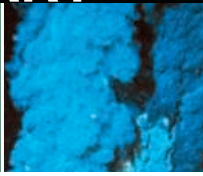


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LETTERS

edited by Etta Kavanagh

Scientific Description Can Imperil Species

SCIENTISTS ARE RACING TO DISCOVER AND describe new species in the face of a global biodiversity crisis. Ironically, in cases of commercially valuable taxa, publishing new species descriptions may inadvertently facilitate their extinctions. These descriptions advertise “novelties” for hobbyists and drive new markets. Most modern descriptions provide detailed information on the locality and habitat where the new species occurs, turning a scientific article into a treasure map for commercial collectors. Researchers in fields with application to bioterrorism are debating codes of conduct to ensure that their findings do not fall into the wrong hands, the so-called “dual-use dilemma” (1). Taxonomists describing new species that have the potential to become commercially valuable are also faced with a dual-use dilemma.

Three of us have published descriptions of new species of restricted-range reptiles and amphibians that tragically aided their commercial exploitation. Immediately after being described, the turtle *Chelodina mccordi* from the small Indonesian island of Roti (2) and the gecko *Goniurosaurus luii* from southeastern China (3) became recognized as rarities in the international pet trade, and prices in importing countries soared to highs of \$1500 to \$2000 each. They became so heavily hunted that today *C. mccordi* is nearly extinct in the wild (4) and *G. luii* is extirpated from its type locality (3). The salamander *Paramesotriton laoensis* from northern Laos was not known in the international pet trade prior to its recent description as a new species (5). Over the past year, Japanese (6, 7) and German collectors used the published description to find these salamanders, and they are now being sold to hobbyists in those countries



A *Goniurosaurus luii* gecko

for \$170 to \$250 each. Similar cases are known from elsewhere in the world and from other taxa.

Withholding locality information from new species descriptions (8) might hamper profiteers, but it also hampers science and conservation.

However, with the aid of the Internet, scientists can now monitor commercial demand for species just as commercial collectors can monitor scientific journals. This means prior information exists on which taxa will likely become commercial commodities (we should become concerned for any newly described species of *Chelodina* and *Goniurosaurus*). In such cases, taxonomists should work closely with relevant governmental agencies to coordinate publication of the description with legislation or management plans that thwart overexploitation of the new species. Of course, this will not always be easy or successful, and may lengthen publication time, but alternative solutions that allow taxonomists to continue their work without contributing to species decline are wanting.

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Tropical Deforestation and Global Warming

THE NEWS FOCUS ITEM “ALONG THE ROAD FROM Kyoto” (E. Kintisch, 24 Mar., p. 1702) dramatically reveals the contrasts among countries in their impact on global warming and correctly identifies countries such as the United States as the greatest emitters of carbon. However, the news report fails to mention that the numbers used in its graphs of “total emissions” and “global emissions” refer only to fossil-fuel combustion and cement

manufacture (1)—they do not include deforestation. The bar representing 2002 emissions from Brazil would be about five times longer if Amazonian deforestation at the 2002 annual rate of $23.3 \times 10^3 \text{ km}^2$ were included (2, 3). Recognizing the substantial contribution of tropical deforestation is important if action is to be taken to reduce the rate of forest loss through measures that could be financed on the basis of the climatic benefits of keeping forests standing (4).

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Concern About Gag Rules

WITH REGARD TO DONALD KENNEDY’S EDITORIAL “The new gag rules” (17 Feb., p. 917), the National Oceanic and Atmospheric Administration’s (NOAA) Science Advisory Board

(SAB) is deeply concerned about reports of attempts to suppress and/or distort the reporting or representation of scientific findings by federal agency scientists. However, the SAB is also concerned about misrepresentations of NOAA actions, particularly when the agency has been scientifically proactive.

At a public meeting of the SAB in March 2005, NOAA Administrator C. C. Lautenbacher Jr. requested that the SAB create an external Hurricane Intensity Research Working Group (HIRWG). He requested that the group be charged with assessing the status of NOAA's hurricane intensity forecasting and making recommendations on ways to improve operational forecasting. Through a public, open nomination process, the SAB created the HIRWG, consisting of 12 U.S. hurricane experts. The HIRWG presented its preliminary findings and recommendations to the SAB on 7 March 2006.

Thus, NOAA requested this external study of the agency's hurricane intensity modeling and forecasting, including the relationships of intensity and intensity change to sea surface temperatures and ocean-atmospheric exchange, several months before hurricanes Katrina and Rita appeared in September 2005. The timing of the request also was well in advance of the publication of the manuscripts to which your Editorial alludes. NOAA and its SAB await the rollout of the final report. Thank you for your continued vigilance.

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Working Together for Communication

DONALD KENNEDY'S EDITORIAL "THE NEW GAG rules" (17 Feb., p. 917) was quite disturbing. I was offended, not by the unfounded allegations of conspiracy at the National Aeronautics and Space Administration (NASA), but by the Editorial's reckless disregard for the truth.

The *New York Times* article (1) upon which the Editorial is based contains no references whatsoever to any personal involvement by me in any sort of conspiracy or political influence. Is Kennedy's citing of these nonexistent allegations a deliberate fabrication of "facts" to fit his editorial position—or is it just shoddy journalism?

I know scientists often feel they are eloquent writers and expert communicators, but often they are not. Nor are public affairs officers always experts in science. This is why public affairs officers and scientists must work together in explaining their work in a way that laymen can understand. That is the best way to communicate their incredible science discov-

eries to the public.

DEAN ACOSTA

National Aeronautics and Space Administration, Office of Public Affairs, Washington, DC 20546, USA.

Reference

1. A. C. Revkin, "Climate expert says NASA tried to silence him," *N.Y. Times*, 29 Jan. 2006, p. 1.

Response

ACOSTA OFFERS NOT A SINGLE INSTANCE OF misrepresentation, fabrication, inaccuracy, or shoddy journalism in my Editorial. Readers can check the *New York Times* article we both cited to see whether I misrepresented it. His letter is short on facts but rich in rhetoric, presumably to support his central point: that public affairs types need to collaborate with scientists because the latter can't write well.

DONALD KENNEDY

Revisiting the Age of the Sahara Desert

IN THEIR BREVIA "THE AGE OF THE SAHARA Desert" (10 Feb., p. 821), M. Schuster *et al.* state that the oldest terrestrial records for desert conditions in the Sahara are only 86 thousand years old (ka). This is not correct. For example, U/Th dating from the Eastern Sahara gives dates of >300 ka (1). The lack of older geochronological data can be explained by the extreme eolian and fluvial erosion during the many arid-humid cycles, which lasted about 100,000 years each and which have deleted most of the sediments deposited during the



preceding cycle. A wealth of paleoclimatic, geomorphological, archaeological, astronomical, and other evidence and reasoning suggests that the origin of the Sahara desert is closely linked to the Quaternary Ice Age, which began about 2.5 million years ago (Ma).

Dunes have existed in subtropical Africa since plate tectonics drifted it to its present latitudinal position. A 7-Ma dune complex (according to biostratigraphic correlation) at 16°N (which is not even in the Sahara but in the sahelian transition zone at its southern fringe) is therefore not a serious base for postulating

such an early age, which contradicts decades of field research in the Sahara. At best, it shows an arid or semi-arid period, which may not at all have persisted over 7 Ma.

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IN THEIR BREVIA "THE AGE OF THE SAHARA Desert" (10 Feb., p. 821), M. Schuster *et al.* interpret Upper Miocene sandstones in Chad as eolian dune deposits, they claim that these sandstones provide the earliest in situ record for arid climates and eolian sand accumulation in the Sahara, and they claim that this interpretation indicates that desert conditions started in the Sahara at least 7 million years ago. There are several concerns about these claims:

1) The photographs and descriptions provided by Schuster *et al.* are not sufficient for a reader to evaluate the interpretation of an eolian origin for the sandstones. Detailed photographs of grainfall deposits and ripple strata would provide more convincing evidence for the interpretation (1, 2).

2) The Upper Eocene Hadida Formation in southern Morocco is the oldest Cenozoic stratigraphic interval in the Sahara that has been given an eolian interpretation (3).

3) Most Miocene strata in the Sahara consist of sandstones with cross-bedding that have been interpreted as fluvial deposits that accumulated under humid climate conditions.

Specifically in Chad, previous studies suggest that the climate during most of the Miocene was relatively humid and that the first appearance of persistent and widespread arid conditions occurred during the Pliocene (4–6).

4) Data from marine cores off the west coast of Africa suggest that persistent and widespread desert conditions first appeared in the Sahara during the Early Pliocene (7, 8).

In addition, there are errors in the Brevia. The oldest thermoluminescence date reported from an eolian sandstone in Tunisia of >86 thousand years ago (ka) (9, 10) may not be "the oldest terrestrial record for desert conditions in the Sahara."

Several claims of pre-Quaternary eolian strata need to be examined more closely, including the Upper Eocene Hadida Formation of southern Morocco (3) and the Pliocene-Pleistocene Garet Uedda Formation of northern Libya (11, 12).

Contrary to the claim that Callot provided "firm evidence ... for a pre-Quaternary Great Western Sand Sea in Algeria," a closer reading

TECHNICAL COMMENT ABSTRACTS

shows that Callot postulated that the age of the Great Western Sand Sea is pre-Holocene and that the Sand Sea was probably initiated during the late Neogene and (or) early Quaternary (13). The age that Callot postulated is based on observations of sand grain sizes, eolian dune geomorphology, and stratigraphic relations with a “hamada” surface.

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Response

THE BOUNDARIES OF THE SAHARA, BASED ON an isohyet distribution and not on latitude, have changed with time (1). Our study area (Toros-Menalla) is located in the “Erg du Djourab” (i.e., Djurab sand-sea), which is clearly part of the Sahara.

It is easy to postulate, as Kroepelin does, that ancient sediments were deposited and then eroded, but that is not a satisfying answer. The “paleoclimatic, geomorphological, archaeological, astronomical, and other evidence” he mentions has systematically failed to precisely date processes older than a few 100,000 years. The U/Th dating mentioned in the comment has been performed on carbonates, deposited during “humid climates.” However, paleontological discoveries over the past 10 years in the Chad Basin [e.g., (2–5)] show that a pre-Quaternary succession (upper Miocene and Pliocene deposits) can be well preserved in the Sahara. Some of these deposits are eolian in origin, with a minimum preserved area of 1000 km². Our data clearly show that a sand sea existed at 16°N as long ago as 7 million years ago (Ma). It was made clear in our Brevia that arid desert conditions have not persisted since 7 Ma but existed repetitively.

It was beyond the scope of our Brevia to discuss sedimentary interpretations based on photographs. We are preparing a paper that will properly illustrate depositional facies and successions, including “ripple strata and grain fall deposits.” However, the interpretation of an old eolian deposit is much more than the occurrence of such primary sedimentary structures.

COMMENT ON “Heterogeneous Hadean Hafnium: Evidence of Continental Crust at 4.4 to 4.5 Ga”

John W. Valley, Aaron J. Cavosie, Bin Fu, William H. Peck, Simon A. Wilde

Harrison *et al.* (Reports, 23 December 2005, p. 1947) proposed that plate tectonics and granites existed 4.5 billion years ago (Ga), within 70 million years of Earth’s formation, based on geochemistry of >4.0 Ga detrital zircons from Australia. We highlight the large uncertainties of this claim and make the more moderate proposal that some crust formed by 4.4 Ga and oceans formed by 4.2 Ga.

Full text at www.sciencemag.org/cgi/content/full/312/5777/1139a

RESPONSE TO COMMENT ON “Heterogeneous Hadean Hafnium: Evidence of Continental Crust at 4.4 to 4.5 Ga”

T. M. Harrison, J. Blichert-Toft, W. Müller, F. Albarede, P. Holden, S. J. Mojzsis

Valley *et al.* review the lines of evidence on which we drew to conclude that continental crust formed much earlier than previously thought. Their comment contains some misrepresentations that we correct, but new information they provide appears to bolster our hypothesis. Nothing in their comment refutes the presence of continental crust or plate boundary processes prior to 4 billion years ago.

Full text at www.sciencemag.org/cgi/content/full/312/5777/1139b

For example, in the Chadian eolian deposit, the similarity of Miocene and modern wind orientations, perpendicular to regional paleoslope, is also convincing evidence.

The Upper Eocene Hadida Formation in Southern Morocco (6) comprises deposits interpreted as eolian in origin (there were no photographs in this paper). However, these deposits are of very limited spatial and temporal extent. In addition, they are intercalated between coastal sebkha deposits and alluvial-fan sediments and therefore represent coastal eolian sand dunes. Such coastal eolian sedimentation cannot be used to ascertain the start of desert conditions in the Sahara (many examples are developed along the Atlantic French coast to the Dutch and German North Sea area).

Dating of the sedimentary succession based on the discovery of abundant Pliocene and Miocene vertebrate faunas is now available (3–5) and replaces less reliable age attributions. Dealing with facies interpretations, cross-bedding is not sufficient to identify fluvial deposition, and we consider that some of the cross-bedded units can be re-interpreted in eolian sediments (see our Brevia). Recent research (1995–2006) in the Chad Basin has greatly challenged the pioneering works used by Swezey, which were done in the 1970s. Marine cores off the west coast of Africa can produce proxies for the onset of arid conditions in the Western Sahara but cannot be used if dealing with the Central Sahara. As the latter area is known to be more arid than the former, the onset of desert conditions may have been earlier in the Chad Basin, and Miocene sand seas would thus be not surprising.

About Callot’s work (7), whatever the late Neogene or early Quaternary age of the former Western Great Sand sea, it clearly reported the oldest eolian deposits known in the Sahara, until the discovery of the Miocene Chadian eolian

sediments. We simply wrote pre-Quaternary as Hamada deposits are generally regarded as Neogene, even if later pedogenetic processes are probably post-Quaternary [(e.g., (8)).

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Letters to the Editor

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