"Acorns stored in a dead tree by acorn woodpeckers in California." [From *Food Hoarding in Animals*; photograph courtesy Walter Koenig]

press; and McNamara *et al.*, *Behavioral Ecology* 1, 12–23 [1990]), and these should, at the very least, help organize future work on the function of food hoarding and the ecological pressures that have affected its evolution.

Vander Wall casts a wide net. Mass provisioning by insects (filling a burrow with prey on which eggs are laid) is regarded as an example of food hoarding, though my own feeling is that this creates too heterogeneous a category to hope for common causal or functional explanations of food hoarding. For anyone who disagrees, *Food Hoarding in Animals* contains a wealth of material on mass provisioning, ably presented. A further critical comment is that the discussion itself is sometimes uncritical, giving as thorough and balanced a coverage to ideas that are best discarded (for example, that food hoarding evolved from "food envy" in animals) as to ideas that make interesting testable predictions (for example, that hoarding occurs in animals that cannot economically defend a rich food source).

Behavioral ecologists concerned with food storing, foraging, and the coevolution of animals and plants will find *Food Hoarding in Animals* a valuable reference work. Anyone simply curious about the behavior of animals will find much in the book to enjoy.

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## Atoms and Laser Light

**The Theory of Coherent Atomic Excitation.** BRUCE W. SHORE. In two volumes. Vol. 1, Simple Atoms and Fields. Vol. 2, Multilevel Atoms and Incoherence. Wiley-Interscience, New York, 1990. xxxiv, 1735 pp., illus. $123.

*The Theory of Coherent Atomic Excitation* is a two-volume monograph that examines the resonant and near-resonant interaction of light with atoms. Studies of such interactions are often concerned primarily with the properties of the light and use the ideas of quantum or nonlinear optics. This book differs sharply from such treatments in that the emphasis is on the behavior of the atom.

The most prominent feature of laser light—its coherence—makes it necessary to replace Einstein's rate equations with the time-dependent Schrödinger equation in the description of atomic excitation by laser light. In this regime of coherent excitation, atomic dipole moments are important as well as the atomic populations of ground and excited states. Standard perturbation theory, which is at the heart of conventional atomic spectroscopic theory, is insufficient because laser light fields can be very strong. On the other hand, if the light is nearly resonant the description of the atom itself may be simplified; instead of giving a full description of the atom in configuration space, we may restrict our attention to the subset of relevant states involved in the interaction. The simplest model atom that serves this purpose is the celebrated two-level atom. The time-dependent equations solved in Shore's monograph are therefore written in the energy representation, where truncation of the atomic structure is most natural. The strong light fields may, for most applications, be described as classical external waves (although their description in terms of quantized photon states is also explained).

The two-level atom in a monochromatic field in the so-called rotating wave approximation lends itself to analytic solutions, and these are carefully explained by Shore. The equations for more complicated atoms must be solved numerically, however, and various numerical techniques and results are also described in detail. In addition, the interaction of atoms with partially coherent fields is treated, and various classical stochastic models of the noisy laser light are presented.

The book is very detailed and stresses completeness rather than overview and synthesis. Derivations are fully reported, making the arguments easy to follow. It will be very useful to those who work or are just beginning to work on resonant optical problems. The book contains a nearly complete set of references and will also serve as a compendium and guide to the growing literature on this subject.

Most textbooks on quantum mechanics pay so much attention to the study of stationary states that students could get the impression that classical mechanics is about time-dependent processes and quantum mechanics about eigenstates of the Hamiltonian. (Even scattering theory is usually treated in a stationary picture.) The subject of coherent atom excitation offers a wealth of quantum-mechanical, time-dependent phenomena and brings to life this often forgotten side of quantum mechanics. This book would be useful as a source of such examples or for reference in a graduate-level course.

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## Books Received

**Acarine Biocontrol Agents**. An Illustrated Key and Manual. Uri Gerson and Robert L. Smiley. Chapman and Hall, New York, 1990. x, 174 pp., illus. $89.50.

**Acts of Meaning**. Jerome Bruner. Harvard University Press, Cambridge, MA 1990. xx, 179 pp. $19.95. Jerusalem-Harvard Lectures.

**Analytical Instrumentation Handbook**. Galen Wood Ewing, Ed. Dekker, New York, 1990. xiv, 1071 pp., illus. $195.

**Applications Development Using Case Tools**. Kenmore S. Brathwaite. Academic Press, San Diego, CA, 1990. xxiv, 263 pp., illus. $49.95.

**Applied Virology Research**. Vol. 2, Virus Variability, Epidemiology, and Control. Edouard Kurstak *et al.*, Eds. Plenum, New York, 1990. xviii, 368 pp., illus. $75.

**The Arctic Ocean Region**. Arthur Grantz, L. Johnson, and J. F. Sweeney, Eds. Geological Society of America, Boulder, CO, 1990. x, 644 pp., illus., + plates + microfiche cards. $85. Geology of North America, vol. L.

**Aspects of Seismic Reflection Data Processing**. R. Marschall, Ed. Kluwer, Boston, 1990. x, 295 pp., illus. $115. Reprinted from *Surveys in Geophysics*, vol. 10, nos. 2–4 (1989).

**Atom-Probe Field Ion Microscopy**. Field Ion Emission, and Surfaces and Interfaces at Atomic Resolution. Tien T. Tsong. Cambridge University Press, New York, 1990. x, 387 pp., illus. $100.

**The Beilstein Online Database**. Implementation, Content, and Retrieval. Stephen R. Heller, Ed. American Chemical Society, Washington, DC, 1990. viii, 168 pp., illus. $34.95. ACS Symposium Series, 436. From a symposium, FL, Sept. 1989.

**Biological Psychology**. Eugene H. Galluscio. Macmillan, New York, 1990. xxvi, 708 pp., illus. $44.

**Biotechnology of Fungi for Improving Plant Growth**. J. M. Whipps and R. D. Lumsden, Eds. Cambridge University Press, New York, 1990. x, 303 pp., illus. $89.50. From a symposium, Sussex, U.K., Sept. 1988. Reprint, 1989 ed.

**Biotechnology in Pulp and Paper Manufacture**. Applications and Fundamental Investigations. T. Kent Kirk and Hou-Min Chang, Eds. Butterworth-Heinemann, Boston, 1990. xxviii, 666 pp., illus. $95. From a conference, Raleigh and Myrtle Beach, SC, May 1989.

**Bubble Wake Dynamics in Liquids and Liquid-Solid Suspensions**. Liang-Shih Fan and Katsumi Tsuchiya. Butterworth-Heinemann, Boston, 1990. xvi, 363 pp., illus. $95. Butterworth-Heinemann Series in Chemical Engineering.

**Cell Lineages in Development**. Frank A. Pepe *et al.*, Eds. New York Academy of Sciences, New York, 1990. xii, 171 pp., illus. Cloth or paper, $50. Annals of the New York Academy of Sciences, vol. 599. From a symposium.

$29.25. Santa Fe Institute Studies in the Sciences of Complexity, vol. 8. From a workshop, Santa Fe, NM, May 1989.

**Computational Plasma Physics**. With Applications to Fusion and Astrophysics. Toshiki Tajima. Addison-Wesley, Redwood City, CA, 1989. xxiv, 503 pp., illus. $50.50.

**Computer Aided Formulation**. A Manual For Implementation. Alan H. Bohl, Ed. VCH, New York, 1990. xviii, 298 pp., illus. $65.

**Connectionist Robot Motion Planning**. A Neurally-Inspired Approach to Visually-Guided Reaching. Bartlett W. Mel. Academic Press, San Diego, CA, 1990. xvi, 165 pp., illus. $29.95. Perspectives in Artificial Intelligence, vol. 7.

**The Cretaceous/Tertiary Boundary Interval, Raton Basin, Colorado and New Mexico, and Its Content of Shock Metamorphosed Minerals**. Evidence Relevant to the K/T Boundary Impact-Extinction Theory. Glen A. Izett. Geological Society of America, Boulder, CO, 1990. vi, 100 pp., illus. Paper, $30. GSA Special Paper 249.

**The Curious Cook**. More Kitchen Science and Lore. Harold McGee. North Point Press, San Francisco, CA, 1990. x, 339 pp., illus. $19.95.

**The Cytoskeleton and Cell Motility**. Terence M. Preston, Conrad A. King, and Jeremy S. Hyams. Blackie, London, and Chapman and Hall, New York, 1990. x, 202 pp., illus. $69.95; paper, $29.50. Tertiary Level Biology.

**The Distribution of Prime Numbers**. A. E. Ingham. Cambridge University Press, New York, 1990. xx, 114 pp. Paper $17.95. Cambridge Tracts in Mathematics and Mathematical Physics, no. 30. Reprint, 1932 ed.

**DORA '90–'91**. Directory of Rare Analyses. Jocelyn M. Hicks and Donald S. Young. American Association for Clinical Chemistry Press, Washington, DC, 1990. iv, 211 pp. Paper, $60; to AACC members, $35.

**The Evolution of Political Systems**. Sociopolitics in Small-Scale Sedentary Societies. Steadman Upham, Ed. Cambridge University Press, New York. xxii, 310 pp., illus. $49.50. School of American Research Advanced Seminar Series. From a seminar, Santa Fe, NM, April 1986.

**Factorization Calculus and Geometric Probability**. R. V. Ambartzumian. Cambridge University Press, New York, 1990. xii, 286 pp., illus. $59.50. Encyclopedia of Mathematics and Its Applications, vol. 33.

**Gold**. Advances in Precious Metals Recovery. Nathaniel Arbiter and Kenneth N. Han, Eds. Gordon and Breach, New York, 1990. vi, 232 pp., illus. $66. Reprinted from *Mineral Processing and Extractive Metallurgy Review*, vol. 6.

**Intervention Research in Learning Disabilities**. Thomas E. Scruggs and Bernice Y. L. Wong, Eds. Springer-Verlag, New York, 1990. x, 347 pp., illus. $30. From a symposium, West Lafayette, IN.

**Introduction to Energy**. Resources, Technology, and Society. Edward S. Cassedy and Peter Z. Grossman. Cambridge University Press, New York, 1990. xii, 338 pp., illus. $60; paper, $27.95. Cambridge Energy Studies.

**Introduction to Polymer Dynamics**. Pierre Gilles de Gennes. Cambridge University Press, New York, 1990. viii, 58 pp., illus. $34.50; paper, $12.95. Lezioni Lincee. From a lecture series, Milan, Dec. 1986.

**Japan's World War II Balloon Bomb Attacks on North America**. Robert C. Mikesh. Smithsonian Institution Press, Washington, DC, 1990. Paper, $9.95. Smithsonian Annals of Flight, no. 9. Reprint, 1973 ed.

**The Journey From Eden**. The Peopling of Our World. Brian M. Fagan. Thames and Hudson, New York, 1990. 256 pp., illus., $22.50.

**Laboratory Health and Safety Handbook**. A. Guide for the Preparation of a Chemical Hygiene Plan. R. Scott Stricoff and Douglas B. Walters. Wiley, New York, 1990. xx, 330 pp., illus. $55. A Wiley-Interscience Publication.

**Psychoanalytic Theories of Development**. An Integration. Phyllis Tyson and Robert L. Tyson. Yale University Press, New Haven, CT, 1990. xvi, 398 pp. $35.

**The Quantum Statistics of Dynamic Processes**. E. Fick and G. Sauermann. Springer-Verlag, New York, 1990. xiv, 395 pp., illus. $79. Springer Series in Solid-State Sciences, 86. Translated from the German edition (Frankfurt, 1983) by William D. Brewer.

**The Secret World of Pandas**. Byron Preiss and Gao Xueyu, Eds. Abrams, New York, 1990. 80 pp., illus., + plates. Paper, $24.95. A Byron Press/New China Pictures Book.

**The Sociology of U.S. Agriculture**. An Ecological Perspective. Do E. Albrecht and Steve H. Murdock. Iowa State University Press, Ames, IA, 1990. viii, 249 pp., illus. $27.95.

**Thermochemistry of Alloys**. Recent Developments of Experimental Methods. H. Brodowsky and H.-J. Schaller. Kluwer, Boston, 1990. x, 574 pp., illus. $134. NATO Advanced Science Institute Series, vol. C286. From a study institute, Kile, F.R.G., Aug. 1987.

**The Universe and Its Origins**. From Ancient Myth to Present Reality and Fantasy. S. Fred Singer, Ed. Paragon, New York, 1990. x, 287 pp., illus. $34.95. An ICUS book.

**Visual Allusions**. Pictures of Perception. Nicholas Wade. Erlbaum, Hillsdale, NJ, 1990. x, 288 pp., illus. $42.95.

**Water Baby**. The Story of Alvin. Victoria A. Kaharl. Oxford University Press, New York, 1990. xii, 356 pp., illus. $21.95.

**Wild Malaysia**. The Wildlife and Scenery of Peninsular Malaysia, Sarawak and Sabah. Junaidi Payne. Photographs by Gerald Cubitt. MIT Press, Cambridge, MA, 1990. 208 pp., illus., + plates. $35.