

Two NPS scientists, D.J. Shaver of Padre Island National Seashore and M.R. Fletcher of the CPSU at the University of New Mexico, appear in the Letters column of *Science* for July 24, 1992, with a spirited reply to Gary Taubes' article about Kemp's ridley sea turtle conservation (Research News, May 1, p. 614, *Science*). After correcting what Shaver and Fletcher term "ambiguous, misleading, or incorrect" statements regarding NPS activities in the Taubes article ("A dubious battle to save the Kemp's ridley sea turtle"), the authors note that "public awareness about the plight of sea turtles has increased as a result of NPS efforts." Further, they point out that "some of the biological information collected by the NPS was the first of its kind for the species and has been used to assist with efforts in Rancho Nuevo, Mexico" (where the turtles' eggs were collected each summer from 1978 to 1988 and transported to Padre Island National Seashore in an international multi-agency effort to establish a secondary breeding colony through imprinting.)

This saga has received ongoing coverage in *Park Science*, most recently in this issue (see pp. 26-27). The Shaver/Fletcher closes with this paragraph:

"The NPS is now focusing conservation efforts for this species on attempts to locate and protect nesting females (wild and headstarted) and stranded hatchlings. Staff at PAIS (Padre Island) are conducting extensive beach patrol and public education efforts, both of which have been given high priority in the recently completed Kemp's Ridley Sea Turtle Recovery Plan. As directed by the recovery plan, NPS mandates, and the Endangered Species Act, these efforts will continue for the foreseeable future."

"Keeping aliens out of paradise," by Anna Maria Gillis in the July/August issue of *BioScience* (pp 482-485), describes the host of educational, research, and enforcement programs developed by the Hawaii Dept. of Agriculture, federal agencies, and numerous environmental groups in the effort to limit alien species' impacts on the native flora and fauna.

Gillis quotes Alan Holt, one of the authors of "The Alien Pest Species Invasion in Hawaii: Background Study and Recommendations for Interagency Planning" (prepared by The Nature Conservancy of Hawaii and the Natural Resources Defense Council) as suggesting that the rate of new species invasions is "thousands of times faster than it was in prehuman times, when one new colonist was estimated to arrive on the islands approximately every 10,000 years." Many scientists now say, writes Gillis, "that Hawaii harbors more aliens than natives." She discusses biocontrol and notes the objections of British Museum entomologist Frank Howarth. He attributes the decline of numerous Hawaiian species – from moths to damselflies to snails – partially to the introduction of biocontrol agents. "In some cases, the agents become pests themselves," writes Gillis. The real focus, says Howarth, should be on cutting the influx. "Once we close the door on new species introductions, then we can figure out how to control what we already have."

A new department, The Professional Biologist, began appearing in the July/August 1992 issue of *BioScience*. The premier subject matter for this department was sabbaticals – a time "to redefine objectives, reflect, evaluate your professional performance, and

be creative ... a time during which you can consider the important spiritual and intellectual goals that higher education must pursue for their own sake ..." and a time to "interact with colleagues in different educational and geographical environments and to experience another culture."

The Professional Biologist's verdict is contained in the first column's headline: "A Sabbatical? Do It!"

Farmers soon may be producing plastic from their potato and sugar-beet crops according to word from Michigan State and James Madison University scientists in *Science*. "For the first time, a plant has been genetically engineered to make something other than a protein – something no other plant has ever made before," according to Christopher Somerville of Michigan State's Plant Research Lab.

The plastic, called polyhydroxybutyrate, is being grown in an experimental plant. PHB, a polyester, could be used as a liner for disposable diapers and for containers. A British company is producing it from bacteria to make shampoo bottles, but this is the first successful attempt to get plants to grow plastic. PHB is similar to polypropylene, a plastic used for molded parts, electrical insulation, packaging, and fibers for clothing; however, PHB is biodegradable and is chemically similar to starch. Both PHB and starch can serve as a way for plants to store carbon.

For 20 years scientists have known about a family of polymers accumulated as storage products in many species of bacteria and blue-green algae. The three genes necessary for one of these bacteria, *Alcaligenes eutrophus*, to make PHB were identified and cloned in 1987 by Douglas Dennis at James Madison U in Harrisonburg, VA. One of the genes also is found in higher plants, including *Arabidopsis thaliana*, a small, quick-growing mustard plant with a very simple genetic structure.

Somerville and colleagues inserted the two key genes from *Alcaligenes eutrophus* into *Arabidopsis thaliana*. They established a new line of *Arabidopsis* plants with one gene and a new line with the other gene. Then they cross-fertilized the two lines to create a hybrid with both genes. This hybrid then began making PHB in small amounts – in its leaves, stems, and roots.

Somerville said that PHB production is a crucial first step in getting plants to grow a whole family of biodegradable plastics from polymers similar to PHB.

A less deadly ("hypovirulent") strain of chestnut blight has been found to neutralize the killer strains that have felled the mighty American chestnut trees, once dominant in eastern North America. *Science News*, in its Aug. 8, 1992 issue, reports on use of the less deadly strain, which causes only superficial, temporary sores on the bark, according to Donald L. Nuss of the Roche Institute of Molecular Biology in Nutley, NJ.

A viral infection reduces this fungal strain's ability to destroy the chestnut tree, according to Nuss and a colleague. Their report in the Aug. 7 *Science* describes how making DNA that encodes the virus' RNA, may enable them to harness this virus—or an improved version of it—for controlling chestnut blight. The transformed fungus that results from the transplanting of the virus causes small cankers to develop on a chestnut

"Beginning with the environmental era, the dignity and nobility of the national parks, once seen largely in terms of majestic landscapes, came also to be measured in the precise, objective terms of science. And it has become apparent that, due to human influences from inside and outside park boundaries, the parks' natural resources have increasingly undergone ecological degradation, slipping farther from any semblance of pristine conditions ...

"Despite the Service's increasing efforts to address these threats, there has been only limited progress in restoring anything like pristine natural conditions. Thus, while the parks continue to be tremendously popular with the American public, the goal of leaving the parks indeed ecologically unimpaired seems more and more unattainable – moving farther out of reach like a distant, receding star."

From "The Roots of National Park Management: Evolving Perceptions of the Park Service's mandate," by Richard West Sellars, historian with the NPS, Santa Fe, NM, in *Journal of Forestry*, Vol. 90, No. 1, pp 16-19.

stem rather than large, rapidly expanding ones, says Nuss.

J. Boone Kauffman, a fire ecologist in the rangeland resources department at Oregon State University, reports in the Winter 1990 issue of OSU's *Oregon Agricultural Progress* on his ongoing study of the impact of fire in the rain forests of South America. He describes an ecosystem that is "unraveling" and irrevocably changing.

"Ashes in the Amazon," by Carol Savonen, describes Kauffman's assessment of the situation in Brazil as a matter of more than mere fire ecology. "It is obvious," Kauffman notes, "that rampant deforestation is not a biological problem. It's merely a reflection of social problems with multiple causes."

These multiple causes also produce multiple and far-reaching effects. To quote the article: "An intact rain forest creates its own climate—scientists estimate about one half of all rainfall originates from the moisture given off by the forest itself. When large tracts of land are deforested, local and overall climatic patterns may change. Once the forest is gone, drought may occur, intensifying the probability of fire and decreasing the probability the forest will ever return."

As if to underscore the possibilities raised in the Boone Kauffman article (see above) the following item appeared in the August 17, 1992 *Earthweek: A Diary of the Planet*, a feature carried in many U.S. newspapers.

"Searing heat and a severe drought have ravaged 78 counties in southern and eastern parts of China's Sichuan province since late June. The official Xinhua News Agency reported that the dry spell has devastated 5.2 million acres of crops and caused a shortage of drinking water for more than 9 million people and an equal number of livestock. An extended drought is causing similar problems in Hubei and Anhui provinces.

"Some of the hottest weather since 1775 has been baking central Europe, worsening the summer drought

in the region and causing outbreaks of unhealthful air.

"The water level of Lake Titicaca, located high in the Peruvian and Bolivian Andes, has dropped two feet this year because of drought."

zResearchers are making progress toward a vaccine to combat the tick-borne illness Lyme disease, according to John Travis's "News & Comment" department in *Science* (Vol. 256:1623). Travis cites the June 15 *Proceedings of the National Academy of Sciences*, in which a team of researchers from Harvard and Yale report that mice vaccinated with a protein from the surface of the bacterium that causes Lyme disease (*Borrelia burgdorferi*), successfully fight off infection from tick bites. The bacterium, a spirochete that is transmitted to humans from its natural hosts—mice and deer—by tick bites, apparently is killed by the antibodies triggered by the vaccine. It is suggested that "it might be possible to curtail the spirochete's population severely and limit the spread of Lyme disease by vaccinating mice and deer."

Richard N. Mack of Washington State University's department of botany reviews in *Science*, June 19, 1992, p. 1699, a new book by R.H. Groves and F. di Castri, Eds., Cambridge University Press, 485 pages,

illustrated, \$125. The book, *Biogeography of Mediterranean Invasions*, (31 chapters) includes reports on work not well known to English-speaking biologists, says Mack, but "it comes at the price of depth on any one topic." Mack deplores a missed opportunity to evaluate the "sometimes obscure literature that reports the circumstances of an immigration" but notes praiseworthy exceptions—the chapters by Kloot and Rejmanek *et al.* on invasive plants in southern Australia and California, respectively, and Blondel's "insightful chapter" on bird invasions in the Mediterranean region.

This book," Mack concludes, "will certainly provide intriguing reading for anyone who is interested in rapidly unfolding biological phenomena."

College of the Atlantic biologist Dr. Craig Greene and three COA graduates have developed a computer database that indexes all research articles written on natural resources of Acadia National Park and adjacent areas in Downeast coastal Maine. "Beause Acadia has been the focus of many naturalists' studies over the past 150 years, the natural history of Mount Desert Island may be the best known of any area of comparable size on the continent," Greene said. "But up until now, no comprehensive bibliography of this information has existed." The accumulated

information will serve as a foundation for future inventorying and monitoring in the Park.

The index is organized by region, species, date, author, and other keywords, and provides an annotated summary of each of the more than 1,000 research articles that have been written on the park, some of them dating back to the 1800s.

Michael Zimmerman, a biology professor and associate dean of the College of Arts and Sciences at Oberlin in Ohio, reported in a July 1992 syndicated column on the impressive improvements in the Third World's agriculture as a result of shifting from pesticide-based to an integrated pest-management approach. Basing his column on a *Science* magazine report, Zimmerman cites a 10 percent increase in Indonesia's rice field harvests, plus "a huge decrease in capital outlay for chemicals, and an untold diminution of pesticide-related illness."

The bad news came from David Pimentel, one of the world's leading agricultural experts and a biologist at Cornell University. Pimentel estimates that more than 500 species of insects now are resistant to pesticides and that the amount of crops "lost to insects has almost doubled during the last 40 years despite a more than 10-fold increase in the amount and toxicity of insecticide" use.