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SCIENCE

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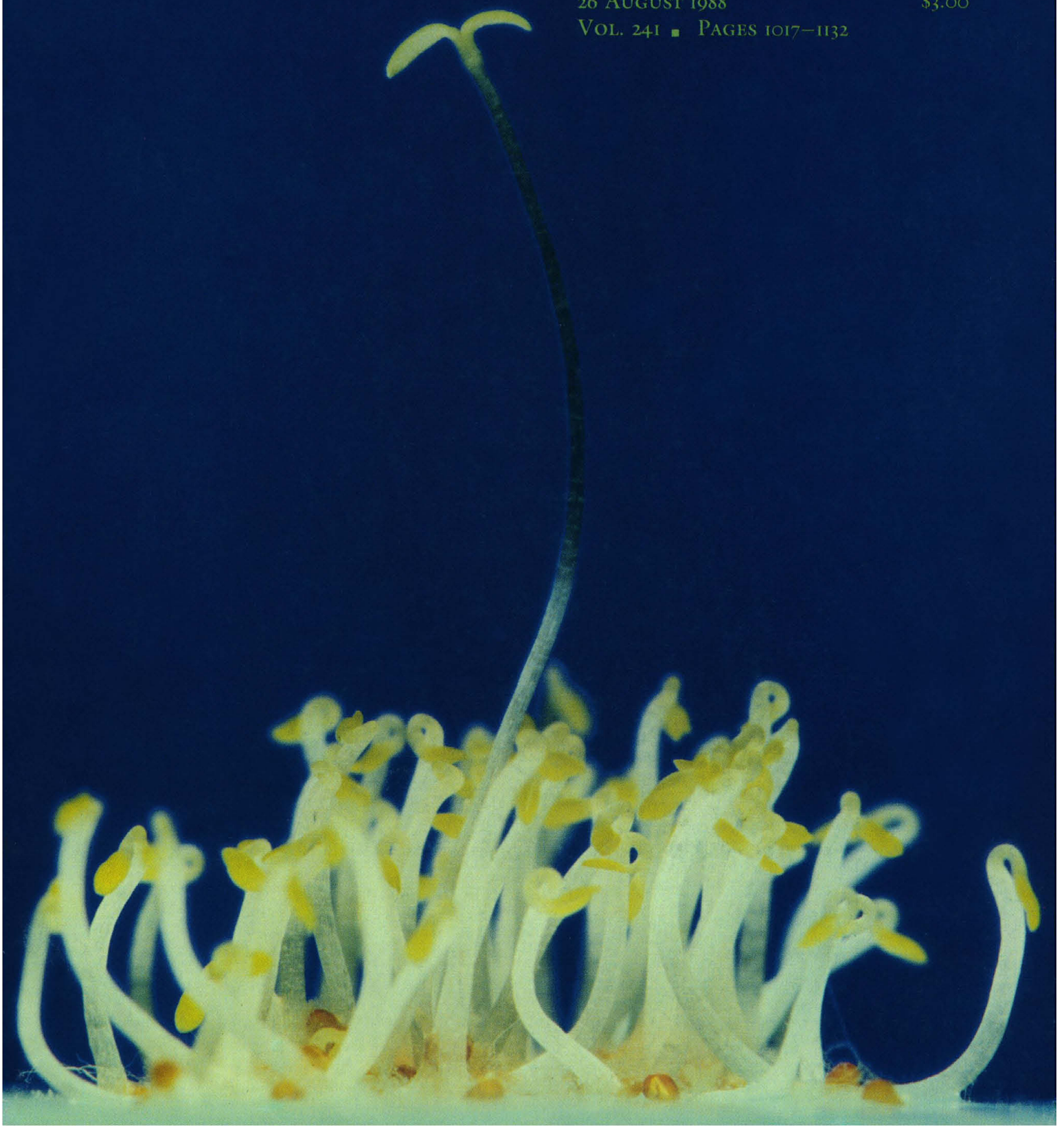

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  P. L. Iversen et al., BioTechniques 5, 521, 523-524 (1987)
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  J. W. B. Hershey, Application Note DS-711. Beckman Instruments, Spinco Division, 1987.
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  D. P. Weeks et al., Anal. Biochem. 152, 376-385 (1986)
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  M. G. Peterson and J. F. B. Mercer, Eur. J. Biochem. 160, 579-585 (1986)
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  J. P. Segrest et al., Beckman TL-100 News 1:2, 1-2 (Dec. 1986)
- **Prepare a protein-free plasma fraction for drug binding studies by a 1-hour run in the TLA-100.2 rotor.**
  T. Zysset, Ther. Drug Monit. 9, 433-438 (1987)
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  P. H. Lin et al., Biochemistry 26, 731-736 (1987)
- **Separate lipoprotein fractions using single or serial 2.5-hour runs in the TLA-100.2 rotor.**
  H. K. Naito, Applications Note DS-693. Beckman Instruments, Inc., Spinco Division, 1986.
- **Estimate sedimentation coefficient of a protein from a 4-hour sucrose gradient run using the TLS-55 rotor.**
  D. L. Gard and M. W. Kirschner, J. Cell Biol. 105, 2203-2215 (1987)

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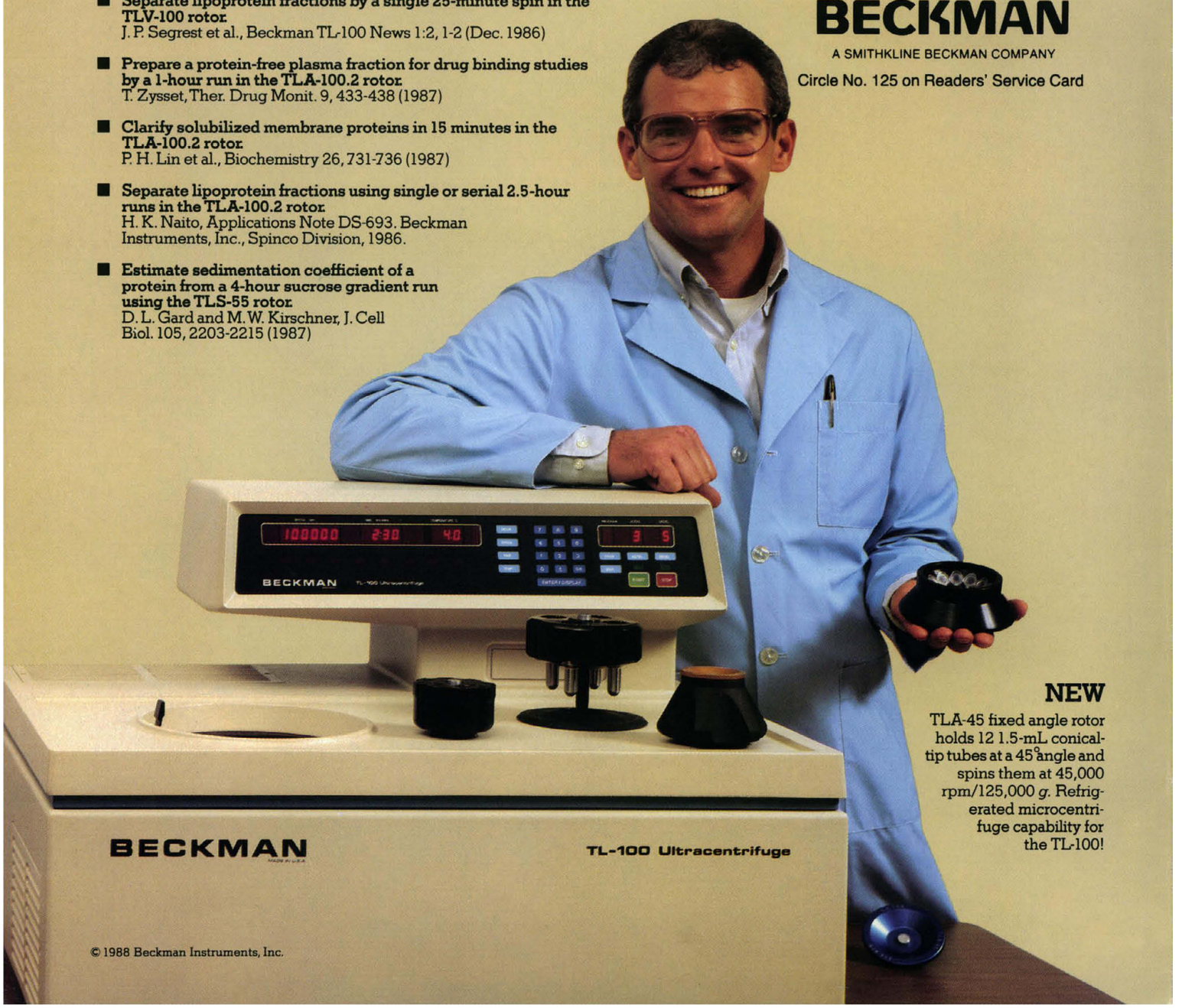

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SCIENCE

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■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

COVER Wild-type seedlings and one ethylene-insensitive mutant of *Arabidopsis thaliana* grown in an atmosphere containing the plant growth regulator ethylene. The wild-type seedlings show a growth habit characteristic for plants treated with ethylene: reduced elongation, thickened hypocotyls, and pronounced apical hooks. The ethylene-insensitive mutant elongated normally just as wild-type seedlings would do in an atmosphere without ethylene. Such a screen was used to select three ethylene-insensitive mutants among 75,000 seedlings grown in petri dishes. [See page 1086. Photo by Kurt Stepnitz, Instructional Media Center, Michigan State University, East Lansing, MI 48824]

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Products & Materials

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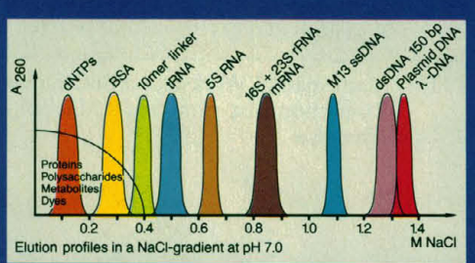

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Modeling past climates

To be able to predict what effects increasing amounts of anthropogenic carbon dioxide in the atmosphere, decreasing ozone, and increased aerosols will have on future climates, climate forecasters need to know how good their models are. One way of checking the models is to see how well they simulate past climates. The COHMAP (Cooperative Holocene Mapping Project) group has assembled a global array of dated paleoclimatic data for the last 18,000 years and compared them with model simulations of past world climates at 3000-year intervals (page 1043). As input to the model the group specified orbitally determined insolation, mountain and ice-sheet topography, sea-surface temperatures, sea-ice limits, and other factors. The driving force behind much of the change of the seasonal and latitudinal distribution of solar radiation is produced by changes in earth-sun geometry. Pollen records, lake levels, and fossil plankton assemblages were used to construct the world climate at the 3000-year intervals. Patterns of change observed in the data are consistent with many of the changes simulated by the climate model, although some discrepancies remain. New insight has been gained into the nature and timing of changes in the earth's climate that have occurred during the time since the last glacial maximum.

Pluto's blue companion

The once-per-century series of mutual events ("eclipses") of Pluto and its satellite Charon that began in 1985 have provided the opportunity for astronomers to learn more about this remote system. Binzel (page 1070) has taken time-resolved multicolor photometric observations of the occultation of Charon by Pluto and the transits of Pluto by Charon in 1986 and 1987. By measuring the change in color as one body passed in front of the other, the relative color of each could be determined. The data are consistent with Pluto being redder than Charon, Charon having possibly become bluer by losing methane ice from its surface. It is also possible that Pluto may have polar ice caps. Events in which bluer Charon transited mid-latitudes of redder Pluto caused the measured color level to change more than when Charon and its shadow transited northern latitudes, indicating that the polar caps of Pluto may consist of relatively blue ice. Charon itself is of relatively uniform color in both hemispheres.

Silica glass at high pressure

The shear strength of most solids increases as they are compressed to high pressures and densities. Meade and Jeanloz (page 1072) find, however, that the strength of amorphous silica decreases about an order of magnitude as it is compressed from 27 to 81 gigapascals. Their observations agree with earlier theoretical predictions that the mechanical properties of polymerized amorphous silicates are sensitive to pressure-induced structural transformations, such as an increase in coordination. Silicon in amorphous SiO_2 has been shown to transform from fourfold to sixfold coordination at pressures above 27 gigapascals. Thus, the new results indicate that the strength of silica glass decreases as it is transformed to higher coordinated structures at high pressures. Deep within the earth, at pressures in the range reached by the diamond cell, silica-rich melts may have relatively low viscosities because of pressure-induced coordination changes. Such changes in viscosity with depth could have strongly influenced the chemical differentiation and thermal evolution of the planetary interior through geologic time.

Amyloid protein precursor

Senile plaques in the brains of persons with Alzheimer's disease consist of spherical clusters of degenerating neurites surrounding a core of amyloid fibrils. The gene encoding the amyloid β protein produces at least three different messenger RNAs. One of the three mRNAs includes a 168-nucleotide insert that encodes a part of the amyloid protein precursor (APP) that is homologous to Kunitz-type protease inhibitors that are specific for serine proteases such as trypsin, chymotrypsin, and elastin. If this domain on APP functions as a protease inhibitor in the brain it could influence how readily the plaques of Alzheimer's disease form from degenerating cell and protein fragments. Palmert *et al.* (page 1080) have found that total APP mRNA was twice as high in the nucleus basalis and locus ceruleus of Alzheimer's disease brains than in these areas of control brains and that the increase was entirely due to an increase in the mRNA lacking the protease inhibitor domain. This increased production of APP-lacking protease inhibitor may provide a substrate that is acted upon preferentially by cerebral proteases to generate the protein that is deposited as cerebral amyloid in Alzheimer's disease.

An ethylene-resistant mutant plant

Ethylene is an endogenous plant growth regulator that influences seed germination and seedling growth, leaf abscission, organ senescence, fruit ripening, and various plant responses to pathogens, wounds, and stress. Hardly anything is known about how growth regulators such as ethylene act, how the tissues recognize them, and how the recognition signal is transduced to yield the responses. Bleecker *et al.* (page 1086) have isolated a mutant of *Arabidopsis thaliana* that lacks a number of responses to ethylene although it is similar in appearance to wild-type plants, indicating that the mutation did not affect major developmental processes. The mutant plant line was insensitive to the action of ethylene on the inhibition of cell elongation, promotion of seed germination, and acceleration of leaf senescence. These responses occur in different tissues, suggesting that a single receptor for ethylene may be present and altered by the mutation.

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SCIENCE

26 AUGUST 1988
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NUMBER 4869

Science and Technology Awards

This past 15 July, President Reagan awarded 20 National Medals of Science and 10 National Medals of Technology to some of our most outstanding citizens. The presentation ceremony was well attended by the families and friends of the medalists as well as media representatives (*Science*, 22 July, p. 410). In his remarks, the President pointed out the vital role played by science and technology in our nation's development and well-being. This event, however, did not receive much coverage, either by the electronic or print media. This is unfortunate because it is individuals like these medalists who have discovered or invented many of the things that we take for granted in our daily lives.

The discoveries made and honored have kept millions of people alive, reduced suffering, and opened up new frontiers for technology. There have been inventions that have made computers work better and faster and improvements to our weapons systems that have made the difference in our national security. The list of discoveries and developments from this group of medalists alone includes nuclear magnetic resonance imaging, high-temperature superconductors, a better understanding of human memory, and the design and production of many of our high-performance military aircraft.

Events like this, at which some of our leading scientists and engineers are honored, are not generally regarded as news by most of the media. This is also true of some of our other national awards, such as the Department of Energy's Fermi and Lawrence awards or the National Science Foundation's Waterman and Vannevar Bush awards. Sometimes the awards are mentioned by the recipient's hometown media because of the local interest, but otherwise there is not much coverage. This is not a criticism of the media. It is a just a fact of life. There is not much pressure for the media to report on these matters. I wonder what would happen if as many of us wrote in to our local newspaper, television, or radio station and asked about the latest award or discovery as do those interested in hockey, football, or baseball scores. Maybe we just might begin to see better coverage of events like the awarding of the medals of science and technology.

Whether or not we get better coverage of the various awards, it is important to see to it that those deserving of recognition are nominated. The screening and evaluation panels should have the appropriate documentation as well as lists of candidates that include the very best in the various categories. For most of the awards with which I am familiar, the screening panels are not permitted to add to the list of nominees. Many of us assume that all the best people are included among the nominees available to be selected. Although the various lists do not want for outstanding candidates, all the outstanding candidates who should be considered are not always on the lists. I am a member of the evaluation committee for the National Medal of Technology. The individuals that we have recommended have all been outstanding, but there are other outstanding individuals who should be nominated and who have not yet been. In that regard, the various engineering and technical societies should examine their membership roles to identify worthy candidates and then persuade some of their members to do the work of preparing well-documented, first-class nominations.

There is today much concern with science and technology education and with the lack of interest shown by our children and young people in pursuing careers in science and technology. Many people lament that we no longer seem to produce the kinds of heroes and role models for our young people to admire and follow as we used to. Well, maybe, but to me these medalists and their fellow medalists from previous years are modern American heroes. Maybe it would help to inspire more young people and educate the public if there were a few more news stories about achievements of scientists and engineers who have saved millions of lives or changed the dynamics of the world economy as a result of a key scientific discovery or invention.—ALVIN W. TRIVELPIECE

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Program

Thursday, October 13

9:00 AM Plenary Session
The U.S. Defense Technology Base: Issues for the 1990s
John Deutch, *MIT;* John Zysman, *Berkeley Roundtable;* additional panelist, *to be announced*

11:00 AM Plenary Session
Qualitative Factors in the Nuclear and Conventional Force Balance
Jasper Welch, *Science Applications International Corporation;* Sir Ronald Mason, *Univ. of Sussex;* Charles Zraket, *MITRE Corporation*

12:30 PM Luncheon Address
A START Agreement and Beyond: Implications for American Nuclear Forces and Strategy
Member of Congress, *to be announced*

2:00 PM Plenary Session
Deep Reductions in Strategic Offensive Nuclear Forces: Implications for Force Structure, Stability, and National Security
Ronald Lehman, *U.S. Dept. of Defense;* Michael May, *Lawrence Livermore National Laboratory;* Brent Scowcroft, *Kissinger Associates*

4:45 PM Open Forum
Issues in Science, Arms Control, and National Security
Colloquium panelists and members, *AAAS Committee on Science, Arms Control, and National Security*

Continued on next page.

Third Annual AAAS Colloquium on Science, Arms Control & National Security

Science and Security: Technology and Arms Control for the 1990s

Continued from previous page.

Friday, October 14

8:00 AM Breakfast Address
The Future of U.S.–Soviet Relations
Robert Gates, *Central Intelligence Agency*

9:30 AM Small Group Sessions — Block I

European Security After INF
Jonathan Dean, *Union of Concerned Scientists;* Peter Lyddon, *UK Defense Policy Staff*

Changing Soviet Military Doctrine and Its Impact on Force Structure and Arms Control
Raymond Garthoff, *Brookings Institution;* additional panelist, *to be announced*

ASAT Weapons and Arms Control
John Pike, *Federation of American Scientists;* Henry Cooper, *U.S. Dept. of State*

11:15 AM Small Group Discussions — Block II

Verifying Arms Control: Implementation of Major Agreements in the 1990s
Sidney Graybeal, *System Planning Corporation;* additional panelist, *to be announced*

Strategic Defenses: Technology Advances and the ABM Treaty in the 1990s
Ashton Carter, *Harvard University;* Louis Marquet, *Atlantic Aerospace*

Nuclear Testing: Technical Requirements for and Implications of New Limits
Thomas Cochran, *Natural Resources Defense Council;* Robert Barker, *U.S. Dept. of Defense*

1:00 PM Closing Luncheon Address
Scientists and Security: The Role of Science in Making National Security Policy
Wolfgang Panofsky, *Stanford University*

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