LETTERS

EDITORIAL
Protectionism and the Universities: R. L. Sproull 125

ARTICLES
Cosmic-Ray Record in Solar System Matter: R. C. Reedy, J. R. Arnold, D. Lal 127
Impact of Genetic Manipulation on Society and Medicine: A. G. Motulsky 135
On the Nature of Intelligence: E. Hunt 141

NEWS AND COMMENT
Ethiopia Halts Prehistory Research 147
Academe and Industry Debate Partnership 150
Congress Ducks the MX 151
Briefing: A "Euro-Brookings" Enters the Lists; Princeton Physicists Meet Tokamak Deadline; School Says Researcher Synthesized Results 152

RESEARCH NEWS
Compact Fusion: Small Is Beautiful 154
El Chichon Climate Effect Estimated 157
Do Tumor Promoters Affect DNA After All? 158

AAAS NEWS
1982 Election Results; Proposals and Resolutions Invited for 1983 Council Meeting; SOHIO Grant Funds Major Science Education Initiative; R & D Colloquium Slated for March; International Committee Plans Future Actions; AAAS-Newcomb Cleveland Prize Announced; Reviewers for Science Books & Films Needed; Calendar of Major Scientific Meetings 160

BOOK REVIEWS
The Rise and Decline of Nations, reviewed by D. C. North; Radiation, D. K. Allison; Bottled Energy, J. E. Brittain; Botanical Exploration of Southern Africa, G. L. Webster; Major Structural Zones and Faults of the Northern Appalachians, D. R. Gray; Books Received 163
RESEARCHERS

Temperature and Precipitation Estimates Through the Last Glacial Cycle from Clear Lake, California, Pollen Data: D. P. Adam and G. J. West.............. 168


Crystalline Todorokite Associated with Biogenic Debris in Manganese Nodules: M. D. Siegel and S. Turner ................. 172

Recombination During Gene Transfer into Mouse Cells Can Restore the Function of Deleted Genes: J. Small and G. Scangos........ 174

Quaternary and Quinernary Structures of Native Chromatin DNA in Liver Nuclei: Differential Scanning Calorimetry: C. Nicollini et al. .............. 176

Uphill Sodium Transport Driven by an Inward Calcium Gradient in Heart Muscle: J. H. B. Bridge and J. B. Bassingthwaighe ............ 178

Membrane Isolation Alters the Gel to Liquid Crystal Transition of Acholeplasma laidlawii B: D. G. Cameron, A. Martin, H. H. Mantsch .......... 180

Trypsin Inhibition by Mouse Serum: Sexual Dimorphism Controlled by Testosterone: F. Kueppers and J. Mills....................... 182

Spider Web Protection Through Visual Advertisement: Role of the Stabilimentum: T. Eisner and S. Nowicki ....................... 185

Adaptation of Fruit Morphology to Dispersal Agents in a Neotropical Forest: C. H. Janson .............. 187

Immunoreactive Dynorphin-(1–8) and Corticotropin-Releasing Factor in Subpopulation of Hypothalamic Neurons: K. A. Roth et al. .......... 189

Red/Green Color Opponency at Detection Threshold: J. E. Thornton and E. N. Pugh, Jr. ........................................... 191

Synchronized Moulting Controlled by Communication in Group-Living Collembola: H. P. Leinaas ....................... 193

Myasthenic Globulin Enhances the Loss of Acetylcholine Receptor Clusters: S. Bursztajn et al. ........................................... 195

Sex Differences in Dendritic Structure in the Preoptic Area of the Juvenile Macaque Monkey Brain: D. M. Ayoub, W. T. Greenough, J. M. Juraska .... 197

PRODUCTS AND MATERIALS

Clinical Chemistry Analyzer; Automated Recovery of Clinical Solvents; Prostaglandin Radioimmunoassay; Programmed Chemistry Modules; Free Thyroxine Assay; Sterile Pipette Tips; Literature .......................... 200

COVER

Spider web "stabilimentum." These silken adornments, commonly found in the hub of diurnal webs, visually warn birds of the presence of webs in their flight path. See page 185. [Thomas Eisner and Stephen Nowicki, Cornell University, Ithaca, New York 14853]
Protectionism and the Universities

There are many good reasons for the great current attention to university-industry relations, but there are troublesome reasons as well. One is that universities are now unusually hungry. There is nothing wrong with hunger. But a hungry man may cut corners in his rush to nourishment, and he may be taken advantage of in negotiations. Fear of this is leading to the threat of protectionism, as exemplified by recent attempts to classify or otherwise control access to university research, including that which joint with industry.

In designing university-industry connections, protecting interests by high-level negotiations is not right. The adversary process, and the proliferation of lawyers to manipulate it, was never intended to apply to joint programs, where the output is also joint, where it is by no means a zero-sum game, and where the accomplishments for all participants are far greater if speed and simplicity of negotiations take the place of exquisitely detailed legal contracts. Protectionism is dangerous and habitual-forming. Circumstances exist where it is appropriate, but only for a short time. One of the few essentials of agreements is that any secrecy or interference with open publication or student interaction should be strictly temporary.

The dominant problem of supporting enough basic research in universities will remain. This must continue to be a federal responsibility; no company or industry can harvest the results soon enough to justify any investment larger than keeping a window on basic research and a conduit for the movement of bright young people into the company. Hard work in the universities will lead to important cooperative research agreements with industry, but unremitting effort will be required to maintain or enlarge the basic research on which all else rests.

But there is far more at stake than support for universities. University-industry interaction should not be looked upon as support at all, but as an absolutely necessary part of the survival both of American institutions and of the American economy. As the economy stumble, protectionism of all kinds becomes rampant, and everyone loses. From the university's standpoint, cooperative projects with industry affect graduate (and even undergraduate) work in healthy ways. To use Harvey Brooks's phrase, giving students "respect for applied problems" is an important part of their education. Wisdom begins when students (and even professors) realize that an invention is not a product and a product is not an industry. What is perhaps most at stake is attracting some of the ablest young people to those fields that can make a difference in the survival of our society. Particle physics ought to be done, just as art galleries ought to be maintained, and the richer the country is, the more particle physics and art galleries it should support. But it would be a disaster if protectionism, of either the government or the industry variety, were to discourage some of the best young people from going into applied fields.

Universities are resilient institutions. We are sufficiently strong in depth that we can afford to experiment. If we move too fast or in an inappropriate direction, we can pull back. Our resilience means that we do not have to be so protectionist that we become precious. After all, what we properly call "integrity" the rest of the world calls "selfishness." Incidentally, I prefer Eric Ashby's words "inner logic" to "integrity." We must be careful to preserve our inner logic, certainly, and incidentally our 501(c)3 status (or the similar tax-exempt status of our affiliated foundations). But the public at large is less interested in the precise boundaries between universities and industry or universities and government; after all, the public is paying for all of these entities. Above all we should indulge in protectionism of a higher sort: we should protect our willingness and ability to take risks, to experiment, to undertake new directions, and to help a new generation prepare themselves for lives of service.—ROBERT L. SPROULL, President, University of Rochester, Rochester, New York 14627

Adapted from an address at the Conference on University-Industry Relations, Madison, Wisconsin, 16 November 1982.