Meeting Standards

Nigel Williams' article "Tobacco funding debate smolders" (News & Comment, 4 Oct., p. 28) highlights the disturbing tendency of some philanthropic organizations to politicize science in a way that threatens independent research. The Cancer Research Campaign (CRC) in Britain threatened to halt future funding for Cambridge University scientists because the university accepted a donation from British American Tobacco Industries to support a new professorship in international relations. The article says that, according to a statement by the CRC, "[t]he CRC's next step will be to develop a new code to ensure that its grants and intellectual scientific property are not 'tainted with tobacco money.' "

The fact is that the vast majority of universities and scientific journals have conflict-of-interest procedures, including the disclosure of funding sources, which seek to ensure that scientific research is judged on its merit alone. It is the responsibility of the scientists (as researchers and as peer reviewers), the universities, and the scientific journals to see that research, regardless of funding source, meets the standards of the discipline. Creating controversy around science through attacks on funding sources diverts attention from the validity of the research and opens the door to intimidation of academic institutions and individual scientists alike. It is ironic that the CRC says it supports academic freedom; it seems that the CRC is actually limiting research opportunities and increasing fear of "political" retribution within the academic setting. All scientists must be alert to protecting academic freedom and enhancing the diversity of views.

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Dating the Origin of Animals

The Research Article by G. A. Wray *et al.* (25 Oct., p. 568) suggesting that the diversification of major animal phyla occurred between 1 and 1.2 billion years ago, finds indirect support from Proterozoic fossil stromatolites. These structures underwent a dramatic decline in diversity over a long period that may be explained if the view of this early origin of animals is accepted.

Earlier published diversity curves of stromatolite abundance (*1*) indicated that peak abundance was reached about 1.5 billion years ago, persisting at this level until about 700 million years ago. Then followed an apparent rapid late Precambrian decline, attributed to increased animal diversity. Such data provided support for those who argued for animal origins very late in the Precambrian.

More recently published Proterozoic stromatolite abundance data (*2*) show, however, a substantially different pattern, with a decline in diversity initiated much earlier and persisting for over 1 billion years. These show peak diversity 1 to 1.3 billion years ago. It then declined to about 75% of this level between 1 billion and 700 million years ago, dropping to less than 20% at the beginning of the Cambrian.

If, as seems likely, the decline in stromatolite diversity was a result of the increase in animal diversity during the late Proterozoic, then the time of onset of this decline supports the suggestion, based on molecular sequence divergence times, of animal origins at least 1 billion years ago.

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Airborne Particle Analysis

In the Perspective "Airborne particle analysis for climate studies" (6 Sept., p. 1352), Thomas Peter discusses upcoming methods of online airborne-particle analysis using time-of-flight mass spectrometry. In the description of the analytical capabilities of the method, Peter points out that "general rules on how to construct an optimal particle grouping under field conditions are still missing." But it has now been described in the literature how an automized classification of particles in an unknown particle population can be performed (*1–3*). The techniques to analyze and classify airborne particles in real time are available. On the basis of the ideas and developments of several groups described during the last decade, methodologies such as on-line mass spectrometry of airborne particles (*4*) and fuzzy clustering of spectral data (*5*) have evolved into a powerful technique that allows for a quick and precise description of the current particle population of the surrounding air.

Meanwhile, there is a common understanding that only a simultaneous analysis of both positive and negative ions formed by laser desorption ionization is able to unambigiously characterize and classify single particles by mass spectrometry. This conceptual paradigm has been validated by a study (*1*) demonstrating that the gain of analytical information by using both ion polarities is by far higher than just a factor of two, as compared with using just one ion polarity. With this approach of data collection, real-time particle classification by statistical methods such as fuzzy clustering can become a reality for atmospheric research (*3*).

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Response: New techniques for real-time chemical analysis of individual particles may open up a rich new understanding of tropospheric and stratospheric aerosol effects and processes. Some of these upcoming possibilities were illustrated in the Perspective, as well as some of the critical steps we will have to overcome on the way to these goals. Three examples served to illustrate the state of the art: simultaneous particle chemical and size analysis (*1*), the first available measurements in the field (*2*), and the development of quantitative techniques