search (NIWA) in Lauder, New Zealand, report that over the past 10 years peak levels of skin-frying and DNA-damaging ultraviolet (UV) rays have gradually been increasing in New Zealand, just as concentrations of protective stratospheric ozone have decreased. By the summer of 1998–99, peak sunburning UV levels were about 12% higher than they were during similar periods earlier this decade. Experts say that the NIWA study provides the strongest evidence yet that a degraded stratospheric ozone layer causes more hazardous conditions for life on the planet's surface. "They have done about as careful a study as you can do," says atmospheric physicist Paul Newman of Goddard Space Flight Center in Greenbelt, Maryland.

Atmospheric scientists first detected the notorious "ozone hole" over the South Pole 14 years ago, the apparent result of chemical reactions caused by chlorofluorocarbons and other pollutants in the stratosphere. Ever since, their calculations have predicted that loss of stratospheric ozone—which acts like a protective sheath around the planet, absorbing much of the harmful UV-B radiation (290 to 315 nanometers)—would let through more of the rays. And not just in the sparsely populated polar regions: Researchers soon began to realize that stratospheric ozone was also thinning above populous midlatitude regions such as northern Europe, Canada, New Zealand, and Australia.

But nailing the expected relationship between ozone loss and increased UV-B radiation has proven to be anything but simple, says atmospheric physicist William Randel of the National Center for Atmospheric Research in Boulder, Colorado (see Randel's Review, p. 1689). Efforts to find a definitive link have been complicated by the fact that transient environmental features—such as clouds, snow cover, volcanic ash, or pollution—can filter or reflect UV-B. In 1993, for example, James Kerr and Thomas McElroy of Canada's Atmospheric Environment Service reported that winter levels of UV-B radiation reaching Toronto had risen more than 5% a year over the previous 4 years, a rate in step with declining peak ozone levels. But that study came under fire for being too short to detect a trend.

Now, NIWA atmospheric scientists Richard McKenzie, Brian Connor, and Greg Bodeker have come up with data that appear to clinch the connection between ozone and UV-B in the midlatitudes. They began their study in 1989, positioning their spectroradiometers and other equipment on the ground at Lauder, a rural region on New Zealand's South Island that enjoys unpolluted, cloudless days much of the year. In measurements taken each year since, the team has found that the maximum summertime UV-B levels crested higher and higher until they are now at least 12% above what they were at the beginning of the study. That agrees remarkably well with the roughly 15% increase the researchers had predicted based on the known decline in stratospheric ozone levels measured since 1978 in Lauder. Meanwhile, the longer wavelength UV-A radiation (315 to 400 nanometers), which is unimpeded by ozone, remained relatively constant.

According to meteorologist Jim Miller at the National Oceanic and Atmospheric Administration's National Centers for Environmental Prediction in Camp Springs, Maryland, New Zealand's peak UV-B levels, which are about 20% higher than those that bathe Toronto, could put inhabitants at increased risk of skin cancer, cataracts, and perhaps immune problems. What's more, elevated UV-B levels may perturb marine ecology, killing important algae and bacteria, says Ottawa University ecologist David Lean. Despite the increases, McKenzie notes that UV levels in New Zealand are still lower than levels in unpolluted, low-latitude regions of Australia, Africa, and South America.

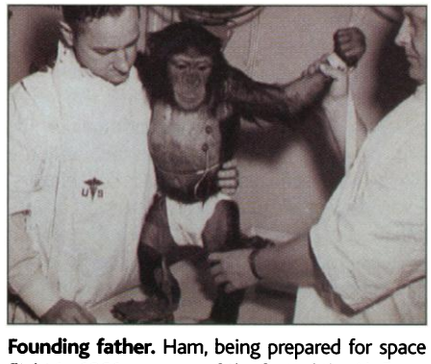
Researchers should have plenty of time to study possible effects in New Zealand and elsewhere. The 1987 Montreal Protocol and its amendments, which restrict the use of ozone-destroying chemicals, have stemmed the flood of damaging pollutants reaching the stratosphere. But it will take decades for the ozone layer to recover, says McKenzie, because chlorine and bromine compounds can hang around in the atmosphere for years. "The problem isn't going to go away until the middle of the next century, at the earliest," he says. **–KATHRYN S. BROWN**

Kathryn S. Brown is a writer in Columbia, Missouri.

ANIMAL RESEARCH

Research Lab to Surrender Chimps

In a move that animal rights activists claim as a victory, the Coulston Foundation, the largest primate research facility in the United States, agreed last week to surrender up to 300 chimpanzees—half its current chimp



CREDIT: NASA

Founding father. Ham, being prepared for space flight in 1961, was one of the first of the Air Force chimps to be housed at the Coulston Foundation.

ScienceScope

On the Fritz Space shuttle wiring problems have forced NASA to delay several upcoming launches, including one to deliver an urgently needed spare part to the Hubble Space Telescope.

Earlier this year, Hubble researchers became alarmed after three of the spacecraft's six gyroscopes failed, leaving it with the minimum number of working stabilizers needed to do science. To prevent another loss from shutting down the $2 billion telescope, NASA officials announced in March that an emergency repair mission would visit Hubble in October (*Science*, 19 March, p. 1827). But a short circuit on the shuttle Columbia in July, and the subsequent discovery of more than 60 frayed wires aboard three shuttles, has prompted NASA to ground the fleet. The Hubble mission may not leave the pad until November.

Can the healthy gyros last that long? Says John Campbell, Hubble project director at NASA's Goddard Space Flight Center in Greenbelt, Maryland, "We've got our fingers crossed."

Out of Sync Protesting a government decision to fund a new foreign synchrotron, French scientists are refusing to fire up two major x-ray sources.

Last month, science minister Claude Allègre decided that France would help build the DIAMOND synchrotron in the United Kingdom, rather than a competing French device called SOLEIL (*Science*, 6 August, p. 819). Now, scientists at LURE, an x-ray laboratory in Orsay near Paris, are condemning that decision. This week, they voted to refuse to collaborate with DIAMOND's planners, and announced that they will idle the aging SUPER-ACCO and DCI x-ray sources for at least a week in a bid to pressure the government to open negotiations on building a new synchrotron in France.

As *Science* went to press, French officials hadn't responded to the shutdown, which could affect the work of 1800 materials scientists, chemists, and other users. In the meantime, LURE director Robert Comès is promising that his protesters will meet again next week "to discuss the situation."

population—by January 2002. The agreement was reached with the U.S. Department of Agriculture (USDA) in response to charges the agency had brought against the lab in 1998 and 1999, ranging from storing the chimps' food improperly to performing unsafe veterinary and surgical procedures that led to the deaths of several animals.

As part of a consent decision signed on 24 August, the Alamogordo, New Mexico–based foundation will also allow a USDA-approved external review team to examine its operations and records and has agreed to implement that team's recommendations. Furthermore, the foundation has agreed not to breed or buy any new chimps, to employ an adequate veterinary staff, and to handle the animals in a way that does not cause them "behavioral stress, physical harm, and unnecessary discomfort."

The Coulston Foundation is a private breeding and research facility supported by the National Institutes of Health (NIH); it conducts research on AIDS, toxicology, spinal cord injury, and vaccine development. The lab also houses chimps left over from the U.S. Air Force's space program and uses them in research (*Science*, 22 May 1998, p. 1186)

According to USDA spokesperson Jim Rogers, the lab paid a $40,000 penalty in 1996 to settle an investigation into the deaths of seven animals. But in 1997, after two more chimps had died, the USDA started a new investigation, leading to a formal complaint in 1998. This complaint was amended this year to include the deaths of three more chimps. By signing the consent decision, the foundation has ended USDA's investigation without admitting the charges. But animal rights activists, who have attacked the foundation for alleged mistreatment of its animals, are claiming vindication. Eric Kleinman, a spokesperson for In Defense of Animals (IDA) in Mill Valley, California, says that the Coulston Foundation lacks the staff and the resources to look after its 600 chimpanzees.

"The Coulston lab has a history of problems in this area," adds Roger Fouts, co-director of the Chimpanzee and Human Communication Institute at Central Washington University in Ellensburg. Fouts is also on the board of directors of the Center for Captive Chimpanzee Care, a sanctuary for retired research chimps that has filed a suit protesting the Air Force's decision to hand over its chimps to Coulston.

Frederick Coulston, the foundation's president, declines to discuss the USDA's charges, but says implementing the agreement "will result in a better foundation." Coulston also says the lab's research is continuing. It is a contractor for an NIH-sponsored study of benign hypertrophy of the prostate—a condition that causes urinary difficulty in older males—in some 100 chimps. According to the consent decision, the USDA may reduce the number of animals to be transferred out of the facility "based on changes in research needs and funding."

The consent decision does not specify where the chimps should go. The lab has already started giving away some chimps to an animal sanctuary, Coulston says. But he notes that the destinations have to be chosen carefully, because sanctuaries are not bound by the Animal Welfare Act, and they are not subject to government oversight. Fouts is also concerned about the chimps' fate. "There are only a few groups that can take in chimps, and none with 300 vacancies," he says.

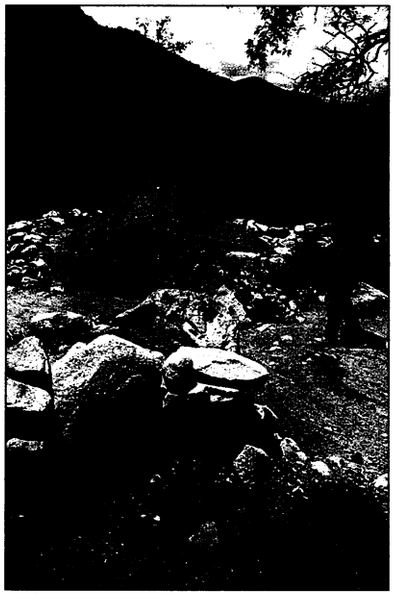
"You can't give them to just anyone," Coulston agrees. **–ELIZABETH NORTON LASLEY**

Elizabeth Norton Lasley is a free-lance writer based in Woodbury, Connecticut.

GAMMA RAY ASTRONOMY

Array Plans Blocked By Indian Ritual Site

TUCSON, ARIZONA—Two cosmologies have collided on telescope-dense Mount Hopkins south of here—and the loser for now appears to be the Smithsonian Institution's plan to build the largest array of ground-based gamma ray telescopes in the world. On 31 August the U.S. Forest Service rejected the Smithsonian's request to build a $16.6 million telescope array on national forest land near the base of the mountain, citing the proximity of a Native American sweat lodge. "Those folks let us know they did not think the telescopes were compatible, and we made a tough call," says John McGee, supervisor of the Coronado National Forest.



Culture clash. Sweat lodge is located less than a kilometer from site of planned telescopes on Arizona's Mount Hopkins.

CREDIT: NORMA JEAN GARGASZ/*TUCSON CITIZEN*

Gamma rays emanate from the most powerful and mysterious phenomena in the universe—quasars, supernovae, and the black hole–powered infernos called blazars. Even though they are blocked by the atmosphere, they can be studied from the ground using a technique that scientists from the Smithsonian's Whipple Observatory pioneered at Mount Hopkins in 1968. Gamma ray photons slamming into the atmosphere create a cascade of charged particles, which emit a faint glow of light, known as Čerenkov radiation, that carries clues about the energy and direction of the original gamma ray photon. Whipple scientists have been observing the Čerenkov glow with a single 10-meter optical reflector. They had hoped to maintain their world leadership with a seven-reflector array of 10-meter optical dishes, called VERITAS, for Very Energetic Radiation Imaging Telescope Array System, funded by the Smithsonian, the Department of Energy, and the National Science Foundation.

Their preferred site, a secluded 4-hectare parcel not far from the observatory's existing base camp, offered excellent shielding from light pollution from the valley below and already has roads and power service, significantly lowering costs. However, it lies less than 1000 meters from a small earth-and-log sweat lodge operated by a Tucson-based group of American Indians called To All Our Relations. The Indians, with the support of at least four Arizona tribal governments, say the array would ruin the lodge's sanctity and disrupt the Indians' twice-monthly traditional steam ceremonies and cleansing rites, in violation of the American Indian Religious Freedom Act of 1978.

More pointedly, Cayce Boone, the 46-year-old Navajo who founded the lodge and obtained a Forest Service permit for it 9 years ago, declared recently that "gamma ray activity and our spiritual practices are not compatible." He cited a 1996 executive order requiring federal agencies to "avoid adversely affecting the physical integrity of Indian sacred sites." The Forest Service appears to have deferred to Boone's concerns in rebuffing the Smithsonian. "There were other factors, such as an emphasis on grazing and wildlife habitat in that area, but the sweat lodge was a significant factor," McGee said.

The decision has left the Indian group jubilant and the scientists struggling to find an alternative site. "We feel great: This sets a precedent that you can't just roll over Indian people with these projects," declares Boone, a technician for a Tucson cable television network. By contrast, Trevor Weekes, principal investigator for the Whipple project, frets that the ruling could cause his group to be eclipsed by at least three other gamma ray observatories from Japan and Germany