RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Moondust in Your Eyes

If anyone's ever going to set up a permanent manned station on the moon, they're going to have to dust first. And that won't be easy. Lunar dust, as astronauts have learned, is a very sticky problem: The fine, silty dust stuck on camera lenses, solar cells, spacesuits, visors, and virtually everything else, often impairing the efficiency of equipment.

Chemist Lieng-Huang Lee of Xerox Corp.'s Webster Research Center, an adhesion specialist, has been trying to find out why moondust adheres so stubbornly. Sticky dust is no stranger to Xerox researchers—xerography is based on tiny particles sticking to surfaces. So, using data from NASA studies, "we applied our knowledge of particle adhesion related to xerography," Lee reported at the recent annual meeting of the American Chemical Society in Chicago.

That led Lee to propose that the clingy quality of lunar dust particles is created primarily by interactions between the acidic minerals in some particles that accept electrons from basic minerals on other particles. These interactions are facilitated by the high vacuum conditions on the moon, which allow dust particles to move close together. Lee says that enhances the acid-base attractions. Longer range electrostatic interactions also could be at work, since phenomena like the solar wind precharge the particles, making them prone to clump together and adhere to surfaces. These forces would make lunar dust "act like wet clay," clumping and sticking even though it is bone dry, says physical chemist Larry Demejo of Eastman Kodak Co. in Rochester.

Experiments with simulated lunar soils under a variety of electrical, atmospheric, and chemical conditions will be needed to test Lee's hypothesis. If he's right, the next step is to cast about for solutions, such as adhesion-resistant coatings.

Earthworms. Sounding a toxic warning about hazardous waste.

Toxicologists Watch As the Worm Turns

Why are toxicologists like early birds? They want to get the worms. Investigators are turning to earthworms to complement their rodent-based toxicity assays, spurred on by rising costs of animal research and fierce pressure from animal rights activists to abandon mammal testing. Arthur Goven of the University of North Texas Environmental Effects Research Group and his colleagues, for instance, now have two grants from the Environmental Protection Agency (EPA) to develop assays to indicate how substances like PCBs or metals impair a worm's immune system.

To tease out such subtle effects, Goven and his co-workers periodically extract and examine an earthworm's coelomocytes, checking the ability of these immune cells, for example, to engulf bacteria in a process called phagocytosis. Certain immune processes are common to many species, including people, so if a compound retards the process in one organism, similar concentrations may do so in all.

Rodents won't be out of a job, however; Goven thinks worms will serve best as early warnings, indicating when further, more sophisticated tests with rodents are necessary. But the worm may have one unique capability: to provide, through its intimate contact with soils, a means of evaluating cleanup attempts at hazardous waste sites. For instance, says Goven, EPA might monitor progress at a Superfund site by periodically analyzing the local worm population. "Earthworms are slowly gaining acceptance in the United States for environmental toxicology. We think we can biologically tell people how clean clean is," he says.

Spinal Trial Gets Stopped

Dogged by controversy since last year, an operation touted to heal spinal cord injuries has run into trouble again. Charges of impropriety in patient recruitment procedures have halted a trial of the procedure at Boston University Medical Center (BUMC).

The trial, begun in June, involves a new technique in which part of a patient's omentum, a blood vessel-rich apron of tissue in the abdominal cavity, is tunneled through the body to the site of the injury. Since one end remains attached to the abdomen, the hope is that it will stimulate nerve regeneration by providing blood and chemicals such as nerve growth factors.

BUMC surgeon Harry Goldsmith, who developed the technique, had already drawn criticism when he announced plans to conduct the trials, as many experts felt they were not justified by previous animal studies (*Science*, 9 October 1992, p. 218). Then in July, complaints by patients started coming in about the recruitment process, conducted by Barbara Devine, head of a Houston clinic, the Walk Back Institute, where most patients go for rehabilitation after the operation. BU spokesperson Barbara Trevet says Devine is alleged to have oversold the benefits of the operation, and to have told patients they would have to buy $4,000 muscle stimulators from her clinic, among other complaints.

The clinic has denied any wrongdoing. "It's sad that allegations get into print, but good work does not," says Walk Back administrator Carl Duke. BUMC has established a scientific review board to pursue the complaints and determine whether the trial, in which 26 of the planned 30 patients have already had the surgery, should be resumed.

French Get a Head in The Fossil Hunt

Armagnac is a part of southwestern France better known for old brandy than for old bones, yet researchers there have recently unearthed the 17-million-year-old skull of a deinotherium, a long-extinct animal that resembled an elephant—but with down-turned tusks.

It is the oldest such skull, by more than 2 million years, found in Europe, and had been well-preserved by sedimentary rocks from the erosion of the Pyrenees mountains. "We knew deinotheria existed in Europe at that time, but no complete skull had ever been found. Now we should be able to define the morphology of the first European deinothera, compare it with that of descendents found in Germany, and describe its evolutionary changes," says Francis Duranthon, associate director of the Natural History Museum of Toulouse, who supervised the dig.

The find confirms the site, Montréal-sur-Gers, which was discovered in 1987, as one of the most important repositories for Miocene remains in Europe. Digs have so far revealed bones of more than 40 species of extinct mammals, reptiles, and birds. The dense accumulation of bones in a climate resembling present-day Indonesia "indicate that animals must have been surprised by violent swellings of rivers or sank in mud near watering points or in swamps," says Duranthon. Many of them were descendents of animals that migrated after continental drift paved the way from Afica, and they appeared to evolve rapidly in the new European environment.