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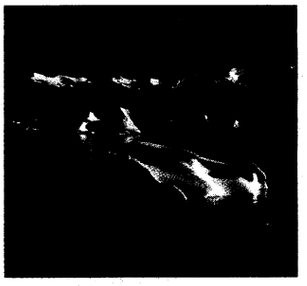
LETTERS

Fire and Ice

Letters this week discuss how global warming might be affecting Arctic ice (at right), the maturation of theory and experiment in plasma physics, how collaborating researchers could share hot data, the missions of laser fusion and particle accelerators, and creatures that hotfoot (and plants that passage) along wildlife corridors.



Global Warming and the Arctic

In the News article "Polar regions give cold shoulder to theories" by Dennis Normile (8 Dec., p. 1566), John Walsh of the University of Illinois is said to note the absence of retreating sea ice, and H. Jay Zwally of Goddard Space Flight Center says his search for long-term trends in ice cover, based on a review of satellite-based remote sensing of polar ice, "has given ambiguous results." These comments are contrary to the enhanced warming in the Arctic region predicted by the global climate model developed by the Hadley Centre for Climate Prediction and Research in Bracknell, United Kingdom (*1*). These statements are also contrary to what we find.

We have shown that there is a significant decrease of sea ice extent (area within the ice-ocean margin limited by the 15% ice concentration contour) and area (area of ice-covered ocean) over the last 16 years by analyzing separately treated, passive microwave satellite data from the SMMR and SSM/I sensors (*2*). Recently we have been able to use the July and August 1987 overlap period between the two sensors to merge the time series (*3*).

We obtained a 16-year record (1978–1994) of Arctic and Antarctic ice extent and ice area: The greatest decreasing trends (within the 99% confidence level) were found in Arctic ice extent, −4.6%, and ice area, −5.8%. These trends are at least one order of magnitude higher than the overlap period differences between the two sensors and also between the trends found earlier (*2*) with the use of separately treated SMMR and SSM/I data. This conformance supports our contention that the merging of SMMR-SSM/I data was successful.

Our study (*3*) establishes a decrease of Arctic ice extent and ice area from 1978 to 1994, which may well be a signal of global greenhouse gas warming. This study has taken place in a critical period with respect to fingerprint detection of global warming (*4*).

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1. J. Mitchell, T. Johns, J. Gregory, S. Tett, *Nature* **376**, 501 (1995).
2. O. M. Johannessen, M. W. Miles, E. Bjørgo, *ibid.*, p. 126; SMMR, scanning multichannel microwave radiometer; SMM/I, special sensor microwave/imager.
3. O. M. Johannessen, M. W. Miles, E. Bjørgo, in *Proceedings from the International Geoscience and Remote Sensing Symposium 1995*, Florence, Italy (Institute of Electrical and Electronics Engineers, New York,1995).
4. K. Hasselmann *et al.*, *Technical Report 168* (Max-Planck-Institut für Meteorologie, Hamburg, Germany, 1995).

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Collaboration and Data Sharing: Continued

While I agree in general with Barbara Mishkin ("Urgently needed: Policies on access to data by erstwhile collaborators," Policy Forum, 10 Nov., p. 927) that clear guidelines would be useful to determine data ownership in scientific collaborations, there are two points on which I depart.

First, one of the cases Mishkin describes, the Maryland Whistleblower case, was not a data ownership or access dispute. I served as trial counsel for the plantiffs in the case. Mishkin is now appellate counsel for the University of Alabama, seeking to reverse the trial court's judgment. The evidence demonstrated that the dispute arose out of the alleged misuse of the whistleblower's intellectual property, not the University of Alabama's data, in seeking National Insti-

tutes of Health (NIH) grants. My client was a Cornell University researcher who used the University of Alabama's data and from that developed her own data set and epidemiological study and drew her own conclusions, to which the Alabama researchers were privy.

Second, scientific collaborations fall under the general rules of partnership. In life and the law, partnerships often are not in writing. They require the utmost good faith on the part of their participants. There is no code of ethics that improves on the human capacity for honesty and decency in science and other endeavors.

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Response: Dangel's comments illustrate the importance of how one characterizes the issues in a case. Dangel describes Berge's complaint against the University of Alabama, Birmingham, as arising from alleged misuse of *her* intellectual property. The threshold question in my view is whether—and if so, under what circumstances—primary data collected by one group of scientists ever become the *exclusive* property of a visitor who is permitted to use their data for further analysis. Berge spent 7 months in Alabama reviewing a unique collection of data amassed over two decades, and extracting portions for her own research. Alabama provided an NIH-funded biostatistician for computer entry and initial organization of the derived data set, and Alabama personnel were co-authors on the resulting paper. Nevertheless, Berge now claims *exclusive* rights to the results of her analyses. She also claims that no one else should have access to Alabama's massive collection of primary data (even to study different questions) so long as she continues to analyze her derived data set.

Good faith, honesty, and decency are essential, but not always sufficient, for avoiding conflicts in human relations. People can enter into partnerships with good faith but different expectations, and disputes arise when those expectations collide. Established bodies of law resolve disputes over rights and responsibilities when marriages or business partnerships dissolve, just as prenuptial and partnership agreements attempt to anticipate problems and resolve them in advance. My hope is that general principles can be established for scientific collaborations to avoid—or resolve—disputes arising from incompatible expectations.

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Megajoules and Other Missions

The letter "Megabucks for megajoules?" by William E. Parkins (24 Nov., p. 1281), in which he opposes the National Ignition Facility (NIF) and the Accelerator Production of Tritium (APT) projects, does not account for recent technological progress or for multiple missions.

The premise that ideas that are difficult or take a long time to realize should be abandoned would deny society many technological benefits. Following this premise, we would not today have manned air or space flight or even the laser.

The fact that fusion is difficult to achieve means that enhanced safety with entirely passive systems is possible; that is, if anything were to go wrong, the reactions would stop and the plant would shut down. Furthermore, a fusion plant would produce little residual radioactivity (1000 times less than a fission plant) which would decay in