

Anthropology

Chimp hairs yield genetic fallout

Strands of hair routinely shed by chimpanzees contain genetic information that can illuminate the animals' evolution and social behavior, a scientific team reports in the Aug. 26 *SCIENCE*. In fact, DNA gleaned from chimp hairs suggests that a third species of these African primates may exist, in addition to the two generally accepted chimp species.

Evolutionary reconstructions of chimps and the 6- to 8-million-year-old ancestor they share with humans "will have to allow for the previously underappreciated [genetic] variation within chimpanzees," assert Phillip A. Morin, a biologist at the University of California, Davis, and his colleagues.

The researchers collected chimp hair from 20 locations in central and western Africa, including the Tanzanian site where Jane Goodall has studied chimp behavior for 30 years. Goodall participated in the new study.

A chimp subspecies living in western Africa may form a species distinct from common chimps (*Pan troglodytes*) and pygmy chimps (*P. paniscus*), Morin's team asserts. They base this conclusion on the extent of differences between these groups in mitochondrial DNA, which is inherited only from the mother. The proposed third species, *P. verus*, emerged about 1.6 million years ago, the researchers estimate.

Analysis of DNA from the nuclei of hair cells allowed the researchers to trace the genealogy of chimps at the site where Goodall has worked. Males show a much closer genetic relationship to each other than do females, they hold; most males are half-brothers. DNA tests identified the fathers of only two male chimps because many older fathers died in a viral epidemic during the late 1980s.

These findings support the theory that, since female chimps often leave their native social group to find mates in other groups, males in a group are more closely related than females. Close genetic links among male chimps may have helped to foster their high levels of cooperation in pursuit of status and power, the investigators suggest.

Egyptian civilization: The south rises

By the end of the fourth millennium B.C., Egypt emerged as a large territorial state ruled by a royal dynasty through a network of administrative centers. Archaeological evidence of how settlements sprinkled along the Nile Valley coalesced into one of the world's first civilizations remains murky.

However, a review of sites dating to between 3000 B.C. and 4000 B.C. concludes that a culture located about 300 miles south of the Nile Delta mobilized Egypt's first state. Available evidence does not support theories that invaders from other regions, such as Nubia, founded Egyptian civilization, asserts Kathryn A. Bard, an archaeologist at Boston University.

Two independent cultures existed in Egypt during the fourth millennium B.C., Bard maintains: the Nagada culture in the south and the Maada culture in the north. Most evidence of the Nagada culture comes from large cemeteries, where elaborate burials reflect the formation of elite social groups, Bard reports in the fall *JOURNAL OF FIELD ARCHAEOLOGY*.

Influences derived from Nagada grave styles, pottery types, and other artifacts show up in the first dynastic state, she says.

More well-preserved settlements exist for the Maada culture, but they contain much simpler burials and scant evidence of any social classes or lasting influence on later Egyptian civilization, according to Bard.

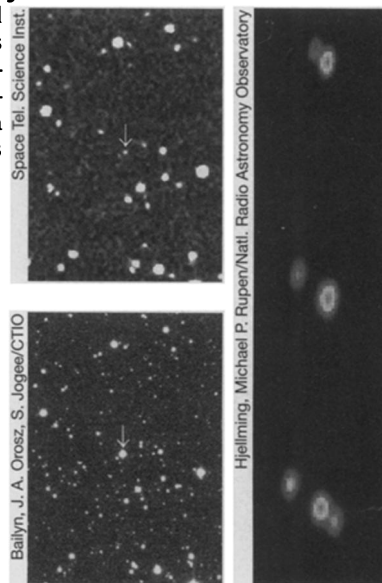
Only the Nagada people had access to gold and other valuable trade items with which they could obtain Mediterranean timber to construct a fleet of long-distance trading vessels, Bard contends. As trade expanded, Nagada groups moved north and eventually established a unified state, the Boston researcher theorizes.

Astronomy

All aglow over an X-ray nova

A Milky Way object that erupted in the constellation Scorpius has beguiled astronomers with its fireworks since late July. This enigmatic source, which could be a black hole some 10,000 light-years

Right, top: Visible-light image shows the faint, prenova object (arrow). Right, bottom: Image taken Aug. 20 shows that the X-ray nova has become 50 times brighter. Far right: Images taken by the Very Large Array radio telescope show evolution of the X-ray nova at a radio wavelength of 1.3 centimeters. In the upper image, recorded Aug. 19, two gas blobs separate. In the middle image, taken 6 days later, the separation has doubled and the source at right has widened. In lower image, taken Aug. 29, a third gas blob appears. If the middle blob is a stationary, radio-wave-emitting core, then the gaseous material to its right travels across the sky at 30 percent of the speed of light and the material to its left moves at more than triple that speed.



from Earth, has spewed radiation at wavelengths ranging from X rays to radio waves.

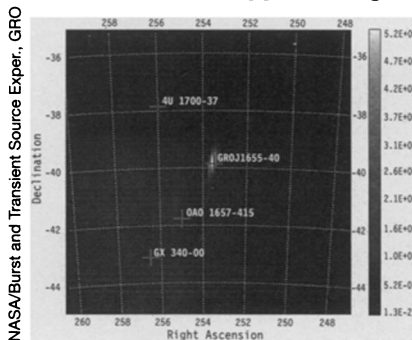
The Compton Gamma Ray Observatory (GRO) discovered the object as a strong emitter of high-energy X rays on July 27. Known as GRO J1655-40, this X-ray nova ranked as one of the three brightest X-ray sources in the sky for 2 weeks.

Astronomers observing at other wavelengths soon got into the act. Using the 0.9-meter telescope at Cerro Tololo Inter-American Observatory in La Serena, Chile, researchers found an optical counterpart to the X-ray source, believed to be a two-star system. Charles D. Bailyn of Yale University in New Haven, Conn., says he and his coworkers appear to have observed one of the stars eclipsing its far denser companion. Determining how long it takes the eclipsing star to orbit its partner may indicate the mass of the companion and whether it is a black hole or just an extremely dense neutron star.

Scientists believe that X-ray novae are created when a black hole or neutron star steals mass from a more ordinary star that orbits it. The stolen matter unleashes a torrent of radiation as it falls onto and heats a disk of material surrounding the dense companion. In the less violent "classical" nova, material falls onto a white dwarf — a compact star much less dense than a neutron star — and undergoes a thermonuclear explosion.

Images taken with the Very Large Array radio telescope near Socorro, N.M., show three radio-emitting blobs of hot gas, one of which appears to give the illusion of moving

at speeds faster than light, says Robert M. Hjellming of the National Radio Astronomy Observatory in Socorro. Bailyn calls the blobs "cosmic burps" — material that the nova's black hole ejected rather than swallowed.



X-ray image of GRO J1655-40.