ten chapters written by prominent jet researchers, is the first monograph devoted to astrophysical jets. Although most of the text focuses on extragalactic jets, one chapter deals with the phenomenology of stellar jets and others address topics of general significance for jet studies, such as collimation and stability. The critique of methods commonly used to interpret radio observations of jets is an important theme that dominates several chapters. In radio galaxies, jets are detectable only through their emission of synchrotron radiation, which depends on the distributions of magnetic field and energetic electrons. In order to estimate such basic quantities as pressures and densities inside jets, it has been necessary to construct chains of inference that are shaky at best, and that in some cases have been discredited. Direct measurements of jet velocities via Doppler shifts are impossible because synchrotron emission produces no spectral line features. We do not even know whether extragalactic jets are composed of ordinary electron-proton plasma or of electron-positron pairs (as is suggested by one theory of jet formation). The situation is not quite as bad for jets from "young stellar objects" (YSOs), since these appear to be relatively cool structures that emit both atomic and molecular lines.

Several chapters grapple with theoretical issues related to the production, collimation, and stability of jets. Theoretical obstacles to a comprehensive theory of jets are formidable, and these chapters emphasize the uncertainties as well as offer some tentative paths toward answers. For instance, Birkinshaw presents an excellent introduction to the theory of beam stability, illustrating from laboratory experience and linear calculations why jets are expected to be highly unstable. Yet they are observed to propagate over a range of distances encompassing nine orders of magnitude in scale. What is more disturbing, they often appear to bend through large angles without losing coherence. Can this be explained through the application of classical fluid dynamics, as Icke suggests, or is more subtle analysis required? The authors are remarkably circumspect about "selling" the latest trendy models, including those in which they have a personal stake. Thus, Eilek and Hughes expose the glaring gaps in our understanding of particle acceleration, and Birkinshaw uses specific examples to show that interpretations of "knots" and "wiggles" in jets in terms of unstable modes usually do not work.

The book does have its idiosyncrasies and omissions. For example, Icke's elegant discussion of classical fluid mechanics is not balanced by a correspondingly detailed discussion of the possible role of magnetic fields in jet propagation, which many researchers suspect to be crucial. Williams's chapter on numerical simulations neatly summarizes his groundbreaking work at Cambridge but does not give adequate coverage to the important work done elsewhere. It also appears to have been completed too early to include the recent breakthroughs in magnetohydrodynamic simulations.

On the whole, the evenness of the book's level and tone is a tribute to Philip Hughes's editorial skills. Although the book seems to be aimed at the practicing astrophysicist who wishes to get up to speed on the subject of jets, the treatment of technical issues is sufficiently discursive that the book could be used as a graduate text. Thorough cross-referencing among chapters and two useful indexes are welcome features. I note only one failing in Hughes's leadership of this project. Despite his plea that the term *jet* be used to refer only to the morphological feature on the sky and *beam* to denote the physical object, he has not managed to enforce this terminology even in his own book. Birkinshaw obeys, but Leahy, Icke, Williams, and Wiita all use the term *jet* with abandon. I suppose I will continue to do the same.

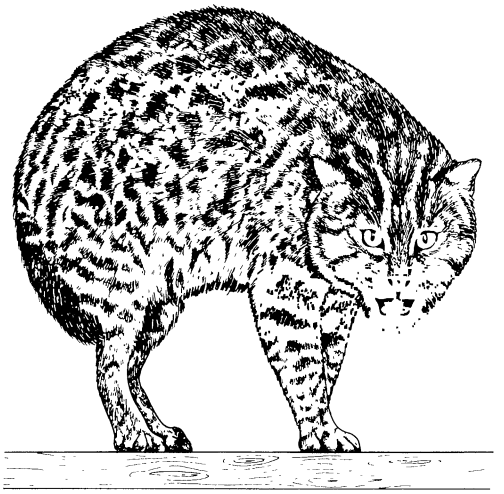
MITCHELL C. BEGELMAN
*Joint Institute for Laboratory Astrophysics, University of Colorado, Boulder, CO 80309–0440*

## Catness

**The Natural History of the Wild Cats.** ANDREW KITCHENER. Comstock (Cornell University Press), Ithaca, NY, 1991. xxii, 280 pp., illus., + plates. $27.50. Natural History of Mammals Series.

The publication of R. F. Ewer's *The Carnivores* (Cornell University Press) in 1973 was a watershed in our understanding of the Carnivora, coupling Ewer's vast personal knowledge of the group with a first comparative synthesis of available information. For those interested in the Felidae, C. A. W. Guggisberg's *Wild Cats of the World* (Taplinger) followed in 1975, and that descriptive work remains a very useful summary of the older and largely anecdotal literature about the felids. With these earlier works as a starting point, Andrew Kitchener has placed virtually all recent behavioral and ecological studies on cats in a broad comparative perspective. In fact, nearly 80 percent of his 420 references were published after 1973. The result is a quick and perceptive entrée for anyone interested in cats.

Nearly anyone can identify a cat as a cat, be it a 250-kilogram lion or a 2-kilogram rusty-spotted cat, because the cats are all so similar in form. But beyond this easy recognition of morphotype (confused only by the fossa, a cat-like civet from Madagascar), the systematics of the Felidae is troubled. There is a thin fossil record, especially for the smaller forms; there are very few specimens for some species from remote localities; and there is considerable intraspecific variation in some widely distributed species. In addition, experts disagree on how to classify island, disjunct, and holarctic forms. In sum, the systematics of the cats is a mess. After describing what makes a cat a cat and sketching the origins of the group, Kitchener proceeds to lead the reader out of the woods, using the felid "lineages" recently identified and described through molecular means by Stephen O'Brien and his colleagues at the National Cancer Institute. Kitchener does yeoman service in gleaning from a diverse and sometimes arcane literature information on body size, conservation status and legal protection, life history parameters, food habits, hunting success rates, densities and home-range size, and various other topics. Presented in tabular form, these data are useful for specialists and those engaged in broad syntheses but do not detract from the flow of the text, because the author tells you what he thinks it all means. Kitchener necessarily focuses his discussion of behavioral development on domestic cats because that is where the work has been done. His discussion of the social organization of wild cats is limited to what has been learned about the large and medium-sized forms, such as the lion, puma, cheetah, ocelot, serval, and lynxes, because these are the species we know something about. Apart from the remarkable studies on the Iriomote cat, the small cats remain virtually unstudied in the wild.



"A medium intensity threat by a Fishing cat." [From *The Natural History of the Wild Cats*, after Novak and Paradiso, 1983]

To a cat specialist, it is obvious that Kitchener is not a specialist. He fails in his knowledge of wild cat lore. For example, he reports there were 140,000 tigers in India at the turn of the century and now there may be 4000. Some tiger specialists insist the turn-of-the-century figure is 40,000. On the other hand, no one really knows how many tigers there were in 1900. The point is there were a lot and now there are very few. I was disappointed to see that Kitchener missed the pioneering work on snow leopards by Rodney Jackson and his associates and that he did not include the recent and rapidly expanding literature on reproductive physiology in wild cats. Further, his section on cat conservation seems weak. But cat specialists are in a quandary on the best approaches to saving some of these species, so this is difficult to fault. In sum, Kitchener's is a valiant attempt to master a difficult subject.

JOHN SEIDENSTICKER
*National Zoological Park, Smithsonian Institution, Washington, D.C. 20008*

## Books Received

**Adverse Effects of Pertussis and Rubella Vaccines**. A Report of the Committee to Review the Adverse Consequences of Pertussis and Rubella Vaccines. Christopher P. Howson, Cynthia J. Howe, and Harvey V. Fineberg, Eds. National Academy Press, Washington, DC, 1991. xiv, 367 pp., illus. $39.95.

**Algal Cell Motility**. Michael Melkonian, Ed. Chapman and Hall (Routledge, Chapman and Hall),- New York, 1992. viii, 236 pp., illus. $45. Current Phycology, 3.

**Astrophysical Formulae**. A Compendium for the Physicist and Astrophysicist. Kenneth R. Lang. 2nd ed. Springer-Verlag, New York, 1991. xxx, 783 pp., illus. $49. Springer Study Edition.

**The Basal Forebrain**. Anatomy to Function. T. Celeste Napier, Peter W. Kalivas, and Israel Hanin. Plenum, New York, 1991. x, 489 pp., illus. $110. Advances in Experimental Medicine. and Biology, vol. 295. From a conference, Chicago, May 1990.

**Basics of Interferometry**. P. Hariharan. Academic Press, San Diego, CA, 1991. xviii, 213 pp., illus. $39.95.

**Belonging to the Universe**. Explorations on the Frontiers of Science and Spirituality. Fritjof Capra and David Steind-Rast with Thomas Matus. Harper Collins, New York, 1991. xvi, 217 pp. $18.95.

**Blood Cell Growth Factors**. Their Present and Future Use in Hematology and Oncology. Martin J. Murphy, Jr., Ed. AlphaMed, Dayton, OH, 1991. viii, 238 pp., illus. Paper, $89. From a symposium, Beijing, Aug. 1991.

**Cardiovascular Drugs and the Management of Heart Disease**. Gordon A. Ewy and Rubin Bressler, Eds. 2nd ed. Raven, New York, 1992.

**Catalog of the Colorado Flora**. A Biodiversity Baseline. William A. Weber and Ronald C. Wittmann. University Press of Colorado, Niwot, CO, 1992. xiv, 215 pp., illus. $34.95.

**Cell Biology of Extracellular Matrix**. Elizabeth D. Hay, Ed. 2nd ed. Plenum, New York, 1991. xviii, 468 pp., illus. $85.

**Chemically Induced Cell Proliferation**. Implications for Risk Assessment. Byron E. Butterworth *et al.*, Eds. Wiley-Liss, New York, 1991. xxiv, 547 pp., illus. $115. Progress in Clinical and Biological Research, vol. 369. From a conference, Austin, TX, Nov. 1989.

**Death, Dying and Society**. Craig Newnes, Ed. Published for the Psychology and Psychotherapy Association by Erlbaum, Hillsdale, NJ, 1992. vi, 176 pp., illus. Paper, $19.95. Special issue of *Changes: An International Journal of Psychology and Psychotherapy*.

**Doing Simple Math in Your Head**. W. J. Howard. Coast Publishing, Coos Bay, OR, 1992. vi, 130 pp., illus. Paper, $9.95.

**Ecology of Estuaries**. Anthropogenic Effects. Michael J. Kennish. CRC Press, Boca Raton, FL, 1992. xiv, 494 pp., illus. $199.

**The Ecology of Fishes on Coral Reefs**. Peter F. Sale, Ed. Academic Press, San Diego, CA, 1991. xviii, 754 pp., illus. $69.95.

**Electricity and Magnetism**. W. N. Cottingham and D. A. Greenwood. Cambridge University Press, New York, 1992. xviii, 197 pp., illus. $54.95; paper, $19.95.

**Elementary Particles**. I. S. Hughes. 3rd ed. Cambridge University Press, New York, 1992. xxii, 431 pp., illus. $80; paper, $29.95.

**Existence and Explanation**. Essays Presented in Honor of Karel Lambert. Wolfgang Spohn, Bas C. van Fraassen, and Brian Skyrms, Eds. Kluwer, Norwell, MA, 1991. xii, 243 pp. $89. University of Western Ontario Series in Philosophy of Science, vol. 49.

**Farmer-Financed Irrigation**. The Economics of Reform. Leslie E. Small and Ian Carruthers. Published in association with the International Irrigation Management Institute by Cambridge University Press, New York, xiv, 233 pp., illus. $69.50.

**Farming in Nature's Image**. An Ecological Approach to Agriculture. Judith D. Soule and Jon K. Piper. Island Press, Washington, DC, 1992. xx, 286 pp. $34.95; paper, $19.95.

**Gases, Liquids and Solids**. And Other States of Matter. D. Tabor. 3rd ed. Cambridge University Press, New York, 1992. xxii, 418 pp., illus. $80; paper, $29.95.

**Gene Regulation**. Biology of Antisense RNA and DNA. Robert P. Erickson and Jonathan G. Izant, Eds. Raven, New York, 1991. xx, 364 pp., illus. $75. Raven Press Series on Molecular and Cellular Biology, vol. 1.

**Genetics and Breeding of Ornamental Species**. J. Harding, F. Singh, and J. N. M. Mol, Eds. Kluwer, Norwell, MA, 1991. vii, 429 pp., illus. $145. Current Plant Science and Biotechnology in Agriculture, vol. 11.

**Herbivores**. Their Interactions with Secondary Plant Metabolites. Vol. 1, The Chemical Participants. Gerald A. Rosenthal and May R. Berenbaum, Eds. 2nd ed. Academic Press, San Diego, CA, 1991. xii, 468 pp., illus. $99.

**The Homosexualities and the Therapeutic Process**. Charles W. Socarides and Vamik D. Volkan, Eds. International Universities Press, Madison, CT, 1991. xii, 315 pp. $40.

**The Ideas of Particle Physics**. An Introduction for Scientists. G. D. Coughlan and J. E. Dodd. 2nd ed. Cambridge University Press, New York, 1992. xii, 244 pp., illus. $59.95; paper, $27.95.

**Images of the Universe**. Carole Stott, Ed. Cambridge University Press, New York, 1992. viii, 235 pp., illus. $54.95; paper, $24.95.

**Immunochemical Assays and Biosensor Technology for the 1990s**. Robert M. Nakamura, Yasushi Kasahara, and Garry A. Rechnitz, Eds. American Society for Microbiology, Washington, DC, 1992. x, 411 pp., illus. $51; to ASM members $43.

**Journey to the Center of Our Galaxy**. A Voyage in Space and Time. Joel Davis. Contemporary Books, Chicago, 1991. xvi, 335 pp., illus., + plates. $22.95.

**Kidney Failure and the Federal Government**. Richard A. Rettig and Norman G. Levinsky, Eds. National Academy Press, Washington, DC, 1992. xiv, 426 pp., illus. $49.95.

**Laser Applications in Medicine and Biology**. Vol. 5. Myron L. Wolbarsht. Plenum, New York, 1991. xvi, 371 pp., illus. $95.

**Lymphatic Tissues and In Vivo Immune Responses**. Beat A. Imhof, Sonia Berrih-Aknin, and Sophie Ezine, Eds. Dekker, New York, 1991. xxii, 1007 pp., illus. $195. From a conference, Compiégne, France, July 1990.

**Maasailand Ecology**. Pastoralist Development and Wildlife Conservation in Ngorongoro, Tanzania. K. M. Homewood and W. A. Rodgers. Cambridge University Press, New York, 1992. xiii, 298 pp., illus. $89.95. Cambridge Studies in Applied Ecology and Resource Management.

**MacMath 9.0**. A Dynamical Systems Software Package for the Macintosh. John H. Hubbard and Beverly H. West. Springer-Verlag, New York, 1991. viii, 162 pp., illus., + plates + floppy disk. Paper, $49.95.

**Nets, Terms and Formulas**. Three Views of Concurrent Processes and Their Relationship. E.-R. Olderog. Cambridge University Press, New York, 1992. x, 267 pp., illus. $49.95. Cambridge Tracts in Theoretical Computer Science, 23.

**Neural Networks for Perception**. Harry Wechsler, Ed. Academic Press, San Diego, CA, 1992. 2 vols. Vol. 1, Human and Machine Perception. xxii, 520 pp., illus. $59.95. Vol. 2, Computation, Learning, and. Architectures. xx, 363 pp., illus. $49.95.

**Organic Chemistry**. T. W. Graham Solomons. 5th ed. Wiley, New York, 1992. xxx, 1198 pp., illus., + index. $64.95.

**Organic Photochemistry**. A Visual Approach. Jan Kopecky. VCH, New York, 1992. x, 285 pp., illus. $65. Translated from the Czech.

**The Origins of Southwestern Agriculture**. R. G. Matson. University of Arizona Press, Tucson, 1991. xvi, 356 pp., illus. $55.

**Perspectives in Chemical Engineering**. Research and Education. Clark K. Colton, Ed. Academic Press, San Diego, CA, 1991. xvi, 606 pp., illus. $99.50. Advances in Chemical Engineering, vol. 16.

**Phylogenetic Analysis of DNA Sequences**. Michael M. Miyamoto and Joel Cracraft, Eds. Oxford University Press, New York, 1991. x, 358 pp., illus. $45.

**Physician Staffing for the VA**. Vol. 1. Joseph Lipscomb, Ed. National Academy Press, Washington, DC, 1992. xvi, 414 pp., illus. $39.95.

**Physics of the Plasma Universe**. Anthony L. Peratt. Springer-Verlag, New York, 1992. xii, 372 pp., illus. $79.

**Quasi-Symmetric Designs**. Mohan S. Shrikhande and Sharad S. Sane. Cambridge University Press, New York, 1992. xvi, 225 pp., illus. Paper, $29.95. London Mathematical Society Lecture Note Series, 164.

**Recapturing Anthropology**. Working in the Present. Richard G. Fox, Ed. School of American Research Press, Santa Fe, NM, 1992 (distributor, University of Washington Press, Seattle). x, 248 pp., illus. $35; paper, $15.95. SAR Advanced Seminar Series.

**Research Directions in Cognitive Science**. Vol. 3, European Perspectives. Jens Rasmussen, Henning B. Andersen, and Niels Ole Bernsen, Eds. Erlbaum, Hillsdale, NJ, 1991. xvi, 217 pp., illus. $45.

**Rethinking the Neolithic**. Julian Thomas. Cambridge University Press, New York, 1992. xvi, 212 pp., illus. $54.50. New Studies in Archaeology.

**Risk and Rationality**. Philosophical Foundations for Populist Reforms. K. S. Shrader-Frechette. University of California Press, Berkeley, 1992. x, 312 pp., illus. $39.95; paper, $15.95.

**Self-Understanding in Childhood and Adolescence**. William Damon and Daniel Hart. Cambridge University Press, New York, 1992. xii, 205 pp. $32.50; paper, $14.95. Cambridge Series in Social and Emotional Development. Reprint, 1988 ed.

**Serving Survivors of Torture**. Glenn R. Randall and Ellen L. Lutz. American Association for the Advancement of Science, Washington, DC, 1991. xvi, 199 pp., illus. Paper, $18; to members, $16. Reports on Health and Human Rights.

**Temperament, Character and Personality**. Biobehavioral Concepts in Science, Art and Social Psychology. P. V. Simonov and P. M. Ershov. Gordon and Breach, Philadelphia, PA, 1991. vi, 166 pp. $52. Monographs in Psychobiology, vol. 5. Translated from the Russian edition (Moscow, 1984).

**The Tinbergen Legacy**. M. S. Dawkins, T. R. Halliday, and R. Dawkins, Eds. Chapman and Hall (Routledge, Chapman and Hall), New York, 1992. xii, 146 pp., illus. $57.50. From a conference, Oxford, UK, March 1990.

**Understanding Social Science Statistics**. A Spreadsheet Approach. Roger Bakeman. Erlbaum, Hillsdale, NJ, 1992. xvi, 450 pp., illus., + disks. $79.95; paper, $34.50.

**Understanding the Eastern Caribbean and the Antilles**. With Checklists Appended. Nelson Marshall. Th'Anchorage, St. Michaels, MD, 1992. xvi, 252 pp., illus. Paper, $17.95.

**Vaccines**. New Approaches to Immunological Problems. Ronald W. Ellis, Ed. Butterworth-Heinemann, Stoneham, MA, 1992. xviii, 478 pp., illus. $95. Biotechnology Series, 20.

**Variable Star Research**. An International Perspective. John R. Percy, Janet Akyuz Mattei, and Christiaan Sterken, Eds. Cambridge University Press, New York, 1992. xiv, 329 pp., illus. $49.95. From a symposium, Brussels, July 1990.

**The World of René Dubos**. A Collection from His Writings. Gerard Piel and Osborn Segerberg, Jr., Eds. Holt, New York, 1992. xxvi, 418 pp., illus. Paper, $16.95. Reprint, 1990 ed.

**World Views and Scientific Discipline Formation**. Science Studies in the German Democratic Republic. William R. Woodward and Robert S. Cohen, Eds. Kluwer, Norwell, MA, 1991. xvi, 462 pp., illus. $128. Boston Studies in the Philosophy of Science, vol. 134. From an institute, Berlin, June 1988.