time, so that there were many more in the past. W. L. W. Sargent reported on a large survey of metal-line systems that showed that they cluster much as present-day galaxies cluster: further evidence that they arise in galaxies like our own. D. Turnshek, C. B. Foltz *et al.*, and J. P. Ostriker discussed how QSOs themselves affect their immediate environment, in some cases spewing forth clouds of material, in other cases merely altering existing clouds with their intense radiation. A. M. Wolfe and F. H. Briggs summarized their long-term study of the "damped Lyman-α" systems, metal-line systems that arise in the disks of early spiral galaxies. The most controversial results were presented by D. Tytler, who argued that there are not two fundamentally different types of clouds but a single population with a continuous distribution of cloud sizes, hydrogen column densities, and metallicities. Two years later, this controversy is still unresolved, and there remains persuasive evidence for both views.

One good feature of this book is that verbatim transcripts of the discussions are included, giving a sense of the stimulating atmosphere of the conference. An unfortunate feature is that only the review talks are included, with the contributed papers issued separately in a preprint that has not been widely circulated. (This reviewer has been unable to get a copy despite numerous requests.) The contributed papers are liberally referred to in the review talks and in many cases report the newest and most influential ideas and results. Still, this book provides a good starting point for students and researchers seeking an introduction to the subject.

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Postmortems

Recent Vertebrate Carcasses and Their Paleobiological Implications. JOHANNES WEIGELT. University of Chicago Press, Chicago, 1989. xviii, 188 pp. + plates. $60; paper, $19.95. Translated from the German edition (Leipzig, 1927) by Judith Schaefer.

Death, decay, decomposition, putrefaction, destruction, burial—these are the subjects of a classic 60-year-old monograph by Johannes Weigelt now translated and accessible to a wide audience for the first time. Weigelt (1890–1948) was a pioneer of taphonomy (though he used the term *biostratinomy*). The German taphonomic tradition did not take root in North America (although Zangerl and Richardson's 1963 monograph on Pennsylvanian black shales was an outgrowth of that tradition). The taphonomy that is popular today follows the Russian tradition of I. Efremov, as introduced to the United States by E. C. Olson in 1962, which blossomed in the 1970s under the leadership of A. K. Behrensmeyer.

Weigelt reviews the processes of decomposition of vertebrate remains and provides an exhaustive classification of causes of death, with abundant examples of mass death (including lemmings in the sea, reindeer in lakes, massive fish kills due to changes in temperature and salinity, the ill effects of El Niño on marine life, and the effects of cold and drought on terrestrial life). He stresses the importance of the moisture content of the burial medium: when the medium is too dry, natural mummification occurs; when it is too moist, decomposition is also inhibited, and a natural anaerobic process of saponification occurs, resulting in a carcass in which the soft parts are preserved as *adipocere*. Macabre examples of these two phenomena include mummies of knights in castle towers and in cathedral crypts and the undecomposed corpses in the Cemetery of the Holy Innocents in Paris. Weigelt recounts his observations of carcasses of cows, turtles, alligators, and garfishes that were killed by severe winter cold at Smithers Lake along the Texas Gulf Coast in December 1924, an event that claimed 1.25 million cattle. He tracks decomposition unflinchingly with an extensive series of photographs taken over a ten-month period. He demonstrates the relevance of the Texas carcasses for interpreting fossil fish and tetrapod remains.

Many of the themes of Weigelt's work (the role of insects in decomposition; burial of land vertebrates in marine strata; carcasses on facies boundary lines) have been discovered independently by modern workers. I am intrigued by his mention *en passant* of alligators regurgitating bone. It is well known that crocodilians have very low stomach *p*H and bone-free feces; thus paleontologists have discounted the role of crocodiles as agents of bone accumulation in the past. Is it possible that crocodiles faced with coarse, bony prey such as turtles and gars (rather than the dainty rodents of experimental studies) actually do regurgitate bone and thus may be agents of bone accumulation?

Conspicuously lacking in taphonomy today are studies of modern mass mortalities that can serve as models for the deposits that are so conspicuous in the fossil record. (We all know that wildebeests drown in great numbers when a herd crosses a river in flood, but who has ever studied the resultant carcasses?) Weigelt's book will serve as an indispensable resource and as a welcome stimulus for some much-needed basic research in taphonomy.

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Books Received

Alternative Life-History Styles of Animals. Michael N. Bruton, Ed. Kluwer, Norwell, MA, 1989. xviii, 617 pp., illus. $215. Perspectives in Vertebrate Science, vol. 6. From a conference, Grahamstown, South Africa, June 1987.

Arms Control and National Security. An Introduction. Arms Control Association, Washington, DC, 1989. vi, 176 pp., illus. Paper, $14.95.

Atmospheric Radiation. Theoretical Basis. R. M. Goody and Y. L. Yung. 2nd ed. Oxford University Press, New York, 1989. xvi, 519 pp., illus. $95.

Authority, Liberty, and Automatic Machinery in Early Modern Europe. Otto Mayr. Johns Hopkins University Press, Baltimore, 1989. xviii, 265 pp., illus. Paper, $16.95. Johns Hopkins Studies in the History of Technology. Reprint, 1986 ed.

The Awakening Desert. The Autobiography of an Israeli Scientist. Michael Evenari. Springer-Verlag, New York, 1989. xiv, 204 pp. + plates. Paper, $29.50. Translated from the German edition (Gerlingen, 1987).

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Darwin Without Malthus. The Struggle for Existence in Russian Evolutionary Thought. Daniel P. Todes. Oxford University Press, New York, 1989. x, 221 pp. + plates. $45. Monographs on the History and Philosophy of Biology.

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