

CONTENTS

Part I. GENERAL DEVELOPMENT

CHAPTER I. FUNDAMENTAL CONCEPTS	1
The Nature and Scope of Embryology	1
The Historical Background	3
The Rôles of Heredity and Environment	6
Ancestral Repetitions	7
The Methods of Study	8
Terminology	9
CHAPTER II. GENERAL FEATURES OF DEVELOPMENT	11
Cell Proliferation	11
Growth	12
Differentiation	21
Integration	24
CHAPTER III. THE REPRODUCTIVE ORGANS AND SEX CELLS	26
The Organs of Generation	26
Common Features of Sex-Cell Differentiation	26
Oögenesis	29
Spermatogenesis	39
The Significance of Meiosis	44
CHAPTER IV. THE DISCHARGE AND UNION OF SEX CELLS	47
Ovulation	47
Semination	52
Fertilization	54
Sex Determination	59
CHAPTER V. CLEAVAGE AND GASTRULATION	62
Cleavage	63
Gastrulation	70
Derivatives of the Germ Layers	83
CHAPTER VI. EMBRYONIC AND FETAL STAGES	85
Period of Cleavage (First Week)	85
Period of the Two-Layered Embryo (Second Week)	85
Period of the Three-Layered Embryo (Third Week)	89

Period of the Embryo with Somites (Fourth Week)	92
Period of Embryo Completion (Fifth through Eighth Week)	98
Period of the Fetus (Third through Tenth Month)	100
Determination of the Age of Embryos	103
Viability and Longevity	106
CHAPTER VII. THE FETAL MEMBRANES	107
Human Membranes	107
Comparative Membranes	113
CHAPTER VIII. PLACENTATION	119
Transport of the Ovum and Blastocyst	119
Preparation of the Uterus for the Embryo	120
Implantation of the Embryo	121
Establishment of the Embryo	124
The Decidua $\ddot{\text{e}}$	128
The Placenta	131
Physiology of the Placenta	138
Childbirth	140
Comparative Placentation	143
CHAPTER IX. REPRODUCTIVE CYCLES AND THEIR HORMONAL CONTROL	151
Reproductive Cycles	151
The Hormones Concerned with Reproduction	157
The Hormonal Control of Reproductive Cycles	163
CHAPTER X. EXPERIMENTAL EMBRYOLOGY AND TERATOLOGY	168
Experimental Embryology	168
Teratology	182
<i>Part II. SPECIAL DEVELOPMENT</i>	
CHAPTER XI. EXTERNAL BODY FORM	193
The Head and Neck	193
The Trunk	202
The Appendages	204
<i>A. ENTODERMAL DERIVATIVES</i>	
CHAPTER XII. THE MOUTH AND PHARYNX	208
The Primitive Digestive Canal	208
The Mouth	211
The Pharynx	228

CHAPTER XIII. THE DIGESTIVE TUBE AND ASSOCIATED GLANDS	241
The Digestive Tube	241
The Liver	251
The Pancreas	256
CHAPTER XIV. THE RESPIRATORY SYSTEM	260
The Larynx	260
The Trachea and Primary Bronchi	262
The Lungs	263
 B. MESODERMAL DERIVATIVES	
CHAPTER XV. THE MESENTERIES AND CŒLOM	269
The Mesenteries	269
The Cœlom	281
CHAPTER XVI. THE URINARY SYSTEM	292
The Pronephros	293
The Mesonephros	295
The Metanephros	298
The Cloaca	305
CHAPTER XVII. THE GENITAL SYSTEM	312
The Indifferent Stage	312
Internal Sexual Transformations	316
The Genital Ligaments and Descensus	326
The External Genitalia	332
Homologies of the Urogenital System	337
CHAPTER XVIII. THE HEART AND BLOOD	340
Angiogenesis	340
Hemopoiesis	342
Development of the Heart	346
CHAPTER XIX. THE VASCULAR SYSTEM	364
The Primitive Vascular System	364
Development of the Arteries	367
Development of the Veins	377
Fetal Circulation and the Changes at Birth	387
The Lymphatic System	390
CHAPTER XX. THE SKELETAL SYSTEM	395
Histogenesis of the Supporting Tissues	395
Morphogenesis of the Skeleton	404
The Articulations	423

CHAPTER XXI. THE MUSCULAR SYSTEM	426
The Histogenesis of Muscle	426
Morphogenesis of the Muscles	429
C. ECTODERMAL DERIVATIVES	
CHAPTER XXII. THE INTEGUMENTARY SYSTEM	439
The Skin	439
The Nails	443
The Hair	444
Sebaceous Glands	447
Sweat Glands	448
Mammary Glands	449
CHAPTER XXIII. THE HISTOGENESIS OF NERVOUS TISSUES	454
CHAPTER XXIV. THE CENTRAL NERVOUS SYSTEM	465
The Spinal Cord	467
The Brain	472
CHAPTER XXV. THE PERIPHERAL NERVOUS SYSTEM	501
The Spinal Nerves	502
The Cranial Nerves	505
The Autonomic Nervous System	515
The Chromaffin System	518
CHAPTER XXVI. THE SENSE ORGANS	522
The General Sensory Organs	522
The Gustatory Organ	524
The Nose	525
The Eye	530
The Ear	542
Part III. A LABORATORY MANUAL OF EMBRYOLOGY	
CHAPTER XXVII. THE STUDY OF CHICK EMBRYOS	553
The Unincubated Ovum and Embryos of the First Day	553
Embryo of Five Somites (Twenty-four Hours)	558
Embryo of Seven Somites (Twenty-five Hours)	559
Embryo of Seventeen Somites (Thirty-eight Hours)	567
Embryo of Twenty-seven Somites (Two Days)	577
Embryo of Thirty-five Somites (Three Days)	591
Embryo of Four Days	605
Embryos of Seven and Ten Days	608

CONTENTS

xi

CHAPTER XXVIII. THE STUDY OF PIG EMBRYOS	609
Anatomy of a Six Mm. Pig Embryo	610
Anatomy of a Ten Mm. Pig Embryo	610
Anatomy of an Eighteen Mm. Pig Embryo	641
Anatomy of a Thirty-five Mm. Pig Embryo	644
INDEX	649