that emphasis was on the ionized gas around active nuclei and the ultraviolet continuum that excites it. A balanced approach is essential in this field; as Weedman recognizes, in a chapter on the evolution of active galactic nuclei and quasars, there is "distressing proof to the observer of how our perception of quasar evolution depends on the tools of the beholder." As an example, more newly discovered Seyfert galaxies are likely to appear in the Infrared Astronomy Satellite catalog than in Markarian's optical catalogs because of the frequent association between active galactic nuclei and dusty star formation regions that can hide much of the optical emission.

The workshop went on for two weeks; there was thus time to discuss the subject in great detail—so much detail in fact that no one present at the proceedings seemed willing or able to provide the traditional conference summary. I think that Miller's decision to ask 21 of the participants to collect all the information into 14 chapters was a good one, considerably more useful than providing a copy of each of the individual presentations. The informal atmosphere of the meeting itself, free of the necessity to constrain presentations to what would definitely be converted to print, was conducive to the generation and exchange of ideas.

With but a few exceptions, the chapters that appear in the book are much better than the original presentations by the same authors at the workshop. The authors clearly learned a lot from each other and the participants and had time to think after everyone left Santa Cruz; as a result they have succeeded in passing on a very useful summary of the field.

At the workshop itself I most enjoyed a presentation by Elvis of the Einstein data on x-ray spectra; the quality of this presentation carries over into a chapter by Elvis and Lawrence. They highlight the striking uniformity of the hard x-ray spectra of objects discovered by x-ray techniques, the complete lack of such uniformity in the x-ray spectra of objects discovered at other wavelengths, and the diversity of soft x-ray spectra. X-ray astronomers, like radio astronomers a decade earlier, took a little time to realize that all quasars do not have canonical power-law spectra of slope $F_\nu \alpha \nu^{-0.7}$. The variety of slopes points to a possible variety of mechanisms for generating x-ray spectra. A masterly discussion of the iron spectrum by Netzer at the workshop is not included in the book. Very clear presentations by Malkan and Fillipenko at the workshop concerning the blue bump and the correlation of line width with ionization parameter are also not included. These two important contributions provided a great deal of insight into the likely structure close to the central engine and the immediately surrounding emission-line region.

Of the papers in the book, I enjoyed Weedman's "worked examples" of quasar evolution models—particularly his graphical presentation of the degree to which the shape of the expected redshift distribution is sensitive to limiting magnitude. I have suggested elsewhere that the drop in broadband magnitude across Lyα may scale roughly as $Z - 2$; that is, 0.5 mag at redshift $Z = 2.5$, 1.5 mag at $Z = 3.5$. When Weedman's graphs (or similar ones that Carswell and I published some years ago) and a simple plausible spectral effect like this are combined, the expected numbers of objects per field near $Z = 3.5$ can easily be less than at $Z = 2.0$ by a factor of 50 yet indicate no falling off the intrinsic luminosity or actual space density beyond $Z = 3.5$. Detailed arguments about redshift cutoffs in the optical range are extremely sensitive to the effects of selection. Hazard and Dunlop have suggested other evolutionary effects, including a tendency toward weaker emission lines and more nearly stellar color at very high redshifts. Weedman has correctly highlighted the study of the luminosity function at high redshifts as a fruitful subject for study during the next few years.

A paper by Begelman on accretion disks in active galactic nuclei is a particularly useful one for the observer, who is continually aware that he or she is merely chipping away from the outside, not very clear about what is happening in the middle, while the theorist is happily trying to find some direct relation between black holes and accretion flows and the fog of currently observable events around them being provided by the "DEO (Donald E. Osterbrock?) ex machina." Begelman clearly describes different modes of accretion with characteristic spectral properties and radiative efficiencies.

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Some Other Books of Interest

The Quaternary History of Ireland. KEVIN J. EDWARDS and WILLIAM P. WARREN, Eds. Academic Press, Orlando, FL, 1985. xxii, 382 pp., illus. $65.

Though the visible landscape of Ireland provides many tantalizing glimpses of its origins, say Edwards and Warren, "we remain largely ignorant of events for perhaps 90% of the Irish Quaternary sequence." This book begins with an account by Edwards and Warren of the history of Quaternary studies in Ireland, which date to Louis Agassiz's 1840 demonstration of evidence of glaciation. The account concludes with "a selected discussion of current views." A chapter by Mitchell on the preglacial landscape is followed by one by Warren in which he proposes a stratigraphic interpretation of the Quaternary sediments of Ireland. Other chapters cover glacial geomorphology, about which little is known (McCabe), periglacial features, which are widespread in Ireland (Lewis), the evolution of the coastline (Synge), the formation of soils (Culleton and Gardiner), vegetation cycles (Watts), vegetational evidence of anthropogenic activity (Edwards), Quaternary vertebrates (Stuart and van Wijngaarden-Bakker), prehistoric settlement (Woodman), the placing of Quaternary events in a chronology (Edwards *et al.*), and economic applications of Quaternary studies (Warren *et al.*). The chapters were refereed, but no attempt was made "to harmonize opinions," for the editors hoped that by including differences of opinion they would "stimulate further research aimed at resolving the many outstanding problems" in the field.—L.H.

Meteorites. Their Record of Early Solar-System History. JOHN T. WASSON. Freeman, New York, 1985. x, 267 pp., illus. $29.95.

Meteorites, Wasson notes, are our chief source of information about the earliest period of solar system history. He intends this book as a textbook for "a general course covering meteoritic evidence regarding the formation and early evolution of the solar system." The book begins with a discussion of the orbits of meteorites, phenomena associated with the fall of meteorites, craters created by the impact of meteorites, and the recovery of meteorites. A chapter on the classification of meteorites is followed by one on the age and isotopic composition of meteorites and isotopic anomalies in some meteorites that offer clues about the nature of presolar matter. Evidence for and against the hypothesis that iron meteorites are fragments of the cores of small planets is considered in the next chapter. The remaining chapters deal with the igneous formation of silicate-rich meteorites, models of solar system formation, evidence that chondritic meteorites formed in the solar nebula, nebula fractionation processes recorded in chondrites, and the relationship of meteorites to the planets, asteroids, and comets. Each chapter contains an annotated list of suggested readings. Nine appendixes cover such subjects as meteorite classification, units and constants, rudiments of celestial mechanics, and how to recognize meteorites.—L.H.

Animal Cell Biotechnology. R. E. SPIER and J. B. GRIFFITHS, Eds. Academic Press, Orlando, FL, 1985. In two volumes, Vol. 1, xviii, 347 pp., illus. $55. Vol. 2, xx, 475 pp., illus. $66.

These two volumes are intended to provide the newcomer with "many details about how to set up and operate cell cultures in a variety of ways and at scales ranging between 0.001 and 10,000 litres" and the specialist with "a well-referenced and well-indexed state-of-the-art report." The contributors, most of whom are British or French, were asked to provide "a balanced, thoughtful and fair assessment of alternative methods to achieve particular ends," but the editors warn that the reader "will have to contend with the clear enthusiasm of one or another of the various contributors."

Volume 1 contains 13 chapters divided into sections on the basic components of cell culture systems and the mass cultivation and production of cells, with chapters on the cultivation of animal cells in continuous-flow culture, various processes in monolayer growth systems, the measurement and control of physical and chemical parameters, and computer applications in animal cell biotechnology.

Volume 2 contains 17 chapters divided into sections on the generation of cell culture products such as lymphocyte hybridomas and insect-pathogenic viruses, the processing of products (clarification and sterilization, inactivation of viruses, purification, concentration, fractionation, and storage), and the testing of products. The volume concludes with a section on genetic engineering and the future of animal cell biotechnology.—L.H.

Books Received

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Contact Mechanics. K. L. Johnson. Cambridge University Press, New York, 1985. xii, 452 pp., illus. $89.50.

The Crab Nebula and Related Supernova Remnants. Minas C. Kafatos and Richard B. C. Henry, Eds. Cambridge University Press, New York, 1985. xvi, 285 pp., illus. $39.50. From a workshop, Fairfax, VA, Oct. 1984.

Creativity in Science. A Symposium. Mudundi R. Raju, James A. Phillips, and Francis Harlow, Eds. Los Alamos National Laboratory, Los Alamos, NM, 1985 (available from National Technical Information Service, Springfield, VA). xviii, 127 pp., illus. Paper, $14.50. From a colloquium and a symposium, Los Alamos, March and Aug. 1984. LA-10490-C. UC-13.

Culture and Depression. Studies in the Anthropology and Cross-Cultural Psychiatry of Affect and Disorder. Arthur Kleinman and Byron Good, Eds. University of California Press, Berkeley, 1985. xii, 535 pp. $45.

The Culture-Bound Syndromes. Folk Illnesses of Psychiatric and Anthropological Interest. Ronald C. Simons and Charles C. Hughes, Ed. Reidel, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, MA). xvi, 516 pp. $69.

The Ecology and Management of African Wetland Vegetation. A Botanical Account of African Swamps and Shallow Waterbodies. Patrick Denny, Ed. Junk, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, MA). xii, 344 pp., illus. $78.50. Geobotany, vol. 6.

Gas-Phase Chemiluminescence and Chemi-Ionization. Arthur Fontijn, Ed. North-Holland, Amsterdam, 1985 (U.S. distributor, Elsevier, New York). xii, 372 pp., illus. $40.75. Based on a symposium, Philadelphia, Aug. 1984.

Gender and Personality. Current Perspectives on Theory and Research. Abigail J. Stewart and M. Brinton Lykes, Eds. Duke University Press, Durham, NC, 1985. vi, 325 pp. Paper, $14.95. Originally published as *Journal of Personality*, vol. 53, no. 2.

General Concepts for the Dosimetry of Internally Deposited Radionuclides. Recommendations. National Council on Radiation Protection and Measurements, Bethesda, MD, 1985. viii, 109 pp., illus. Paper, $12. NCRP Report no. 84.

General Relativity. An Introduction to the Theory of the Gravitational Field. Hans Stephani. John Stewart, Ed. Cambridge University Press, New York, 1985. xvi, 298 pp., illus. Paper, $24.95. Translated from the German edition (Berlin, 1980) by Martin Pollock and John Stewart. Reprint, 1982 edition.

Genetics and The Law III. Aubrey Milunsky and George J. Annas, Eds. Plenum, New York, 1985. xx, 514 pp. $42.50. From a symposium, Boston, April, 1984.

Interaction Structure and Strategy. Starkey Duncan, Jr., and Donald W. Fiske. Cambridge University Press, New York, and Editions de la Maison des Sciences de l'Homme, Paris, 1985. xx, 342 pp. $39.50. Studies in Emotion and Social Interaction.

Interaction Theory in Forest Ecology and Management. Rolfe A. Leary. Nijhoff/Junk, Dordrecht, 1985. x, 219 pp., illus. $39.50. Forestry Sciences.

Interactions Between Electromagnetic Fields and Cells. A. Chiabrera, C. Nicolini, and H. P. Schwan, Eds. Plenum, New York, 1985. xiv, 639 pp., illus. $95. NATO Advanced Science Institutes Series A, vol. 97. From a workshop, Erice, Sicily, Sept. 1984.

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