

Embryogenesis in Mammals

Experimental Approaches to Mammalian Embryonic Development. JANET ROSSANT and ROGER A. PEDERSEN, Eds. Cambridge University Press, New York, 1987. xiv, 558 pp., illus. \$70.

The recent surge of progress in the study of mammalian embryology, accelerated by refinements in embryo micromanipulation and the application of genetic tools and molecular technology, has generated excitement among those who work in the area. This book reflects that progress and conveys that excitement. Its chapters define current knowledge and future prospects for understanding the problems of cell lineage, cell-to-cell interactions, and the regulation of gene expression during development.

The book is somewhat arbitrarily divided into three parts: Cellular Aspects, Molecular and Biochemical Aspects, and Toward a Genetic Understanding of Development. Part 1 combines descriptions of the dynamics of early embryo development with an evaluation of results obtained by the latest sophisticated methods for assessment of cell lineages. The first chapter, by Roger Pedersen, sets the tone of the book with its clear writing, good illustrations, and questions for the future. Related chapters follow by Martin Johnson and Bernard Maro, Janet Rossant, and Rosa Beddington on critical cellular events such as the development of polarity and the initial development of embryonic and extraembryonic lineages. Part 1 also contains a chapter by Virginia Papaioannou and Karl Ebert on the experimental manipulation of embryos from a variety of laboratory, domestic, and primate species.

Part 2 contains chapters on spermatogenesis by Norman Hecht and oogenesis by Richard Schultz. These are followed by a chapter by Gilbert Schultz on the utilization of genetic information by preimplantation embryos. Peter Kaye summarizes information available on the metabolism of preimplantation embryos. Such studies are important not only for elucidating the basic physiology of embryogenesis but also for developing systems that support embryogenesis in vitro. This part also includes chapters on cell-surface molecules in early development by Jean Richa and Davor Solter and regulation of the X chromosome by Verne Chapman. A chapter by Eileen Adamson on cell-lineage-specific gene expression complements chapters in part 1.

The third part of the book is a potpourri. Besides describing the elegant studies by his own and other groups using embryo micromanipulation techniques that indicate different roles of maternal and paternal genomes

in embryogenesis, Azim Surani reviews pertinent genetic data related to this fascinating phenomenon. Unfortunately, the photographs of trophoblasts are poorly reproduced. In a thoughtful chapter, Terry Magnusson explores ways in which genetic tools could be utilized in the future, taking up potential problems as well as suggesting exciting possibilities such as identifying homologous genes in different species. Elizabeth Robertson and Allan Bradley describe the production of permanent cell lines from early embryos and their use in studying development. The book ends with a chapter by Erwin Wagner and Colin Stewart on the integration and expression of genes introduced into mouse embryos.

The "mammalian" of the title notwithstanding, all but one of the chapters focus primarily on studies utilizing the mouse. This emphasis reflects the relative ease of experimental manipulation of this species and its value as a genetic resource. Nevertheless, it is important that it be understood that the mouse is a model and starting point for similar studies using other species.

From beginning to end this is a book of highest quality in content and readability. Moreover, it defines many areas for future research in mammalian embryology.

JOHN J. EPPIG
*Jackson Laboratory,
Bar Harbor, ME 04609*

Cosmic High-Energy Physics

High Energy Phenomena Around Collapsed Stars. F. PACINI, Ed. Reidel, Dordrecht, 1987 (U.S. distributor, Kluwer, Norwell, MA). viii, 368 pp., illus. \$69.50. NATO Advanced Science Institute Series C, vol. 195. From an institute, Cargèse, France, Sept. 1985.

During the past two decades, exploration of the electromagnetic spectrum in segments other than the optical has resulted in new views of celestial objects. The high-energy windows have been difficult to open. Because Earth's atmosphere absorbs most of the ultraviolet and x-ray light, high-energy rays cannot be adequately examined with ground-based telescopes and must therefore be studied from space. In recent years, the use of ultraviolet rays, x-rays, and gamma rays as probes of the emission mechanisms associated with cosmic high-energy phenomena has become possible thanks to satellites such as the International Ultraviolet Explorer, the Einstein (x-ray) Observatory, and EXOSAT. Although increasingly expensive, the astronomy of the highest energy regions of the electromagnetic spectrum is being nurtured by researchers through

difficult technical and budgetary periods, for it provides fundamental information that is unavailable to other branches of astronomy. The questions that it can address relate to the physics of astronomical sources of violent activity such as supernovae, pulsars, black holes, x-ray binary stellar systems, and even the very distant quasars. High-energy radiation from such sources provides clues to massive explosions and to the age, density, and temperature of the sources.

Though still in its infancy, the study of cosmic high-energy phenomena is growing rapidly and offers exciting prospects for the next generation of astrophysicists. This collection of review papers, from lectures delivered at a NATO Advanced Science Institute, provides students and young researchers with a relatively up-to-date account of galactic high-energy astrophysics. Many of the papers are by leading astrophysicists in their respective fields, exemplified best, perhaps, by Edward van den Heuvel, who gives a masterful and thorough account of the mechanisms for the formation of neutron stars in binary systems. This subject is crucial to our theoretical investigation of the progenitors of x-ray binaries, many of which are as luminous as 10,000 suns—in x-rays alone.

At least five of the reviews deal directly with the observation, dynamics, and progenitors of supernovae and their association with pulsars (all with extensive reference to the published literature). This discussion is timely, particularly with regard to the occurrence of Supernova 1987A, which made possible the first detection of neutrinos originating outside the solar system. The papers in this volume contain good theoretical discussions of the impact of such an event on questions dealing with, for example, the formation of neutron stars.

Finally, the review by Martin Rees is a gem for anyone wishing to learn about the astrophysical relevance of black holes. Its level, like that of the other papers, is such that a graduate student with a background in basic physics and a particular interest in astrophysics can get from it a firm introduction to an exciting subject.

FULVIO MELIA
*Department of Physics and Astronomy,
Northwestern University,
Evanston, IL 60208*

Small Mammals

The Natural History of Badgers. ERNEST NEAL. Croom Helm, London, and Facts on File, New York, 1986. xviii, 238 pp. + plates. \$19.95.

Ernest Neal's third magnum opus on badgers appropriately commemorates the 50th

anniversary of the start of the career that has earned him international recognition as "Mr. Badger," and also appears just 40 years after the completion of the classic field studies in Gloucestershire that resulted in his exemplary 1948 monograph *The Badger* (fourth edition, with German and Japanese editions, 1975). The new book is essentially an update of Neal's now out-of-print 1977 *Badgers* and provides an authoritative, wide-ranging survey of the ecology of the Eurasian badger, particularly its breeding biology, social organization, and diet, subjects our knowledge of which has changed most radically since 1948. Comparative data are also provided on the North American and Southeast Asian badger species, admirably covered in the meantime in Long and Killingley's *The Badgers of the World* (Thomas, 1983).

The chapter on reproduction incorporates major new Swedish and Swiss studies and explains how a spring cubbing and main rut are compatible, thanks to delayed implantation, with matings also now known from every other month of the year and even involving subyearling sows, a phenomenon more usual in the American badger. It is worth emphasizing this postpartum rut, since many authors still cite the 1948 edition of *The Badger*, which erroneously favored late summer as the rutting season for European badgers, comparable to that well documented for the American badger.

The section on social life reviews scent-marking, home range, and territoriality. Little evidence of movement between clans in high-density areas has been found; population density and stability thus may ultimately result from density-dependent constraints on recruitment (particularly cub mortality), with clear implications for rabies or tuberculosis control strategies. More recent work has, however, shown much less rigid territoriality in discontinuous urban conditions and at low densities, a situation approximating more that of the American badger.

The chapter on diet emphasizes the importance of earthworms and the overall correlation of their availability with badger density (as an aside, an equivalent major mammalian predator capitalizing on superabundant worm prey remains to be discovered for North America). More might have been said about recent studies of specialist "worm patch foraging" in relation to the evolution of sociality. These elegant studies may tend to oversimplification, however, since "predation" (human) is the ultimate controlling factor throughout much of the badger's Eurasian range, and secure den sites, indispensable for successful breeding, may be critical for both cub and adult survival, particularly in northern areas in a

possibly formerly hibernating species. Choice of habitat, with a further 3000 setts in the British National Survey, is covered in the remaining chapters, together with such topics as badgers in relation to the law and the current status of the controversy over the role of English badgers in bovine tuberculosis, with emphasis on the minimization of badger-cattle contacts through manipulation of grazing regimes rather than on the still somewhat theoretical possibility of an oral vaccine.

Perhaps the most intriguing aspect of the book is the challenging array of questions still to be answered. Particularly revealing is the dearth of knowledge of the basic ecology of ferret, hog, honey, and stink badgers. Their diet is known only in general terms. Is there acute ecological competition between the Eurasian and hog or honey badgers where their ranges overlap sympatrically? Fragmentary evidence suggests delayed implantation in hog and Russian honey badgers, but rats may breed aseasonally in the tropics. Many exciting issues are waiting to be resolved.

M. HANCOX

*Animal Ecology Research Group,
Department of Zoology,
Oxford University,
Oxford OX1 3PS, U.K.*

Books Received

Acoustical Imaging. Vol. 15. Hugh W. Jones, Ed. Plenum, New York, 1987. xii, 692 pp., illus. \$110. From a symposium, Halifax, Nova Scotia, July 1986.

The Acute Leukemias. Biologic, Diagnostic, and Therapeutic Determinants. Sanford A. Stass, Ed. Dekker, New York, 1987. xiv, 478 pp., illus. \$115. Hematology, vol. 6.

Acute Renal Failure. Clinical and Experimental. Alberto Amerio *et al.*, Eds. Plenum, New York, 1987. xii, 324 pp., illus. \$55. Advances in Experimental Medicine and Biology, vol. 212. From a seminar, Bari, Italy, April 1986.

The Analysis of Psychological Theory. Metapsychological Perspectives. Henderikus J. Stam, Timothy B. Rogers, and Kenneth J. Gergen, Eds. Hemisphere (Harper and Row), New York, 1987. xvi, 318 pp. \$49.95. Based on a symposium, Calgary, Alberta.

The Body Victorious. The Illustrated Story of Our Immune System and Other Defenses of the Human Body. Lennart Nilsson with Jan Lindberg. Text by Kjell Lindqvist and Stig Nordfeldt. Delacorte, New York, 1987. 196 pp. \$25. Translated from the Swedish edition (Stockholm, 1985) by Clare James.

Brain Edema. A Pathogenetic Analysis. G. Mchedlishvili *et al.*, Eds. Akadémiai Kiadó, Budapest, 1986. xiv, 366 pp., illus. \$38.

Calculated Molecular Properties of Polycyclic Aromatic Hydrocarbons. Ronald A. Hites and William J. Simonsick, Jr. Elsevier, New York, 1987. xviii, 272 pp., illus. \$127. Physical Sciences Data, 29.

Carbon Substrates in Biotechnology. J. D. Stowell *et al.*, Eds. IRL Press, McLean, VA, 1987. xii, 206 pp., illus. Paper, \$45. Special Publications of the Society for General Microbiology, vol. 21. Based on a symposium, Durham, U.K., July 1986.

The Causes of Crime. New Biological Approaches. Sarnoff A. Mednick, Terrie E. Moffitt, and Susan A. Stack, Eds. Cambridge University Press, New York, 1987. xii, 376 pp., illus. \$42.50. From a conference, Skiathos, Greece, Sept. 1982.

Drinking Water and Health. Disinfectants and Disinfectant By-Products. Vol. 7. National Research Council. National Academy Press, Washington, DC, 1987. xii, 207 pp. Paper, \$19.95.

Eating Characteristics and Temperament. General Measures and Interrelationships. Albert Mehrabian. Springer-Verlag, New York, 1987. xiv, 145 pp. \$38.

Ecology of Forest Insects. Andrzej Szujewski. Junk, Dordrecht, and PWN, Warsaw, 1987 (U.S. distributor, Kluwer, Norwell, MA). xiv, 601 pp., illus. \$185. Series Entomologica, vol. 26. Translated from the Polish edition (Warsaw, 1980) by Albert Radziwiłł.

e⁺e⁻ Physics at High Energies. E. Fernandez and A. Mendez, Eds. World Scientific, Singapore, 1987 (U.S. distributor, Taylor and Francis, Philadelphia). x, 556 pp., illus. \$74. From a meeting, Sant Feliu de Guixols, Spain, March 1986.

From Children to Citizens. Vol. 2, The Role of the Juvenile Court. Francis X. Hartmann, Ed. Springer-Verlag, New York, 1987. xx, 413 pp. \$55.

A Functional Biology of Crop Plants. Vincent P. Gutschick. Timber Press, Portland, OR, 1987. x, 230 pp., illus. \$39.95.

Gangliosides and Modulation of Neuronal Functions. Hinrich Rahmann, Ed. Springer-Verlag, New York, 1987. xviii, 647 pp., illus. \$138. NATO Advanced Science Institutes Series H, vol. 7. From a workshop, Stuttgart, F.R.G., Oct. 1986.

Geomorphic Systems of North America. William L. Graf, Ed. Geological Society of America, Boulder, CO, 1987. viii, 643 pp., illus. \$48.50. Centennial Special Volume, 2.

Hormones and Depression. Uriel Halbreich, Ed. Raven, New York, 1987. xx, 412 pp., illus. \$55. Based on a symposium, Dec. 1984.

Hydra and the Birth of Experimental Biology, 1744. Abraham Trembley's *Mémoires* Concerning the Polyps. Sylvia G. Lenhoff and Howard M. Lenhoff. Boxwood, Pacific Grove, CA, 1986. Various pages + plates. \$28.50.

Hypoglycemia. D. Andreani, V. Marks, and P. J. Lefebvre, Eds. Raven, New York, 1987. xvi, 312 pp., illus. \$48. Sero Symposium Publications from Raven Press, vol. 38. From a symposium, Rome, Italy.

The Identification, Classification and Analysis of University Research Support Personnel. Oliver D. Hensley, Ed. Society of Research Administrators, Santa Monica, CA, and Texas Tech Press, Lubbock, TX, 1986. xiv, 303 pp., illus. \$24. Based on symposium, Coronado, CA, Sept. 1984.

An Introduction to Ore Geology. Anthony M. Evans. 2nd ed. Blackwell Scientific, Palo Alto, CA, 1987. x, 358 pp., illus. \$48; paper, \$23.95. Geoscience Texts, vol. 2.

Introduction to the Principles and Practice of Soil Science. R. E. White. 2nd ed. Blackwell Scientific, Palo Alto, CA, 1987. x, 244 pp., illus. \$45; paper, \$25.

The Johnson Years, Volume Two. Vietnam, the Environment, and Science. Robert A. Divine, Ed. University Press of Kansas, Lawrence, KS, 1987. xii, 267 pp. \$25.

Judgment Studies. Design, Analysis, and Meta-Analysis. Robert Rosenthal. Cambridge University Press, New York, and Editions de la Maison de Sciences de l'Homme, Paris, 1987. xii, 255 pp. \$39.50. Studies in Emotion and Social Interaction.

Kinetics of Interface Reactions. M. Grunze and H. J. Kreuzer, Eds. Springer-Verlag, New York, 1987. xii, 299 pp., illus. \$55. Springer Series in Surface Sciences, vol. 8. From a workshop, Campobello Island, New Brunswick, Sept. 1986.

Lewis Henry Morgan and the Invention of Kinship. Thomas R. Trautmann. University of California Press, Berkeley, CA, 1987. xvi, 290 pp., illus. \$30.

Life Table Techniques and Their Applications. Krishnan Nambodiri and C. M. Suchindran. Academic Press, Orlando, FL, 1987. xii, 275 pp. \$39.95. Studies in Population.

Light-Activated Pesticides. James R. Heitz and Kelsey R. Downum, Eds. American Chemical Society, Washington, DC, 1987. x, 339 pp., illus. \$69.95. ACS Symposium Series, 339. Based on symposium, Anaheim, CA, Sept. 1986.

Lipids in Modern Nutrition. Marc Horisberger and Umberto Bracco, Eds. Raven, New York, 1987. xviii, 248 pp., illus. \$29.50. Nestlé Nutrition Workshop Series, vol. 13. From a symposium, Vevey, Switzerland, Sept. 1985.

Made in America. Science, Technology, and American Modernist Poets. Lisa M. Steinman. Yale University Press, New Haven, 1987. xiv, 219 pp. \$20.

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