

Contents

1 Introduction	1
References.....	6
2 A Scientific Genealogy: Early Development of Fetal–Neonatal Research	7
2.1 The Beginnings and Some Definitions	7
2.2 Arthur St. George Huggett and Early Studies of Fetal Physiology	9
2.3 Late Nineteenth and Early Twentieth Century Contributions by German Physiologists and Others.....	10
2.4 Nicholson J. Eastman, Huggett, and Others of the 1930s to 1950s.....	15
2.5 Joseph Barcroft and a Widening of Interest in Physiology of the Fetus	21
References.....	34
3 Oxford and the Development of Physiology, with Notes on the Nuffield Institute for Medical Research	43
3.1 William Harvey and Seventeenth Century Physiology	43
3.2 Other Early Oxford Physiologists	47
3.3 Founding of the Royal Society.....	49
3.4 The Oxford Medical School and Further Developments in Physiology	51
3.5 The Nuffield Institute for Medical Research	56
References.....	59
4 Geoffrey S. Dawes: A Life in Science	63
4.1 Early Life and Work.....	63
4.2 Dawes and the Fetal Cardiovascular System: The 1950s and 1960s	68
References.....	75

5	Fetal Asphyxia and the Primate Colony in Puerto Rico	79
5.1	Historical Perspective	79
5.2	Eastman and “Mt. Everest In Utero”	82
5.3	William F. Windle and the Primate Colony at <i>Cayo Santiago</i>	84
5.4	The Puerto Rico Studies of Asphyxia	85
5.5	Virginia Apgar and Evaluation of the Newborn Infant	89
5.6	In Summary.....	91
	References.....	91
6	The Pulmonary Vasculature and Dawes’ <i>Foetal and Neonatal Physiology</i>	97
6.1	The Pulmonary Vasculature of the Fetus and Newborn.....	97
6.2	Dawes’ <i>Foetal and Neonatal Physiology</i>	106
	References.....	108
7	Embryology and Early Developmental Physiology	113
7.1	Origins.....	113
7.2	Stazione Zoologica di Napoli.....	118
7.3	The Discovery of Genetics.....	120
7.4	Embryology Becomes a Science.....	124
	References.....	130
8	Some Aspects of the Physiology of the Placenta	137
8.1	Late-Nineteenth and Early-Twentieth Centuries.....	137
8.2	Mid-Twentieth Century to the Present: Placental Fine Structure and Function	143
8.3	The Uteroplacental Circulation, Transplacental Exchange, and an Introduction to Placental Endocrinology	145
8.4	Pathology of the Placenta.....	154
	References.....	156
9	Governmental Support of Research in Fetal and Newborn Physiology	167
9.1	The Medical Research Council of Great Britain.....	167
9.2	The Medical Research Councils of Canada and Australia.....	172
9.3	The US National Institutes of Health.....	173
	References.....	180
10	Fetal–Neonatal Growth and Metabolism	183
10.1	Early Studies	183
10.2	Robert A. McCance, Elsie May Widdowson, and Continued Studies of Growth and Metabolism	188
10.3	Neonatal Birthweights and the Small for Gestational Age Infant.....	194
10.4	Metabolic Rate	199
	References.....	200

11	Epigenetics and the Fetal Origins of Adult Health and Disease	207
11.1	Overview	207
11.2	A Brief Introduction to Epigenetics and Development.....	209
11.3	The Dutch “Hunger Winter” of 1944–1945: A Case Study.....	212
11.3.1	Maternal and Infant Characteristics	212
11.3.2	Metabolic Sequelae	214
11.3.3	Cardiovascular Sequelae	214
11.3.4	Related Sequelae	216
11.3.5	Neuropsychological Sequelae	217
11.4	Other Antenatal Maternal Starvation Studies	219
11.5	A Perspective on the Fetal Origins of Adult Health and Disease ..	219
11.6	Critiques of the “Fetal Origins” Hypothesis	222
11.7	Malnutrition During Pregnancy as a Global Health Problem.....	223
	References.....	224
12	Some Aspects of the Developing Brain and Nervous System	235
12.1	Overview	235
12.2	Developmental Neurogenesis	238
12.3	Cognitive Development.....	242
12.4	Cerebral Blood Flow in the Fetus and Newborn.....	245
	References.....	249
13	Related Developments in Fetal and Neonatal Endocrinology.....	257
13.1	The Beginnings of Reproductive Endocrinology and Medicine....	258
13.2	Fetal–Neonatal Endocrinology	260
13.3	Developmental Neuroendocrinology	264
13.4	Hormonal Regulation of the Timing of Birth	267
	References.....	272
14	Further Developments in Fetal and Neonatal Physiology	281
14.1	Pulmonary Physiology and Respiratory Distress Syndrome	281
14.2	Corticosteroids and Maturation of the Fetal Lung	294
14.3	A Tribute to “Mont” Liggins.....	297
14.4	Blood and Hematology	300
14.5	Hyperbilirubinemia and Kernicterus in the Fetus and Newborn ...	305
14.6	Immunology	306
14.7	Chronic Catheterization of the Fetus	308
14.8	Cardiovascular Physiology.....	310
14.9	Related Fields of Research.....	313
	References.....	313
15	Additional Clinical Aspects of Developmental Physiology.....	327
15.1	Preterm Birth and Neonatal Intensive Care	327
15.2	Retinopathy of Prematurity.....	340
15.3	Transcutaneous O ₂ Measurements	344
15.4	Thermoregulation.....	346

15.5 Some Aspects of the Development of Maternal–Fetal Medicine... 347

15.6 Pathology of the Fetus and Newborn..... 354

References..... 355

16 Bioethical Issues in Research on the Fetus and Newborn Infant 367

16.1 An Awakening of Responsibility 367

16.2 The Emergence of Bioethics 368

16.3 The Massachusetts Experience 370

16.4 Later Developments 372

References..... 374

17 Textbooks, Monographs, and Other Volumes on Fetal and Newborn Physiology 379

17.1 Volumes on Physiology of the Fetus and Newborn Infant..... 379

17.2 The Josiah Macy, Jr. Foundation Conferences on Gestation 384

17.3 New York Academy of Sciences Conferences
on Fetal Homeostasis 385

17.4 Essays in Perinatal Medicine 387

References..... 388

18 Fetal “Breathing” in the 1970s, and Fetal Heart Rate Analysis in the 1980s and Early 1990s..... 391

18.1 Early Studies of Fetal Breathing Movements 391

18.2 Fetal Breathing in Humans 398

18.3 Early History of Fetal Heart Rate Monitoring 402

18.4 Subsequent Studies on Electronic Fetal Heart Rate Monitoring ... 405

18.5 Some Contemporary Developments 407

References..... 410

19 Dawes’ Contributions to Symposia and a Summing Up..... 421

19.1 Ciba Foundation Symposia 421

19.2 The Barcroft Centenary Symposium 425

19.3 The “Dawes Symposium” and Others 426

19.4 A Summing Up by Dawes 428

References..... 430

20 Dawes as a Mentor: Reminisces of Former Graduate Students, Postdoctoral Fellows, and Associates 433

References..... 460

21 Early Years of the Society for Gynecologic Investigation, the Fetal and Neonatal Physiological Society, and Several Other Groups 463

21.1 Beginnings of the Society for Gynecologic Investigation 463

21.2 Journal of Gynecologic Investigation/Reproductive Sciences..... 465

21.3 The Fetal and Neonatal Physiological Society 470

References..... 476

22 Epilogue	477
22.1 The Adventure of Science.....	477
22.2 Fundamental Research, Clinical Medicine and the Role of the Physician–Scientist	483
22.3 Fetal and Neonatal Physiology and Its Relation to Physiology in General	485
22.4 Fetal–Neonatal Physiology and the Future	487
22.5 What Lessons are to Be Learned?.....	489
22.6 Conclusion	495
References.....	495
23 Bibliography of Geoffrey S. Dawes	499
Name Index	513
Subject Index	521



<http://www.springer.com/978-1-4614-7920-8>

The Rise of Fetal and Neonatal Physiology

Basic Science to Clinical Care

Longo, L.D.

2013, XXVII, 533 p. 52 illus., 18 illus. in color., Hardcover

ISBN: 978-1-4614-7920-8