*Journal of Paleontology*, 91(6), 2017, p. 1341

0022-3360/17/0088-0906
doi: 10.1017/jpa.2017.108

JOURNAL OF PALEONTOLOGY
A PUBLICATION OF THE Paleontological SOCIETY

# Awards and Citations

# Presentation of the 2015 Schuchert Award of the Paleontological Society to Jonathan Payne

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It is both a privilege and a great pleasure to introduce this year's Schuchert awardee, Jonathan Payne. I first met Jon about sixteen years ago, when, as a high school science teacher not far removed from his undergraduate training at Williams College, he visited my lab to talk about Ph.D. programs. Even then, Jon didn't need me to suggest research topics—he liked big questions in life's history, he really liked mass extinction, and he absolutely loved the end-Permian mass extinction. And already at this early stage of his professional development, Jon understood that paleobiological and geologic data could be integrated to illuminate evolutionary history.

Fortunately for me, Jon joined our lab the following fall and quickly established a research trajectory that, fifteen years later, continues on a strongly positive arc. With minimal guidance from me, Jon started to think both quantitatively and creatively about the end-Permian extinction and its aftermath. For example, while others had noted anecdotally Permo-Triassic reduction in body size, Jon quantified this for gastropods, providing a numerical baseline for subsequent studies of extinction and recovery. With the generous help of Dan Lehrmann, Jon also began a continuing field program on the Great Bank of Guizhou in South China, establishing a stratigraphic framework that allowed him to quantify latest Permian and Early Triassic species richness and skeletal abundance across an environmental gradient from lagoon to basin. Earlier geochemical research had established that end-Permian extinction was accompanied by a substantial carbon isotopic excursion, but by continuing chemostratigraphic research up to the Middle Triassic, Jon showed that the end-Permian event was only the first of four negative excursions that collectively document the instability of Early Triassic carbon cycling. In general, Jon came to realize the extinction itself was act one in a three act play that ended only with the mid-Triassic return of diverse, ecologically and biogeochemically stable marine ecosystems.

In a brief postdoc with Lee Kump, Jon added biogeochemical modeling to his tool kit, writing a provocative (in the best possible sense) paper that linked Triassic carbon cycle instability to continuing episodic volcanism and advancing the case, now increasingly well supported, for an extinction-level dissolution horizon in carbonate successions that span the Permo-Triassic boundary.

Since establishing his own lab at Stanford, Jon has continued to broaden and deepen his research in exciting ways. A recent paper on C-isotopic variation following the end-Triassic extinction does for this event what Payne et al. earlier did for P-Tr extinction, showing how a widely recognized boundary phenomenon relates to a detailed pattern of secular variation that developed in its aftermath. And in collaboration with geochemist Don DePaolo, Jon's papers on Ca isotopic variation across the P-Tr boundary bring an important new tool to bear on extinctions in the geologic record—this research makes the strongest direct case to date for ocean acidification at the time of end-Permian mass extinction. Other continuing research on P-Tr events includes measurements of foraminifer size and diversity to investigate patterns of recovery in Early Triassic oceans. To appreciate the rigor and insight of this paper, one need only compare it to other articles on post-extinction recovery. Most papers consider one piece of evidence, assume that it correctly captures a fundamental truth about all Early Triassic life, and then discuss why previous papers on the subject are wrong. Jon and his colleagues ask instead how our understanding of Early Triassic life and environments can be enriched by granting that all of these contributions provide data appropriate to one group of organisms in one place at one time. By integrating datasets rather than choosing among them, Jon shows the path forward in reconstructing general patterns of Triassic ecosystem recovery.

In recent years, Jon has made increasing use of physiology to address questions of evolutionary history. "Escargot through time," a terrific essay on the Mesozoic marine revolution, uses physiological insights to ask whether stratigraphic changes in the gastropod fauna support hypotheses of a mid-Mesozoic increase in the nutritional status of the oceans. They do, providing one of the most insightful commentaries on this evolutionary transition since Vermeij's foundational paper and Bambach's stimulating "Seafood through time" follow-up. Physiology also lies at the core of recent papers on broad patterns of size increase through geologic time. And in an intriguing recent contribution, Jon and his colleagues parse the term "rarity" into its several potential meanings and show that some forms of rarity correspond closely to extinction risk, whereas others do not.

Jon Payne and his students are forging ahead along a number of stratigraphic, quantitative paleobiological, and biogeochemical fronts. At the same time, Jon has established himself as an excellent teacher, a gifted mentor, and a valued colleague at Stanford and within the broader scientific community. In short, Jon is an adult—not a term I apply loosely to academics. Jon has emerged as one of paleontology's rising stars, an unusually broad and deep thinking paleontologist who is leading our field into new partnerships with geologists, geochemists, physiologists, and evolutionary biologists. I am proud to present Jonathan Payne as the 2015 winner of the Paleontological Society's Schuchert Award.

November 1, 2015