

Insect heaven: America's Triassic buzz

With a million named and many more unknown species, insects can safely claim the title of the world's most prosperous creatures. Their success is nothing new. Ever since animals left the oceans and took up a drier lifestyle, insects and their arthropod kindred have ruled the planet. Now, paleontologists have discovered a missing chapter in insect evolution, thanks to an extraordinarily rich fossil site in southern Virginia.

The Solite quarry near the North Carolina border has yielded 25 different types of insects, as well as numerous plants, dating to the end of the Triassic period, 210 million years ago. Although well-known insect deposits from this time exist in Russia and Australia, "this is the only really, truly significant Triassic deposit for insects in North America," says David A. Grimaldi of the American Museum of Natural History in New York. Grimaldi, Nicholas C. Fraser of the Virginia Museum of Natural History in Martinsville, and their colleagues report their work in the April 18 *NATURE*.

Although geologists discovered some fossils in the Solite shale 20 years ago, most of the insect remains came to light during recent excavations. The fossils are preserved in exquisite detail, showing even the tiny wing hairs of animals only a millimeter long. Unlike many sites, which yield only isolated insect wings, the Solite quarry has preserved entire bodies, giving paleontologists new insight into ancient forms. In particular, Fraser and his colleagues have discovered the oldest definitive records of three orders of insects and many families and superfamilies.



Grimaldi/NATURE

The oldest known thrips from the Solite quarry.

Did dinosaurs need mother love?

Paleontologist John R. Horner ruffled feathers in 1979 when he proposed that some infant dinosaurs were altricial—nest-bound creatures requiring the care of doting parents. Now, two zoologists contend that dinosaurs were precocial, able to leave the nest immediately after hatching.

Nicholas R. Geist and Terry D. Jones of Oregon State University in Corvallis focus on one part of Horner's argument: that some dinosaur hatchlings had underdeveloped leg joints and could not leave the nest. To test this idea, Geist and Jones studied the femurs of newborn birds.

Emus and other precocial birds have joints similar to those of Horner's dinosaurs, yet these birds can walk just after emerging from the egg. For that reason, the two zoologists conclude that limb bones cannot reveal whether hatchling dinosaurs were nestbound or precocial, they report in the May 3 *SCIENCE*.

Instead, they suggest looking at the pelvis. In all altricial birds, hatchlings come out with poorly formed pelvic bones that are still composed largely of cartilage. In precocial birds and crocodiles, however, hatchlings have pelvises already formed into bone.

By the pelvic test, dinosaurs qualify as precocial, say Geist and Jones. The five known examples of fossilized dinosaur embryos all have visibly ossified pelvises, suggesting that they would have hit the ground running. But Horner, a researcher at the Museum of the Rockies in Bozeman, Mont., contends that the only way to tell the state of the dinosaur pelvises would be to slice them open—an unlikely option, given their rarity.

Horner raises other evidence to support his theories. He has found fossils of young dinosaurs preserved inside nests, an indication that they must have remained there for some time after hatching and were thus altricial. "There are no living examples of babies that leave the nest and then come back to live there," he says.

Bruce Bower reports from New York City at the annual meeting of the American Psychiatric Association

Exploring trauma's cerebral side

New studies suggest that people who fall prey to a severe stress reaction following military combat or sexual abuse have an unusually small hippocampus, a brain structure that helps to regulate memory. But scientists cannot say yet whether severe trauma causes the hippocampus to shrink or whether a small hippocampus somehow contributes to vulnerability to trauma.

In a brain scan investigation directed by Murray B. Stein of the University of California, San Diego, 22 women who cited repeated childhood sexual abuse displayed hippocampal volumes smaller by 5 percent than those of 20 women who reported no sexual abuse and no psychiatric disorders. Similar findings appeared last year (*SN*: 6/3/95, p. 340).

Sixteen of these sexually abused women suffered from post-traumatic stress disorder (PTSD). Hippocampal volume was lowest in those reporting the most severe dissociation, Stein asserts. Dissociation includes feelings of detachment from one's self and other alterations of consciousness.

Women abused as young children performed better on short-term memory tasks than those abused at later ages. The brains of young children may have more resilience to trauma than those of teenagers or adults, Stein theorizes.

Another study, directed by Tamara V. Gurvits of the Veterans Affairs Medical Center in Manchester, N.H., found a 24 percent smaller hippocampal size in seven Vietnam combat veterans suffering from PTSD, compared to seven Vietnam combat veterans free of PTSD and eight men who did not serve in the military. In the PTSD group, the smallest hippocampal volume appeared in those exposed to the most severe combat, Gurvits reports.

Trauma researchers must account, however, for brain scan evidence that healthy people experience a drop in hippocampal volume of about 15 percent as they age, contends Mony J. de Leon of New York University Medical Center.

In a 4-year study of 405 elderly volunteers, de Leon and his coworkers found that probable cases of Alzheimer's disease often emerge in people who start out with a small hippocampus and mild memory problems. Hippocampal volume declined from 20 percent to 50 percent more in victims of apparent Alzheimer's disease than in healthy elderly controls, according to de Leon.

Several possible explanations exist for a link between a smaller hippocampus and PTSD, argues Roger K. Pitman, a New Hampshire colleague of Gurvits. Hippocampal shrinkage may occur first and boost the likelihood either of encountering traumas (such as making one more prone to volunteer for combat) or of developing PTSD after trauma. Conversely, hippocampal atrophy may result directly from severe trauma, from PTSD produced by trauma, or from alcohol or illicit drug abuse, which frequently accompanies PTSD.

Till death do us part

A husband who copes poorly with stress may inadvertently help speed the progression of his wife's breast cancer, according to a study directed by David Spiegel of Stanford University School of Medicine.

Spiegel's group studied 31 couples recruited for a study of the effects of psychotherapy on women's breast cancer survival. Women whose husbands initially exhibited high concentrations of the stress hormone cortisol in their saliva died at a markedly higher rate over a period of up to 4 years.

Elevated cortisol may reflect the stress caused by a husband's difficulty in dealing with his wife's life-threatening condition and in providing her with effective emotional support, Spiegel and his coworkers propose. This biological reaction may also accompany a husband's anticipation of bereavement, which begins years before his wife dies, the researchers contend.