Letters

Women Engineers: T. Estrin; CONAES Energy Scenarios: B. I. Spinrad

Editorial

Needed: Conviction to Match Our Science: L. M. Branscomb

Articles

Focus on Polar Research: A. L. Washburn

Fossilized Viscera in Primitive Echinoderms: B. N. Haugh and B. M. Bell.

Measuring the Societal Benefits of Innovation: J. G. Tewksbury, M. S. Crandall, W. E. Crane

News and Comment

Ma Bell Eyes New Markets

Biologist Is New Head of Kennedy Institute

Briefing: Law of Sea Conference Still in Deep Water; Helsinki Accords Review Includes Science Contacts; A Sentimental Trip Down Accelerator Lane

Panel Asks "When Is a Person Dead?"

Condor Flap in California

Consensus—More or Less—on the Pap Smear

Research News

Improving the Success of Kidney Transplants

Separations by MS Speed Up, Simplify Analysis

Book Reviews

Shang Civilization, reviewed by F. Ikawa-Smith; Fisheries Ecology of Floodplain Rivers, T. M. Zaret; Alfred Wegener und die Drift der Kontinente, T. H. van Andel; Some Adaptations of Marsh-Nesting Blackbirds, P. R. Grant; Books Received

Reports

Sources of Continental Crust: Neodymium Isotope Evidence from the Sierra Nevada and Peninsular Ranges: D. J. DePaolo

Foraminifera: Distribution of Provinces in the Western North Atlantic: M. A. Buzas and S. J. Culver

Detection, Pursuit, and Overgrowth of Tropical Gorgonians by Milleporid Hydrocorals: Perseus and Medusa Revisited: C. M. Wahl
Endocytotic Sucrose Uptake in Amoeba proteus Induced with the Calcium Ionophore A23187: R. D. Frusch .......................... 691
Atmospheric Water Uptake by an Atacama Desert Shrub: H. A. Mooney et al. .................. 693
Cell-Free Synthesis of Acetylcholine Receptor Polyepitides: B. Mendez et al. .................. 695
Viviparity and Intrauterine Feeding in a New Holocephalan Fish from the Lower Carboniferous of Montana: R. Lund .......... 697
Estrogen and the Growth of Breast Cancer: New Evidence Suggests Indirect Action: S. M. Shafie .................. 701
C-Glucuronidation of the Acetylcholinic Moiety of Ethchlorvynol in the Rabbit: C. R. Abolin et al. .......... 703
Critical-Path Scheduling of Mental Processes in a Dual Task: R. Schweickert .................. 704
Visually Induced Self-Motion Sensation Adapts Rapidly to Left-Right Visual Reversal: C. M. Oman, O. L. Bock, J.-K. Huang ............ 706
Ethanol Specifically Potentiates GABA-Mediated Neurotransmission in Feline Cerebral Cortex: J. N. Nestoros .............. 708
Neuronal Loss in Hippocampus Induced by Prolonged Ethanol Consumption in Rats: D. W. Walker et al. ...... 711
Do Corals Lie About Their Age? Some Demographic Consequences of Partial Mortality, Fission, and Fusion: T. P. Hughes and J. B. C. Jackson ........... 713
Environmental Influences on Body Weight and Behavior in Developing Rats After Neonatal 6-Hydroxydopamine: D. E. Pearson et al. ...... 715

PRODUCTS AND MATERIALS

Liquid Chromatography; Amino Acid Analyzer; Physiological Recorders; Electronic Top-Loading Balances; Metabolism Cages for Small Animals; Data Terminal; Gas Chromatograph; Liquid Scintillation Counter; Literature ........................................ 724

COVER
Greek pottery oinochoe (wine jug), late 6th century B.C. The person on the left appears to be a reveler; the one on the right plays a flute. Has mankind been attracted to alcohol because of its GABA-potentiating properties? See page 708. [Photograph by L. Lurie, permission of Petit Musée, Montreal, Canada]
Needed: Conviction to Match Our Science

The quality of technology actually used in U.S. industrial production is best mirrored by looking at productivity figures. There the U.S. economy demonstrates a miserable performance overall, with a productivity growth rate that lags that of most of our foreign industrial competitors. Yet much of this poor performance is not a reflection on the technology of which our engineers are capable, and certainly not on our science. Instead, it reflects the failure of our society to give priority to savings and to capital formation, plus a great variety of social and political barriers to the replacement of antiquated plant facilities by more productive new ones.

While there are no quantitative data that can be used to assess the comparative states of technology here and abroad, I am convinced that even where our industrial technology lags that of competition, our capability does not. American engineers are capable of accomplishing more than what is actually built and made in many of our factories. It is not that our technology is weak or lagging. It is that we are failing to push as rapidly ahead as we could as a nation.

On the scientific scene, our science is still the envy of the world. Only last year our spacecraft took the most extraordinary pictures and measurements of the planet Jupiter and its moons, and made in one mission more extraordinary observations in planetary science than had been made since Galileo. The preeminent of our microbiology is unchallenged and the beginnings of its industrial potential are now in sight. The combination of our solid-state science with our industrial electronics engineering has done much to create the most spectacular growth industry the world has seen. Geological sciences have not only brought us understanding of the dynamics of the earth’s crust that have shaped our continents, but have also contributed much to U.S. world leadership in the scientific search for oil and other minerals.

Despite this record, the energies of our best scientists seem too much devoted to debates over the shutting down of major research facilities and the choice between going abroad for the best facilities or facing a long, drawn-out effort to acquire them here, stretched out not by technical challenge but by financial restraint. American scientists admire and applaud the new leadership achievements of European nations in providing first-rate new facilities for their scientists, and envy the Japanese scientists and engineers their nation’s wholehearted support and admiration. We would not have it otherwise. But we are in a serious, if friendly, global competition with our allies. America no longer can take technical strength for granted.

We have entered an ambivalent period. The press reports our scientists still winning Nobel Prizes from a foreign government, along with “Golden Fleece Awards” from their own. Scientists are concerned that their energies are increasingly diverted by administrative encrustations, such as faculty time recording under OMB circular A-21. They remain committed to the most rigorous competition to ensure that the best ideas receive funding support, and they are understandably confused by persistent questions about the legitimacy of peer review as the mechanism for that competition.

Thus, the picture of American science and technology today is one of great strengths yet deep doubts, of strong foundations and timid commitment, of critical importance to the economy and uncertain political priority. If indeed our domestic and our foreign trade performance are poor, is lagging technology the symptom or the cause? And if technology lags, is this because the steam has gone out of our science? Or because of a failure of economic policy and industrial will?

There is plenty of room for debate, but there is an obvious conclusion: whatever the cause and effect relation between scientific, technological, and industrial performance, our nation should commit itself to excellence in all three areas. No less a goal is worthy of us.—LEWIS M. BRANSCOMBE, IBM Corporation, Armonk, New York 10504

Excerpted from a commencement address at the Polytechnic Institute of New York, Brooklyn, 29 May 1980.