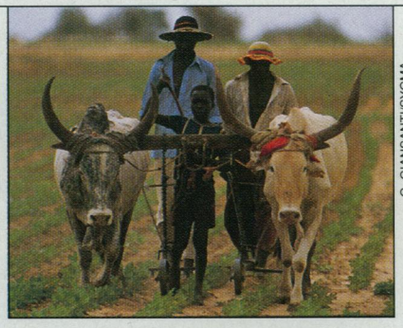
RANDOM SAMPLES

edited by JOCELYN KAISER

Were Cattle Domesticated in Africa?

Early African societies, many researchers have contended, didn't develop the trappings of modern civilization—money and kingship, for instance—on their own, but imported them from Eurasia. One reason to believe so was that the first clear signs of domesticated cattle—a major source of wealth in early societies—appear in the archaeological record in the Near East some 9000 years ago. But now geneticists studying DNA in modern cattle have found evidence that Africans may have indeed begun raising cattle independently.

Daniel Bradley and co-workers at Trinity College in Dublin, Ireland, report in last week's *Proceedings of the National Academy of Sciences* that they looked at mitochondrial DNA (mtDNA) samples from 90 cattle belonging to 13 breeds in India, Europe, and Africa. MtDNA mutates at a regular rate, so differences among breeds, researchers think, can be used as a "molecular clock" to date their divergence from a common ancestor.



G. GIANSANTI/SYGMA

Hoofing it. Modern African cattle at work.

The team had already found evidence that Indian cattle broke off from a lineage that led to the Near Eastern stock 200,000 years ago, suggesting there was a second domestication site in India (*Science*, 15 April 1994, p. 343). And now it seems the ancestral cluster split again, about 22,000 to 26,000 years ago, into groups that gave rise to modern African and European cattle.

This split means that cattle wandered into Africa long before researchers had thought they did and remained a distinct group. And that suggests, Bradley says, that Africans domesticated cattle on their own.

The new results challenge the view that African societies depended on the Near East to develop, notes anthropologist Alison Brooks of George Washington University. "A lot of people don't want to ascribe any independent discoveries to Africa," Brooks says. Fred Wendorf of Southern Methodist University in Dallas adds that independent invention could help explain why Africans, unlike Eurasians, traditionally used cattle for milk and blood, and seldom for meat.

Getting in the Groove

In their quest for a friction-free world, tribologists—people who study lubricants—have made a slick discovery. When Harvard chemists Paul Sheehan and Charles Lieber tried to push nanometer-sized crystals of one material across another, the crystals slid freely only when the two surfaces' crystalline lattices were perfectly aligned. The result: a new slant on friction at an atomic scale, and a tiny lock.

The researchers, who report their results on page 1158, worked with molybdenum oxide nanocrystals sitting on a layer of molybdenum sulfide, a common solid lubricant. They studied this system with an atomic force microscope (AFM), which has a sensitive tip that, when dragged over a surface, measures atomic-scale forces. Applied with more force, the tip can actually shove very small objects around.

And when these nanocrystals were nudged, they wouldn't budge easily—unless they were pushed in a certain direction. This orientation appears to correspond to channels between rows of sulfur atoms on the bottom crystal's surface—rows of atoms on the top nanocrystal drop into these channels and slide along. That's a first in AFM research, says physicist Shirley Chiang of the University of California, Davis: "People have certainly slid things, but they haven't been able to say [it was] along a crystallographic axis."

Lieber and Sheehan found a way to take advantage of this asymmetry: a nanolatch. Using two nanocrystals with different sliding directions, they machined a notch in one crystal and cut a rectangular piece from another—a pin of sorts—and slid the pin into the hole, locking the two pieces together. "It's a nifty demonstration," says chemist Richard Colton of the Naval Research Laboratory in Washington, D.C.

Round Two for Boron Tumor Treatment

The rocky road of an experimental brain cancer therapy at Brookhaven National Laboratory (BNL) seems to have smoothed out as researchers begin a second round of trials this month. The treatment, called boron neutron capture therapy (BNCT), raised controversy when first used at BNL in 1994, as it had killed several patients in the 1950s. But the recent results, which use an updated therapy, have been encouraging, so researchers are moving ahead.

BNCT is meant to slow the growth of glioblastoma multiforme, a rare brain cancer that usually kills within 6 months. Researchers inject a patient with a boron compound that concentrates in tumor cells, then irradiate the tumor site with neutrons that react with the boron atoms and self-destruct, releasing radiation that should kill the cancerous cells.

BNL scientists recently completed a first trial on 15 patients begun last year (*Science*, 17 February 1995, p. 956). Patients seemed to experience no adverse effects on brain function, and eight are still living. So BNL proposed a second trial involving up to 28 patients to the Food and Drug Administration, which granted approval on 10 May. This time the researchers may use stronger treatments: They can irradiate the brain from both sides and deliver a higher dose of neutrons.

Frank Mahoney, who administers extramural radiotherapy grants at the National Cancer Institute, says the new round of experiments seems worthwhile against so intractable a cancer. "They've got an interesting drug, and they're conducting the trial in a responsible fashion," Mahoney says.

Duel for Control of NAE Nears Climax

The final act in the drama between the president and governing council of the National Academy of Engineering (NAE) has begun. The council adopted a resolution 9 May calling for Harold Liebowitz to be removed from his elected position, and last week it sent ballots to members asking them to approve that resolution. This follows an overwhelming vote by members to amend the NAE's bylaws so that the membership can remove NAE officers.

Liebowitz, in turn, mailed a 14 May letter to NAE members defending his leadership. He also enclosed an informal ballot of his own—a survey asking whether he or the council should step down. "Do not be fooled by the council's assertion that they are embarked on a 'for cause' termination," the president wrote. "That is a cover by their lawyers ... who have charged the academy thousands of dollars to pursue the policy agendas of council members intent on stopping my platform." Liebowitz added that he mailed the material at his own expense.

Council members and their supporters maintain Liebowitz has acted incompetently and has endangered the NAE's reputation, funding sources, and staff morale (*Science*, 1 March, p. 1222). The ballots are due by 23 June; the NAE will announce the results shortly thereafter.