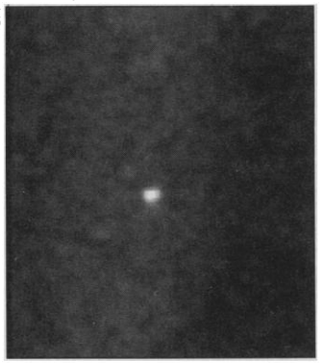
Briefings

edited by CONSTANCE HOLDEN

NASA



Parting shot of Spaceship Earth. *Sun is above.*

Voyager's Last Light

On the evening of 13 February 1990, as the Voyager 1 spacecraft was some 3.7 billion miles from the sun on its long, long journey out of the solar system, the venerable probe looked back over its shoulder and took the last images its cameras are ever likely to register: a 64-frame mosaic of the sun and its planets as seen from the outside. On 6 June, after months of processing and enhancement, NASA finally released the images to the public. Mercury and Mars were lost in the glare of the sun, and Pluto was out of range, but the other six planets—including Earth—were just barely visible as tiny flecks of light.

"We got them all dead center," exulted Jet Propulsion Laboratory spokesman Jurrie Van Der Woude. Creating the mosaic was extraordinarily difficult, he said, not only because the cameras were staring almost straight into the sun, but because most of the Voyager team are already being transferred to newer projects; the cameras will soon be deactivated and only a skeleton crew will be retained in the coming decades as the spacecraft continues magnetic field measurements along the way to interstellar space. Indeed, the mosaic is largely the work of about half a dozen true believers who would not give up on it. "Historically, we had to do it," he said. "We'll never get another chance—certainly not in our lifetimes."

Cornell University astronomer Carl Sagan, who has been urging NASA to take this picture for years, compared Voyager's mosaic to the famous photograph of the Earth taken by the Apollo astronauts in the 1960's that was so inspirational for the environmental movement. "This is where we live—a blue dot," he said, pointing to Voyager's tiny, one-pixel-wide image of Earth. "On that blue dot, everyone you know, and everyone you ever heard of, has lived out their life. It's a humbling experience to see it."

Damage to Animal Research Mounts

As animal rights supporters were massing for their weekend demonstration before the U.S. Capitol last week, the Association of American Medical Colleges launched a preemptive strike. The organization held a press conference on 7 June to reaffirm the message that such activists are nothing more than "animal rights terrorists."

According to data reported to the AAMC by 124 of 126 accredited American medical schools, the cost of lost data, break-in damage, property defacement, and demonstrations has mounted to $3.5 million and 15,000 staff hours over the past 5 years. Installation and maintenance of security systems intended to protect research facilities cost the institutions $5.5 million and more than 5700 staff hours. And that's not counting the millions spent in meeting new animal care regulations.

Seventy-six schools reported incidents of vandalism, break-ins, demonstrations, and other "disruptive incidents," while 54 described themselves as targets for "repeated disruptive incidents." Over the 5 years, schools reported about 3700 incidents of individual harassment, including bomb threats, death threats, picketing of family homes, and threatening letters and telephone calls.

AAMC chairman L. Thompson Bowles stressed that these figures represented only a preliminary analysis of the data, and said that AAMC would release a full report sometime in the fall.

Soviet Missile on Display

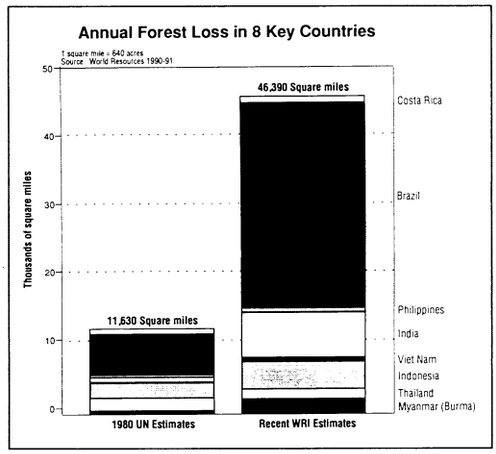
A Soviet nuclear missile landed in the United States in May, but instead of kicking up a mushroom cloud, it triggered a frenzy of photo-taking.

In a new style "nuclear exchange" of the 1990s, it came as a gift to the U.S. National Air and Space Museum under the auspices of the Intermediate Nuclear Forces Treaty. This 1987 agreement calls for the destruction of a whole class of

Third World Pollution

Poor countries are fast catching up with the rich when it comes to producing greenhouse gases, according to the latest biennial report of the World Resources Institute in Washington, D.C.* WRI, which has developed a new "greenhouse index" tracking contributions to global warming on a country by country basis, says Brazil, China (already a bigger coal burner than the United States), and India now rank as the biggest global warmers after the U.S. and the Soviet Union. In 1987, a year of intense land clearing by fire in the Amazon, Brazil accounted for more carbon dioxide emissions than the United States. India's methane emissions—from rice growing and livestock—are second only to those from the U.S. The U.S. is still way ahead of everyone else in the production of chlorofluorocarbons, the third major greenhouse gas.

On a per capita basis, data show "unexpectedly high" carbon emissions among less developed countries, with the Lao People's Democratic Republic (Laos) in the lead—10 metric tons of carbon per capita—because of deforestation. Qatar and the United Arab Emirates rank next because of energy consumption and gas flaring.



Deforestation accelerating. *WRI estimates that 46,390 square miles (29.7 million acres) of tropical forest were lost in eight countries in 1987, more than four times the rate calculated by the U.N.'s Food and Agriculture Organization in 1980. Worldwide, says WRI, satellite sensing shows that tropical forests are vanishing at a rate of 40 million to 50 million acres a year—considerably faster than the U.N. estimate of 28 million. In India, for example, satellites show that large areas legally designated as forest land are already bare.*

According to a report issued in mid-May by the United Nations Population Fund, Third World countries—which will be supplying 90% of global population growth in the coming decades—will be emitting four times as much carbon dioxide as the developed world now produces by 2025.

**World Resources 1990–91*, available for $17.50 plus $3 handling from WRI Publications, P.O. Box 4852, Hampden Station, Baltimore, MD 21211.