Hale, director of the Carnegie Institution of Washington's Mount Wilson Observatory, on plans for a 200-inch telescope, and soon after with Francis G. Pease and John A. Anderson of the Mount Wilson staff (who were not, as Willard suggests, Caltech astronomers). Through the agreement, by which the Rockefeller Foundation gave the initial $6,000,000 for the 200-inch project, the planning, construction, and operation were to be carried out jointly by the Carnegie Institution of Washington and the California Institute of Technology. (The observatories on Mount Wilson and Palomar Mountain have now been named the Hale Observatories.) Porter's connection with the project, originally expected to last a few months, lasted more than 20 years. His contribution as "Associate in Optics and Instrument Design" is graphically illustrated by his skillful "cut-away" drawings for the various instruments and buildings, including the 200-inch dome. The telescope was dedicated on 3 June 1948. Porter was ill and could not be there. He died on 22 February 1949.

Willard includes a bibliography but, unfortunately, no index. In general the details are accurate. This biography can be recommended to any reader who is interested, as Porter was, in the exploration of remote regions of the earth and distant regions of the sky.

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## Tumors and Embryogenesis

**Teratomas and Differentiation**. Proceedings of a symposium, Nutley, N.J., May 1975. MICHAEL I. SHERMAN and DAVOR SOLTER, Eds. Academic Press, New York, 1975. xviii, 324 pp., illus. $16.50.

Nothing matches the development of an embryo for complexity, beauty, and elegance. Each cell of a very early embryo is like a ball rolling down a mountainside, with time taking the place of gravity. The descendants of each cell end up at the base as one or another irreversibly differentiated part of the organism. A teratoma is a tumor made up of levitating cells, poised at the top of the mountain, sending progeny down without losing the ability to send off more: the totipotent cell forever. Thus the teratoma is not only a tumor, but also a marvelously manipulatable travesty of normal embryogenesis. As such, it has been discovered by many different sorts of developmental and molecular biologists in the last few years. There are not many groups in modern biology who can summarize their work in less than 300 pages, as the teratoma workers have done in this book. I suspect this was their last chance to do so.

The book comprises the papers presented at a meeting at the Roche Institute. There is an introduction and a paper on terminology. The rest of the papers are assembled by topic: Embryo-Teratoma Relationships, Surface Antigens on Embryos and Teratomas, Teratoma-Host Interactions, Control of Differentiation of Embryonal Carcinoma Cells, Properties of Embryonal Carcinoma Cells, and Properties of Teratomas *in Vitro*. Both in vitro and in vivo studies are represented.

The laboratories of Boon, Sherman, Martin, Levine, and Ephrussi report on their success in harnessing the process of differentiation of the tumor cells in vitro. It has apparently become routine to select cloned teratoma cell lines showing various differentiated states. The biochemical characterization of these cultured descendants of the embryoid body is well under way. Interestingly, most, if not all, cultured differentiated lines of teratoma origin are unable to make tumors when they are injected into susceptible host mice.

Work in vivo has been concentrated on the antigenic and morphological similarities between normal early embryos and embryoid bodies. Although there are many such similarities, a major difference between these two cell masses remains: only embryoid bodies have the capacity to form tumors. Therefore the most surprising and novel contributions in the book must be those from Philadelphia. In separate studies, Mintz, Illmensee, and Gearhart, of the Institute for Cancer Research, and Brinster, of the University of Pennsylvania, have apparently shown that a normal embryo can normalize tumorigenic teratoma cells. That is, they have used Stevens's teratoma embryoid body cell populations to demonstrate that a teratoma is a form of cancer that has a totally reversible loss of growth control.

Mintz *et al.* and Brinster dissected embryoid bodies into their core cells and their rind of differentiated endothelial cells. The core cells are the germ cells that give rise to all differentiated types. By mating C57 white mice, they obtained blastocysts, into which they injected clumps of core cells from teratomas from black mice of strain 129. The hybrid embryos were then reimplanted in the uteruses of foster mothers (also white), and the pregnancies were permitted to go to term. Normal mice were born that were mosaic in coat color. Furthermore, the male mice born of these constructed hybrid embryos were fertile, that is, they made normal sperm and produced some $F_1$ black mice when mated to female hybrids. Since the mice were normal in every way, we must conclude that these descendants of tumor cells were normalized by the environment of the normal mouse embryo.

Beautiful as these results are, their potential importance lies in the possibility of combining them with the sort of studies that fill the rest of the book, those on the culture in vitro of the differentiated descendants of teratomas. If the implantation results are confirmed and other studies are carried out with cultured teratoma cells, one would expect future implantations to be carried out with cultured diploid cells that have received DNA sequences obtained by cloning in prokaryotic organisms. That would, it seems to me, be the technology for carrying a known DNA sequence directly through a prokaryote vector for amplification, then through a mammalian cultured cell for integration into the mammalian genome, and then through blastocyst injection and reimplantation of an embryo for stabilization in a whole mammalian organism. Although this bypass of evolution has not yet been accomplished, the book provides an experimental context for carrying out such work. I suspect that this context will become increasingly important to all biologists.

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## Statistical Induction

**Perspectives in Probability and Statistics**. Papers in Honour of M. S. Bartlett on the Occasion of His Sixty-Fifth Birthday. J. GANI, Ed. Applied Probability Trust, Sheffield, England, 1976 (U.S. distributor, Academic Press, New York). viii, 424 pp. $21.

The first half of this century witnessed the major developments in the theory and methods of statistical induction. The pioneering contributions made in England by Karl Pearson, Ronald Fisher, Jerzy Neyman, and Egon Pearson are widely recognized and revered. One

should add to this list of pioneers the name of Maurice Bartlett, whose versatility, innovativeness, and influence are honored in this volume of papers marking his retirement. The majority of the contributions are by Bartlett's colleagues in England.

The most notable feature of the collection is the large number of papers dealing with theory and applications of stochastic processes. Several of these articles are open-ended but substantial contributions in new directions, and as such make stimulating reading. Kendall presents a lucid account of reversible processes, motivated by the need of genealogists to examine stochastic birth-death processes backward in time. In the same vein of hard problem-solving is a preliminary account of Gani's work on estimating vocabulary type counts in literary works with the use of Markov chains.

Papers by Hammersley and Kingman present novel approaches to important problems in the theory of Markov processes.

Among the several papers on statistical inference for stochastic processes is an interesting piece by Grenander on restoration of deformed lattice patterns. Here the problem is that a regular lattice of points, characterized by basis vectors and a phase (location) parameter, has been "jittered" by considerable random noise. A Fourier-type analysis of the jittered points leads to a reconstruction method.

In the realm of experimental statistics there are some solid contributions summarizing current work on regression models. An all-too-brief paper by Barnard revives the important Fisherian idea of analyzing linear models with reference to data-specific, rather than average, properties. In a different vein, Meier presents his work on large-sample Brownian-motion properties of the Kaplan-Meier estimate of survival curves based on censored data.

As I hope these brief comments suggest, there is variety and imagination in this volume. There are refreshingly unusual pieces, such as Cedric Smith's on the systematic theory of iteration near a fixed point and Norman Bailey's expert review of the contributions made by the theory of infectious diseases to the practical enterprise of public health control.

Through their enthusiasm and ingenuity these 30 authors have provided a fitting tribute to a master.

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## Books Received

**The Abdication of Philosophy**. Philosophy and the Public Good. Essays in Honor of Paul Arthur Schilpp. Eugene Freeman, Ed. Open Court, La Salle, Ill., 1976. viii, 328 pp. $19.50.

**Abdominal Ultrasound**. Hans Henrik Holm, Jørgen Kvist Kristensen, Sten Nørby Rasmussen, Jan Fog Pedersen, and Søren Hancke. Munksgaard, Copenhagen, 1976 (U.S. distributor, University Park Press, Baltimore). 182 pp., illus. $47.50.

**Abyss**. The Deep Sea and the Creatures That Live in It. C. P. Idyll. Crowell, New York, ed. 3, 1976. xx, 428 pp., illus. Cloth, $12.50; paper, $6.95.

**Adaptive Information Processing**. An Introductory Survey. Jeffrey R. Sampson. Springer-Verlag, New York, 1976. x, 214 pp., illus. $14.80. Texts and Monographs in Computer Science.

**American Folk Medicine**. A Symposium. Papers from a conference, Los Angeles, Dec. 1973. Wayland D. Hand, Ed. University of California Press, Berkeley, 1976. viii, 348 pp. $12.95. Publications of the UCLA Center for the Study of Comparative Folklore and Mythology, 4.

**Ancient Hispanic Inscriptions**. James M. Anderson. University of Calgary Department of Archaeology, Calgary, Canada, 1975. xii, 90 pp., illus. Paper, C$6. Occasional Papers No. 3.

**Atlas of Stereoscopic Neuroradiology**. Keiji Sano, Ed. University of Tokyo Press, Tokyo, 1976 (U.S. distributor, International Scholarly Book Services, Forest Grove, Ore.). x, 114 pp. $40.

**Basic Visual Processes and Learning Disability**. Gerald Leisman and others. Thomas, Springfield, Ill., 1976. xiv, 440 pp., illus. $27.50.

**Behavior Control and Modification of Physiological Activity**. David I. Mostofsky, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1976. viii, 504 pp., illus. $17.95. Century Psychology Series.

**Cardiovascular Physiology II**. Arthur C. Guyton and Allen W. Cowley, Jr., Eds. University Park Press, Baltimore, 1976. x, 394 pp., illus. $22.50. International Review of Physiology, vol. 9.

**Central Action of Drugs in Blood Pressure Regulation**. Proceedings of a symposium, London, 1975. Donald S. Davies and John L. Reid, Eds. University Park Press, Baltimore, 1976. xii, 306 pp., illus. $29.50.

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**Communication Assessment and Intervention Strategies**. Lyle L. Lloyd, Ed. University Park Press, Baltimore, 1976. xviii, 904 pp., illus. $16.50.

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**Computational Semantics**. An Introduction to Artificial Intelligence and Natural Language Comprehension. Eugene Charniak and Yorick Wilks, Eds. North-Holland, Amsterdam, 1976 (U.S. distributor, Elsevier, New York). viii, 294 pp., illus. $19. Fundamental Studies in Computer Science, vol. 4.

**Computer Handling of Geographical Data**. An Examination of Selected Geographic Information Systems. Unesco Press, Paris, 1976 (U.S. distributor, Unipub, New York). 214 pp., illus. Paper, $15.20. Natural Resources Research, 13.

**Control of Air Pollution Sources**. J. M. Marchello. Dekker, New York, 1976. viii, 630 pp., illus. $49.50. Chemical Processing and Engineering, vol. 7.

**Cumancaya**. A Peruvian Ceramic Tradition. J. Scott Raymond, Warren R. DeBoer, and Peter G. Roe. University of Calgary Department of Archaeology, Calgary, Canada, 1975. vi, 144 pp., illus. Paper, C$6. Occasional Papers No. 2.

**Dialectic**. Humanistic Rationale for Behavior and Development. J. F. Rychlak, Ed. Karger, Basel, 1976. xii, 160 pp. Paper, $20. Contributions to Human Development, vol. 2.

**Dictionary of Cultivated Plants and Their Centres of Diversity**. Excluding Ornamentals, Forest Trees and Lower Plants. A. C. Zeven and P. M. Zhukovsky. Centre for Agricultural Publishing and Documentation, Wageningen, The Netherlands, 1975 (U.S. distributor, International Scholarly Book Services, Forest Grove, Ore.). 220 pp., illus. $21.50.

**Digital Transmission Systems**. P. Bylanski and D. G. W. Ingram. Published for the Institution of Electrical Engineers by Peregrinus, Stevenage, England, 1976 (U.S. distributor, International Scholarly Book Services, Forest Grove, Ore.). xiv, 358 pp., illus. $35. IEE Telecommunications Series 4.

**Early Hydraulic Civilization in Egypt**. A Study in Cultural Ecology. Karl W. Butzer. University of Chicago Press, Chicago, 1976. xvi, 134 pp., illus. Cloth, $8; paper, $2.45. Prehistoric Archeology and Ecology.

**The Economists**. Leonard Silk. Basic, New York, 1976. xii, 294 pp. $10.95.

**The Effectiveness of Drug Abuse Treatment**. S. B. Sells and D. Dwayne Simpson, Eds. Ballinger (Lippincott), Cambridge, Mass., 1976. Vol. 3, Further Studies of Drug Users, Treatment Typologies, and Assessment of Outcomes during Treatment in DARP. xxxiv, 466 pp. $22.50. Vol. 4, Evaluation of Treatment Outcomes for 1971–1972 DARP Admission Cohort. xxx, 484 pp. $22.50.

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**Energy**. Vol. 3, Nuclear Energy and Energy Policies. S. S. Penner, Ed. Addison-Wesley, Reading, Mass., 1976. xxxvi, 714 pp., illus. Cloth, $28.50; paper, $16.50.

**Energy Supply and Government Policy**. Robert J. Kalter and William A. Vogely, Eds. Cornell University Press, Ithaca, N.Y., 1976. 358 pp. Cloth, $18.50; paper, $5.95.

**Environmental Aspects of Nuclear Power**. Geoffrey G. Eichholz. Ann Arbor Science,

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