July '93

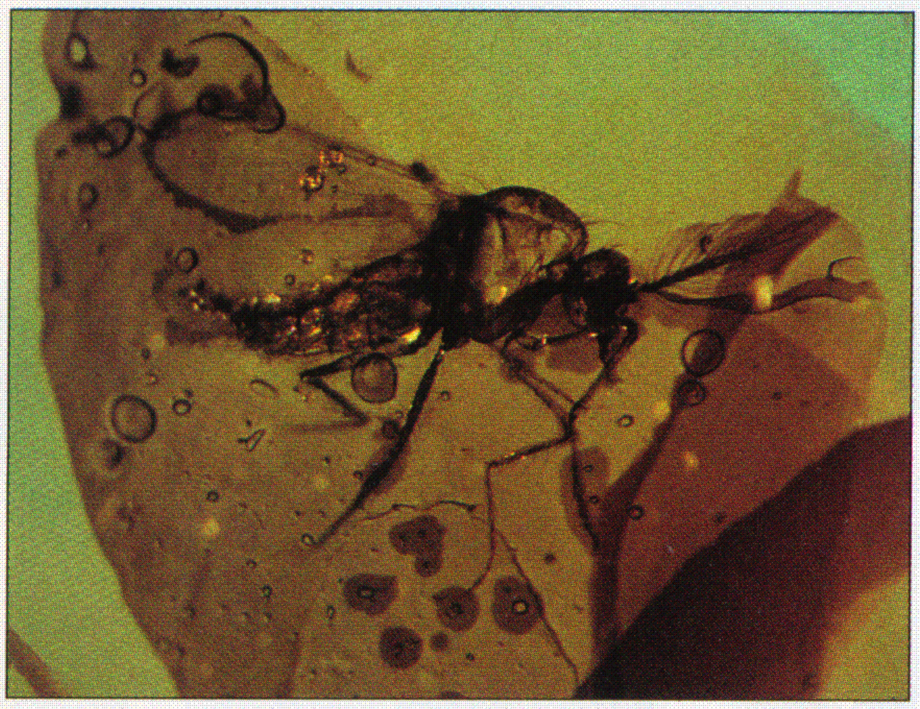
DIGS

RESURRECTING THE DINOSAUR:
The scientist behind *Jurassic Park* moves closer to isolating dinosaur DNA

By Kathleen McAuliffe

In *Jurassic Park,* Michael Crichton's best-selling novel and the new motion picture, scientists bring to life a menagerie of dinosaurs. They clone the behemoths by retrieving dinosaur DNA from fossilized insects that fed on the dinosaurs' blood.

Farfetched? The concept of sequencing portions of dinosaur DNA could soon become a reality, according to George O. Poinar, a paleontologist at the University of California at Berkeley whose research inspired Crichton's plot. "We've got a project underway to extract dinosaur DNA from insects preserved in amber samples," he reports. Cloning the long-extinct giants, however, isn't possible yet. Still, he doesn't rule out the possibility that the technology for cloning could become available sometime in the future.



Paleontologist George O. Poinar (top) hopes to extract dinosaur DNA from ancient insects that, like this midge (above), have been preserved in amber.

His colleagues have, for the time being, reserved judgment on Poinar's venture. In their view, simply recovering dinosaur genes would be an extraordinary coup. "The DNA molecule normally deteriorates rapidly after the animal dies," points out Michael Braun, a molecular biologist at the Smithsonian Institution's National Museum of Natural History. "The conditions of burial and preservation would have to be just right to salvage genetic material that old."

Until recently, the oldest known DNA came from 18-million-year-old magnolia leaves preserved in an Idaho bog. Researchers have teased other still-intact genes from animal bones protected from degradation in arid desert caves or tar pits. But new research suggests that amber may beat all comers in prolonging DNA's viability. Poinar and other California researchers stunned the scientific community last September by announcing that they had extracted DNA from an extinct 30-million-year-old bee embedded in amber. Almost simultaneously, a team of researchers led by Rob De Salle of the American Museum of Natural History in New York City reported recovering genetic material from another insect encased in amber—this time an extinct termite of roughly the same age.

Amber is essentially fossilized plant sap. A few rare pieces contain flying insects, spiders, centipedes, frogs, the feathers of birds—the remains of virtually any small creature that stepped in the wrong place thousands or millions of years ago, thus becoming entombed in the soft, gooey resin. As the sap hardened with age, the glossy encasement protected the specimen from weathering and biological agents of decay. Small wonder the Egyptians harnessed the resin to embalm their mummies.

Despite amber's remarkable preservative qualities, the feasibility of recovering genes from as far back as the dinosaur era, which ended 65 million years ago, has yet to be demonstrated. But Poinar may just be able to pull it off. He recently detected tiny soft-bodied creatures in 230-million-year-old amber pieces, and he hopes to retrieve genetic material from these organisms, which include a pollen grain frozen at the moment of germination and a protozoan immortalized in the process of ingesting a filamentous bacterium. "We're not talking about an imprint in stone," he stresses. "This is the entire organism that is preserved to the point that we can actually make out cellular structures in exquisite detail, including the nuclei where the genes reside."

To tip the odds in favor of getting dinosaur DNA, Poinar will sort through his ancient specimens, picking out amber insects of the blood-sucking variety that lived at the tail end of the age of reptiles some 70 million years ago. He plans to crack the amber right through the middle so that the specimens fall out. He'll then scrape out the insects' body contents and search for blood cells. If he lucks out and the pest's last meal happened to be a dinosaur, he'll try to isolate from the blood a foreign genetic sequence with the great reptiles' telltale signature. "We'll compare the genes to those of dinosaurs' closest living relatives—birds and crocodiles—to see if the mix is a good match," Poinar explains.

If his technique works—a big "if"—the paleontologist might snare the blueprints for such notables as the mighty *Tyrannosaurus rex* and the triple-horned *Triceratops*—dinosaurs that lived at the same time as the insects trapped in his amber samples. The information encoded in the molecules should speak volumes about the mysterious rise and fall of the dinosaurs.

Poinar's groundbreaking research may also answer questions about the future as well as the past, among them whether the sequel to *Jurassic Park* will unfold on the silver screen or in a scientist's laboratory.