

an integral approach that incorporates empirical and phenomenological viewpoints and ultimately values the partialness, but necessity of both.

David Lorimer has done a splendid job in introducing the subjective interpretation and in linking the various contributors to create a unified and meaningful whole. I highly recommend this book.

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An Instinct for Dragons by David E. Jones. New York: Routledge, 2000. 208 pp. \$24.95 (cloth). \$17.95 (paper). ISBN 0-4159-3729-9.

Dragons are a conundrum. As Jones observes in his introduction, virtually every human language has a word for the beast. "How can something so impossible exist in the art, mythology, religion, and legend of so many places?" This question is immediately followed by the admission that the dragon is not "impossible" in the context of our present understanding of marine dinosaurs, but "[t]hey cannot [be a] model for the dragon, because dinosaurs [are long] extinct . . . (p. 3)." Jones' thesis is summarized in his caption to Figure 2: "Three predators who most threatened our ancestors—the eagle, the leopard, and the snake—merge in mythology to become a single creature, the dragon." It occurred to him, he writes, while preparing notes for an undergraduate lecture on primate behavior in which the vervet monkey, which has three distinct alarm calls for the leopard, eagle, and python, served as an example.

The book consists of an introduction, seven chapters, two appendices (B rather more to the point than A), bibliography, and index. Chapters 1, 3, 4, and 5 begin with tautological restatements of the author's thesis. Despite these and other repetitions, and references to "Steven S." Gould (are editors extinct?), a variety of ideas are raised and discussed, primarily from an anthropological perspective. From a dragonological perspective, however, what stands out are the issues Jones fails to satisfactorily address: the implications of the aquatic nature of dragons in the context of a two-thirds-wet world; whether Mesopotamian representations of all manner of chimera are dragons or metaphors; whether pre-Colombian North American representations of the plumed serpent (mentioned in passing in Appendix B; not in the index) are relevant to dragonology; and what we are to make of eyewitness reports and multicultural representations that suggest biological reality rather than imperial metaphor.

Early on Jones confuses the issue of exactly what he thinks a dragon is by asserting that "the griffin . . . is an ancient type of dragon . . . or griffin-dragon (p.7)." A hundred and thirty pages later, "the chimera" is mentioned, once.

To the reviewer's knowledge, no chimera has previously been posited to be a dragon, rather than a metaphor for political power or hunting prowess. Indeed, apart from occasional wings (an attempt to represent paddle-like limbs? See Figures 8 and 37), there is nothing chimerical, in the biological sense, about dragons.

Jones proves the point with four of his thirty-nine figures, which to the reviewer's eyes redeem an otherwise almost-fatally-flawed dragonological monograph. But first, the bad news. The linkages between figures, text, and index are incomplete; "the most famous of western dragon slayers, [Saint?] George of Cappadocia" in the caption of Figure 9 is nowhere mentioned in the text, although there is an erroneous reference to "St. George" in the index. Beside three representations of menacing snake, raptor, and cat trios, fanciful illustrations from earlier books and of dragons hitched to wagons and carts, there is a grotesque misrepresentation of the Taung skull (Figure 16), upon which Raymond Dart erected *Australopithecus africanus*. Editor, where art thou?! Or is it her and, or Jones' (subconscious?) intention to graphically ridicule an "impossible" subject?

Of the four figures which bear careful consideration, the Mesopotamian (4) and the Chinese (31) representations are ancient and unambiguously aquatic. The long-necked, -bodied, and -tailed Eskimo representations (11 and 12) date from the nineteenth century; they show a quadruped three times the length of a caribou, and similar forms with six and eight limbs, ears, and a long snout with teeth and tongue. If one compares these Chinese and Eskimo representations to those offered by Swords (*JSE* 5:85, 1991) from the Pacific coasts of North and South America. and adds to the obvious resemblances the observation that "[w]e find scattered throughout the islands of the Pacific the familiar stories of the dragon (quoting Elliot-Smith, p. 15)," one is faced with only two real possibilities (neither mentioned by Jones). Either these are representations of a Jungian archetype of such uncanny precision, duration, and distribution as to suggest that the collective unconscious is realer than some can bring themselves to imagine, or they are practically indistinguishable from representations of a real zoological denizen of the Pacific over two or more millennia.

If the reader detects a note of exasperation, it should be said that this is due only in part to the analytical and editorial infelicities of *An Instinct for Dragons*. If one compares the bibliographies of Swords (35 entries) and Jones (158 entries), one finds three entries in common: Charles Gould's *Mythical Monsters* (1886/1989), Bernard Heuvelmans' *In the Wake of the Sea-Serpents* (1969/1986), and Grafton Smith's (Elliot-Smith in Jones) *The Evolution of the Dragon* (1919). Jones mentions Mackal's expedition to the Congo, but not his *Searching for Hidden Animals* (1980). There is no mention of Swords, perhaps because "dragon" occurs only in a single paragraph.

It is not the reviewer's intention to suggest that the bibliography of one of these college professors is better than the other, but rather that these bibliographies passing in the night, so to speak, suggest that dragonology is, like ufol-

ogy, "an immature field . . . where the normal give and take of scientific debate [may be] severely biased by selective citing of the evidence (Vallee, *JSE* 15:403, 2001)."

A solution to this problem, given the apparent demise of the journal *Cryptozoology* and the Society which published it, might be for the Society for Scientific Exploration to encourage the formation of a College of Dragonology under its aegis. As a practical matter, the first step might be the preparation of an authoritative syllabus (drafted by Student Members?), to be published and perhaps debated in *JSE*. That accomplished, a dragonological symposium—for which interested members could do some homework with the syllabus—might then be part of an annual meeting, with invitations to present papers issued first to all the extant dragonologists as reflected in the syllabus. This approach presupposes that a basic level of collegiality, without which scientific progress is virtually impossible, might be achieved in this case with a relatively modest effort.

Jones writes that "dragons [are] almost universally associated with water, especially deep pools and wells (p. 90)," yet he makes no mention of the sea in his analysis of this facet! Swords suggests his subject "is a 'candidate for reality' . . . due to . . . the easy potential of the sea to spawn, nurture, and hide such spectacular forms." If one finds the latter view preferable in light of Jones' and Swords' data, as does the reviewer, then the enormity of the dragons' potential habitat, and our relative ignorance of it, are obvious. Reportedly, we have better topographic data for the surface of Mars than for the ocean basins of Earth. The question of the biological reality of dragons arises in a geographical context which, coincidentally, offers the greatest opportunities for further earthly exploration.

Despite Jones' failure to engage the most obvious alternative hypothesis, he dutifully presents, in addition to the four figures, evidence of a global, marine phenomenon. *Draco* is, throughout South Asia, *makara* (p. 9). And while the phenomenon appears to diminish with the advance of steam power in the nineteenth century, and all sorts of noisy marine propulsion in the twentieth, it is not completely extinguished:

On July 30, 1915 . . . a German submarine . . . torpedoed [a] British steamer [in the Irish Sea, after which] a huge underwater explosion blasted a gigantic, writhing monster out of the sea . . . [I]t was about 60 feet long and shaped like a crocodile, with a long pointed tail and four limbs with powerful webbed feet (p. 147).

What was it? Probably not, in this particular case, a whale from the early Tertiary, but that leaves at least four other possibilities. Current paleontology finds that mosasaurs and pliosaurs were among the major marine predators up to the K-T boundary, and plesiosaurs and crocodiles were marine predators which appear, on the basis of the absence of evidence, to decline tens of millions of years prior to the K-T event. All in all, a fascinating subject and a thought-provoking read, but I remain unconvinced that human nature includes

an instinct for the representation and description of imaginary, or chimerical, dragons.

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Permissible Dose: A History of Radiation Protection in the Twentieth Century by J. Samuel Walker. Berkeley, CA: University of CA Press, 2000. xii + 168 pp. ISBN 0-520-22328-4.

This book is so biased that it does not even admit the possibility of benefits from low-dose radiation (radiation hormesis), which is one of the best established alternative treatments (Kauffman 2003).

As the historian of the US Nuclear Regulatory Commission (NRC), Walker probably wrote an accurate record of what the NRC, its peers, and its antecedents did to protect us from excess radiation. Moreover, the writing is outstandingly clear, perfectly edited, and well-organized, mainly chronologically, and has footnotes to sources that appear in the best academic tradition.

The NRC is to be congratulated on its successful protection of the public, except for accidental individual blunders in industrial or medical practice. It may feel proud of resisting the excessive demands of the EPA, John W. Gofman, MD, PhD, and self-styled environmental groups, and certainly did not cave in to the opposing demands of industry and medicine. The book's undesirable aspects are the rationalizations for the NRC's positions and recommendations.

One of the reasons for public panic about radiation is exemplified by this quotation: "... a radiological accident has no definite end; uncertainty about the long-term effects of exposure continues. Invisible contaminants remain a part of the surroundings ... An "all clear" is never sounded." Walker does not think the NRC bears any responsibility for the myth that all radiation exposures are risky, and thus has contributed to unfounded fears (p. 146) because eventually the level of exposure would be in the beneficial (hormetic) range until it dropped below even that. The linear no-threshold (LNT) extrapolation from high doses is justified throughout the book despite overwhelming evidence of its failure to account for observations (Kauffman 2003).

Of the hundreds of journal articles and books reporting or reviewing radiation hormesis (Luckey, 1991), not one is cited. Of the 4500 individual examples of hormesis (Hively, 2002), not one is cited. Of the dozens of reviews in peer-reviewed journals by respected scientists, specifically T. D. Luckey, E. J. Calabrese, B. L. Cohen, J. M. Cuttler, M. Pollycove, L. E. Feinendegen, K. L. Mossman, A. C. Upton, and S. Wolff, among others, not one is cited. After admitting only that "controversy" exists over the biological effects of low doses many times, Walker gives one token quotation based on newspaper and magazine articles by Myron Pollycove, and even this may have been