photographic plate that you cannot do any other way. We have to be careful about discarding an old technology," warns Craine, who chairs the AAS's Working Group on Astronomical Imaging Technology (which, 6 years ago, was still called the Working Group on Photographic Materials). For example, plates, unlike CCDs, can capture a huge swatch of the sky in a single exposure because they can be cut into large sizes, such as 17 inches by 17 inches. Mosaics of the much smaller CCDs may be able to accomplish the same task, but experimentation with them is just beginning. And for smaller observatories, a forced shift to CCDs is also "an expensive proposition when you already have a working system," says Kyle Cudworth of the University of Chicago's Yerkes Observatory, explaining that one CCD can cost $50,000—and that doesn't include modifications to make it work with the telescope.

Photographic plates are also considered a great archival material and many observatories maintain extensive, scientifically valuable libraries. When the discovery of the first quasar was announced, for instance, two astronomers rushed to the stacks at Harvard College Observatory and pulled out dozens of historical survey plates, and made the important find that its brightness varies over the years. In contrast, the flood of data from CCDs often prompts astronomers to discard information that doesn't directly concern their object of study. And that data is lost forever. "One hundred years from now, one can always pick up a photographic plate and see a picture of the night sky," notes Robert Brucato of Palomar Observatory.

At last month's AAS meeting, Kodak's Brown explained that most of the plates used in the wide-field sky surveys would still be made for the foreseeable future and that the company hoped to adapt less specialized—and thus cost-effective—emulsions such as T-MAX 100, which is used for general black and white photography, to the stringent requirements of astronomical plates. "The plate business will be around for a while," he promised.

But with such a small market for Kodak to sell to, astronomers wonder how long "a while" really is. And Van Altena is still in desperate straits. He is now testing plates made by a small company in St. Petersburg, Russia, but he is unsure whether he can depend on their quality. Such scrambling has brought out gallows humor among the scientists, and the University of Virginia's Philip Ianna, who has a dwindling supply of his own discontinued plates, grimly joked that, "I'm considering auctioning them off to the highest bidder. They may be the last ones in existence." For Ianna, Van Altena, and other astronomers, that's not really a laughing matter.

–John Travis

GREENHOUSE CHEMISTRY

Methane Increase Put on Pause

Whatever their view of the threat from greenhouse warming, scientists are agreed on one thing: They'd like to see the inadvertent experiment in global change put on hold while they get a better grip on what is going on. Well, they just got their wish, or part of it. The rise in a key greenhouse gas, methane, which had been increasing at a disturbing rate until 1991, has stopped dead in its tracks, at least in the Northern Hemisphere. But nobody knows why.

The possible explanations range from the optimistic—humans plugged enough leaks in natural gas pipelines to staunch methane's rise for good—to the disconcerting. Mother Nature may be up to some new tricks that researchers have not fathomed, sending tremors through the web of processes that control the amount of methane and other gases in the atmosphere. "The measurements are first-rate, but [atmospheric methane] is a system with a number of unknowns and equations," says atmospheric chemist Ralph Cicerone of the University of California, Irvine, "and I'm rather sure that there are more unknowns than equations."

The evidence in the great methane mystery of '92 is laid out in the 1 January issue of *Geophysical Research Letters* in a report from Edward Dlugokencky of the National Oceanic and Atmospheric Administration's Climate Monitoring and Diagnostics Laboratory (CMDL) in Boulder and his colleagues. They compiled methane measurements from 28 CMDL sites around the world and along two shipping routes to determine recent trends in methane concentrations. Previous studies had shown that the rise in methane had been slowing gradually in the 1980s (*Science*, 14 June 1991, p. 1496). But beginning in mid-1992, according to the new analysis, the rate of increase dropped sharply in the Southern Hemisphere and plummeted to zero in the Northern Hemisphere.

That doesn't mean that all methane sources in the Northern Hemisphere were suddenly choked off. The end of the rise simply means that methane supply and its removal by chemical reactions in the atmosphere had come into balance at levels more than double those of 200 years ago. Dlugokencky and colleagues believe the most likely explanation is that one or more of the eight or so major sources, which range from digestion by termites and cattle to decomposition in wetlands and landfills, slowed by some 10 million tons a year. Their leading candidate is a drop in the amount of methane escaping from Russian natural gas systems. Dlugokencky points out that the huge Siberian gas fields and distribution system have been notoriously leaky. After a disastrous gas explosion in 1989, efforts began to reduce leaks in the Russian system, and by 1992 engineers might have plugged enough leaks to have ended the methane rise, says Dlugokencky.

That's an optimistic interpretation, because it could mean that the threat of rising methane is over for good—welcome news, because so far methane accounts for one-quarter as much warming effect as carbon dioxide. But Cicerone isn't convinced. "What they say is plausible and may well be the cause," he says, but he argues that the magnitude of the Russian leaks is too poorly known to be sure they caused much of the earlier rise.

Leak prone. Laying a Siberian gas pipeline.

As a suggestion of where else to look, Cicerone points out that methane wasn't the only gas that began acting strangely in 1991. At the same time, analyses by Charles Keeling of the Scripps Institution of Oceanography showed, the decades-long rise in carbon dioxide slowed abruptly. And according to measurements by his son Ralph Keeling, also of Scripps, oxygen took an unusual jump. A surge in the storage of carbon by plants on land or in the ocean might account for the signals, and the biological change might in turn have been driven by climate. There's even a possible driver of climate change: the eruption of Mount Pinatubo in June 1991, which lofted a climate-cooling sunscreen of debris. Methane could fit neatly into this scenario, for example, if the cooling slowed production of the gas by wetlands.

So far, no one has calculated whether a climate shift could have thrown all three gases off track at once, by the observed amounts. But if climate does turn out to be behind the observations, researchers might learn more about how climate change could interact with greenhouse gases to amplify the warming in the next century. That way, even a temporary pause in the greenhouse experiment might yield a lasting benefit.

–Richard A. Kerr