

with the new rules, she says, “in some cases the experimental protocols will have to be modified to minimize pain and suffering in the animals.”

The greatest impact of the directive will likely be on the newer E.U. members in Eastern Europe. In some member countries, animal-housing standards, for example, were regulated by voluntary guidelines instead of enforceable law, Higgins says.

In Romania, says Mircea Leabu, a cell biologist at the “Carol Davila” University of

Medicine and Pharmacy in Bucharest and a member of the National Committee of Scientific Research Ethics, many of the new standards have been adopted as the E.U. discussion moved forward. And because animal research is expensive, he says, Romanian scientists are already motivated to use as few animals as possible. But the new rules boost control and enforcement measures, he says, and may require more people qualified to evaluate the ethical aspects of animal experiments. Indeed, enforcement measures are

one of the most important areas to watch as the directive is translated into national laws, Higgins says.

Observers agree that standardized rules across Europe will be a step forward for both researchers and animal welfare. “I think it’s wonderful. That’s a core task of the E.U.,” Treue says. Higgins agrees. “The new law brings in a number of new and welcome measures,” she says. “The sooner that new legislation is implemented the better.”

—GRETCHEN VOGEL

ANIMAL-RIGHTS ACTIVISM

A Tricky Balance Between Activists’ and Researchers’ Rights

In 2004, animal-rights activists broke into psychology laboratories at the University of Iowa. A video they recorded, available on YouTube, shows several people wearing gloves and ski masks smashing computers and other equipment with hammers, spray-painting slogans on the wall, and loading rats into plastic tubs. Hundreds of animals were taken, and the damage totaled more than \$400,000. A few days later, the Animal Liberation Front claimed responsibility.

Last November, just as the statute of limitations was about to expire, federal prosecutors charged Scott DeMuth, a sociology graduate student at the University of Minnesota, Twin Cities, with felony conspiracy in connection with the break-in (*Science*, 18 December 2009, p. 1609). DeMuth’s trial was scheduled to begin last week, but at the last minute prosecutors offered him a plea agreement: They would drop all charges related to the Iowa case if he pleaded guilty to a lesser misdemeanor conspiracy charge for an unspecified role in a 2006 break-in at a ferret-breeding facility in Minnesota. DeMuth took the deal and now faces up to 6 months in jail and a fine of up to \$5000, considerably lighter penalties than he could have received if convicted of the felony.

DeMuth’s case and others highlight the difficulty of identifying the small minority of animal-rights activists who break the law and successfully prosecuting those who are charged. In July, a federal judge in San Jose, California, threw out a felony indictment against activists accused of harassing researchers at the University of California (UC) campuses in Berkeley and Santa Cruz. They had been indicted under the federal Animal Enterprise Terrorism Act (AETA), a 2006 law intended to crack down on animal-rights extremists. Several incidents of vandalism and harassment aimed at scientists at UC Los Angeles (*Science*, 21 December 2007,

p. 1856) and elsewhere remain unsolved.

In DeMuth’s case, it’s not clear what evidence prosecutors had. “I don’t have any idea what the government says he actually did in terms of Iowa,” says his lawyer, Michael Deutsch. The indictment says only that he conspired “to intentionally damage and cause the loss of property.” According to Deutsch, in a pretrial hearing last week prosecutors said they planned to introduce entries from DeMuth’s personal diary and MySpace page as evidence of his animal-rights sympathies, as well as expert testimony that his height (somewhat below average at 5’6”) matches that of an individual in the video. Deutsch says that DeMuth, who was 17 at the time, was asleep in his parents’ home in Minnesota the night of the incident. “His mother was going to come in and testify,” he says. The U.S. attorney’s office in Davenport, Iowa, where the case was to be tried, declined to comment.

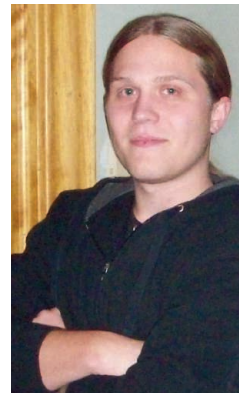
DeMuth and his supporters have argued that his indictment was punishment for refusing to cooperate with a grand jury investigating the Iowa break-in. His research focuses on radical activist groups, and he claimed that forcing him to break confidentiality agreements with his subjects to reveal anything he might know about the incident would violate his academic freedom. Two activists and friends of DeMuth’s said they would go to jail for contempt of court rather than testify against him if his case went to trial—a major factor, Deutsch says, in his decision to accept the plea deal. DeMuth did not respond to a request for comment.

In California, federal prosecutors have

had a similarly difficult time. In July, Judge Ronald Whyte dismissed an indictment against four activists for threatening and intimidating researchers at UC Berkeley and UC Santa Cruz in 2007 and 2008. Supporting documents describe several instances of people chanting and chalking slogans on the sidewalk outside researchers’ homes; an incident in which activists allegedly tried to force their way into a researcher’s home; and the distribution of flyers around town with the names and addresses of researchers, who were described as “murderers and torturers.” The indictment made no mention of more dramatic events in Santa Cruz, including an attempted arson at a scientist’s home (*Science*, 8 August 2008, p. 755).

Whyte said the indictment failed to provide sufficient evidence that the activists’ actions constituted “true threats” as opposed to political protest protected by the Constitution. However, in dismissing the case “without prejudice,” Whyte left the door open for prosecutors to try again. Jack Gillund, a spokesperson for the U.S. Attorney’s office in San Francisco, said he could neither confirm nor deny plans to reindict. However, Robert Bloom, the lawyer for one of the defendants, says his client recently received and complied with a warrant seeking a DNA sample, which seems to suggest the government still has an interest in the case.

The Santa Cruz activists were the first to be charged under AETA, the 2006 law that increased possible penalties for those convicted of crimes committed in the name of animal rights. (DeMuth was origi- ▶



Plea deal. Scott DeMuth pleaded guilty to a misdemeanor charge after prosecutors dropped charges related to a lab break-in at the University of Iowa.

nally charged under AETA, but because the two break-ins happened before the law was enacted, prosecutors later reindicted him using language from the older Animal Enterprise Protection Act.) Subsequently, two men were convicted under AETA for releasing 650 minks and vandalizing a mink ranch in Utah in 2008. Most recently, in July, authorities charged a Utah man under AETA for lighting a fire that destroyed a sheepskin factory in Denver in 2009.

AETA's track record—two convictions in 4 years—raises questions about whether it's having its intended effect. Frankie Trull, president of the Foundation for Biomedical Research (FBR) in Washington, D.C., says AETA has given investigators new tools to monitor communications by people planning attacks and use such evidence in court.

But FBR's statistics on illegal activities by animal-rights activists show no clear trend since the law was enacted.

Some researchers who have been on the receiving end of harassment aren't sure AETA has had much impact. J. David Jentsch, a neuroscientist at UCLA whose car was set on fire in 2009, says activists still spew venom about him on their blogs and gather at his house about once a month to yell slogans that go well beyond free speech. "Any reasonable person would see it as threats," he says. Jentsch points out that many of the actions directed at him were illegal before AETA was enacted. "Blowing up my car was obviously illegal, but no one has been arrested," he says.

Activists loathe the law but for different reasons, says sociologist David Pellow,

DeMuth's graduate adviser. The Santa Cruz case in particular has convinced some activists that authorities are using AETA to criminalize lawful protest, Pellow says. "Others have argued that this law may have the unintended consequence of driving people in precisely the wrong direction and sending them underground," he says.

The reason so few extremists who commit these crimes have been caught, Pellow says, is that they often operate in very small, autonomous groups. "There's a cell of maybe three or four people who trust each other ... who get together to do these actions," Pellow says. Each cell is independent, so if one is infiltrated or someone snitches, other cells are unaffected. Pellow says, "They are very clever and very good at practicing a security culture."

—GREG MILLER

ASTRONOMY

New Type of Cosmic Dust Tells of Galaxy's Violent History

The vast interstellar expanses of galaxies are filled with clouds of dust and gas in which new stars and planets form. The physical details of these cocoons have been hazy to astronomers. Now, researchers have found that the cores of many of these clouds are swarming with dust grains 10 times as large as those previously detected. These grains scatter starlight to produce a so-called coreshine effect, which the researchers say could be used to probe the age and history of interstellar clouds.

The team, led by Laurent Pagani of the Paris Observatory and Jürgen Steinacker of the Max Planck Institute for Astronomy in Heidelberg, Germany, describes the results on page 1622. "I think this is an exciting new approach to understanding the structure within molecular clouds," says Doug Johnstone, an astronomer at the NRC-Herzberg Institute of Astrophysics in Victoria, Canada, who was not involved in the research.

Interstellar clouds generally appear as dark patches against the starry sky because their dust absorbs and scatters the light from stars behind them. But light at infrared wavelengths—0.8 micrometers (microns) and longer—can filter through most interstellar dust, whose average grain size is about 0.1 micrometers in radius. That's why researchers use infrared wavelengths to image stars and galaxies that would otherwise be obscured by dust clouds.

Pagani and colleagues originally set out to measure the dust in a prominent cloud

in the Milky Way called L183. Looking at images from the Spitzer Space Telescope's Infrared Array Camera, the researchers made a surprising find: The densest parts of the cloud appeared to glow at a midinfrared wavelength far too long to shine through ordinary-sized dust.

"The only way to explain what we were seeing was with grains much bigger than usually thought, that is, grains of 1 micron size on average," Pagani says. Theorists

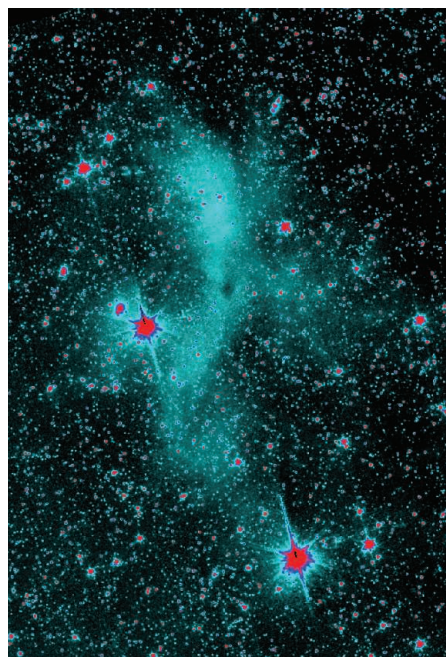
had proposed that smaller dust grains could merge to form grains that large, but this was the first direct evidence of them.

Studying 110 dust cloud cores surveyed by Spitzer, Pagani and colleagues detected coreshine in about half of them. The researchers say large grains—and the consequent coreshine—may be a marker of a cloud's history. They speculate, for instance, that the Gum/Vela nebula lacks coreshine because most of its agglomerated large grains might have been smashed back to smithereens by a supernova explosion a million years ago.

Coreshine measurements could be used not only to determine the structure and density of dust clouds but also to estimate their age, Pagani says. "It takes a while for the grains to grow by collision in between them, and the collisions are all the more frequent if the density is higher," he says. Using a model that relates growth speed to density, researchers can deduce from the quantity of coreshine "when the grains have started to grow and therefore the age of the cloud."

Impressed by coreshine's potential as a tool, Johnstone says he plans to calibrate and exploit the effect after the James Webb Space Telescope is launched 5 years from now. JWST—a 6.5-meter instrument designed for infrared observations—"should provide unprecedented images of the cloudshine feature with exquisite spatial resolution," Johnstone says. That faint glow will help astronomers look deeper into those hazy stellar birthing grounds.

—YUDHIJIT BHATTACHARJEE



Glowing. Researchers saw diffuse light in the dense cores of dust clouds.