



Society of Vertebrate Paleontology

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Subject: Fossils from conflict zones and reproducibility of fossil-based scientific data

Dear Editors,

We are writing you today to promote the awareness of a couple of troubling matters in our scientific discipline, paleontology, because we value your professional academic publication as an important ‘gatekeeper’ to set high ethical standards in our scientific field. We represent the Society of Vertebrate Paleontology (SVP: <http://vertpaleo.org/>), a non-profit international scientific organization with over 2,000 researchers, educators, students, and enthusiasts, to advance the science of vertebrate palaeontology and to support and encourage the discovery, preservation, and protection of vertebrate fossils, fossil sites, and their geological and paleontological contexts.

The first troubling matter concerns situations surrounding fossils in and from conflict zones. One particularly alarming example is with the so-called ‘Burmese amber’ that contains exquisitely well-preserved fossils trapped in 100-million-year-old (Cretaceous) tree sap from Myanmar. They include insects and plants, as well as various vertebrates such as lizards, snakes, birds, and dinosaurs, which have provided a wealth of biological information about the ‘dinosaur-era’ terrestrial ecosystem. Yet, the scientific value of these specimens comes at a cost (<https://www.nytimes.com/2020/03/11/science/amber-myanmar-paleontologists.html>). Where Burmese amber is mined in hazardous conditions, smuggled out of the country, and sold as gemstones, the most disheartening issue is that the recent surge of exciting scientific discoveries, particularly involving vertebrate fossils, has in part fueled the commercial trading of amber. The rarest types of fossils are sought after for exceptionally high prices (<https://www.sciencemag.org/news/2019/05/fossils-burmese-amber-offer-exquisite-view-dinosaur-times-and-ethical-minefield>). Our understanding is that the Myanmar military has recently seized control of the mining operation, causing armed conflict and ethnic strife in the country where the “offensive killed and displaced thousands of people [forcing them to live in makeshift camps without aid] and has been condemned by the UN as a genocide and crime against humanity” (<https://www.newscientist.com/article/2214875-military-now-controls-myanmars-scientifically-important-amber-mines/>). In fact, Burmese amber is now dubbed ‘blood amber’, with calls for a strict boycott of its commercial trading (<https://www.newscientist.com/article/mg24232280-600-blood-amber-the-exquisite-trove-of-fossils-fuelling-war-in-myanmar/>).

There are fossils from other areas of concern but SVP regards the problem surrounding Burmese amber to be particularly pressing. Although SVP’s mission includes advancing the science of vertebrate paleontology, and SVP respects each country’s natural heritage as well as laws and regulations that govern it, we do not condone promoting our scientific endeavor at the

expense of people facing humanitarian crisis. Therefore, in addition to a call to its own members and other professionals and enthusiasts in the greater paleontological community, SVP respectfully asks journal editors and publishers to be mindful when handling manuscripts for publication that involve fossils from conflict zones. Circumstances vary from country to country, and from specimen to specimen. In the case of Burmese amber, boycotting its commercial trading altogether, at least until the situation in the country stabilizes, may ultimately be one of the most effective solutions. Journal editors, publishers, and peer referees can also serve as ‘gatekeepers’ to set high ethical standards in our scientific field by only publishing manuscripts on Burmese amber that have already been acquired prior to the recent conflict. We also hope that scientists who study Burmese amber as well as private fossil collectors would exhibit the highest possible level of integrity so as not to encourage a black-market for commercial trading of Burmese amber.

The second troubling matter concerns the need to raise the standard of reproducibility of results that is an essential aspect of every scientific study. What may not necessarily be obvious to non-paleontologists is the fact that, in paleontology, the fossils themselves are generally the data that directly offer results. These fossils, remains and traces of prehistoric life, are inherently non-renewable. This means that reproducibility of paleontological research rests on the premise of permanency and accessibility of examined fossil specimens permanently accessioned and deposited in stable repositories within the public trust, each with a unique permanent catalog number. Fossils outside of the public domain, such as those in private collections and privately-operated for-profit museums that are not managed within the public trust as permanent institutions, do not meet these essential standards, even if their owners would allow their fossils to be ‘accessible’ to researchers. It should be noted that this includes cases where the fossil is privately owned but perhaps on long-term loan to a museum. Where scientifically significant vertebrate fossils have become commonly lost to private collections through commercial trading (including via auctions and internet), there has been an increasing lack of understanding of why privately-owned fossil specimens cannot be introduced into scientific literature. This includes at least one case of such a specimen described in a scientific literature under the premise of its future deposition in a yet-to-exist museum (<https://www.sciencemag.org/news/2019/05/fossils-burmese-amber-offer-exquisite-view-dinosaur-times-and-ethical-minefield>). Simply put, privately owned fossils regrettably cannot be regarded as reliably available for study, cannot be considered part of reproducible science, and must not be introduced in scientific literature due to the uncertainty in the long-term accessibility necessary for guaranteeing reproducibility of data from them.

To promote academic rigor of our scientific field, we suggest the following as a template that could be added to editorial policies for your journal or publisher:

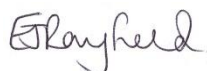
“Any fossil specimen that is described or illustrated in a manuscript intended for publication must be formally accessioned into a permanent, accessible repository, where the specimen will be available for study by the scientific community. Long-term loans from private individuals or private organizations to repositories generally are not sufficient to ensure long-term access to fossils or reproducibility of results.”

Furthermore, we request a moratorium on publication for any fossil specimens purchased from sources in Myanmar after June 2017 when the Myanmar military began its campaign to seize control of the amber mining.

In summary, we ask you as editors of peer-reviewed journals or publishers that are important stakeholders to promote best practices and a high ethical standard in paleontology by being mindful of the issues raised in this letter. While SVP strives for scientific advancement, we firmly believe that scientific endeavor must not come at the expense of humanitarian welfare, intentionally or unintentionally. After all, we must remember that science is a human endeavor.

Please forward this letter to every member of your editorial team to promote the awareness of these existing issues. This letter was sent to the journals and publishers listed at the end of this letter, and we would also appreciate if you can share this letter with any other journals and publishers that publish paleontological papers we could have inadvertently missed. Comments and questions concerning our letter can be addressed to any one of us or Dr. Kenshu Shimada (Chair of SVP's Government Affairs Committee) at svp@vertpaleo.org. We are also willing to provide support in crafting relevant ethics statements for your publication. Thank you in advance for your cooperation.

Sincerely yours,



Emily J. Rayfield, Ph.D.
SVP President



Jessica M. Theodor, Ph.D.
SVP Vice President



P. David Polly, Ph.D.
Past SVP President

CC:

Acta Geologica Polonica
Acta Geologica Sinica
Acta Ornithologica
Acta Palaeobotanica
Acta Palaeontologica Polonica
Acta Palaeontologica Romaniaae
Acta Palaeontologica Sinica
African Invertebrates
African Zoology
Albertiana
Alcheringa
Ameghiniana
American Journal of Botany
American Journal of Science
American Malacological Bulletin
American Museum Novitates
American Naturalist
Anais da Academia Brasileira de Ciências
Anatomical Record
Andean Geology
Annales de Paléontologie
Annales Societatis Geologorum Poloniae
Annals of the Carnegie Museum
Anuário do Instituto de Geociências
Society of Vertebrate Paleontology

Annual Review of Earth and Planetary Sciences
Annual Review of Ecology, Evolution, and Systematics
Arthropod Structure and Development
Arthropod Systematics and Phylogeny
Australasian Palaeontological Memoirs
Australian Journal of Zoology
Austrian Journal of Earth Sciences
BioEssays
Biogeosciences
Biological Journal of the Linnean Society
Biological Reviews
Biology Letters
Biology Open
bioRxiv
BMC Evolutionary Biology
Boletín de Ciencias de la Tierra
Boletín de la Sociedad Geológica Mexicana
Boletín del Museo Nacional de Historia Natural, Chile

Bollettino Della Societa Paleontologica Italiana
Boreas
Bulletin de la Société géologique de France
Bulletin of Geosciences
Bulletin of Goshoura Cretaceous Museum
Bulletin of the Akiyoshi-Dai Museum of Natural History
Bulletin of the American Museum of Natural History
Bulletin of the Geological Society of Denmark
Bulletin of the Gunma Museum of Natural History
Bulletin of the Hobetsu Museum
Bulletin of the Kanagawa Prefectural Museum
Bulletin of the Kurashiki Museum of Natural History
Bulletin of the Mikasa City Museum
Bulletin of the Mizunami Fossil Museum

Bulletin of the Museum of Natural and Environmental History, Shizuoka
 Bulletin of the National Museum of Nature and Science (Japan)
 Bulletin of the Osaka Museum of Natural History
 Bulletin of the Peabody Museum of Natural History
 Bulletin of the Saitama Museum of Natural History
 Bulletins of American Paleontology
 Canadian Journal of Earth Sciences
 Carnets de Géologie
 China Geology
 Climate of the Past
 Communications Biology
 Comptes Rendus Palevol
 Condor
 Contemporary Trends in Geoscience
 Contributions to Zoology
 Copeia
 Cretaceous Research
 Current Biology
 Data in Brief
 Development Genes and Evolution
 Developments in Palaeontology and Stratigraphy
 Diversity
 Diversity and Distributions
 Eastern Paleontologist
 Earth and Environmental Science Transactions of the Royal Society of Edinburgh
 Earth and Planetary Science Letters
 Earth Science (Chikyu Kagaku, Japan)
 Earth-Science Reviews
 Ecography
 Ecology and Evolution
 Ecology Letters
 Ecology
 eLife
 Episodes
 Estonian Journal of Earth Sciences
 Estudios Geológicos (Spain)
 Estudos Geológicos (Brazil)
 European Journal of Taxonomy
 EvoDevo
 Evolution and Development
 Evolution
 Evolutionary Ecology
 Facies
 Folia biologica et geologica
 Fossil Imprint
 Fossil Record
 Fossils and Strata
 Society of Vertebrate Paleontology
 Frontiers in Earth Science
 Frontiers in Ecology and Evolution
 Frontiers in Zoology
 Geo.Alp
 Geobiology
 Geobios
 Geochronometria
 Geodiversitas
 Geologica Acta
 Geologica Belgica
 Geologica Carpathica
 Geological Journal
 Geological Magazine
 Geological Quarterly
 Geological Society of America Bulletin
 Geological Survey of Denmark and Greenland Bulletin
 Geologie de la France
 Geologija
 Geology Today
 Geology
 Geology, Earth and Marine Sciences
 Geology, Geophysics and Environment
 Geology of the Intermountain West
 Geosciences
 Geosciences Journal
 Geoscience Frontiers
 GFF
 Global and Planetary Change
 Global Change Biology
 Global Ecology and Biogeography
 Global Geology
 Gondwana Research
 Grana
 Historical Biology
 Holocene
 Ichnos
 Integrative Organismal Biology
 International Journal of Earth Sciences
 International Journal of Paleobiology and Paleontology
 International Journal of Paleopathology
 International Journal of Plant Sciences
 International Journal of Tropical Geology, Geography and Ecology (Geo-Eco-Trop)
 International Journal of Zoology and Animal Biology
 Invertebrate Zoology
 Irish Journal of Earth Sciences
 Island Arc
 Joannea - Geologie und Paläontologie
 Journal of African Earth Sciences
 Journal of Anatomy
 Journal of Arachnology
 Journal of Asian Earth Sciences
 Journal of Biogeography
 Journal of Crustacean Biology
 Journal of Earth Science
 Journal of Evolutionary Biology
 Journal of Experimental Zoology Part B: Molecular and Developmental Evolution
 Journal of Foraminiferal Research
 Journal of Fossil Research
 Journal of Geophysical Research
 Journal of Herpetology
 Journal of Mammalogy
 Journal of Mediterranean Earth Sciences
 Journal of Micropalaeontology
 Journal of Molluscan Studies
 Journal of Morphology
 Journal of Nannoplankton Research
 Journal of Palaeogeography
 Journal of Paleolimnology
 Journal of Paleontological Techniques
 Journal of Paleontology
 Journal of Quaternary Science
 Journal of South American Earth Sciences
 Journal of Stratigraphy
 Journal of Systematic Palaeontology
 Journal of the Geological Society
 Journal of the Geological Society of India
 Journal of the Geological Society of Japan
 Journal of the Geological Society of Korea
 Journal of the National Museum (Prague), Natural History Series
 Journal of the Palaeontological Society of India
 Journal of the Royal Society Interface
 Journal of Vertebrate Paleontology
 Journal of Zoology
 Kaseki (Fossils, Japan)
 Kirtlandia
 Lethaia
 Mammal Review
 Marine Micropaleontology
 Memoir of the Fukui Prefectural Dinosaur Museum
 Methods in Ecology and Evolution

Micropaleontology	Philosophical Transactions of the	Stratigraphy and Geological
Mie Prefectural Museum Research	Royal Society B	Correlation (Stratigrafiya.
Bulletin	PhytoKeys	Geologicheskaya Korrelyatsiya)
MorphoMuseum	Phytotaxa	Stratigraphy
National Science Review, nwz206	PLoS Biology	Swiss Journal of Geosciences
Natural History Report of Kanagawa	PLoS One	Swiss Journal of Palaeontology
Nature Communications	Polar Research	Systematic Biology
Nature Ecology and Evolution	Polish Polar Research	Terra Nova
Nature Geoscience	Proceedings of the Geologists'	Transactions of the Kansas Academy
Nature	Association	of Science
Nauplius	Proceedings of the Linnean Society	Trends in Ecology and Evolution
Nautilus	of New South Wales	Turkish Journal of Earth Sciences
Netherlands Journal of Geosciences	Proceedings of the National	Vegetation History and
Neues Jahrbuch für Geologie und	Academy of Sciences of the	Archaeobotany
Paläontologie	United States of America	Verlag Dr. Friedrich Pfeil
New Mexico Museum of Natural	Proceedings of the Royal Society B	Vertebrate Anatomy Morphology
History and Science Bulletins	Proceedings of the Yorkshire	Palaeontology
New Zealand Journal of Geology	Geological Society	Vertebrata PalAsiatica
and Geophysics	Proceedings of the Zoological	Volumina Jurassica
Newsletters on Stratigraphy	Institute of the Russian Academy	Waterbirds
Norwegian Journal of Geology	of Sciences	Yerbilimleri
Open Journal of Geology	Publicación Electrónica de la	Zitteliana A
Organisms Diversity and Evolution	Asociación Paleontológica	Zitteliana B
Ornis Hungarica	Argentina	ZooKeys
Palaeo Ichthyologica	Quaternary	Zoologica Scripta
Palaeo Vertebrata	Quaternary International	Zoological Journal of the Linnean
Palaeobiodiversity and	Quaternary Research	Society
Palaeoenvironments	Quaternary Sciences	Zoological Letters
Palaeodiversity	Quaternary Science Reviews	Zoological Science
Palaeogeography,	Review of Palaeobotany and	Zoomorphology
Palaeoclimatology, Palaeoecology	Palynology	Zoosymposia
Palaeontographica Canadiana	Revista Brasileira de Paleontologia	Zoosystematica Rossica
Palaeontographica Section A	Revista de la Asociación Geológica	Zootaxa
Palaeontographica Section B	Argentina	
Palaeontographical Society	Revista del Museo Argentino de	
Monographs	Ciencias Naturales	
Palaeontologia Africana	Revista del Museo de La Plata	
Palaeontologia Electronica	Revista Mexicana de Ciencias	
Palaeontologia Polonica	Geológicas	
Palaeontology	Revue de Micropaléontologie	
Palaeontos	Revue de Paléobiologie	
Palaeoworld	Rivista Italiana di Paleontologia e	
Palaios	Stratigrafia	
Paleobiology	Royal Society Open Science	
PaleoBios	Science Advances	
Paleoceanography and	Science Bulletin	
Paleoclimatology	Science China Earth Sciences	
Paleontological Contributions	Science	
Paleontological Journal	Science of Nature	
(Paleontologicheskii Zhurnal)	Science Report of the Toyohashi	
Paleontological Research	Museum of Natural History	
PaleorXiv	Scientific Data	
Palynology	Scientific Reports	
Paläontologische Zeitschrift	Scottish Journal of Geology	
Papers in Palaeontology	South African Journal of Science	
Peer Community in Paleontology	Spanish Journal of Palaeontology	
PeerJ		
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