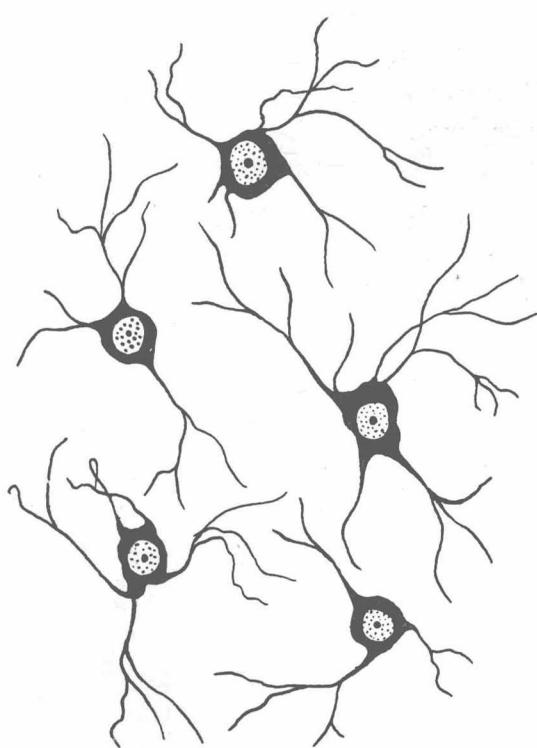


FIG. 4. Oligodendrocytes (scheme).

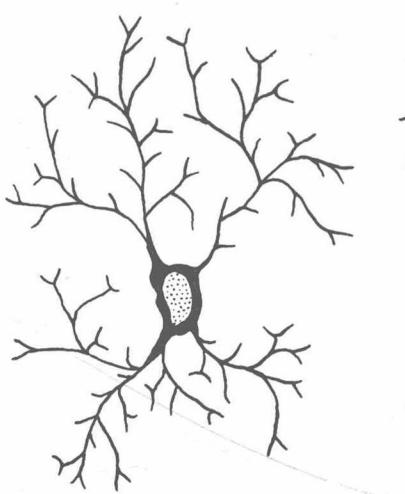


FIG. 5. Microglial cells (scheme).

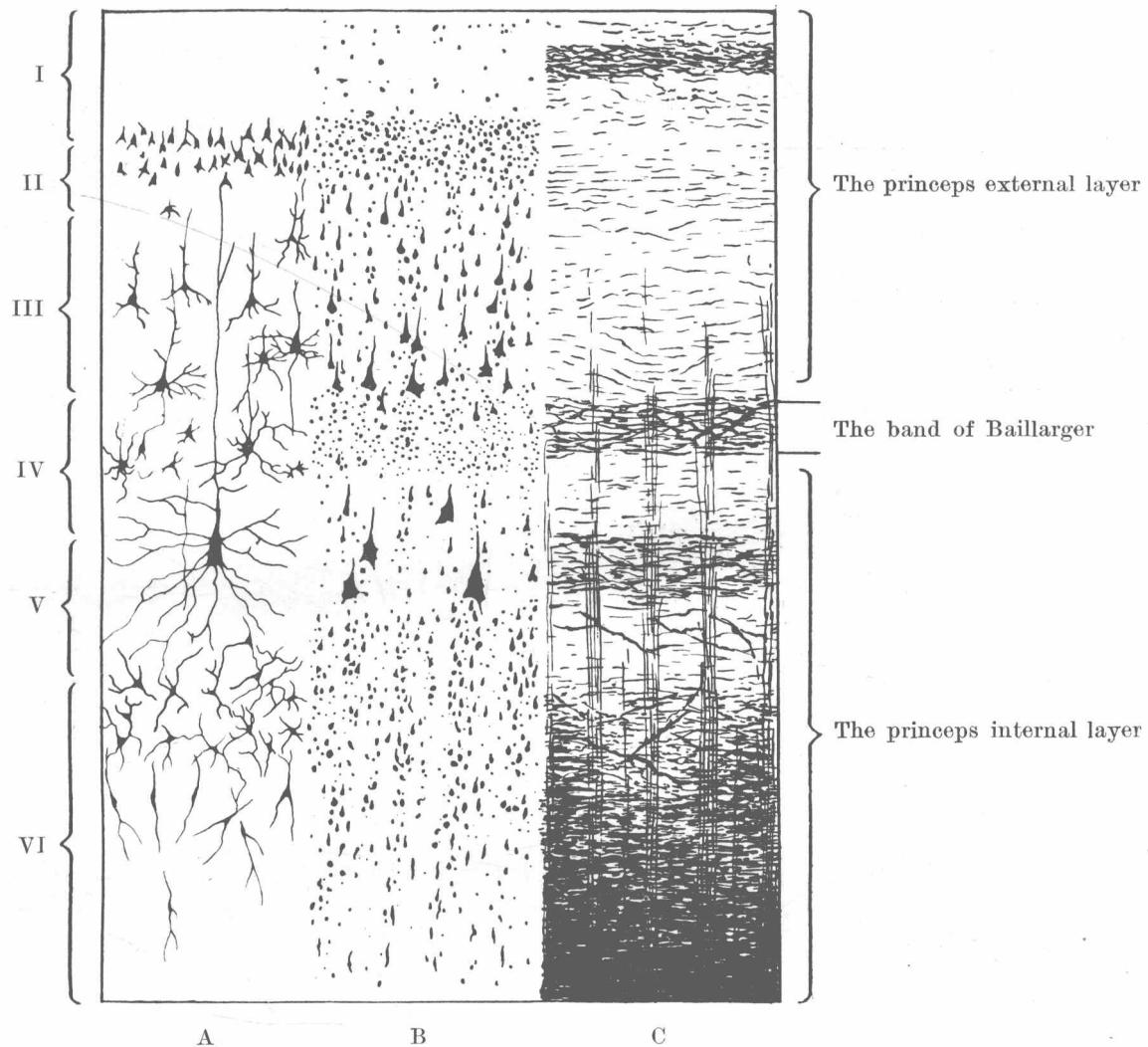


FIG. 6. Layers of the cerebral cortex — isocortex (scheme):

- A. Types of cells.
 - B. Layers of cells.
 - C. Layers of fibres.
- I. *Stratum moleculare.*
 - II. *Stratum granulare externum.*
 - III. *Stratum pyramidale (Meynerti).*
 - IV. *Stratum granulare internum.*
 - V. *Stratum ganglionare.*
 - VI. *Stratum multiforme.*

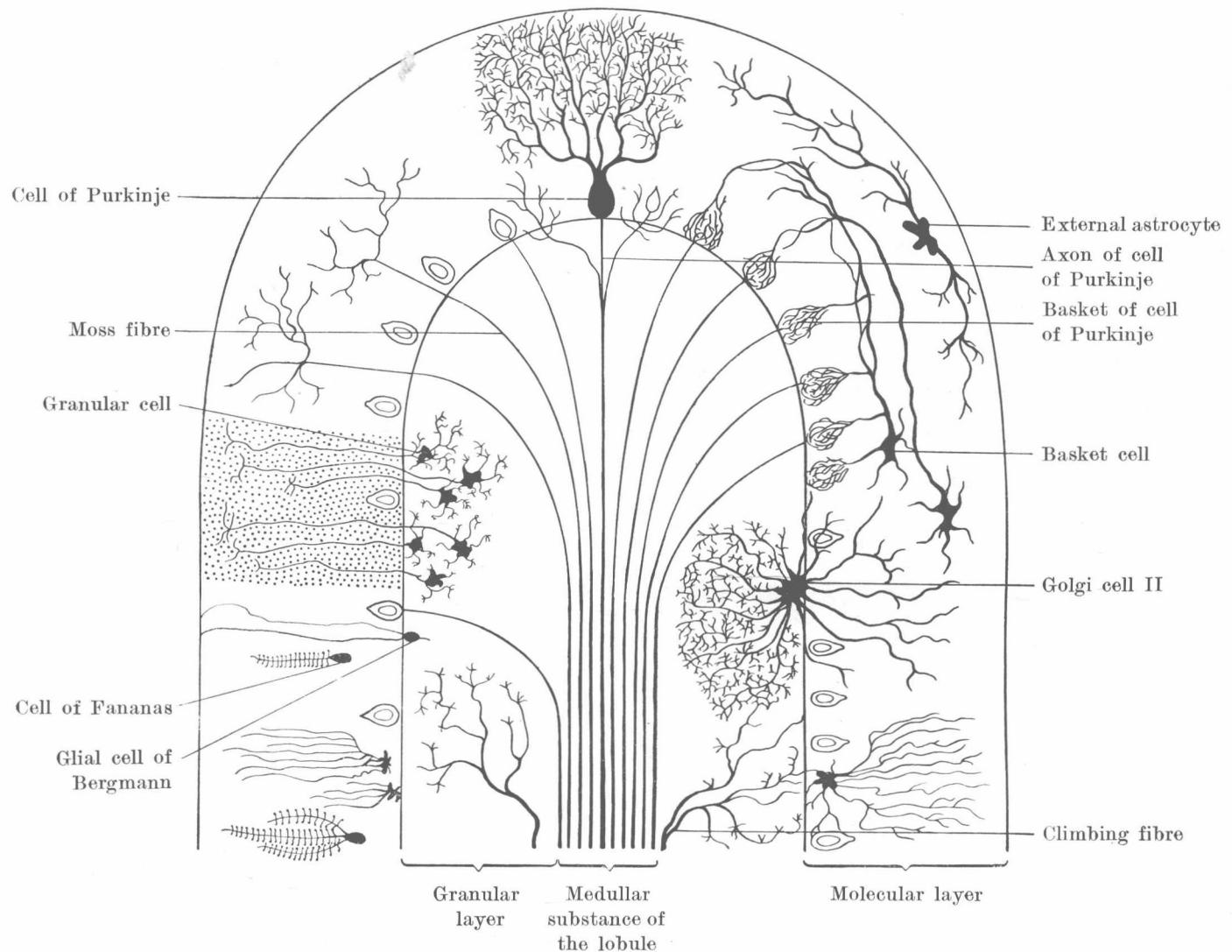


FIG. 7. A cerebellar lobule in the transverse section after *Cajal* and others (scheme).

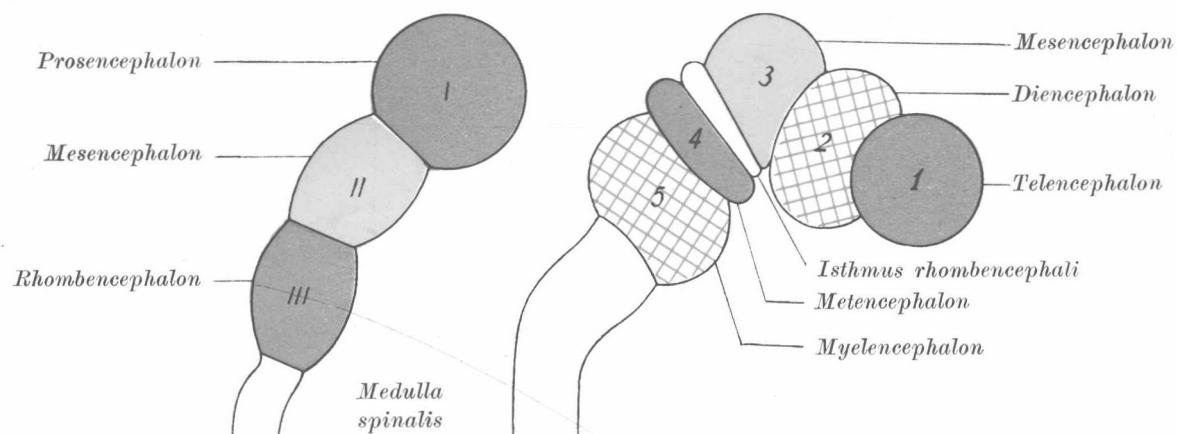


FIG. 8, 9. The formation of cerebral vesicles (scheme).

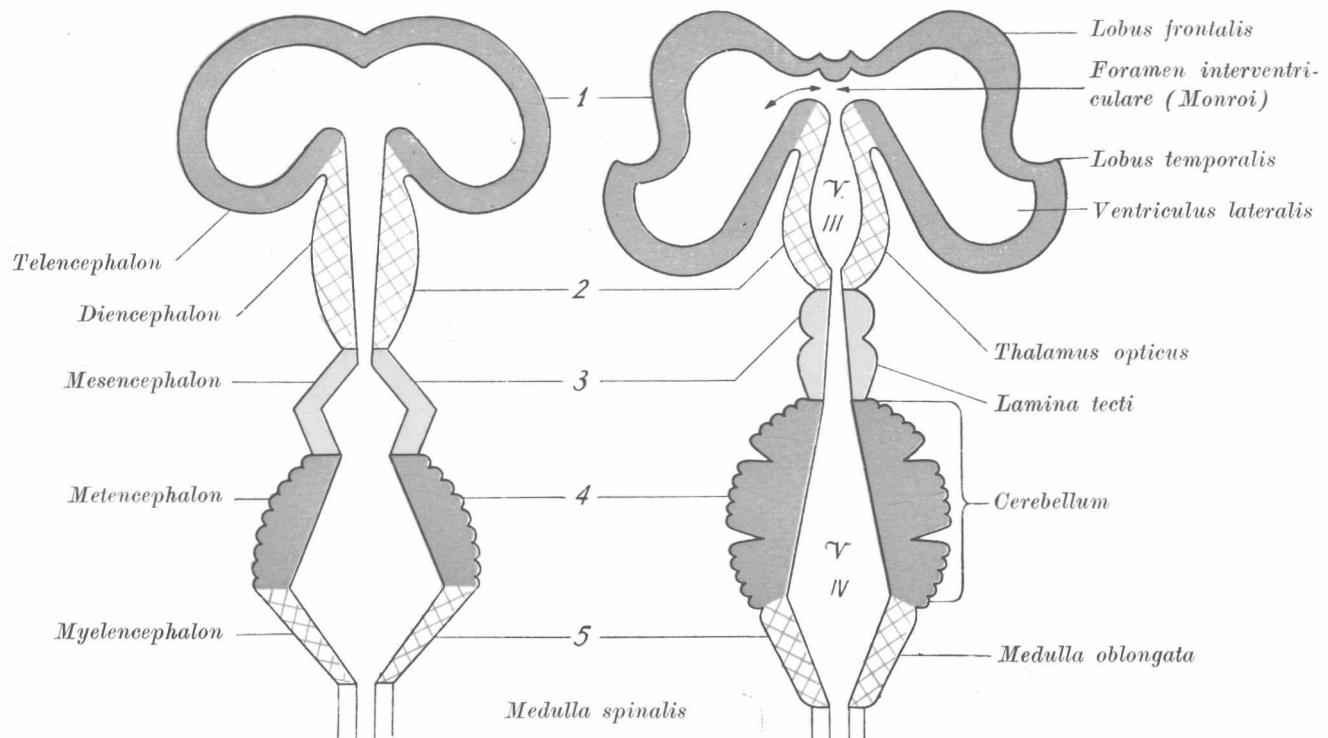


FIG. 10, 11. The formation of parts of the brain from 5 vesicles (scheme).

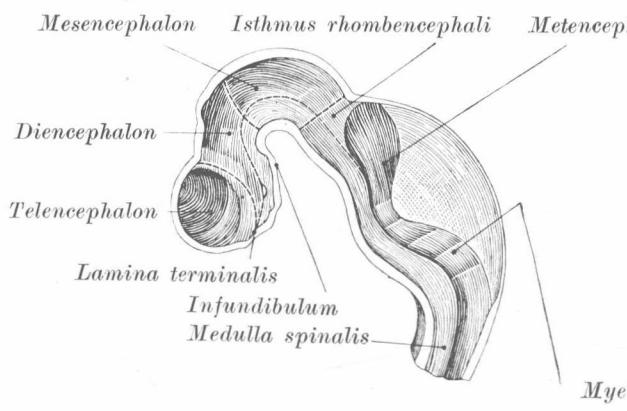


FIG. 12. The brain of a human embryo in a median section.

Length 7,8 mm. From a model by Hochstetter (scheme).

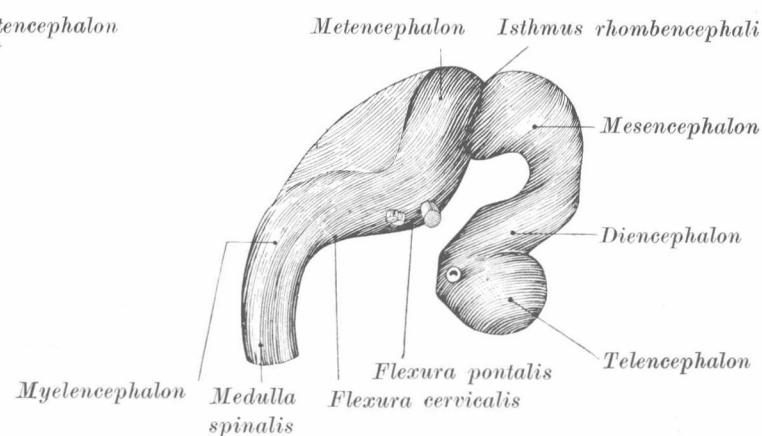


FIG. 13. The brain of a human embryo (lateral view).

Length 7,8 mm. From a model by Hochstetter (scheme)

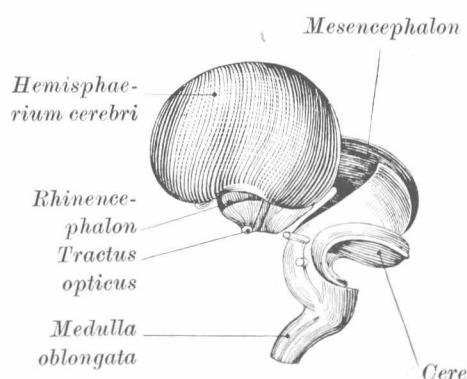


FIG. 14. The brain of a human embryo (lateral view).

The inion-parietal length 38 mm. From a preparation by Hochstetter (scheme).

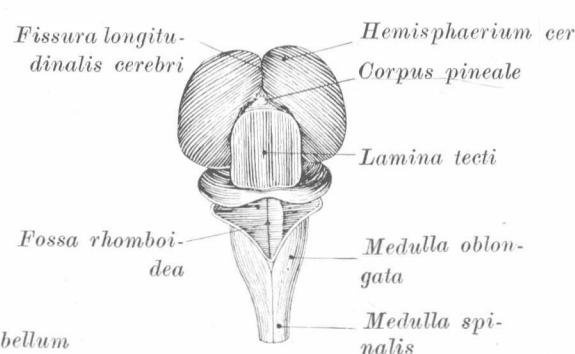


FIG. 15. The brain of a human embryo (posterior view).

Length 38 mm. From a preparation by Hochstetter (scheme).

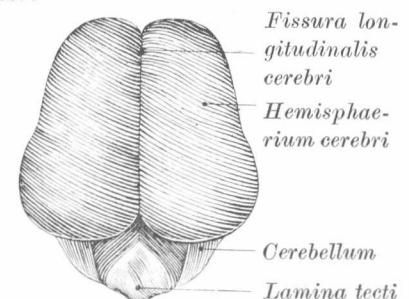


FIG. 16. The brain of a human embryo (superior view).

Length 38 mm. From a preparation by Hochstetter (scheme).

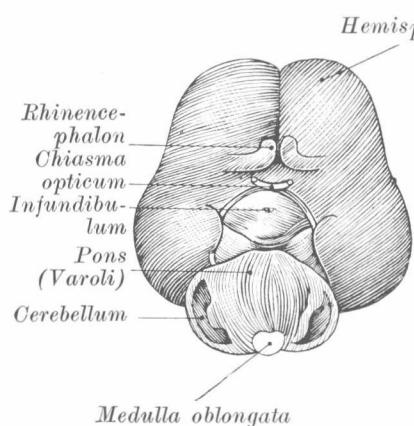


FIG. 17. The brain of a human embryo (inferior view).

Length 68 mm. From a preparation by Hochstetter (scheme).

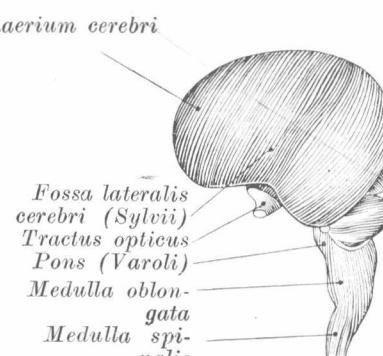


FIG. 18. The brain of a human embryo (lateral view).

Length 68 mm. From a preparation by Hochstetter (scheme).

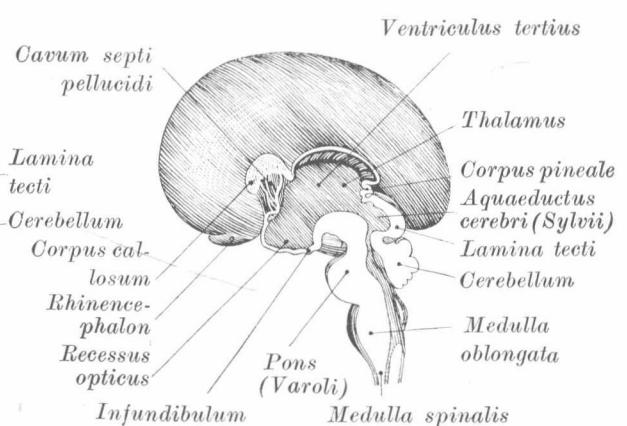


FIG. 19. The brain of a human embryo in a median section.

Length 102 mm. From a model by Hochstetter (scheme).

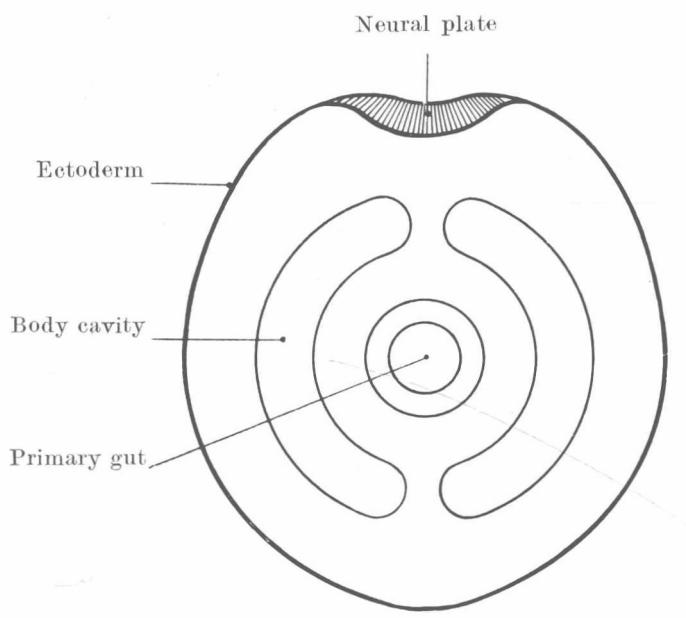


FIG. 20

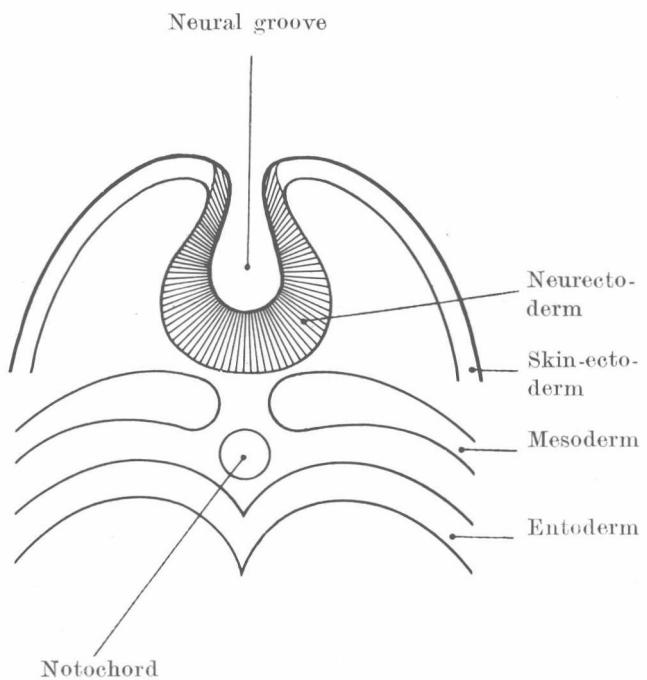


FIG. 21

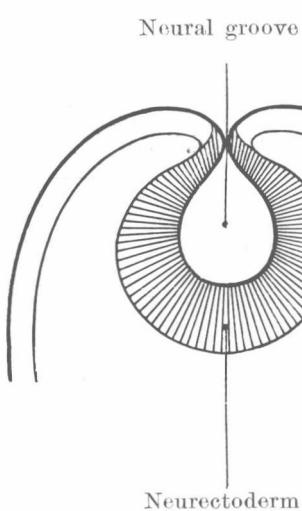


FIG. 22

Skin-ectoderm

Ganglion ridges (neural crests)

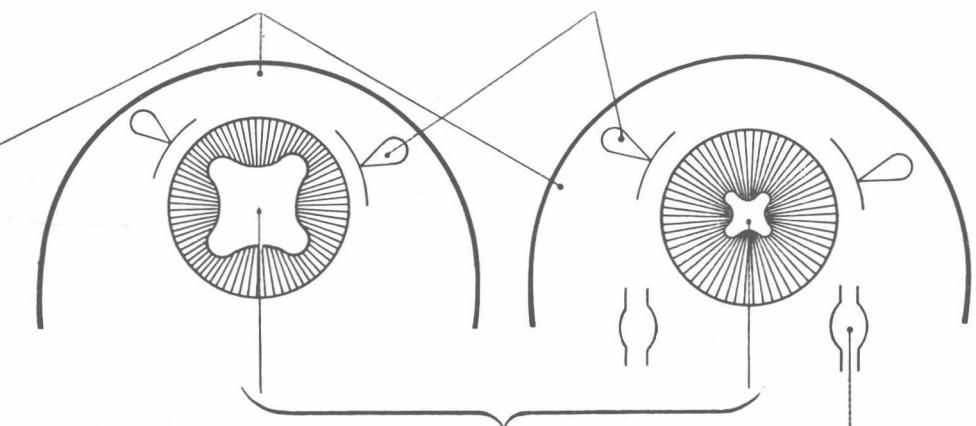


FIG. 23

FIG. 24

FIG. 20, 21, 22, 23, 24. The formation of the neural tube (scheme).