



Priscum



NEWSLETTER OF THE

Paleontological

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S O C I E T Y

PRESIDENT'S REFLECTIONS

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By Arnie Miller (University of Cincinnati), President

These are challenging times for scientists and for the professional societies that represent them. In the national political

arena, scientific findings, policies, and funding streams that should not be viewed as controversial are being questioned and, in some cases, reversed or curtailed. At the same time, the changing paradigms for scholarly publications, including the transition to online platforms and open access, have generated new financial risks for societies that publish peer-reviewed journals.

While the science of paleontology and the Paleontological Society are not immune to these challenges, the work of my two immediate predecessors, Sandra Carlson and Steve Holland, in many ways ushered in a new era of Society activism, in which we now routinely seek out new directions intended to better position us for years to come.

With the transition begun in 2015 to Cambridge University Press as the publisher of the *Journal of Paleontology* and

Paleobiology, the finances of both journals appear secure for the foreseeable future, and with a much-improved online presence for both journals. To be sure, more work lies ahead, but we are collaborating with Cambridge to expand our author and reader bases, and, more generally, to monitor the ever-evolving publishing landscape. Our partnership with Cambridge is providing additional enhancements for our members, including the digitization of the Society's entire archive of special publications; as of this writing, all of the Society's short course volumes are now available through the member's portal, and all remaining Society publications will be made available soon. We are also exploring an exciting new outlet through Cambridge for all future Special Publications. Stay tuned!

In my first year as President, the Society has continued to move forward on multiple fronts, as we actively explore and pursue new means to carry out our core missions of enhancing and broadening the reach of our science and of our Society, and providing expanded developmental opportunities for all of our members. You have already heard about several of these changes through previous email communications and announcements at our website and in social media, and you will hear more about them at the Society's Annual Meeting in Seattle, but they are worth summarizing here:

- A new partnership with the Federation of American Societies for Experimental Biology (FASEB) to help manage the business affairs of the Society. While many of FASEB's activities may not be directly visible to most of our members, the range of services they are providing behind the scenes are greatly facilitating the work of Society officers as they pursue their core agendas.
- The completion of a contract to engage our first-ever webmaster, Amber Frederick, who is now actively working to enhance our web presence, working collaboratively

President's Reflections

with our wonderful social-media guru, Tara Lepore, and our communications director, Tony Martin.

- The formation of an Ad Hoc Committee on Diversity and Inclusion, chaired by Dena Smith. The committee is already hard at work analyzing Society policies and practices, and is formulating an ambitious agenda of activities and initiatives to help ensure that the Society provides a rich, welcoming, and nurturing environment for all of its members, and seeks actively to encourage a more diverse constituency pursuing the science of paleontology. The Society also expanded its support of its Student Ambassador program and GSA's On to the Future Program, and is funding a Women in Paleontology social and networking event at the upcoming GSA meeting, in Seattle.
- The appointment of the inaugural avocational paleontologist liaison to the PS Council, Jayson Kowinsky, as part of the Society's ongoing effort to reach out to avocational paleontologists, whose numbers are now steadily increasing among our membership. Jayson is a high-school physics teacher in the Pittsburgh area, who has long impacted the paleontological community through his website, www.fossilguy.com. Jayson has already begun to reach out to the leadership of avocational paleontological societies and clubs nationwide to learn what the Society can do to more effectively partner with, and serve the needs of, this constituency.
- Growing opportunities for professional and student research funding through the initiation of the Newell Grants program for early-career professionals; a significant expansion in the number and dollar amounts of grants funded through the PS Student Grants programs; and the continued geographic expansion of the Paleontological International Research Grant Program (PALSIRP).
- Enhancement of the Society's Distinguished Speakers program to include a soon-to-be initiated collaboration with the Society of Vertebrate Paleontology, including the joint sponsorship and publicity of the program.
- Expanded efforts by our student representatives to Council to enhance professional-development opportunities and programming for the Society's student members, including a recent survey that assessed the needs and concerns of current and former students; see the first of a two-part report on this survey in this edition of *Priscum*. Clearly, expanded opportunities for profession-

al development should be a growing priority for the Society, and early efforts in this direction will be evident in our programming in Seattle.

- Active participation in the April 22nd March for Science, including official co-sponsorship by the Society. Mary Droser undertook a prodigious effort to galvanize participation by Society members, as well as our friends and families, and we were well represented in Washington DC, Chicago, Los Angeles, and elsewhere.

The final bulleted point, about the March for Science, is emblematic of the need for the Society to become more politically active and engaged. In the past year, we have also weighed in on the Paleontological Resources Preservation Act (PRPA), the designation of the Bears Ears area in southeastern Utah as a National Monument, and the more recent, ongoing reassessment by the Department of the Interior of areas designated as National Monuments over the past two decades. We are also actively exploring the possibility of establishing a summer geoscience policy internship in Washington DC, in partnership with the American Geosciences Institute (AGI). There is much more that we could be doing, however, in the political arena, and one of our challenges for the coming year will be to map a way forward.

That said, I could not be more pleased with the health and directions of the Paleontological Society, nor could I be any more grateful for the hard work of so many of my colleagues to ensure the continued vitality and richness of our science. See you in Seattle!



PALEONTOLOGICAL SOCIETY STUDENT SURVEY, PART I: REPORT ON STUDENT DIVERSITY AND INCLUSION

By Emily Orzechowski (University of California Berkeley)
and Sharon McMullen (Hess Corporation & University of
Wisconsin Madison)
Student Representatives

Why survey paleontology students?

The Paleontological Society (PS) is devoted to facilitating and upholding the highest standards of collegiality and professional development of its members and the science of paleontology as a whole. As PS Student Representatives, we aim to serve paleontology students by delivering on these goals. As part of our expanding efforts, we gauged student experiences and collected recommendations for improving PS student services by conducting an anonymous survey that many of you participated in (thank you!). 290 paleontologists participated in our survey (35% survey invitation response rate).

Our survey is grounded in the belief that the most effective way to learn how to best serve paleontology students is to understand their experiences and seek the opinions of both current *and* former students. Thus, we sent out two surveys – the first to all student members of the PS who paid dues in 2016, and the second to former graduate students, including those recommended to us by faculty from universities across the country and those who are now Regular PS members.

Here, we present the first of a two-part summary of the experiences and recommendations of survey participants, on diversity and inclusion. The second part, on career develop-

ment, will be published in the winter 2018 issue of PRISCUM. An executive summary of full survey results, with volunteered sensitive information redacted to protect complete anonymity, will be provided online at a future date. For now, we share some key lessons gleaned through the lenses of several summary figures and participants' own words.

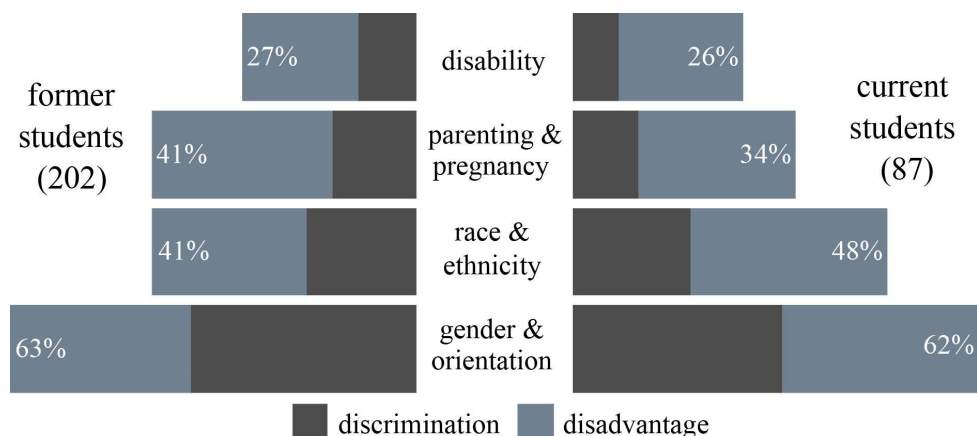
Why survey student diversity and inclusion?

Diversity and inclusion are keys to growing intellectually robust, enjoyable, and collegial environments. Environments that fail to promote intellectual growth and meaningful collegiality are those that stifle the free exchange of ideas and experiences through harassment/discrimination and an atmosphere that is exclusionary to those from some backgrounds. Surveying student experiences with diversity and inclusion allows the PS to assess the health of our society and highlight areas in need of immediate response. Here, **we present a summary of survey participants' experiences of exclusion and harassment/discrimination, as well as their opinions on how the PS can best create and support a diverse professional environment that is inclusive for all.**

There are many forms of diversity that contribute to the makeup of paleontology. In this survey, **we focus on disability, pregnancy & parenting, gender & orientation, and race & ethnicity.** Other important forms of diversity—such as those related to economic background, religion, age, nationality, and geography—will be addressed in the future.

Experiences: Current vs. Former Students.

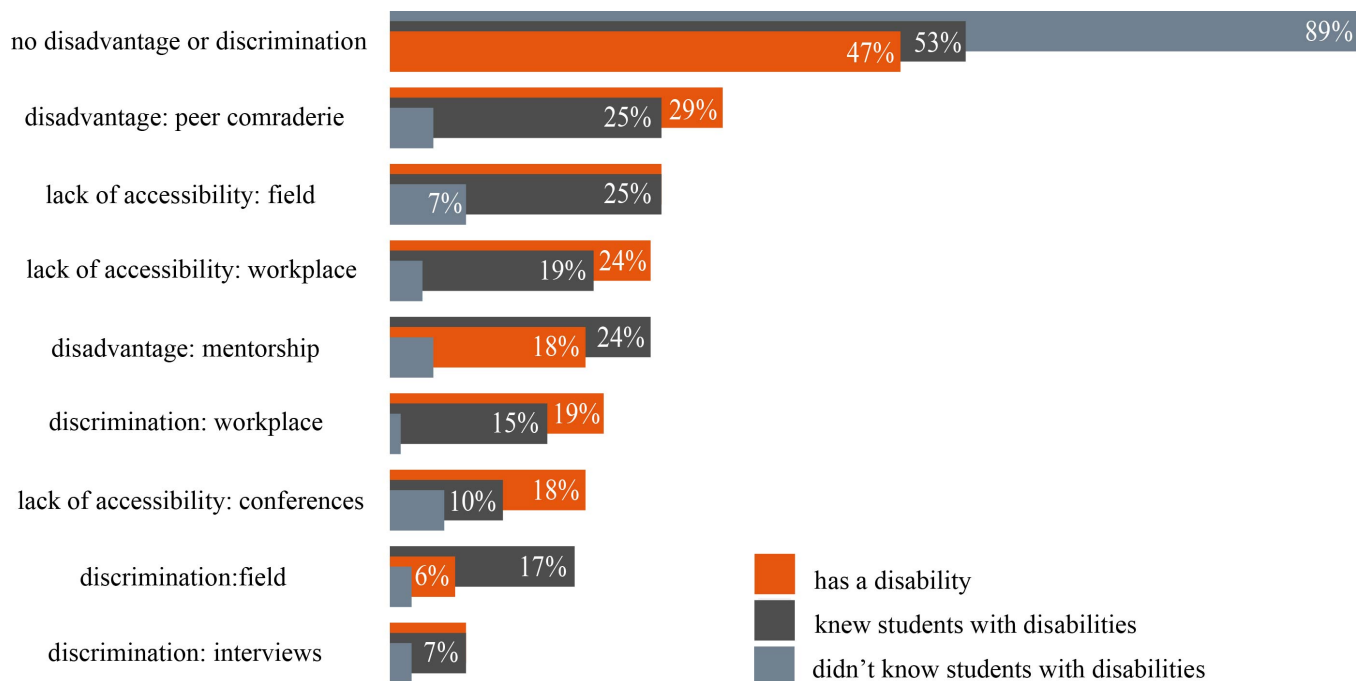
Former and current students report similar levels of disadvantage and discrimination.



PALEONTOLOGICAL SOCIETY STUDENT SURVEY, PART I: REPORT ON STUDENT DIVERSITY AND INCLUSION

Experiences: Disability

Many students with disabilities encounter a lack of logistical, financial, and professional support.



Lack of support creates barriers for paleontologists with disabilities

"This was a significant barrier for graduate students and young professionals." –former student

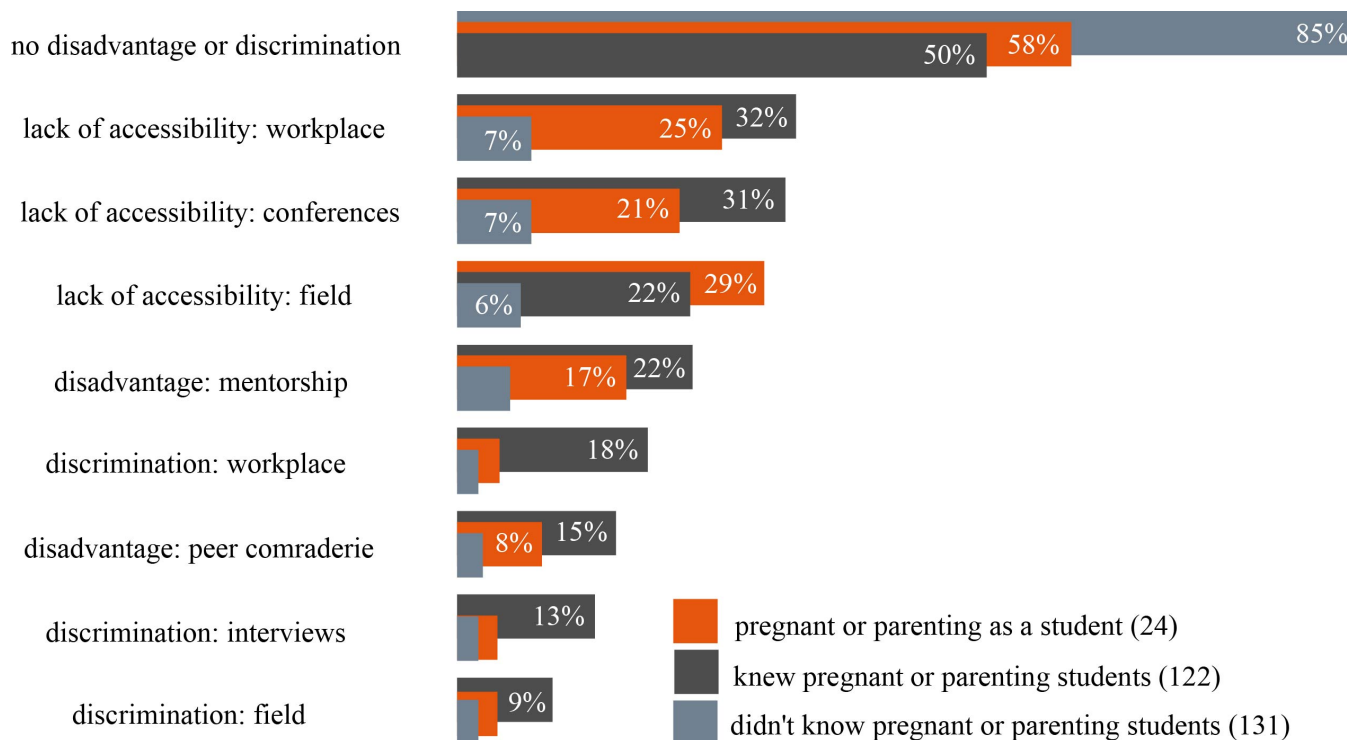
"Students with physical disabilities were not able to get field experience." –former student

"[...] lack of institutional commitment to provide assistance" –former student

PALEONTOLOGICAL SOCIETY STUDENT SURVEY, PART I: REPORT ON STUDENT DIVERSITY AND INCLUSION

Experiences: Pregnancy and Parenthood

Many students who are pregnant and parenting encounter lack of logistical, financial, and professional support.



Discrimination & lack of pregnancy & childcare support at conferences and in the workplace

"I see no support system for graduate student parents." –current student

"Evolution meetings have had child care available for many years now. GSA is way behind on this." –former student

"Women with infants were not allowed to enter the GSA 2016 poster hall." –current student

Mothers face disproportionate career disadvantage & discrimination

*"I did observe that **female graduate students were discouraged** from starting a family during graduate school [...] It was **seen as a major disadvantage** while pursuing a career in academia."* –former student

*"Female students just avoided getting pregnant while in grad school because **of attitudes of all faculty and male students**. Most students with kids were males."* –former student

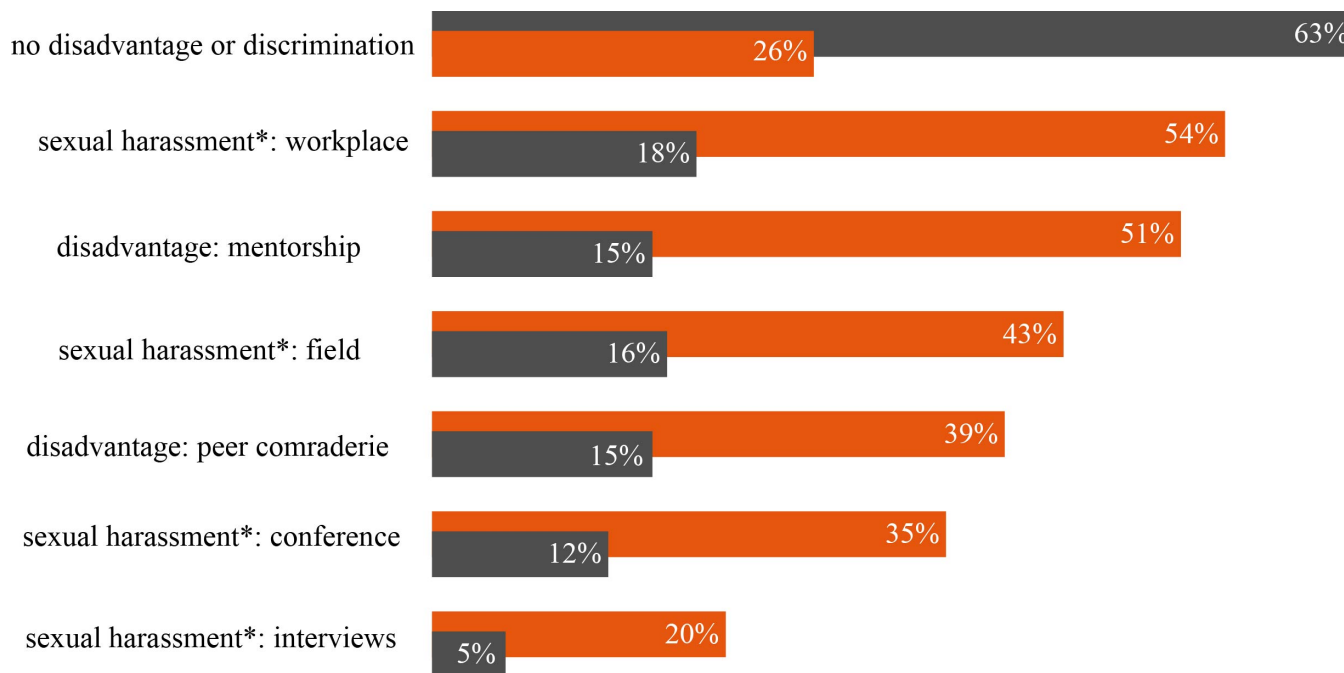
*"[...] sexual **discrimination at a job** (post-doc) with respect to **pregnancy**"* –former student

*"[...] it is clear that **women generally suffer from penalties associated with career interruptions** and ongoing parental responsibilities **that many men do not**."* –former student

PALEONTOLOGICAL SOCIETY STUDENT SURVEY, PART I: REPORT ON STUDENT DIVERSITY AND INCLUSION

Experiences: Gender and Orientation

Overall, most survey participants reported sexual harassment & discrimination; women experience high levels.



*sexual harassment refers to discrimination on the basis of sex, gender, or orientation

men (167) women (166)
(0 selected "custom" self-written gender response)

Ongoing silence around LGBTQ identities alienates both senior & junior scientists

"I often felt alienated [...] This has led me to separate my professional life from the rest of my life in a way that feels more extreme than most of my colleagues. I feel less a part of the "culture of paleontology." –former student

"I'm sure there must be LGBTQ paleontology students/ professionals, but there is zero visibility, so I lack that kind of role model, and lack knowledge of who senior to me I can go to with questions about my identity in relation to my career." –current student

Senior scientists tell current students of worsening gender discrimination after graduate school

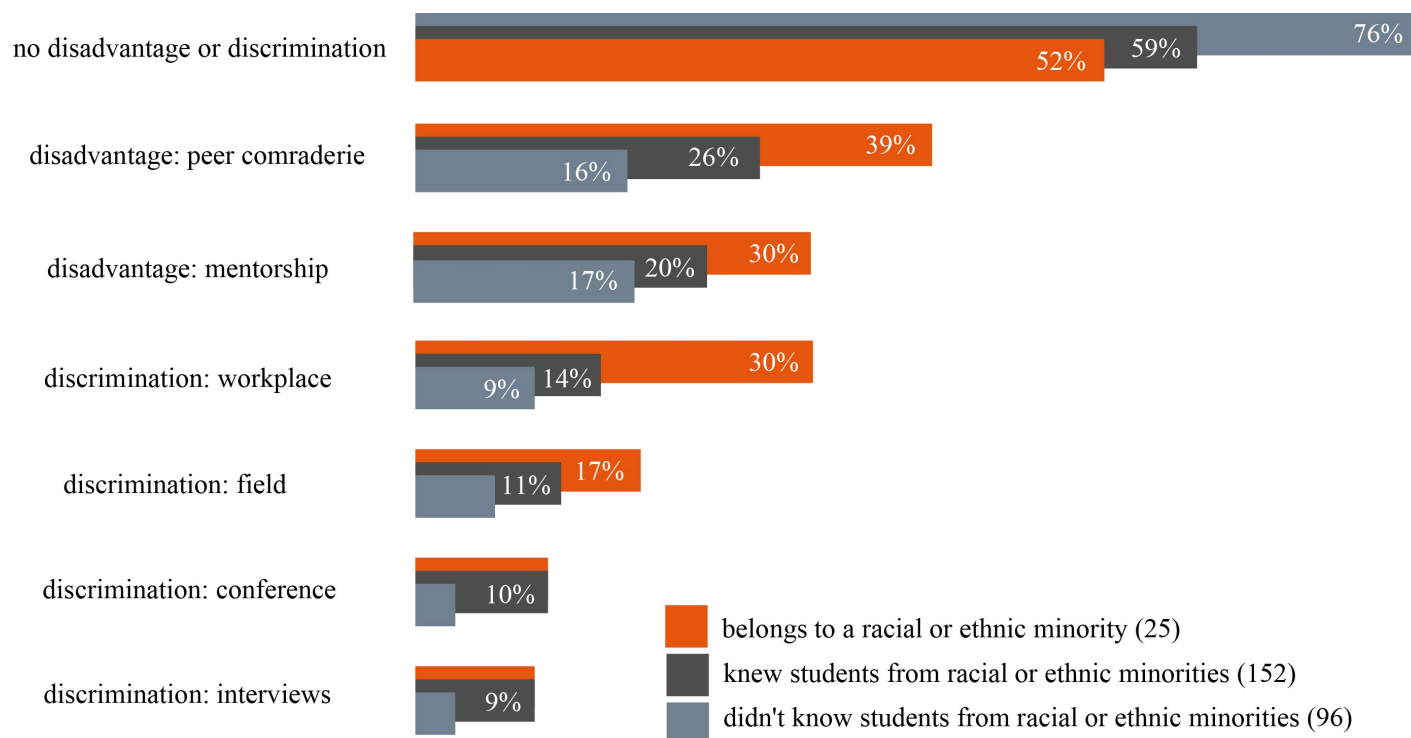
"As a student, most things were bright and shiny and exciting. It was only once I became a faculty member that I understood the prevalence of gender discrimination in science." –former student

"The issue is not at the front end; [...] it is the death by 1000 cuts after one has gotten the job." –former student

PALEONTOLOGICAL SOCIETY STUDENT SURVEY, PART I: REPORT ON STUDENT DIVERSITY AND INCLUSION

Experiences: Race and Ethnicity

Students from racial and ethnic minorities report workplace discrimination and considerable disadvantages to



Persistent lack of racial and ethnic diversity in paleontology is recognized & viewed as major problem

"I do not remember interacting with any non-white paleontologists as a graduate student. Now, I can think to ask, why is this so?" –former student

"I was terribly embarrassed [...] when a student asked to give a presentation on a prominent black female paleontologist... and I couldn't think of one to suggest to her." –former student

"While I have not encountered disadvantages due to race or ethnicity, I know students who have, and it will end up disadvantaging all of us who lack that kind of experience when trying to support our own diverse students in the future." –current student

"The lack of diversity present in my academic experience has negatively impacted my camaraderie and collaborations." –current student

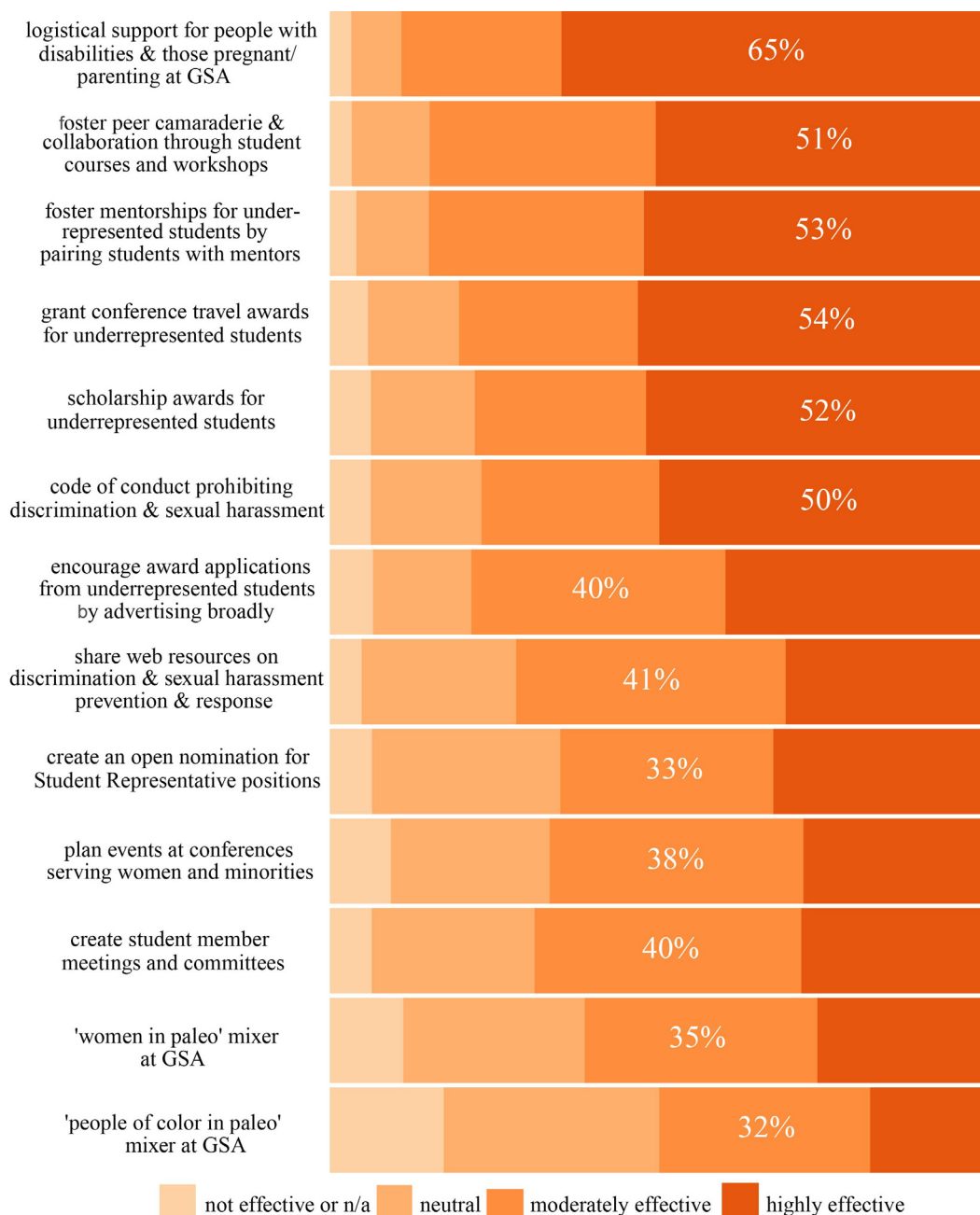
PALEONTOLOGICAL SOCIETY STUDENT SURVEY, PART I: REPORT ON STUDENT DIVERSITY AND INCLUSION

Recommendations from Survey Participants

The recommendations from survey participants reported below relate to diversity and inclusion within the PS at present, and focus on actions the PS might take to foster a diverse, inclusive environment, and profession. They do not address diversity and inclusion at-large throughout academia or paleontology. We therefore do not address grassroots di-

versity and inclusion initiatives, such as K-12 or public outreach, which are important issues in their own rights.

The rank ordering of recommendations do not markedly differ among participants who reported experiencing disadvantages and discrimination or between those who identified as male or female, having a disability, belonging to racial or ethnic backgrounds, or having been pregnant/parenting.



PALEONTOLOGICAL SOCIETY STUDENT SURVEY, PART I: REPORT ON STUDENT DIVERSITY AND INCLUSION

PS Plan of Action

Already in Effect

- PS Diversity & Inclusion Committee
- “On to the Future” grant enhancement (provides financial support, networking, and mentoring opportunities for underrepresented students at GSA)
- Women in paleontology mixer at GSA 2017
- Inclusion Pledge & Mary Anning buttons at GSA 2017 (Mary Anning buttons signal to conference-goers that they are free to speak to the button wearer about issues related to inclusion and diversity in paleontology)
- Collaborate with GSA to uphold Code of Conduct that prohibits discrimination & sexual harassment
- New student research grants named in honor of diverse outstanding paleontologists

Planned for the Near Future

- PS-supported framework (financial & logistical) for new mixers (e.g. LGBTQ mixer)
- Open nominations for Student Representatives, encouraging nominations from and of underrepresented students
- Scholarship opportunities for underrepresented students with financial need to attend PS courses
- Enhanced early career networking opportunities
- Partner with GSA to provide more accessible support for scientists with disabilities & those pregnant and parenting at GSA and other meetings
- Professional conduct/ discrimination & sexual harassment prevention training freely available to PS members and those attending PS courses

For Further Discussion of Diversity and Inclusion in Paleontology please visit...

Below are articles, newsletters, and websites with recent discussion on issues related to diversity & inclusion in paleontology. The focus of these discussions has centered on women in paleontology. In the future and at present, the PS will continue contributing to the important issue of promoting women in science as well as focus more heavily on other forms of diversity.

1. Carlson 2013: http://paleosoc.org/wp-content/uploads/2015/10/Priscum_Winter2013.pdf
2. Stigall 2013a: http://paleosoc.org/wp-content/uploads/2015/10/Priscum_Winter2013.pdf
3. Stigall 2013b: http://www.academia.edu/5146925/Priscum_Summer2013
4. Plotnick et al. 2014: <http://www.geosociety.org/gsatoday/archive/24/11/article/i1052-5173-24-11-44.htm>
5. Cohen 2016: http://paleosoc.org/wpcontent/uploads/2016/02/Priscum_Winter16.pdf
6. Early et al. 2017: [http://vertpaleo.org/Society-News/Blog/Old-Bones-SVP-s-Blog/July-2017-\(1\)/How-to-Support-Attend-the-Women-in-Paleontology.aspx](http://vertpaleo.org/Society-News/Blog/Old-Bones-SVP-s-Blog/July-2017-(1)/How-to-Support-Attend-the-Women-in-Paleontology.aspx)
7. Stigall 2017: <http://www.alyciastigall.org/2017/04/alumni-symposium-women-in-geology/>
8. The Bearded Lady Project: <http://thebeardedladyproject.com/>
9. American Geophysical Union Diversity Programs: http://education.agu.org/diversity_programs/
10. American Geosciences Institute: <https://www.americangeosciences.org/workforce/data/list/diversity>



[Join us at GSA 2017!](#)

THE DRY DREDGERS OF CINCINNATI, OHIO CELEBRATE 75 YEARS IN SUPPORT OF PALEONTOLOGY

By Jack Kallmeyer

President of the Cincinnati Dry Dredgers

April 23, 2017 marked the 75th anniversary of the Cincinnati Dry Dredgers, founded originally by thirty-three devoted individuals with the sponsorship of University of Cincinnati Professor Kenneth E. Caster. Twelve more people joined at the first formal meeting on May 7, 1942. The founding was an outgrowth of a U. C. Evening College Lecture series that covered multiple topics in natural history. This small group first met in the Geology building known as Old Tech to hear U. C. Professor Otto von Schlichten speak on *An Outline of the Development of the Topography of Cincinnati*.

Involvement in the Dry Dredgers organization by professional paleontologists began early in our history. During 1943 through 1945, scheduled speakers included the aforemen-



tioned Drs. Kenneth Caster and von Schlichten (UC), Dr. William Shideler (Miami University, Oxford, Ohio), Dr. John Wells (Ohio State University), Dr. Arthur McFarlan (University of Kentucky), and Dr. V. C. Stechschulte (Xavier University). From the 1940's into the 1950's and beyond, the names of the participating professionals shifted to a new cast of characters, but their dedication to promoting the education of our group of involved amateurs never wavered.

Dr. Caster was prescient in seeing something in the young Dry Dredgers organization that could provide mutual support to both the club and paleontology as a whole. Dr. Caster saw the advantage of having hundreds of enthusiastic and educated "boots on the ground" beyond what he could ever muster through the professional ranks. Properly trained and coached amateurs could and did make discoveries new to science over and over again. A portion of this training as instilled by Professor Caster was that important finds should be donated to the appropriate paleontologist or museum for study. Dry Dredgers have made important discoveries for the

past 75 years and have unselfishly made donations rather than keeping important specimens in a display cabinet for their own enjoyment.

Part of Dr. Caster's vision was to encourage his graduate students to become involved with the Dry Dredgers. The Dredgers responded by donating specimens to students pertinent to their field of studies. They further took these students to sites connected with their studies, and, in some instances, played invaluable roles with excavations. Many of these students went on to successful careers in paleontology and all of them remember the generous assistance given by Dry Dredgers members.

A number of soon-to-be professional paleontologists/geologists were actually members of the Dry Dredgers. To name just a few: Dr. John Pope (University of Miami at Oxford, Ohio) was president of the Dry Dredgers in 1956 – 1957; Dr. Jon Branstrator (Earlham College), Dry Dredgers Publicity and Membership Chair in 1966; Dr. Gene Ulmer (Temple University); and Dr. Jane Forsyth (Bowling Green University).

Two of our members, William White and Stephen Felton, have been awarded the Paleontological Society's Strimple Award for their contributions. Felton was also awarded the Katherine Palmer Award by PRI in 1996 and was more recently featured in *Discover Magazine* in December 2008 among eight other citizen scientists who have contributed to science without the benefits of advanced degrees or grants.

While individual members continue their support of paleontology by specimen donation, site assistance, and field help, the organization itself is also able to provide financial support to students. Up through the late 1970's, the Dry Dredgers were like many small clubs whose month-to-month financial existence was questionable. Our fortunes changed with an idea attributed to then club President Joe Gastright, who suggested that we take extra fossils donated by members and create educational kits to be sold at the Cincinnati Museum of Natural History. We were supported in this effort by Dr. Richard A. Davis who was then curator at the museum. More recently, we have partnered with the Cincinnati Mineral Society to run an annual gem, mineral and fossil show that provides outreach and educational activities for the public. From that time forward, The Dry Dredgers have successfully managed club finances and have saved enough money to endow a research grant fund for qualified applicants. The grants are open to amateurs, students and professionals, with 44 grants awarded to date, primarily to students.

THE DRY DREDGERS OF CINCINNATI, OHIO CELEBRATE 75 YEARS IN SUPPORT OF PALEONTOLOGY

Dry Dredgers' financial support has also benefitted the Geology Library at U. C. many times over the years, most recently With a contribution of a set of books by Ebenezer Emmons, *American Geology, Containing a Statement of Principles of the Science with Full Illustrations of the Characteristic American Fossils* (1855, 1857). This set augments the Ebenezer Emmons collection in the Rare Book section of the Geology Library.

The Cincinnati Museum of Natural History has also been supported by the Dry Dredgers with thousands of fossil donations over the past 75 years. We have also contributed financially toward book publication costs and in funding professional prep work on exceptional local fossils. The most recent contribution paid for restoration of the historic Marschand Ordovician sea floor diorama originally contracted by the museum in the late 1950's under the direction of Professor Caster. Funding further supported creation of the museum's *Cincinnati Under the Sea* exhibit that featured this diorama.

On April 28th of this year, the Dry Dredgers hosted a very special anniversary meeting. We invited a long list of special guests that included past presidents of the Dry Dredgers, professional paleontologists who have worked with the Dry Dredgers, and current and past graduate students, with a very good representation among the 115 members and guests in attendance.

The Dry Dredgers organization distinguishes itself from many similar organizations across the country in three specific areas: Our location is centered in the best Upper Ordovician exposures in the world; our 75 year association with the University of Cincinnati's highly rated paleontological program; and most importantly, the active participation of professional paleontologists and students from the university with the Dry Dredgers. Through my association with Dr.

Bruce MacFadden's FOSSIL Project, I realized that very few of the amateur organizations in the country have all these advantages.

Our specially invited program speaker for the meeting was Dr. Nigel Hughes from the University of California, Riverside. Dr. Hughes passed through Cincinnati in the mid-1990's as Curator of Invertebrate Paleontology at the Cincinnati Museum of Natural History, and has long been an enthusiastic supporter of the Dry Dredgers. He remains an advocate for the importance of amateurs in paleontology as evidenced by his program: *Fossils, science and citizens: a tribute to public engagement in paleontology*. Upon request, Dr. Hughes ended the evening with a rendition of his famous Trilobite Song with ukulele accompaniment.

At the end of the program we allowed guests and members to express their thoughts about the Dry Dredgers. This began with the introduction of the President of the Paleontological Society, UC Professor Arnie Miller. We were all quite surprised when Dr. Miller presented the Paleontological Society's President's Citation in Recognition of the Dry Dredgers. This was a very special honor and a complete surprise. Dr. Miller said that to his knowledge, this award had only been presented, at most, a small handful of times by the Society.

After the Paleontological Society presentation, others were invited to speak. Those who made comments included: Dr.



Pre-meeting socializing.



President of The Cincinnati Dry Dredgers, Jack Kallmeyer

THE DRY DREDGERS OF CINCINNATI, OHIO CELEBRATE 75 YEARS IN SUPPORT OF PALEONTOLOGY

John Pope (University of Miami at Oxford, Ohio and past president of the Dry Dredgers); Dr. David Meyer (UC and Dry Dredgers advisor since 1977); Dr. Bruce MacFadden (University of Florida, President-Elect of the Paleontological Society and founder of the FOSSIL Project); Dr. Lewis Owen (UC Geology Department Head); Dr. Carl Brett (UC); Dr. Brenda Hunda (Cincinnati Museum Center Curator of Invertebrate Paleontology); Dr. Glenn Storrs (Cincinnati Museum Center Vice President and Curator of Vertebrate Paleontology); Dr. Danita Brandt (Michigan State University); and by letter, Dr. Greg McDonald (Bureau of Land Management).

Dry Dredgers member Tom Bantel, chairman of the Paleontological Research Awards committee, formally announced the five grant award winners for 2017, and Dry Dredgers member Kyle Hartshorn made a PowerPoint presentation for

the anniversary field trip the next day to two sites east of Lexington, Kentucky.

The UC Professor Carl Brett devoted his entire day to accompany the Dredgers on the trip. Even though the published field trip was to two specific sites, Dr. Brett, of course, added several bonus sites for collecting and education. Dr. Brett's devotion to teaching and his support of amateur paleontology is just one more example of why the Dry Dredgers have endured for 75 years. This kind of enthusiasm by professional paleontologists for amateurs is beneficial to all of us, perpetually realizing the vision of Dr. Ken Caster.



Arnie Miller presenting the "Paleontological Society President's Citation In Recognition of" honor to The Cincinnati Dry Dredgers.

THE PALEONTOLOGICAL SOCIETY DIGS DEEP AND EMBRACES THE HYDROLOGIC CYCLE

By Marie Jimenez (Syracuse University)

The March for Science was not what I expected. Although I'd like to think we don't fit the science elitist stereotype, I projected that view on what the march would be like. I expected to see field gear, puns and obscure references; the recluses were coming out to play. In hindsight, if most scientists I know aren't like that, why did I expect that from everyone as a collective? Needless to say, I was pleasantly surprised by the outcome.

Arriving at the designated meeting spot for the Paleontological Society was the first sign that this was going to be a great march. The t-shirts gave our group a sense of unity and common purpose. The witty signs were aplenty, I'd like to think my sign included, but they were accessible. So many of the paleontologists marching had signs that welcomed questions about evolution, extinction, and climate change. Who better to ask about what is likely to come than someone who studies what has already occurred? I remember thinking "This is why we march!" to address the disconnect between "Trilobites are cool" and "Paleontology is important because..."

There is something intrinsically powerful about forming a collective front and you could feel that in our group. As we navigated the streets of D.C., we were greeted with acknowledging nods, thumbs up, and even praise from passersby. With foam fingers and signs raised, we marched in a "parade of Paleontologists". There was a sense of pride whenever people would take pictures of our signs. And if we got lost from the group due to the insane number of people marching, we could easily locate a member by the Paleontological Society logo on their sign or the "paleo cube" carried by Carlie Pietsch. By the end of the march, our clothes were soaked & our signs gained artistic tie-dye flare, but our enthusiasm never wavered. Unsurprisingly, the weather did not hamper our attitudes; we were having so much fun! Besides, a little drizzle is nothing compared to fieldwork, and I'd take being outside over writing proposals any day.

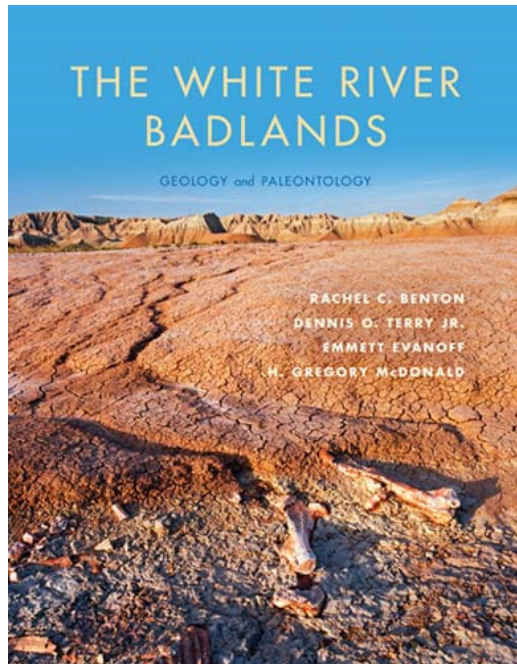
Looking back, I am extremely happy that we could march as a group. I am fortunate to have an advisor, shout-out to Linda Ivany, who not only encouraged us but was the motivating force behind us driving down to march in D.C. I am also grateful for the work done by Mary Droser and Arnie Miller to organize "the troops" because being a part of this group made the march more meaningful to me. It was amazing to see paleontologists at varying stages in their careers, all exhibiting a passion for our field and a mutual concern for the future of science. As someone who is just starting out, it is encouraging to know that The Paleontological Society stands

in solidarity with me and other young paleontologists who may be greatly affected. I walked away with a great sense of community and purpose. In the end, you can count on paleontologists to dig deep, because we rock. (sorry, couldn't help myself)



Event	Day	Time	Place
Paleontological Society (PS) Short Course: Biochemical Approaches in Paleobiology and Paleoecology	Saturday October 21, 2017	9 AM-5 PM	Washington State Convention Center, Ballroom 6C
Paleontological Society (PS) Education and Outreach Committee	Sunday October 22, 2017	12:00-1:30 PM	Sheraton Seattle Hotel, Boren Room
Paleontological Society (PS) Business Meeting and Awards Reception Buffet **Ticketed Event**	Sunday October 22, 2017	6:30-10:30 PM	Washington State Convention Center, Ballroom 6E
Paleontological Society (PS) Mentors in Paleontology Careers Luncheon	Monday October 23, 2017	12:00-1:30 PM	Tap House Grill, 1506 6 th Ave., Seattle, WA 98101
Paleontological Society (PS)/ Cambridge University Press Editorial Meeting	Monday October 23, 2017	5:30-7:00 PM	Sheraton Seattle Hotel, Kirkland Room
Paleontological Society (PS) Schuchert Talk and Student Social	Monday October 23, 2017	6:30-8:00 PM	Washington State Convention Center, Room 607
Paleontological Society (PS)/ Cambridge University Press Town Hall Meeting	Tuesday October 24, 2017	10:00 AM-12:00 PM	Sheraton Seattle Hotel, Willow A Room
Paleontological Society (PS) Council Meeting	Tuesday October 24, 2017	1:00-5:00 PM	Sheraton Seattle Hotel, Seneca Room
Paleontological Society (PS) Women in Paleontology Reception	Tuesday October 24, 2017	6:00-9:00 PM	Tap House Grill, 1506 6 th Ave., Seattle, WA 98101

BOOK REVIEW—THE WHITE RIVER BADLANDS: GEOLOGY AND PALEONTOLOGY



Benton, R. C., D. O. Terry, Jr, E. Evanoff, and H. G. McDonald. 2015. *The White River Badlands: Geology and Paleontology*. Indiana University Press, Bloomington, IN, 240 pp. (\$31.50 cloth, \$31.49 e-book with 30% PS discount.)

Reviewed by Ashley Poust (University of California, Museum of Paleontology)

“Badlands” is an evocative name, appropriate to the landform described by Loren Eiseley as “torn, ravaged and convulsed like the features of profane old age” (p.3). But those of us lucky enough to travel, work, or teach in the White River Badlands (WRB) find in the torn topography wisdom rather than ruin. The wealth of knowledge collected since the first scientific descriptions of the region in the 19th century is so extensive that it is hard to manage, even for specialists, which makes *The White River Badlands: Geology and Paleontology* a very welcome addition to the literature.

The quest to summarize a well-known subject requires navigation between two challenges: how to be comprehensive enough to cover everything and still constrained enough to remain useful. Benton *et al.* have traversed these waters while keeping the book readable for multiple audiences. Throughout, they balance basic explanation of a topic, such as soil formation, with detailed, citation-rich description of where examples of it can be found in the park. Casual visitors dropping down from I-90 to Badlands National Park may find that much of the book will exceed the average interest

level, and working scientists will need to abet their reading with the primary geological literature and ideally with the comprehensive figures compiled in the Scott and Jepson publications from the ‘30s and ‘40s. But Benton *et al.* have produced an authoritative reference that perfectly meets their aims “to complement, enhance, and in some ways replace” previous works.

Benton *et al.* begin by summarizing the scientific exploration of the region, starting with the first brontothere jaw brought back East in 1846. This historical chapter gives context that will interest scientists and help orient more casual readers and students unfamiliar with the sometimes sinuous paths of science.

Subsequent chapters address the geology, paleosols, erosion, and, in the largest chapter by far, the fossils. The last three chapters are short summations of paleoenvironment, regional context, and park policy. This arrangement lends the book an hourglass structure which is very satisfying: the history of exploration that led to discoveries, the increasingly fine-scale discoveries themselves ranging from the contextualizing geology to the specific taxonomy, then a consideration of regional events during the Eocene-Oligocene transition which again widens the scale of the discussion. In spite of this symmetry, the book need not be read cover-to-cover: it works well as a reference text, especially for the vertebrate fossils.

Though not explored in great detail, several issues specific to the National Park are addressed in the last chapter, such as the park’s relationship with the Oglala Sioux and the effect of the upcoming Paleontological Resources Preservation Act upon law enforcement. Students of sediments and paleosols will appreciate the color plates, which are better used than in many paleontology books. The remaining figures could be of more consistent quality, especially the photographs of fossils, though most are excellent.

From the work of Osborn on the drivers of evolution (1908) to recent assessments of global body-size dynamics (e.g. Smith *et al.* 2010) and taphonomic bias (Moore and Norman 2009), data from the WRB has informed our understanding of evolution for over a hundred years. Chapter seven references some of this work, but a fuller discussion of the Badlands’ contribution to the field of paleobiology is the one thing I felt the book was lacking.

Although fellow paleontologists would dispute the usage of some language, such as calling brain endocasts and eggs trace fossils, Benton *et al.* are generally very consistent with

BOOK REVIEW—HADROSAURS

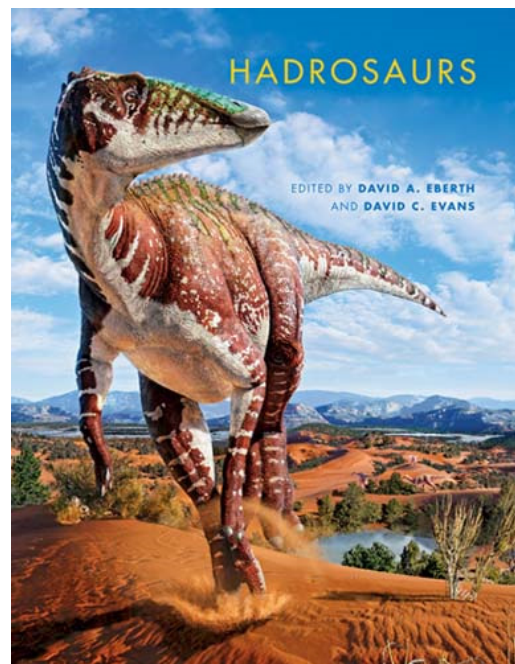
their terminology and elsewhere properly include fossil eggs with other bird body fossils.

In spite of any such criticisms, the book is incredibly useful. I have already found myself checking the taxonomic section to make sure my IDs are up-to-date. I look forward to leading my next field trip to the Badlands; armed with this book I can help my students get the most from this incredible landscape. The book even possesses a certain elegance. The systematics chapter ends by figuring the first fossil found in the WRB. This recalls the attentive reader to the first paragraph of the book describing this fossil's discovery, and ends the major chapters with particular resonance.

Benton *et al.* should be praised: it's rare for a book to belong both in the gift shop and on the bookshelves of serious researchers. The privilege of working with such rich subject matter is juxtaposed with the challenge of doing it justice, a challenge that "The White River Badlands" accepts head on with great results. One can only hope other important regions will soon receive treatment of similar quality.

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Eberth, D. A. and D. C. Evans, eds. 2014. *Hadrosaurs*. Indiana University Press, Bloomington, IN, 640 pp. (\$66.50 cloth, \$66.49 e-book with 30% PS discount.)

Reviewed by Cynthia Crane (Aurora Fossil Museum)

Editors David Eberth and David Evans have presented a wonderful compilation of hadrosaur research. In this volume, one will read about the studies and discoveries of this cosmopolitan species. The book has been subdivided into six main components: overview, origins, anatomy, biogeography, function and growth, and preservation.

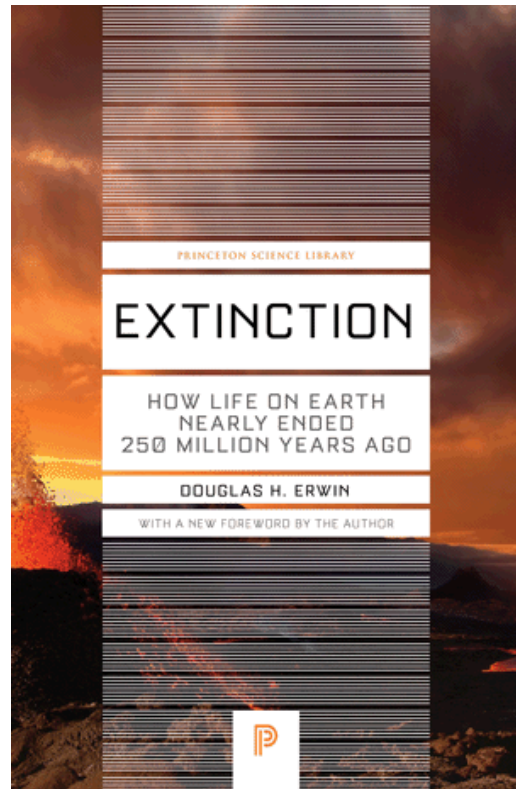
The overview section introduces the reader to the history of the ornithopods. An interesting part of this chapter is the research trends presented on ornithopod studies beginning in the year 1820 through the year 2000. These trends show pulses in studies during the first 120 years then a switch to a steady increase of research from 1940 to 2000. Also interesting is that the trends portray the increase in the variety of studies conducted over time, beginning with primarily taxonomic studies to the more modern biogeographic, paleoecologic, growth, soft tissue, and faunal studies, all of which are presented in this volume. The origins section includes a variety of chapters on the origins of hadrosaurs and offers chapters on research from England, China, Texas, Mongolia, and Canada. I particularly enjoyed the biogeography and biostratigraphic section, which included research studies from Europe, Asia, South America and North America. Another very

BOOK REVIEW—EXTINCTION: HOW LIFE ON EARTH NEARLY ENDED 250 MILLION YEARS AGO

interesting chapter in this section was on research from the Upper Cretaceous dinosaur localities in the Amur Region of Russia and the discovery of the Blagoveschensk bonebed.

Insights on hadrosaur growth, mobility, and jaw mechanics were presented in the function and growth section. One particularly interesting chapter in this section was on comparing hadrosaurs and ceratopsians in regards to their susceptibility to drowning. The final section presents various studies on hadrosaur preservation, tracks, and traces. Chapters in this section include studies on paleopathology, soft tissue preservation, and death assemblages in the form of bone bed accumulations. An intriguing read was the research conducted by Tanke and Rothschild on the range of pathologies preserved in hadrosaur specimens recovered from the Upper Cretaceous Oldman and Dinosaur Park formations of the Belly River Group at Dinosaur Provincial Park.

In closing, this volume presents updated investigations on a wide range of topics, locations, and content. Although some of the articles tend to be more technical in nature, most readers will be able to comprehend and learn from the material presented. I would recommend this volume to anyone interested in hadrosaurs. My regards to editors Eberth and Evans for compiling such a thorough and insightful volume.



Erwin, D. H. 2015 (2006). *Extinction: How Life on Earth Nearly Ended 250 Million Years Ago*. 2nd ed with new preface. Princeton University Press, Princeton, NJ, 320 pp. (\$15.96 paper with 20% PS discount.)

Reviewed by Mike Meyer (Geophysical Laboratory, Carnegie Institution for Science)

When people ask you how this book is, you can tell them that everybody dies at the end and be completely serious (and only minutely inaccurate). *Extinction* is a book that has held up in the 10 years since its original publication, and this anniversary printing (with new preface by the author) should be considered required reading for anyone interested in paleontology, regardless of expertise or academic background. It was not until after I read this new version that I remembered I owned the original (required reading in a class taken longer ago than it seems), so I pulled it off of the shelf and leafed through the notes I took in the margins. After getting past the fact that my hand writing has been terrible for a long time, I was struck by the amount of references I circled, specifically so that I could find them in the library. In the age of online accessibility and PDFs, that process also seems near extinction!

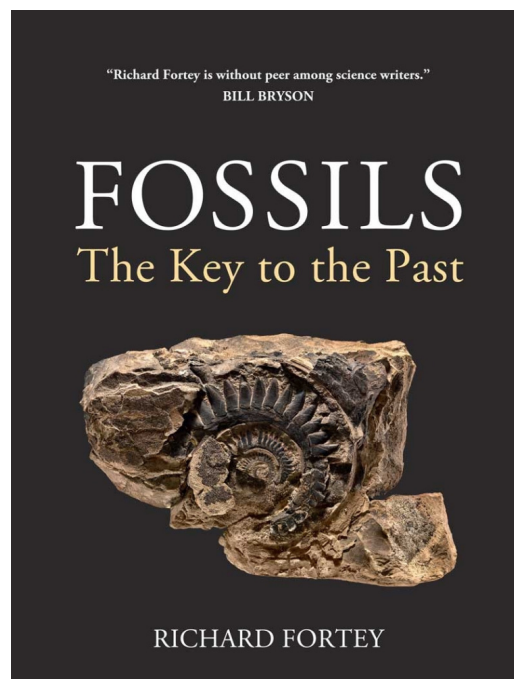


Visit the
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BOOK REVIEW—FOSSILS: THE KEY TO THE PAST

The book centers on the greatest and most severe known extinction event in the history of Earth, occurring around 250 million years ago at the boundary of the Permian and Triassic periods. This extinction event decimated over 80% of all genera, over 95% of marine taxa, and over 50% of terrestrial taxa; it is no surprise that it is known as 'The Great Dying'. The book has a great format, interspersing paleontological knowledge with personal stories and vignettes, all while building step-wise to answer the question "Why and how did this extinction occur?" The author takes you into the field in numerous locales, such as South China and South Africa. I happened to be reading the book while in South Africa and Namibia and saw a lot of the rocks and fossils mentioned in *Extinction*. (I recommend everyone travel to exciting places in the books you read!). The book builds on itself well, with the reader gaining more knowledge on diversity trends, Earth systems, and all five 'Great Mass Extinctions' in Earth history. All while refereeing back to each factor that could play a part in this massive extinction.

The end of the book and the new preface deal with the possibility that we are living in the time of a sixth great mass extinction caused by the activities of humans. While the original ending on that topic was a bit dour, it is not nearly as much a downer as in the new preface (titled "The Coming Crisis"). That being said, I agree with the author. There is a bleak conundrum we face in that, with the knowledge of how mass extinctions work, and the inability of the political will to take effective action (or willful refusal with the newest administration), that there may be nothing we can do if the links in the ecological chain are already breaking or broken. As I wrote in my margins ten years ago, "We are screwed? Hopefully not."



Fortey, R. 2015 (1982). *Fossils: The Key to the Past*. 5th ed. Cornell University Press and Comstock Publishing Associates, Ithaca, NY, 256 pp. (\$24.95.)

Reviewed by Tobias Grun (University of Tübingen)

The well-known paleontologist Richard Fortey, author of numerous books and a multiple award medalist, describes the alluring world of fossils and paleontology in a clear and understandable way. *Fossils: The Key to the Past* is a synopsis of fossil research and related disciplines first published in 1985. The fifth edition of this book published in 2015 contains 256 pages with 238 illustrations and is intended for the interested non-professional, but at the same time, serves as a useful source of basic knowledge for students and young professionals alike.

The first chapters of the book guide the reader through the early discoveries of fossils and their interpretations within their historical context. The transition from the rather mythical fossil interpretations in former times to the emergence of paleontology as a modern science is demonstrated by some examples of iconic fossils. It is explained that fossils recovered from the field can be incomplete or be overprinted by geological processes. Thus, general geological processes are expounded in a way that the newcomer understands the complex steps leading to the fossilization, distribution and deformation of organisms in the rock record.

BOOK REVIEW—SOLVING THE MYSTERY OF THE FIRST ANIMALS ON LAND

The reader is subsequently introduced to various fields of paleontology with a description of the most important fossil groups of plants, invertebrates and vertebrates. This richly illustrated section begins with an overview of systematics. The organisms are described with respect to their morphological features, ecological adaptations, stratigraphic range, spatial occurrences, associated sediments, and other relevant details which can also be found in the figure captions throughout the entire book. Although the book does not focus on the detailed anatomy of the organisms, the reader obtains a general impression of their complex morphologies and functional morphology. In the following text, the author revives a number of animals back to life, thereby illustrating the art of reconstructing organisms and their environments based on the sometimes meager remains found in the rock record. The reader becomes familiarized with those methods of reconstructing animals based on morphological features and their functional interpretations.

The study of organisms' morphology and their functional understandings would be incomplete without understanding the origin and history of life that lead to the development of such specific morphologies. The author reaches back to the formation of Earth and thereby describes those factors relevant for the development of life. These are followed by the equally important topic of extinction as a driver of evolution. The reader thus has the chance to reflect upon the circumstances that are responsible for the extinction of organisms and major mass-extinction events. Richard Fortey emphatically demonstrates that extinction, though generally assigned a negative connotation, has a positive effect on the course of evolution. Utilizing specific examples of several organisms, it becomes clear that morphological pathways can be followed in the fossil record and, perhaps more importantly, such changes track evolution and ultimately serve as the basis for biostratigraphy. This section closes with the advent and development of humans, including a brief introduction of human evolution and methods used in anthropological sciences. As scientific methods are developed, approaches within paleontology are modernized accordingly. The reader is introduced to the basics of DNA research and the significance, potentials and limits of such modern methods for analyzing ancient organisms.

Important microfossils are used to provide insights into their specific uses in geological surveys, the petroleum industry, and mineral prospecting. The uses of fossils as raw materials in fashion design and as decorative objects are also examined, confronting the reader with the lucrative business of rare remains from the ancient world. Finally, the reader ob-

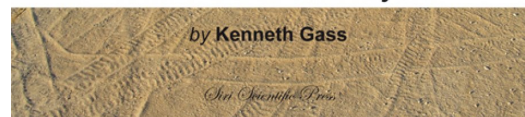
tains hand-on instructions for creating and curating a fossil collection, from scratch with details concerning proper collecting strategies, the preparation of the material and its identification, as well as the storage of samples.

Richard Fortey's *Fossils: The Key to the Past* covers the basics of paleontology and the importance of fossils for scientists, thus vividly fulfilling the purpose of the book "to stimulate the reader to further study and enjoyment of our geological legacy" (Richard Fortey, 2015).

Solving the Mystery of the First Animals on Land



The Fossils of Blackberry Hill



Gass, K. 2015. *Solving the Mystery of the First Animals on Land*. Siri Scientific Press, Manchester, UK, 96 pp. (£11.50 paper from <http://www.siriscientificpress.co.uk>)

Reviewed by Claire Milne (Stockton, CA)

Kenneth Gass belongs to that band of non-professional paleontologists to whom paleontology is greatly indebted. Their contributions in the field and from independent research augment the work of professional paleontologists. Blackberry Hill is the name given to Cambrian rock outcroppings in central Wisconsin, whose flat surfaces are covered with the fossil trackways, footprints, resting places and burrows of animals who left the sea to spend part of their existence on land.

Who were these trace-makers? The search for the perpetrators of the traces is cast in the form of a mystery story, with

BOOK REVIEW—SOLVING THE MYSTERY OF THE FIRST ANIMALS ON LAND

each chapter bringing us closer to the nabbing the animals responsible. The author writes that the book as a picture book, and indeed it is, as out of 85 pages, 55 pages provide photographs of the traces left by the intrepid animals that had ventured onto the land. The photographs of the traces are extraordinary in their definition and clarity, and bring to life most vividly the activities of the animals. These trace fossils are of the greatest importance, as they are direct evidence that the beginnings of animal life leaving the sea for life on land began during the 540-500 million years of the Cambrian period, and not many millions of years later during the Silurian and Devonian periods. The surfaces of the Blackberry Hill rock outcrops are well preserved, showing the cracks, ripple marks and raindrop impressions characteristic of tidal flats. It should be noted that the raindrop impressions are unmistakable evidence that certain surfaces had existed above the high tide line.

There is a mystery within a mystery though, as the traces had been protected from wind and weather long enough to have remained intact while on their way to eventual fossilization. Although this problem has not been completely resolved, the author offers as a possibility for protection the microbial mats that existed on dry land during the Cambrian, and are found on the Blackberry Hill rock surfaces. These mats, made up of a variety of microorganisms, formed tough mats of filaments bound together by secretions.

The chapter “The First land-walkers—Vanished with a Trace” provides a bit of history, as it was in 1847 that Sir William Logan, the director of the Geological Survey of Canada, provided specimens of trackways that had been found in Quebec to Sir Richard Owen, the founder of the Natural History Museum in London and the “Father of Comparative Anatomy”. Owen concluded that the tracks were made by arthropods, and because these tracks were the first found, he named them *Protichnites*. *Protichnites* is a trackway characterized by two parallel lines with a furrow down the center. There are two other trackways, *Diplichnites* with two parallel lines but no furrow, and *Climactichnites* with cross-bars between parallel lines, giving a ladder-like appearance. Although descriptions of the three kinds of trackways appear in several chapters, the fact that they are scattered and do not appear in the comprehensive terminology section may cause some confusion.

During the intervening decades, suggestions for possible perpetrators ranged from trilobites to algae, but in 2002, researchers felt that a plausible suspect had emerged, as the anatomy of the euthycarcinoid arthropods seemed to match

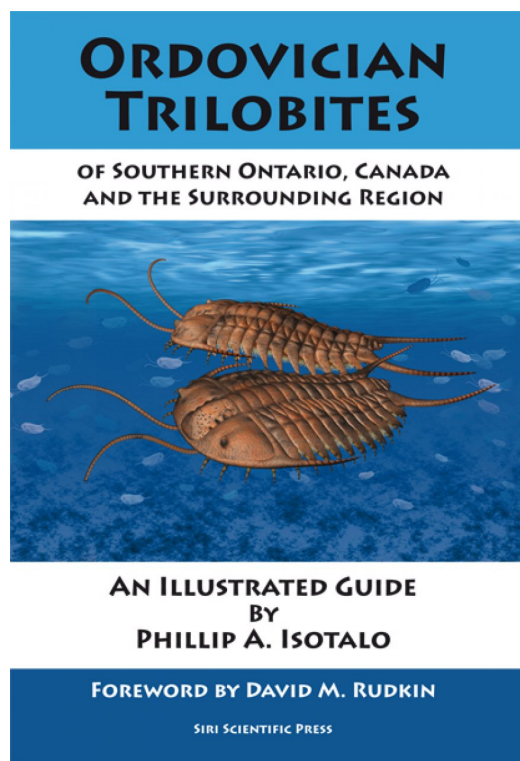
up with the features found with *Protichnites*. We are getting closer, with the evidence pointing to euthycarcinoids as the makers of those first tracks, but what is needed still is missing is the essential body fossil of the track maker.

“Cold Case Cracked - Bodies Found on Beach” heads the chapter describing the discovery of not one but two track makers, the first found from any site. I would like to suggest however, that the heading is a bit incongruous as “A Cambrian tidal flat locality had finally produced arthropod body fossils!” follows in the first paragraph. One of the two fossils found was a phyllocarid, a crustacean still found on present-day beaches. They were too small to have made the *Protichnites* but their indisputable presence also on the Cambrian tidal flats is of great importance. The body fossils of three euthycarcinoids, given the name *Mosineia macnaughtoni*, proved to have features consistent with those found in *Protichnites*. The discovery of euthycarcinoids and *Protichnites* in the same outcrop brought the solution within tantalizing reach, but still there was no unequivocal link between them. It remained for the author and his son to discover on a slab from the same outcrop the most probably solution to the mystery: a single slab containing both *Protichnites eremita* and *Mosineia macnaughtoni* fossils.

Protichnites eremita is characterized by shingle-shaped markings between two parallel lines. How these markings had been made had been a puzzling problem, evoking much speculation. The solution arrived with the discovery that the medial markings of *Protichnites eremita* were consistent with the size, shape, and number of *Mosineias macnaughtoni*'s tail segments. The tail of the animal produced the medial markings while the animal was moving, and were particularly deep when the animal negotiated a sharp turn. Gass considers this slab his “Rosetta Stone” providing the proverbial “smoking gun”. However, I wonder if the last paragraph might require a bit of modification, as he writes “Blackberry Hill had thus produced fossils of a maker of *Protichnites*—the first footprints that appear to have been made on land—and that animal was a euthycarcinoid. This means that after more than 150 years of speculation, the mystery of “what was the first animal to walk on land?” finally appears to be solved.

Gass always will have the distinction of being first to provide body fossils of pioneer Cambrian animals who left the the sea for sojourns on land. However, at the same time, we should recall that Laurentia's shoreline was long, and that there were many tidal flats along the coasts and species, known and unknown in these habitats, which potentially might have ventured ashore during the Cambrian period.

BOOK REVIEW—ORDOVICIAN TRILOBITES OF SOUTHERN ONTARIO, CANADA AND THE SURROUNDING REGION



Isotalo, P. A. 2015. *Ordovician Trilobites of Southern Ontario, Canada and the Surrounding Region*. Siri Scientific Press, Manchester, UK, 224 pp. (£12.99 paper from <http://www.siriscientificpress.co.uk>)

Reviewed by Thomas A. Hegna (Western Illinois University)

I must confess—my heart has a soft spot for trilobites. Evidently, I am not alone in this affliction, as attested to by the new book *Ordovician Trilobites of Southern Ontario, Canada and the Surrounding Region* by Phillip A. Isotalo. The book is a geographic review of trilobites from the region, the likes of which has never been put together before. Additionally, the book contains sections on regional geology, trilobite morphology and biology, regional sites of exceptionally preserved trilobites, and final chapters on trilobite collecting for amateurs. Throughout, the book has wonderful, full-color pictures of trilobites and excellent artwork: seascapes with a retro feel by Michael Léveillé and innovative organism ‘portraits’ by John Iellamo—I would like to particularly commend his adventurous depictions of *Marrella* and *Cryptolithus*. The book is written to accommodate non-academics, but is still scholarly and fully referenced. With its reasonable price, the book will be a must-have for trilobite aficionados.

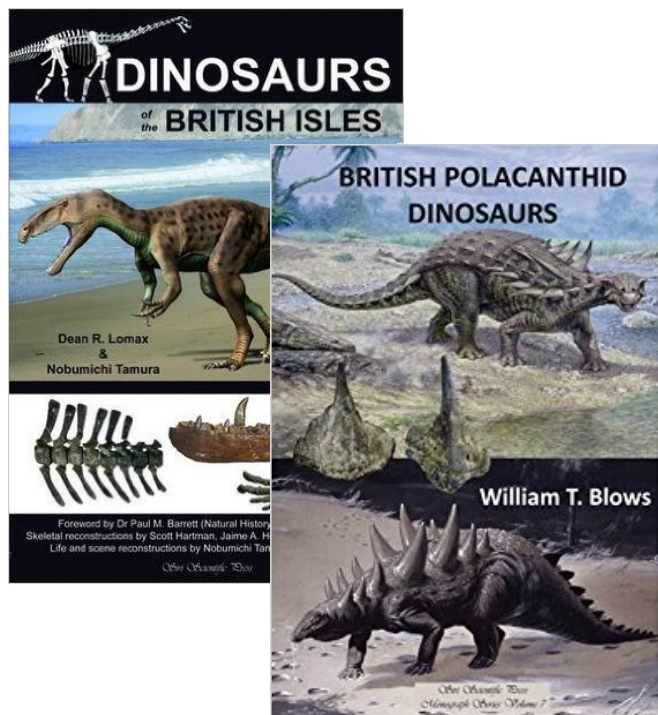
The book begins with a review of the regional geology. The geology of the area is rather arbitrarily bisected by the US-Canada border. Furthermore, the Paleozoic regions of Ontario itself are widely separated by the Canadian Shield. Isotalo does a good job of knitting together stratigraphic nomenclature into an understandable framework from the point of view of trilobite-bearing units. Next, trilobite anatomy and classification are briefly explained with diagrams from Dr. Sam Gon III’s award-winning website www.trilobites.info.

The meat of the book is the trilobite descriptions and pictures, fully accounting for half of the pages. Nearly every species of Ordovician trilobite from the region is given its own section with photographs and a brief discussion of its distribution and important morphological features. The photographs are almost entirely color light photographs—for most trilobites, this works quite well. However, some of the specimens could have benefited significantly from a light coating of ammonium chloride to help increase the contrast and to make fine-scale features more visible. The trilobite section is organized systematically. However, the stratigraphically-minded paleontologists need not fear—the stratigraphic distribution of the trilobites is given in an important table following the trilobite section. Following the trilobite section are two sections on regional sites of exceptional preservation: Beecher’s Trilobite Beds and the Walcott-Rust Quarry, both of which are located in upstate New York. Both are good introductions to the sites. The illustrated trilobites throughout the book are a mix of museum-held specimens and privately held specimens. Though the privately owned specimens are spectacular, their inclusion may cause some frustration for future researchers.

The final, brief sections of the book are less tightly organized around the theme of the book, though still useful. The final sections include a table of famous trilobite sites around the world, and sections devoted to trilobite collection for amateurs. The latter chapter includes sections on field safety, curating collections, photography, and preparation—the sequence of photos in the preparation section are quite remarkable!

Overall, this is an outstanding work with illustrations that will please all audiences as well as an attention to references that please pedants like myself.

BOOK REVIEW—DINOSAURS OF THE BRITISH ISLES & BRITISH POLACANTHID DINOSAURS



Lomax, D. R. and N. Tamura. 2014. *Dinosaurs of the British Isles*. Siri Scientific Press, Manchester, UK, 416 pp. (£22.00 paper from <http://www.siriscientificpress.co.uk>)

Blows, W. T. 2015. *British Polacanthid Dinosaurs: Observations on the History and Palaeontology of the UK Polacanthid Armoured Dinosaurs and Their Relatives*. Siri Scientific Press, Manchester, UK, 224 pp. (£33.00 cloth from <http://www.siriscientificpress.co.uk>)

Reviewed by James O. Farlow (Indiana University-Purdue University)

I really should plan a holiday on the Isle of Wight. That is the strongest impression I received from reading these two recent books from Siri Scientific Press. That little island has an unusually rich concentration of dinosaur fossils, comprising both skeletal material and footprints. And if I were lucky enough to make such a trip, these two books would definitely be in my suitcase.

The book by Lomax and Tamura is more accessible to the general reader. It devotes its first several sections (there are no formal chapters) to brief introductions to the skeletal anatomy and classification of dinosaurs, a survey of the major groups of dinosaurs, the outsized role that Britain played in the early study of dinosaurs, modern research techniques,

trace fossils, and non-dinosaurian Mesozoic vertebrates. The main part of the book is a detailed account of the major dinosaur discoveries in the British Isles. The material is arranged stratigraphically, beginning with Late Triassic forms and ending with Late Cretaceous finds. There are many excellent photographs of actual specimens (both skeletal remains and footprints) in the field or in museum collections, as well as skeletal reconstructions and life restorations of the dinosaurs. The book ends with a short account of the major dinosaur collections in British museums, and some practical observations about the logistics and ethics of looking for dinosaur fossils in the field.

The most useful feature of this book to professional paleontologists will be the extensive, mostly color photographs of skeletal and footprint specimens. If I were planning a research trip to visit museum collections in Britain—or if I were able to take that vacation on the Island of Wight—I would bring this book along as a guide to what I should be looking for. In fact, just reading the book drew my attention to some important specimens that were immediately of interest for a current research project.

Blows' book is a much more technical work that focuses on the skeletal anatomy and systematics of a particular group of ankylosaurian dinosaurs, the polacanthids, the exact relationships of which to other ankylosaurs are uncertain; Blows favors the hypothesis that polacanthids constitute a separate family within the ankylosaurs. He presents an engaging history of the collection and study of these dinosaurs in England, in which he has been a major actor, having himself found and collected an important specimen of *Polacanthus* on (where else?) the Isle of Wight.

The main part of the book is a detailed, profusely illustrated description of the skeletal anatomy of *Hylaeosaurus* and *Polacanthus*, beginning with the skull and teeth, and moving from there to the vertebral column and ribs, the limb girdles, the limbs themselves, and fossil footprints attributed to such dinosaurs. A good deal of attention is then devoted to characterization of the osteoderms (a topic of particular interest to me) of these dinosaurs. Throughout these chapters, comparisons are sometimes made with polacanthids from other parts of the world, but a more detailed account of these other dinosaurs gets a chapter of its own. The book ends with a description of an ankylosaur specimen from Sussex that Blows thinks deserves its own genus, and so names the beast *Horsamosaurus*.

As with the Lomax and Tamura book, I suspect that the photographs in Blows' account (some in black and white, but

BOOK REVIEW—AMBER PALAEOBIOLOGY: RESEARCH TRENDS AND PERSPECTIVES FOR THE 21ST CENTURY

many in color) will be among the most useful features to specialists. The quality of reproduction of photographs in both books is crisp and clear, both books have glossy pages, and the text is easy to read. Siri Scientific Press has done a very nice job of producing both of them.



Penney, D. 2016. *Amber Palaeobiology: Research Trends and Perspectives for the 21st Century*. Siri Scientific Press, Manchester, UK, 128 pp. (£12.99 paper from <http://www.siriscientificpress.co.uk>)

Reviewed by Mike Meyer (Geophysical Laboratory, Carnegie Institution for Science)

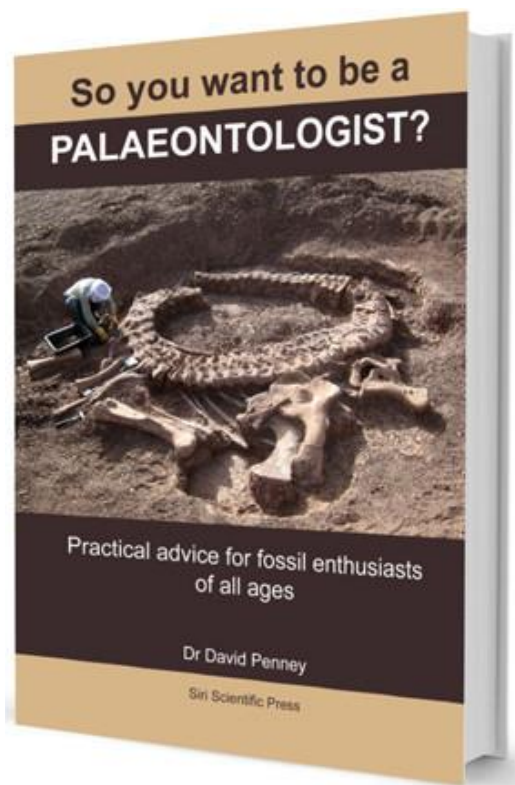
According to archeological evidence, amber has fascinated humans for at least 40,000 years and is still quite popular today, especially given various associations in popular culture. (I know you are thinking of John Hammond!). Professionally, I am interested in exceptional preservation, and organisms trapped in amber are some of the most exceptional in the fossil record. However, amber studies is a niche even in paleontology and when I picked up this book (which is small and only 128 pages long) I assumed that it was going to be targeted at that small community of researchers or enthusiastic collectors (with the hope of some neat photos). I am glad I was so wrong!

After a short introduction, the book begins with an overview of fossiliferous amber deposits that informs the reader of the physical differences between types of deposits, why only some fossils are found in certain places or times than others, all while showcasing some genially beautiful specimens, including microbes! The next chapter covers advanced imaging techniques such as image stacking and computed tomography and synchrotron scanning. This chapter covered the basics of these systems, why they were applied, and then showed some great examples; the best was a hand-sized 3D-printed pseudoscorpion, the original fossil was only 2 mm in length! This is also where I should mention that if you do not like spiders, this book may be at times rather terrifying. Though I hadn't given it much thought beforehand, amber inclusions are the primary method of preserving spiders in the fossil record (see pages 74–75), so they get a lot of page space and some rather close-up views...into their dead eyes, like dolls eyes. This is not a book I advise reading in the dark.

The book then gets into the problems of paleotaxonomy and paleoecology in amber-bearing fossils. This is one of the best discussions on bias in the fossil record I have ever read (especially on one type of preservation), and the author has compiled the data and made figures that allow for an easy understanding of the issues. This section ends on a slightly more personal note from the author on the nature of quantitative paleobiology and how we (as scientists) are doing ourselves a disservice by not collaborating with more extant biologists: "Historically, ecology and paleoecology have been separated for primarily psychological and methodological reasons, not because there are any differences between them *per se*". The book ends on discussions of Copal, amber's younger sibling mineralogically, and the sixth mass extinction.

This book is definitely THE book to go to if you want to know more about general amber research and amber paleobiology and can be recommended for most audiences (both professional and amateur). The author did a great job of covering a lot of ground in a short amount of pages in a succinct and engaging way. The frontispiece is also well done. I should also note that if you are interested in purchasing this book, it is actually cheaper to buy it from the publisher rather than Amazon!

BOOK REVIEW—SO YOU WANT TO BE A PALAEOLOGIST? PRACTICAL ADVICE FOR FOSSIL ENTHUSIASTS OF ALL AGES



Penney, D. 2016. *So You Want to be a Palaeontologist? Practical Advice for Fossil Enthusiasts of All Ages*. Siri Scientific Press, Manchester, UK, 64 pp. (£5.99 paper from <http://www.siriscientificpress.co.uk>)

Reviewed by Roy Plotnick (University of Illinois, Chicago)

Since its founding in 2008, David Penney's Siri Scientific Press has published a growing list of paleontological and other natural history titles, generally oriented towards professionals and dedicated avocational scientists. He has now authored a somewhat more personal volume, aimed at filling a need that many of us have long seen: a guide to what a career (or dedicated hobby) in paleontology is like and how to pursue it. *So You Want to Palaeontologist*, subtitled *Practical Advice for Fossil Enthusiasts of All Ages*, addresses many of the topics that may be raised by an aspiring paleontologist, in particular, what do paleontologists actually do and where do they do it? Much of this is filtered through his own background and history, briefly reviewed in the Preface. Penney's personal enthusiasm shows throughout (lots of exclamation points!).

The first chapter of this slim book gives an overview of the field, introducing the differences among invertebrate paleontology, vertebrate paleontology, paleobotany, micropaleon-

tology, and paleobiology. Given equal attention to these divisions are topics such as taphonomy, ichnology, and paleobiogeography. I would like to have seen some attention to the fact that the boundaries between these areas are very fluid; for example, that many vertebrate paleontologists study taphonomy and ichnology.

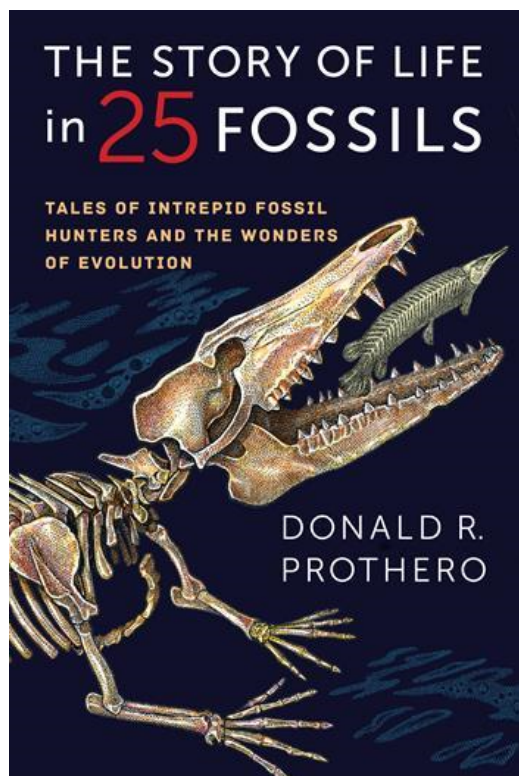
The second chapter, entitled "Why is palaeontology important?", merits only a single page (actually, only two paragraphs). Given the intended audience, and the current state of the discipline, a somewhat longer treatment would not have been remiss. For example, there is nothing here on the integration with development biology or on calibrating molecular phylogenies.

Chapter 3 lists many of the tasks that we would recognize as making up the bulk of our days; e.g., preparing talks for conferences or reviewing papers. Unfortunately, there is little sense given of how these are integrated with each other or what their relative demands on time would be.

Chapter 4, "Where do palaeontologists work?" makes up the bulk of the book. Written with a decidedly U.K.- oriented slant, this chapter reviews the work and duties of paleontologists (or palaeontologists) in museums, parks, industry, and universities, in tasks ranging from curator to volunteer. There is also the notable inclusion of the "independent paleontologist" not associated with an institution, and of commercial collectors. Worthwhile attention is also given to the amateur paleontologist. For all of these, there is an honest assessment of necessary training, job tasks and employment prospects.

The final chapter is a very good synopsis of what it takes these days to pursue a career in paleontology. This includes summaries of needed skills, background coursework, and overall good advice on how to get involved in the field (such as attending conferences).

Overall, this is good introduction to the field of paleontology for someone contemplating a career or at least a dedicated avocation. It is well-written and illustrated with many color photos and diagrams. Granting that it is written from a British perspective, it is still accessible to readers from other countries. Although explicitly aimed at aspiring paleontologists of "all ages," the book would be challenging for younger readers, since many terms and concepts are used that require at least some advanced knowledge. I would recommend it for an American high school senior or college underclassman.



Prothero, D. R. 2015. *The Story of Life in 25 Fossils*. Columbia University Press, New York, 408 pp. (\$28.00 cloth, \$20.80 paper, \$27.99 e-book with 20% PS discount.)

Reviewed by Danielle Montague-Judd (Wanship, UT)

"The Largest Fish." "The Largest Predator." "The Largest Land Animal." Catchy phrases draw the reader in, but Prothero's 2015 book goes well beyond categorizing ancient life into statistics like 'first' and 'largest'. Telling the story of life is a massive undertaking, but this book narrows the focus to 25 key fossils. Prothero weaves history, adventure, and scientific discovery into engaging portraits of the chosen fossils and those who study them, and shows how paleontologists use the scientific process to decipher the history of life. The author includes commentary on misinterpretation of fossils, including distortion and exaggeration by the media and special-interest groups (notably creationists).

Prothero explains the dilemma of choosing only 25 fossils for the book in the preface, "Thus picking just 25 fossils to represent hundreds of millions of extinct species is not an easy task. . . . Given the interests of nonscientist readers, I tended to favor dinosaurs and vertebrates in general" (Prothero 2015, p. ix). Taxonomic coverage includes prokaryotes (1 chapter), invertebrates (5 chapters), plants (1 chapter), and

vertebrates (18 chapters; 2 on dinosaurs, 7 on mammals). Most chapters conclude with a bibliography and a "See it for yourself!" box listing museums and parks that exhibit the key fossils. An appendix of museums and an index round out the book.

Nineteen key taxa feature evolutionary origins, such as the first multicellular animals (Ediacara fauna, represented by *Charnia*) and the origin of amphibians (*Tiktaalik*). Six chapters mark a shift from evolutionary significance of the key taxa to examples of what evolution can achieve: largest predator (*Giganotosaurus*), largest marine reptile (*Shonisaurus*), or largest "sea monster" (*Kronosaurus*). The distinction between the largest marine reptile and the largest "sea monster" seems a bit forced since ichthyosaurs such as *Shonisaurus* could also be considered "sea monsters," and the text does not clarify usage of the term. Throughout the book, Prothero explains key concepts such as functional anatomy, body size estimates, and systematics.

Several of the key fossils represent a host of taxa that are important in the evolutionary story told in each chapter. In some cases, such as the largest land animal (*Argentinosaurus*), numerous taxa could qualify as the highlighted taxon, depending on the latest fossil finds and analysis. Prothero clearly lays out the dynamic nature of science as new discoveries and interpretations appear. Emphasis is placed on the evolutionary significance of the selected taxa. Overall, the writing is engaging and easy to read.

Although the chapters are short, numerous figures accompany the text in the form of drawings, diagrams, photographs, and charts. Many figures are taken from the author's previous works where they reproduced well. In *25 Fossils*, however, poor printing quality and small figure size obscure some of the details, leaving a few of the detailed figures difficult to read (e.g., Figure 16.4, p. 209; Figure 17.6, p. 227). Many figures lack scale bars (e.g., Figure 2.2, p. 20; Figure 3.3, p. 31; Figure 4.3, p. 39; Figure 5.1, p. 47, and so on). In at least one case, a figured specimen has no scale cues in the figure, caption, or text (Figure 18.4, p. 246). On p. 117, Figure 10.2 appears to be mislabeled: based on the text, the top diagram should be *Acanthostega* and the bottom diagram should be *Ichthyostega* (cf. Fig. 10.8 in Prothero 2007).

In addition to figures, the author has drawn heavily from his previous books for other material. For example, the subtitles for the first three chapters in *25 Fossils* are the same as the chapter section headings in Chapter 7 of *Evolution: What the Fossils Say and Why It Matters*.

BOOK REVIEW—GIANTS OF THE LOST WORLD: DINOSAURS AND OTHER EXTINCT MONSTERS OF SOUTH AMERICA

The references listed in the "For Further Reading" sections at the end of chapters are largely books and secondary sources; very few journal articles are provided even when work is described in the chapter. For example, in chapter fourteen, Charles Camp's and Jennifer Hogler's research articles on *Shonisaurus popularis* are mentioned but not listed; only Camp's general-audience pamphlet with an outdated interpretation of depositional environment is included. Four of the 25 epigraphs that introduce each chapter are listed in the bibliographies. A few typos and misprints occur throughout the book (e.g., p. 3, "buried under a thick layers of much younger . . ." and p. 192, "and had weighed 5000 kilograms [100,000 pounds]"; conversion should be 11,000 pounds). A glossary would have been a helpful addition to this general-interest book as a few terms, like "amniote" (p. 254), appear in the text without explanation and are not listed in the index.

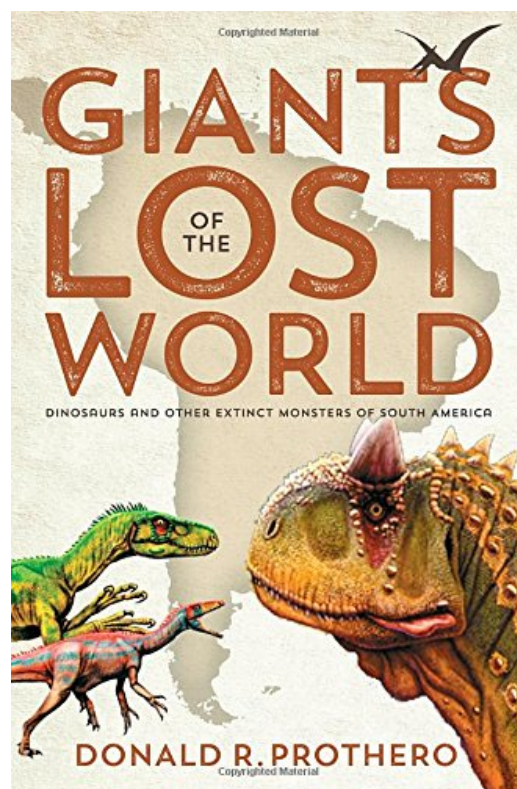
Prothero (2007) provides an in-depth explanation of the modern view of life as a bush rather than a linear "chain of being." It would benefit the reader of the current work to have a short recap of this discussion, because the sequence of chapters perhaps unconsciously reinforces the outdated linear notion by organizing the book from simple to complex, smaller to bigger, and invertebrate to vertebrate.

The author provides greater detail in chapters that deal with his area of expertise (mammals) and content ranges from non-technical to technical throughout the book. This book will appeal to the general reader and especially to the young-adult reader with a keen interest in fossils and prehistoric life. Prothero takes care to point out humans' place in the evolutionary tree and the abundant evidence for human evolution.

Can the story of life be told in 25 fossils? When one considers the totality of life over Earth's history, probably not. Although Prothero provides only snippets of the whole story, those snippets give the reader an intriguing view of evolution and the fossil record. In summary, the book's subtitle, *Tales of Intrepid Fossil Hunters and the Wonders of Evolution*, gives an accurate overview of the focus and style of this glimpse into life's history.

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Reviewed by Mike Meyer (Geophysical Laboratory, Carnegie Institution for Science)

In 1912 Sir Arthur Conan Doyle published *The Lost World*, a tale of adventurers finding an amazing trove of ancient animals and dinosaurs on an isolated plateau in South America. The novel was a critical success that spawned a movie trope which continues to today (abet with more Chris Pratt, not a bad thing). However, the seeds for the novel are real and, at times, stranger than fiction; such as the 'Islands in the Sky', isolated plateaus (or tepuis) found in Bolivia, Brazil, Venezuela and Guyana (and were the destination in Pixar's Up!). In this book the author, Donald Prothero, takes readers in search of the real lost world, the 'island continent' of South America, and all of its exotic denizens over time.

The book begins, after a brief history and legacy of the novel *The Lost World*, when South America was just beginning to break away from Pangea and its continental siblings of Gondwanaland. From there it follows all of the interesting fauna that developed in isolation (or relative isolation, there were a few oddball 'invaders' such as the primates) until the devel-

BOOK REVIEW—GIANTS OF THE LOST WORLD: DINOSAURS AND OTHER EXTINCT MONSTERS OF SOUTH AMERICA

opment of the Isthmus of Panama and the “Great American Biological Interchange”. Throughout, the author focuses on influential scientists and paleontologists that were from or worked in South America and changed the way we look at the ancient world. It was nice to read about the scientific advancements made by South Americans, rather than through the work of Europeans, as those stories are often pushed aside or don’t get much press outside of South America.

It may not surprise readers of this publication to find that dinosaurs get a lot of page time in this book (over a third of the chapters are on them!) while also gracing the cover of my review copy. I could lament about that some, but the author actually uses them quite well to help explain a lot about how the animals lived, what was different about the world in the Mesozoic, and what changes occurred over time. The effective communication of paleontological and geological concepts, while being a fun read, is one of the reasons this book

is a keeper (the section on the K/Pg extinction may be something to consider as a reading assignment for an Earth History class). Sometimes the illustrations were a little wacky or reminding me of a 90’s webpage, but they always conveyed the intended points well.

The book is generally well paced with only the ‘Old Timers’ chapters feeling like they stretched on (though maybe I am just not a fan of large mammals?). I think the best chapters are some of the last—“The Castaways” and “Invasion!”—as the process of alien animal introduction has always been a fascination of mine. The hypotheses surrounding the transport of monkeys from Africa to South America are very interesting and this book describes them well. In conclusion, this is a great read that is suitable for many audiences, from the casual to the professional, and for anyone who is interested in exploring their own lost worlds.

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Book publishers: Please contact Book Reviews Editor Phil Novack-Gottshall (pnovack-gottshall@ben.edu) if you are interested in providing review copies for inclusion in *Priscum*, which has a readership of 1,600 professional and avocational paleontologists.

Available for Review

Allmon, W.D. and M. M. Yacobucci, eds. 2016. *Species and Speciation in the Fossil Record*. Univ. of Chicago Press.

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IDEAS FOR PRISCUM CONTENT OR BOOK REVIEWS?

Do you have any ideas for content for the *Priscum* newsletter? If so, please contact Leigh Fall (leigh.fall@oneonta.edu).

We are interested in including a wide range of content of possible interest to members of our Society. Consider anything from a short description of a future GSA symposium or field trip you are planning to an op-ed sharing a cantankerous viewpoint on a topical issue, an idea for a regular *Priscum* feature, or memorable photos of fossils or fieldwork.

For *Priscum* Content:

Leigh M. Fall, Editor

E-mail: leigh.fall@oneonta.edu

Phone: 607-436-2615

For Book Reviews:

Phil Novack-Gottshall, Book Reviews Editor

E-mail: pnovack-gottshall@ben.edu

Phone: 630-829-6514



Contact the Society:

The Paleontological Society

9650 Rockville Pike

Bethesda, MD 20814

Tel: +1-301-634-7231

Fax: +1-301-634-7099

membership@paleosoc.org