identified sequences from eight plant families, including grasses, yucca, grapes, and mint. The coprolite had identifiable fragments of only five families, so DNA analysis may help identify plants chewed beyond recognition, says Poinar.

The team hopes to study more sloth dung to help answer the question of why these and other large animals vanished from North America about 10,000 years ago. "We'd like to ... see if there's a change in diet before they go extinct," says Pääbo. Climate change, a possible agent of extinction, might show up as a change of diet, he says.

Right now, Pääbo is analyzing samples of what could be Neandertal feces, from 45,000-year-old cave deposits in Gibraltar. "They look human, but it's hard to be sure that they're not jackal," he cautions. If the samples do contain Neandertal DNA, they would be the second such sequences ever and could offer additional evidence in the continuing debate over this extinct human's kinship to our own species. "A second sequence would give a real window on Neandertal variation," says paleoanthropologist Christopher Stringer of The Natural History Museum in London, who discovered the feces last summer. They could also reveal what Neandertals dined on and what parasites may have plagued them. "Five years ago, we wouldn't have thought we would have the possibility of reconstructing Neandertal diet in this way," says Stringer.

Still, some paleontologists caution that DNA from dung may not reveal everything its proponents hope for. Changes in coprolite contents could simply reflect seasonal shifts rather than pointing to causes of extinction, says Russ Graham, a paleontologist at the Denver Museum of Natural History. The technique may not work on coprolites found in warmer or wetter conditions, or on very ancient samples, as most DNA is thought to degrade within 100,000 years, says Poinar.

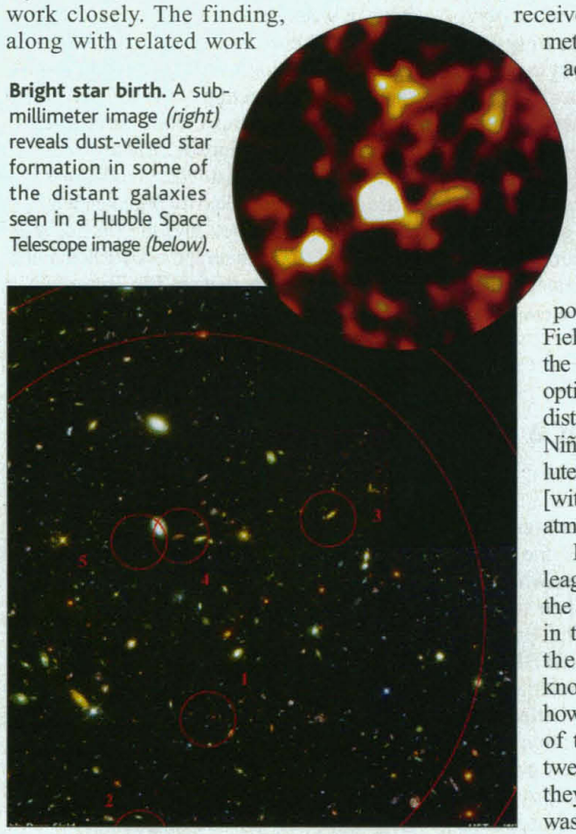
Despite such caveats, "I'm gathering as much poop as I can," Poinar says. "There's going to be a run on feces." **–ERIK STOKSTAD**

ASTRONOMY

Glow Reveals Early Star Nurseries

The universe shrouds many of its secrets in dust. Among them is the history of star birth, which transformed primordial gas into the countless starry galaxies of the present-day universe. Now a team of U.K. astronomers has used light absorbed by dust and remitted at longer wavelengths to look back in time. They saw signs of galaxies undergoing frenzied star formation when the universe was a fraction of its present age. The observation implies, says team member James Dunlop of the Institute for Astronomy in Edinburgh, that astronomers studying visible light "have only seen about a fifth of the star formation in the early universe."

Reported in this week's issue of *Nature*, the observations are "a very exciting new development," says Max Pettini, an astrophysicist at Britain's Royal Greenwich Observatory. Star formation is "part and parcel of the broader question of how the universe evolved from the smooth conditions of the big bang into the galaxies we see today," says Pettini, who has followed the work closely. The finding, along with related work reported in the same issue of *Nature*, suggests that large-scale star formation may have gotten a surprisingly early start.



HUGHES *ET AL.*

Bright star birth. A submillimeter image *(right)* reveals dust-veiled star formation in some of the distant galaxies seen in a Hubble Space Telescope image *(below)*.

The present-day universe is mostly past its reproductive prime. So astronomers have been searching at great distances—which correspond to earlier times—to find the heyday of star birth. But dust is particularly thick in star-forming regions, where it hides the light of hot, young stars, reradiating it in the infrared. "For objects that are very, very heavily obscured by dust, this is where all the energy comes out," says Charles Steidel of the California Institute of Technology.

Observations by infrared satellites have already revealed large numbers of galaxies that shine brightly in the infrared, signifying intense star formation, as much as halfway back to the big bang, says Michael Rowan-Robinson of London's Imperial College. But for even older, more distant stars and galaxies, the expansion of the universe stretches infrared into the submillimeter waveband, a twilight region of the spectrum between the infrared and radio waves. And until recently, astronomers had no way to make submillimeter images of the most distant star nurseries.

That gap is now being filled by SCUBA (for Submillimeter Common User Bolometer Array), the world's first submillimeter camera, based at the 15-meter James Clerk Maxwell submillimeter telescope on Mauna Kea, Hawaii. SCUBA has a palmtop-sized receiver made up of closely packed metal horns, each a few millimeters across, that funnel incoming radiation to heat sensors, called bolometers. To build an image, SCUBA shuffles through 16 slightly different locations and combines the results, like fingers mapping out a heat pattern by tapping around it.

Earlier this year, the team pointed SCUBA at the Hubble Deep Field, the small patch of sky where the Hubble Space Telescope captured optical images of some of the most distant galaxies ever. "Thanks to El Niño, we had nearly 2 weeks of absolutely perfect submillimeter weather, [with] almost no water vapor in the atmosphere," says Rowan-Robinson.

Rowan-Robinson and his colleagues were able to match five of the brightest submillimeter sources in their image to faint galaxies in the Hubble image, which have known redshifts—an indication of how far back in time they lie. Four of the five have redshifts of between 2 and 4, which means that they date from when the universe was between a third and a fifth of its present age—up to 9 billion years ago. Their submillimeter brilliance indicates that dust is shrouding large populations of hot, newborn stars, implying that these are "starburst galaxies," spawning stars at 100 times the rate of our own, says Dunlop. Additional SCUBA images made by a U.S.–Japanese group also reveal bright submillimeter galaxies in the distant universe.

SCUBA offers a mere two-hundredths of Hubble's image quality, which limits the certainty with which the submillimeter images can be matched with optical counterparts. As a result, the distance and hence the age of these submillimeter sources is "somewhat ambiguous," notes Steidel. "Really, we would like a few hundred sources to begin to say something more statistical and general" about star formation in the early universe, agrees Rowan-Robinson. **–ANDREW WATSON**

Andrew Watson is a writer in Norwich, U.K.