quence. This avoids the problem associated with coordinating simultaneous growth in different regions of the nervous system and prevents errors of topography among higher-order cells like Purkinje neurons from disrupting the topographic organization at all lower levels. Sotelo and collaborators have successfully grafted genetically normal embryonic Purkinje cells into the adult cerebellum of an adult neurological mutant mouse (PCD) in which all Purkinje cells degenerate. Sotelo demonstrates that the grafted cells carry their own agenda for orientation, growth, and differentiation and follow an "internal clock that regulates all their developmental programs independently of environmental agents."

A highlight of the section of the book devoted to the electrophysiology of Purkinje cells and inferior olivary neurons is the chapter by Llinás and Sugimori. The authors not only summarize much of their work on calcium conductance in Purkinje cells but, perhaps more significant for the non-specialist, offer some functional interpretations of the results. That specialized voltage-dependent conductance channels for sodium or calcium can be triggered by either parallel-fiber or climbing-fiber excitation to produce simple or complex spikes respectively has been well documented by these authors. However, the additional bewildering variety of calcium conductances means that different parts of the dendritic tree are independently responsive and that Purkinje cells can generate as many as six different all-or-none potentials in addition to the plateau potential. Moreover, the dendritic spikes and the plateau potentials differ only in that they are generated at different regions of the dendrites with different complements of potassium channel types. Some dramatic color images of calcium conductance changes after intracellular application of the voltage-sensitive dye fura-2 are used to document the plateau potentials in in vitro cerebellar slices. The illustrations are of excellent quality throughout the book, and the anatomical figures are especially noteworthy, although I noted a few discordances between legends and figures.

The final section of the book deals with cerebellar activity in movement and more particularly with learned movements. The perpetual riddle of the role of the climbing fibers is posed once again, but the varied answers failed to generate the heat and passion that characterized the debate on the same issue at a similar symposium in Turin a year earlier. Alas, there still appears to be no agreement in sight. Even the consensus that complex spikes diminish Purkinje cell responsiveness to parallel fiber excitation appears to some extent equivocal according to Bloedel and collaborators. Although more than half the book is devoted to elaborating the organization of Purkinje cells into narrow rostrocaudal bands, Thach adds evidence to support an old hypothesis that runs counter to the parasagittal bands both literally and figuratively. He suggests that in addition to the rostrocaudal organization, the long parallel fibers running mediolaterally serve to link the functionally different parasagittal bands of the cerebellum together to create specific muscle synergies for multijoint movements.

In some ways we have come full circle with this book since Cajal's pioneering demonstration of the simple geometric arrangement of cerebellar neurons. Neuroscientists expecting that the simple geometric structure would soon be followed by a similarly simple and elegant explanation of its function have been disappointed. Rather ironically, it appears clear from this excellent collection of papers that, after one hundred years of impressive progress, we have developed an elaborate neuron doctrine of the whole brain, but a simple explanation of cerebellar function has yet to be achieved.

Allan M. Smith
Centre de Recherche en Sciences Neurologiques, Université de Montréal, Montréal, Québec, Canada H3C 3J7

■

Books Received

Advances in Measurement of Soil Physical Properties. Bringing Theory into Practice. G. Clarke Topp, W. Daniel Reynolds, and Richard E. Green, Eds. Soil Science Society of America, Madison, WI, 1992. xvi, 288 pp., illus Paper, $42; to members, $35. SSSA Special Publication no. 30. From a symposium, San Antonio, Oct. 1990.

Advances in X-Ray Analysis. Vols. 35A and 35B. Charles S. Barrett *et al.*, Eds Plenum, New York, 1992 xxxiv, 1333 pp., illus. $185. From a conference, Hilo and Honolulu, Aug. 1991.

Alzheimer's Disease. New Treatment Strategies. Zaven S. Khachaturian and John P. Blass, Eds. Dekker, New York, 1992. xvi, 237 pp., illus. $99 75. Dementia Reviews.

Amino Acid and Peptide Synthesis. John Jones. Oxford University Press, New York, 1992. viii, 86 pp., illus. $29.95. Oxford Chemistry Primers, 7.

Bones. A Forensic Detective's Casebook. Douglas Ubelaker and Henry Scammell. HarperCollins, New York, 1992. xvi, 317 pp , illus. $23

The Cancer Dictionary. Roberta Altman and Michael Sarg. Facts on File, New York, 1992. xiv, 334 pp., illus. $40

Cell Culture. M. Butler and M. Dawson, Eds. Bios Scientific, Oxford, U.K., and Academic Press, San Diego, CA, 1992 xx, 247 pp., illus. Spiral bound, $49.95. Labfax Series.

The Center, Bulge, and Disk of the Milky Way. Leo Blitz, Ed. Kluwer, Norwell, MA, 1992. x, 167 pp , illus. $59. Astrophysics and Space Science Library, vol. 180. From an assembly, Buenos Aires, 1991.

Chalk Up Another One The Best of Sidney Harris AAAS, Washington, DC, 1992. viii, 146 pp., illus. Paper, $10.95; to members, $8.75

Chaos. From Theory to Applications Anastasios A. Tsonis. Plenum, New York, 1992. xii, 274 pp., illus. $59.50.

The Data Handbook. A Guide to Understanding the Organization and Visualization of Technical Data. Brand Fortner Spyglass, Champaign, IL, 1992. xii, 229 pp , illus. Paper, $39 95.

The Development of American Pharmacology. John J. Abel and the Shaping of a Discipline John Parascandola Johns Hopkins University Press, Baltimore, MD, 1992. xx, 212 pp , illus. $32.50.

Dynamics of the Standard Model. John F Donoghue, Eugene Golowich, and Barry R. Holstein. Cambridge University Press, New York, 1992. xviii, 540 pp., illus. $100. Cambridge Monographs on Particle Physics, Nuclear Physics, and Cosmology, 2.

Electrodermal Activity Wolfram Boucsein Plenum, New York, 1992. xiv, 442 pp , illus. $65. Plenum Series in Behavioral Psychophysiology and Medicine.

Evolutionary Ecology and Human Behavior Eric Alden Smith and Bruce Winterhalder, Eds. Aldine de Gruyter, Hawthorne, NY, 1992. xvi, 470 pp., illus. $59.95; paper, $29.95. Foundations of Human Behavior.

Exploring Music The Science and Technology of Tones and Tunes. Charles Taylor Institute of Physics, Philadelphia, 1992 (distributor, American Institute of Physics, New York) x, 255 pp., illus. Paper, $35.90

Fire Under the Sea. The Discovery of the Most Extraordinary Environment on Earth Volcanic Hot Springs on the Ocean Floor Joseph Cone. Morrow, New York, 1992. 288 pp., illus., + plates. Paper, $12. Reprint, 1991 ed

Fracture Mechanics of Ceramics. Vol 9, Composites, R-Curve Behavior, and Fatigue. R C. Bradt *et al.*, Eds Plenum, New York, 1992. xii, 604 pp., illus. $129.50. From a symposium, Nagoya, Japan, July 1991.

Greek Mathematical Thought and the Origin of Algebra. Jacob Klein. Dover, New York, 1992. xvi, 360 pp. Paper, $9.95 Dover Books on Advanced Mathematics. Translated from the German edition (Berlin, 1934–1936) by Eva Brann. Reprint, 1968 ed.

The Greenpeace Book of Coral Reefs Sue Wells and Nick Hanna Sterling, New York, 1992 160 pp., illus. $35.

A History of Women in the West Georges Duby and Michelle Perrot, Eds Harvard University Press, Cambridge, MA, 1992. 2 vols. Vol. 1, From Ancient Goddesses to Christian Saints Pauline Schmitt Pantel, Ed. Translated from the Italien edition (Roma-Bari, 1990) by Arthur Goldhammer xxiv, 572 pp., illus. $29.95. Vol. 2, Silences of the Middle Ages Christiane Klapisch-Zuber, Ed. Translated from the Italien edition (Roma-Bari, 1990). xii, 575 pp , illus. $29.95

How the Shaman Stole the Moon. In Search of Ancient Prophet-Scientists from Stonehenge to the Grand Canyon William H Calvin Bantam, New York, 1992. xvi, 224 pp., illus Paper, $12.50. Reprint, 1991 ed.

An Introduction to Animal Behavior. Aubrey Manning and Marian Stamp Dawkins 4th ed. Cambridge University Press, New York, 1992. xii, 196 pp., illus. $69.95; paper, $24·95.

An Introduction to Electromagnetic Inverse Scattering. K I. Hopcraft and P. R. Smith. Kluwer, Norwell, MA, 1992. xii, 228 pp., illus. $96. Developments in Electromagnetic Theory and Applications, vol. 7.

Inventivity The Art and Science of Research Management. John J. Gilman. Van Nostrand Reinhold, New York, 1992. xviii, 187 pp , illus. Paper, $29.95.

Inverse Methods in Physical Oceanography. Andrew F. Bennett. Cambridge University Press, New York, 1992. xvi, 346 pp., illus. $59.95 Cambridge Monographs on Mechanics and Applied Mathematics.

The Laboratory Revolution in Medicine. Andrew Cunningham and Perry Williams, Eds: Cambridge University Press, New York, 1992. xii, 347 pp., illus. $69.95.

The Life and Times of Modern Physics. History of Physics II Melba Phillips, Ed American Institute of Physics, New York, 1992. xii, 366 pp , illus. $40. Readings from *Physics Today*, no. 5

Materials Science and Technology. A Comprehensive Treatment. R. W Cahn, P. Haasen, and E. J. Kramer, Eds. Vol. 2A, Characterization of Materials, Part 1. Eric Lifshin, Ed. xvi, 724 pp., illus Vol 3A, Electronic and Magnetic Properties of Metals and Ceramics, Part 1. K. H Jurgen Buschow, Ed xiv, 641 pp., illus. Vol. 4, Electronic Structure and Properties of Semiconductors Wolfgang Schroter, Ed. xvi, 603 pp., illus. Vol. 5, Phase Transformations in Materials. Peter Haasen, Ed. xiv, 648 pp , illus Vol 7, Constitution and Properties of Steels F. Brian Pickering, Ed. xvi, 824 pp., illus. Vol. 9, Glasses and Amorphous Materials.

Jerzy Zarzycki, Ed. xiv, 797 pp., illus. Vol. 14, Medical and Dental Materials. David F. Williams, Ed. xx, 469 pp., illus. Vol. 15, Processing of Metals and Alloys. Robert W. Cahn, Ed. xiv, 628 pp., illus. VCH, New York, 1991–92. Each volume, DM 430.

Mathematical Modeling of Melting and Freezing Processes. Vasilios Alexiades and Alan D. Solomon. Hemisphere (Taylor and Francis), Bristol, PA, 1993. xiv, 323 pp., illus. $49.50.xxxiv, 1333 pp., illus. $185. From a conference, Hilo and Honolulu, Aug. 1991.

Nature's Mind. The Biological Roots of Thinking, Emotions, Sexuality, Language and Intelligence. Michael S. Gazzaniga. Basic Books, New York, 1992. xiv, 220 pp., illus. $25.

Nicholas Copernicus: Complete Works. Johns Hopkins University Press, Baltimore, MD, 1992. *On the Revolutions*. Jerzy Dobrzycki, Ed. xxii, 452 pp., illus. Paper, $39.95. *Minor Works*. Pawel Czartoryski, Ed. xvi, 373 pp., illus. Paper, $48. Foundations of Natural History. Translated from the Polish by Edward Rosen. Reprint, 1978 and 1985 eds.

Nuclear Spectroscopy on Charge Density Wave Systems. Tilman Butz, Ed. Kluwer, Norwell, MA, 1992. xii, 325 pp., illus. $129. Physics and Chemistry of Materials with Low-Dimensional Structures, vol. 15. From a workshop, Bavaria, 1989.

Oncogenes in the Development of Leukaemia. O. N. Witte, Ed. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1992. vi, 191 pp., illus. $66. Cancer Surveys, vol. 15.

Ordered and Turbulent Patterns in Taylor-Couette Flow. C. David Andereck and F. Hayot, Eds. Plenum, New York, 1992. xii, 357 pp., illus. $95. NATO Advanced Science Institutes Series B, vol. 297. From a workshop, Columbus, OH, May 1991.

Organizations, Uncertainties, and Risk. James F. Short, Jr. and Lee Clarke, Eds. Westview, Boulder, CO, 1992. xiv, 381 pp., illus. $49.95.

Probability and Algorithms. Committee on Applied and Theoretical Statistics. National Academy Press, Washington, DC, 1992. x, 178 pp., illus. Paper, $21.

Protein Blood Group Antigens of the Human Red Cell. Structure, Function, and Clinical Significance. Peter C. Agre and Jean-Pierre Cartron, Eds. Johns Hopkins University Press, Baltimore, MD, 1992. xiv, 267 pp., illus. $115. Johns Hopkins Series in Hematology/Oncology.

Radiation and Cloud Processes in the Atmosphere. Theory, Observation, and Modeling. K. N. Liou. Oxford University Press, New York, 1992. x, 487 pp., illus. $85. Oxford Monographs on Geology and Geophysics, no. 20.

Radiocarbon After Four Decades. An Interdisciplinary Perspective. R. E. Taylor, A. Long, and R. S. Kra, Eds. Springer-Verlag, New York, 1992. xviii, 596 pp., illus. $89. From a conference, Lake Arrowhead, CA, June 1990.

Rape Law Reform. A Grassroots Revolution and Its Impact. Cassia Spohn and Julie Horney. Plenum, New York, 1992. 192 pp., illus. $32.50. Plenum Series in Crime and Justice.

Reactive Intermediates. Christopher J. Moody and Gordon H. Whitham. Oxford University Press, New York, 1992. vi, 90 pp., illus. $29.95; paper, $9.95. Oxford Chemistry Primers, 8.

Sexual Science and the Law. Richard Green. Harvard University Press, Cambridge, MA, 1992. xii, 323 pp. $35.

The Sword and the Grail. Of the Grail and the Templars and a True Discovery of America. Andrew Sinclair. Crown, New York, 1992. x, 245 pp. + plates. $22.50.

Symmetry in Chaos. A Search for Pattern in Mathematics, Art and Nature. Michael Field and Martin Golubitsky. Oxford University Press, New York, 1992. xii, 218 pp., illus. $35.

T Lymphocytes. Structure, Functions, Choices. Franco Celada and Benvenuto Pernis, Eds. Plenum, New York, 1992. xii, 256 pp., illus. $79.50. NATO Advanced Science Institutes Series A, vol. 233. From an institute, Porto Conte (Alghero), Sardinia, Italy, Sept. 1991.

Techniques for Determining Probabilities of Geologic Events and Processes. Regina L. Hunter and C. John Mann, Eds. Oxford University Press, New York, 1992. xvi, 364 pp., illus. $49.95. Studies in Mathematical Geology, 4.

Technology and the Wealth of Nations. Nathan Rosenberg, Ralph Landau, and David C. Mowery, Eds. Stanford University Press, Stanford, CA, 1992. xvi, 443 pp., illus. $49.50; paper, $16.95. Based on a conference, Stanford, CA, Sept. 1989.

Usability. Turning Technologies into Tools. Paul S. Adler and Terry A. Winograd, Eds. Oxford University Press, New York, 1992. xii, 208 pp., illus. $35. From a seminar, Stanford, CA, March 1990.

Variational Methods in Mechanics. Toshio Mura and Tatsuhito Koya. Oxford University Press, New York, 1992. xii, 244 pp., illus. $39.95.

Vital Signs 1992. The Trends That Are Shaping Our Future. Lester R. Brown, Christopher Flavin, and Hal Kane. Worldwatch Institute, Washington, DC, and Norton, New York, 1992. 131 pp., illus. $19.95; paper, $10.95.

The Vulnerable Brain and Environmental Risks. Robert L. Isaacson and Karl F. Jensen, Eds. Plenum, New York, 1992. 2 vols. Vol. 1, Malnutrition and Hazard Assessment. xxii, 268 pp., illus. $65. Vol. 2, Toxins in Food. xxiv, 332 pp., illus. $69.50.

Who Survives Cancer?. Howard P. Greenwald. University of California Press, Berkeley, 1992. xxii, 280 pp., illus. $25.

Wildlife Management and Subsistence Hunting in Alaska. Henry P. Huntington. University of Washington Press, Seattle, 1992. xviii, 177 pp., illus. $50.