

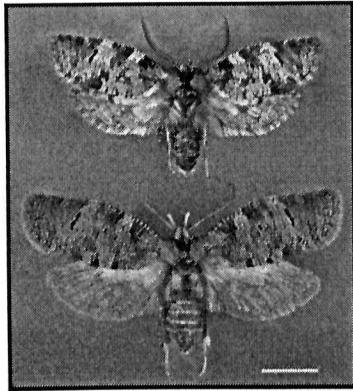


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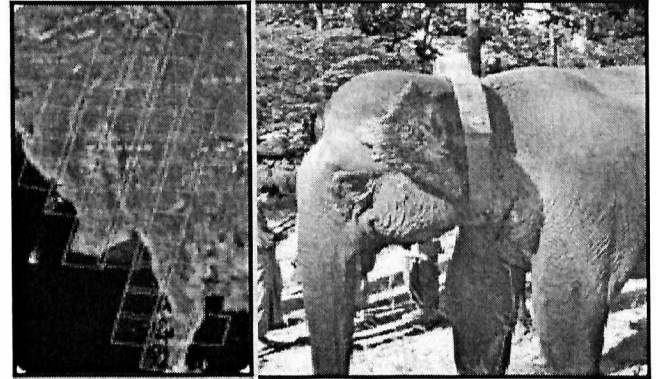
Spotlight on Science at the Smithsonian

Weekly Newsletter

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Andesiana lamellata, one of the species of a new moth family (top-figure male; bottom-figure female).



Map shows areas covered by the satellite imagery used to track the condition of Myanmar's forests.

Entomologists Discover “Living Dinosaurs” of the Insect World

Don R. Davis and Patricia Gentili-Poole of the Department of Systematic Biology's Entomology section have discovered a new family and superfamily of primitive moths (*Andesianidae*) from southern Argentina and Chile. This announcement is the most recent of a series of important discoveries that Davis and colleagues have made over the last 20 years on the diversity and biogeography of *Lepidoptera* as a result of their intensive fieldwork in the temperate regions of southern South America.

Previously Davis had reported on the new family *Palaephatidae*, as well as the first New World records of two other families and the first Southern Hemisphere record of another family. These discoveries involving the “living dinosaurs” of the insect world have provided us with a clearer understanding of the evolutionary history, classification, distribution, and history of *Lepidoptera*.

Tracking the Fate of Myanmar's Treasures

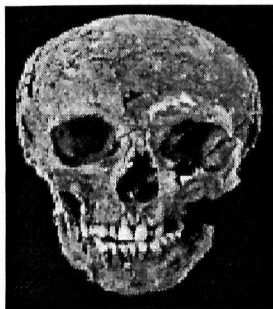
National Zoo scientists are using high-resolution satellite imagery to track changes in Myanmar's wild jungles, which are among the last strongholds for tigers and Asian elephants.

Dr. Peter Leimgruber, Director of the National Zoo's Geographic Information System Lab, and his staff are comparing satellite images from the 1990s with images from 2000. Using Landsat satellite imagery, they are training a computer to automatically identify areas that were deforested between 1990 and 2000. The final result will be the first complete forest map of Myanmar that also highlights threatened and intact forest areas.

The scientists hope to use this state-of-the-art satellite technology to identify, monitor, and fight habitat loss and species extinction globally. The situation is grim in most of Southeast Asia. Thailand, for example, has lost more than 50 percent of its forests in only 30 years, much of which was prime habitat for endangered species, including tigers and Asian elephants. This makes Myanmar a crown jewel for forest conservation in mainland Southeast Asia.

Myanmar is reported to harbor more than half of mainland Southeast Asia's remaining closed-canopy forest and had little deforestation during most of the 1970s and 1980s. New reports suggest that deforestation rates in Myanmar have increased dramatically in recent years, but no comprehensive study of all of Myanmar's forests has been conducted. Preliminary results of the Zoo study suggest that Myanmar's deforestation rates are considerably below the annual 1.4 percent reported by the United Nations Food and Agriculture Organization.

Final study results will be released later this summer, when an ongoing accuracy assessment is completed. Dr. Leimgruber and his team intend to use the data for a more detailed study on the remaining Asian elephant habitat in Myanmar. The maps from the satellite analysis can be viewed at the Zoo's Conservation Atlas and will also be available for download later this year.



A skull from the Americas.

Diversity Has Old Roots in the New World

Preliminary study of the size and shape of human skulls in pre-contact and early-contact Latin American and Caribbean human skeletal remains have revealed surprising results. Physical anthropologist Douglas Ubelaker and colleagues Ann Ross and Anthony Falsetti found more diversity among Latin American populations and greater heterogeneity in the Americas than previously thought. Their data support the argument that different populations inhabited the New World before the arrival of the Europeans. Their work was published in the December 2002 issue of *Human Biology*.



Island Paradise for Tropical Research

In April, Barro Colorado Island (BCI) celebrated its 80th anniversary. The island was formed during the construction of the Panama Canal from 1910 to 1914, when the Chagres River was dammed and an area approximately the size of Barbados Island was flooded to create Gatun Lake. A hill reaching 171 meters above sea level, separated from the mainland by the new lake's rising waters, became BCI.

James Zetek, William Morton Wheeler, and Richard Strong were among the scientists who came to the Isthmus of Panama during the canal's construction to study the *Anopheles* mosquito (the carrier of malaria). They foresaw the importance of establishing a forest reserve in this undisturbed island near hospitals and civilization, where they could study the tropical flora and fauna.

On April 17, 1923, the governor of the former Canal Zone approved the scientists' petition, and BCI was declared a biological reserve. A laboratory was built on the island, and BCI became one of the first protected tropical rainforests in the New World. On July 16, 1946, the U.S. Congress assigned the responsibility for maintaining the facility to the Smithsonian Institution. Since then, the administration and maintenance of BCI has become the Smithsonian Tropical Research Institute's chief responsibility.

During the negotiations that resulted in the Panama Canal Treaties of 1977, BCI and five adjacent areas were declared a nature monument—a designation from the 1940 Convention for Nature Protection and Wildlife Preservation in the Western Hemisphere. An article about BCI appeared in the April 24 issue of *National Geographic*.



A dramatic cluster of galaxies (Abell 1689), as photographed by the Hubble Space Telescope. The figure above shows a Hubble Space Telescope image of the galaxy cluster Abell 1689, which resembles A754; Hubble has not taken an image of Abell 754 itself.

Galaxies in Collision

Galaxies are not randomly spread across space, but are often found clustered together in groups. Our own Milky Way galaxy is a member of the "Local Group" of about three dozen galaxies, which includes the Andromeda Galaxy located about 2 million light-years away.

Very large clusters can contain thousands of galaxies, all bound together by gravity. Sometimes these galaxies collide with one another, and, in even more cataclysmic events, clusters can even collide and merge with other clusters.

A team of eleven Smithsonian Astrophysical Observatory astronomers led by Maxim Markevitch, along with one of their colleagues, has used the Chandra X-ray Observatory to map the temperature of the gas between the galaxies in one rich cluster that is thought to have experienced collisions, Abell 754. The scientists were trying to understand how the cluster may have formed, and how galaxies in clusters (like our Milky Way) evolve. They discovered that the gas is extremely hot in places, over 15 million degrees Celsius. By comparing their Chandra image of the hot gas with other data, they have concluded that a simple collision between two galaxies, or even between two smaller clusters of galaxies, could not have produced the cluster we see today. Instead, they calculate this may be an in-

stance when three clusters of galaxies merged together in a complex interaction.



Burial from Voegtly Cemetery, Pittsburgh, Pennsylvania.

Remember Me As You Pass By

Curator of Physical Anthropology Douglas Ubelaker and colleagues have received a Historic Preservation Excellence Award from the Federal Highway Administration's Pennsylvania Division for "the best representative project for archaeology and preservation."

Planned highway construction led to the discovery of a German cemetery in Pittsburgh, Pennsylvania, dating between 1833 and 1861. In 1987, the Pennsylvania Department of Transportation invited Dr. Ubelaker to participate in the site's excavation and analysis.

The remains of 823 individuals and associated artifacts were uncovered, providing information about burial customs, material culture, and biology in 19th-century America. The average height of females was 5'3", and males were about 5'7". Their pathological conditions included trauma, infection, extreme arthritis, and tuberculosis, along with poor dental health. Life expectancy was short, especially among infants and children, with the average age of death being 14.6 years. This demographic information complements analyses performed on other U.S. skeletal remains and adds to our understanding of human biology, U.S. history, and the development of American culture.

Recent Publications

Clark, K.L.; Ruiz, G.M.; Hines, A.H. 2003. "Diel variation in predator abundance, predation risk and prey distribution in shallow-water estuarine habitats," *Journal of Experimental Biology and Marine Ecology*, 287:37-55.

Davis, D.R.; Gentili, P. 2003. "Andesianidae, a new family of monotrysian mother (Lepidoptera: Andesianoidea) from Austral South America," *Invertebrate Systematics*, 17:15-16.

Herre, E.; Machado, C.; Sevenster, J.; Keller, L. 2003. "Cryptic species of fig-pollinating wasps: Implications for the evolution of the fig-wasp mutualism, sex allocation, and precision of adaptation," *Proceedings of the National Academy of Sciences*, 100(10): 5867-5872.

Markevitch, M.; Mazzotta, P.; Vikhlinin, A.; Burke, D.; Butt, Y.; Donnelly, D.; Forman, W.; Harris, D.; Kim, D.; Virani, S.; Vrtilik, J. 2003. "Chandra temperature map of A754 and constraints on thermal conduction," *Astrophysical Journal Letters*, 586: (L19).

Thompson, C. 2003. "A fly in the biogeographic ointment," *Nature*, May, 423.

Ubelaker, D.; Jones, E.; Landers, D. 2003. "Voegtly Cemetery," *Smithsonian Contributions to Anthropology*, " 46.

Ubelaker, D.; Ross, A.; Falsetti, A. 2002. "Cranio-metric Variation in the Americas," *Human Biology*, December, 807-818.

Web Links

The Coelacanth: More Living than Fossil highlights an ancient fish once thought to exist only as a fossil.

Working in a zoo means very different things for different people. Curious about what it's like to work at a zoo, this web site prompted this collection of bios and profiles of the *National Zoo staff*.

"*Where the Land and Sea Intertwine: Connecting the Coastal Ecosystems of Belize*", is an Electronic Field Trip to offer student learning opportunities they would not otherwise experience.

Spotlight on Science at the Smithsonian

Spotlight on Science at the Smithsonian is a weekly electronic newsletter about Science at the Smithsonian. It is produced for the Smithsonian community by the Office of the Under Secretary for Science. To contact the editor, e-mail mellendickt@si.edu.

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www.si.edu/research/spotlight