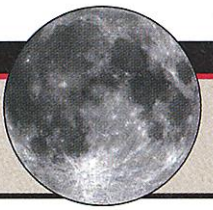


clashes between government and rebel troops continue. Indeed, Thompson recently heard that her station had been looted and her Congolese collaborators had fled heavy fighting in the area.

Nevertheless, several research groups are looking into the possibility of returning to the DRC, whether or not the fighting stops. Photojournalist and conservationist Karl Ammann, for one, believes some limited research might be feasible even now. He traveled to northern DRC in February and says that rebel leader Jean-Pierre Bemba expressed support for conservation efforts and invited researchers back to the territory his troops control. Many researchers are reluctant to be perceived as supporting the rebels but are eager to return.

"The civil war might take several more years," says bonobo researcher Ellen Van Krunkelsven of the University of Antwerp in Belgium. "We cannot just sit and wait," she says, because bonobos might not have that long. **–GRETCHEN VOGEL**

FRANCE

Allègre Loses Job, Research Split Off

PARIS—Geochemist Claude Allègre was dumped this week as France's minister of research and education in a Cabinet reshuffle. Allègre, whose 3-year tenure invoked strong reaction from scientists and a series of protests and recent school closings from the powerful teachers' unions, was replaced on 27 March by Roger-Gérard Schwartzenberg, a lawyer and veteran politician. Prime Minister Lionel Jospin also sacked three other ministers and split Allègre's domain into two smaller ministries, with Jack Lang, a former culture minister, taking the education portfolio.

Gone. Allègre became a liability for the Jospin government.

Firing Allègre was not an easy step for Jospin, who has known the scientist since their university days 40 years ago. But for many researchers and teachers, Allègre had become the man they loved to hate. Allègre combined far-reaching reform proposals with an aggressive, combative style, and the mix was highly combustible (*Science*, 4 February, p. 781). With support for his Socialist government slipping, Jospin apparently had little choice but to dump Allègre and other unpopular ministers.

Allègre's departure leaves researchers wondering about the views of his replacement, who has no background in science. A professor of civil law at the University of Paris, Schwartzenberg served as secretary of state for education before being elected to the National Assembly in 1986. However, an initial interview with the French radio station France Info, in which Schwartzenberg stressed the importance of research to economic growth and pledged to encourage French industry to invest more in science, has some French scientists hoping for the best. Many researchers criticized Allègre sharply for pushing them to link up with industry without putting similar pressure on companies to take research more seriously. "Nothing was done to induce industry to treat research as other than a furnisher" of raw data, says Harry Bernas, a physicist at the University of Paris's Orsay campus.

Allègre's director of research, geophysicist Vincent Courtillot, says his boss had launched much-needed reforms. He cites the creation of hundreds of new research positions in the universities and of a fund to allow young researchers to gain independence early and start their own labs as examples of Allègre's commitment to research. Ironically, Allègre's departure came just days after part of his controversial reform package of the basic research agency CNRS was approved by its executive board. Two key elements, CNRS president Edouard Brézin told *Science*, are "greater freedom" to set its own research agenda and the creation of a "fully independent scientific council."

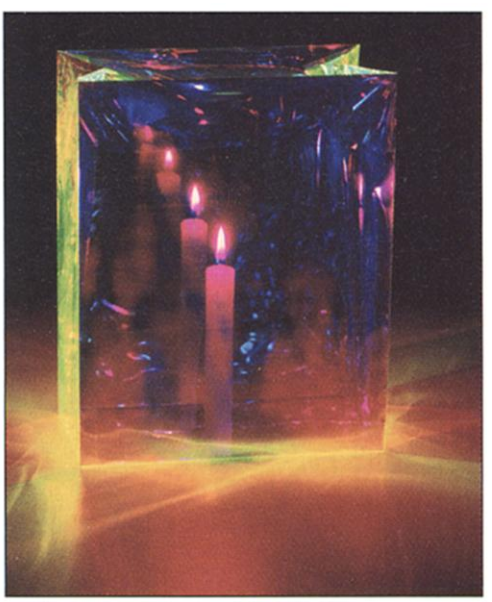
The reshuffling leaves unclear the status of Courtillot, a longtime Allègre colleague and his right-hand man at the ministry. And although many French scientists may rejoice at Allègre's departure, they agree on the need to shake up French research. "He was asking a lot of the right questions," says Bernas, "but giving the wrong answers." **–MICHAEL BALTER**

With additional reporting by Peter Coles in Paris.

MATERIALS SCIENCE

Mirror Film Is the Fairest of Them All

Imagine holding a rainbow in your hand—a flimsy plastic bag that glistens red, blue, green, violet, yellow, and orange as light bounces off it from different angles. Imagine holding another flimsy bag that is a perfect mirror for light waves oscillating in one direction, or polarization, while transparent for others. Now combine the two, and you can begin to picture the dance of light on a new plastic film produced by researchers at the 3M Corp. in St. Paul, Minnesota, and reported for the first time on page 2451.



Bright idea. Layered plastic can be tailored to play new tricks with light.

The new material is an assembly of thin, alternating layers of two common plastics that reflect different colors and amounts of light depending on the angle at which the light strikes them. And unlike previous multilayer mirrors, which are best at reflecting light that's traveling perpendicular to the mirror's surface, the new films can reflect light coming in at all angles equally well. That's likely to make them useful for everything from improving the light emission from laptop computer displays to funneling outdoor light deep inside buildings.

"It looks like a nice idea that can be used in a general way," says Shaul Mukamel, a chemical physicist and optics expert at the

CREDITS: (LEFT TO RIGHT) A. CLOPET/BLACK STAR; WEBER *ET AL*./3M

University of Rochester in New York. Mukamel notes that the work marries two long-studied areas in optics: multilayer mirrors and a property known as birefringence, whereby light moves at different speeds as it travels through a material in different directions. The offspring of the marriage is an inexpensive plastic film capable of reflecting more than 99% of the light that hits it. (A typical silver-on-glass telescope mirror reflects only 95%.)

The 3M researchers didn't set out to reinvent the mirror. They were developing a new set of mirrors to reflect polarized light out of multiple layers of plastics. Such multilayer mirrors and filters had been around for decades. They take advantage of the fact that light waves bounce off boundaries between two materials that pass light at different speeds, such as air and water. Multilayer reflectors amplify this effect by repeatedly alternating a "slow" material (one with a high refractive index) with another that has a low refractive index. Each boundary between layers reflects a fraction of the incoming light. As light waves reflect off different boundaries, their oscillating peaks and troughs can either line up and reinforce one another or cancel one another out. By controlling the thickness of each layer, researchers can determine how these light waves will interfere and thus which colors of light will be reflected.

The most common multilayer mirrors are made up of alternating layers of two inorganic materials, such as glass and titanium dioxide. Though effective, such mirrors suffer a common drawback: Their refractive index is always the same no matter at which angle the light moves through the film. One result is that certain kinds of polarized light can pass through at sharp angles, because they don't see a change in refractive index as they move through the layers. Polymers, on the other hand, are birefringent: The refractive index can change depending on which way the long, chainlike molecules are oriented in a film.

The 3M researchers wanted to see if they could use that property of birefringent plastics to reflect all kinds of polarized light. They came up with a new proprietary way to extrude sheets of hundreds of alternating layers of two or more common plastics, such as polymethylmethacrylate and polyester. They then followed the common practice of heating and stretching their polymer sheets into thin films. And when they did, they got a surprise: The resulting films not only were nearly perfect plastic mirrors, but remained almost perfect reflectors even at sharp angles.

"When we saw it, we thought something weird was going on," says report co-author Michael Weber. By controlling each layer's thickness and the orientation of the polymer molecules, they found that they could tailor their films to determine exactly which colors and polarizations of light were reflected in any direction. When they searched the literature, they were surprised to find that they were the first ones to control multilayer films in this manner. "It floored us that no one had ever noticed it before," says Weber.

People will be noticing soon. The 3M researchers have already started turning the new films into products both serious and fun. Already on its way to market, Weber says, is a way of using the films to improve the performance of displays for laptop computer and handheld organizers. Set at the back of the display, the 3M film can reflect light from an internal bulb out of the screen, thereby saving energy and battery power. Other soon-to-be-seen products include optical filters, iridescent and reflective packaging, bows and ribbons, and—who knows—off-the-rack rainbows, one size fits all.

–ROBERT F. SERVICE

CREDIT: P. BAGLA

NATIONAL IGNITION FACILITY

Richardson Puts Laser Project on Short Leash

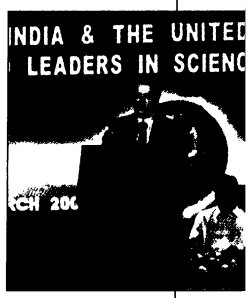
The Department of Energy (DOE) is tightening its oversight of the world's largest laser project, which is years behind schedule and at least $300 million over budget. Energy Secretary Bill Richardson last week announced a series of steps designed to put the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory in California back on track.

The moves aren't the final word on the troubled project, observers predict. Next month federal lawmakers are expected to receive a highly critical audit report from the General Accounting Office, its investigative arm, followed by new cost estimates from DOE that could balloon NIF's price tag. "NIF is headed for choppy seas," predicts one House aide.

The $1.2 billion NIF is designed to focus 192 laser beams on a lozenge-sized target in a bid to test the feasibility of fusion energy and simulate nuclear weapons behavior without actual testing. A host of technical glitches and management missteps have forced Livermore officials to consider scaling back the project and stretching the timeline beyond its scheduled completion in 2003 (*Science*, 17 September 1999, p. 1831). On 24 March Richardson took a series of interim steps, including the appointment of Livermore weapons scientist George Miller to a new

ScienceScope

Giving Back A group of Indian-born business leaders who have made it rich in Silicon Valley has pledged $300 million toward a $1 billion network of private research universities in their native country. Their plan to create a half-dozen Global Institutes of Science and Technology received a pat on the back last week from President Bill Clinton (right), who mentioned it during a speech to high-tech business leaders in Hyderabad.



"I have no doubt they will succeed," said Clinton about plans to set up six nonprofit institutes that would offer undergraduate and advanced degrees in biotechnology, materials science, information technology, and other hot fields to 2000 students on each campus. Officials at the University of California, Berkeley, have agreed to help design the curriculum, lend faculty, and offer distance-learning courses, although details have yet to be worked out. "The students would be exposed to the best facilities and faculties available anywhere," says Purnendu Chatterjee, managing director of the $1.2 billion software management Chatterjee Group of New York, a prime mover in the venture. He said the institutes would also serve as incubators for new high-tech companies. Site selection is expected to be completed over the next 8 to 12 months.

Rescued Legislation aimed at ending 30 years of controversy over "rescue archaeology" in France is close to becoming law. The National Assembly last month voted to approve a proposal by Culture Minister Catherine Trautman that supporters say will improve protection of artifacts threatened by development (*Science*, 14 May 1999, p. 1099). The French Senate was expected to take up the bill as *Science* went to press.

The new law—which would replace an existing agency for rescue archaeology with a new organization under the culture and research ministries and open rescue digs to researchers from universities and the basic research agency CNRS—is being greeted enthusiastically by Françoise Audouze of the Center for Archaeological Research in Nanterre. But Audouze is wary that the law does not adequately define how archaeologists will work with the new organization. Turf battles, she warns, could still hamper efforts to study and save threatened artifacts.