

## As the earth quakes in Turkey and Idaho

"There was a horrible growling from under the soil, then all hell broke loose."

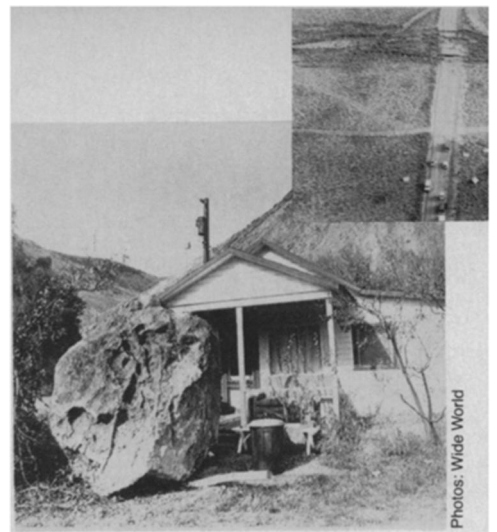
A Turkish woodcutter from the mountainous province of Erzurum spoke what many people in his country and the United States were probably thinking last week. By Tuesday, 1,200 of the Turk's countrymen were reported killed in a devastating—7.1 on the Richter scale—earthquake that crumbled 50 villages in six provinces last Sunday morning. In a similarly mountainous region of the United States a quake—rated 6.9—surprised the townspeople of Mackay and Challis, Idaho, on Oct. 28, killing two children and sending tremors through eight adjacent states and Canada. It was one of the worst quakes in the continental United States in 34 years.

The Turkish quake hit a region of the world where earthquakes are not a geologic anomaly. In the last 50 years three earthquakes have killed a total of 50,000 people in the area. Earthquake frequency maps show a heavily peppered strip through the Mediterranean and across Asia (SN: 2/3/79, p. 74). "We suspect the primary driving push behind the Turkish quakes is the push north of the Arabian plate," says Nafi Toksoz, a Turkish-born seismologist at the Massachusetts Institute of Technology, who will travel to Turkey next month where he has set up a sys-

tem of earthquake detection centers. Earthquakes around the globe are caused by the earth's shifting lithosphere (outer crust), which is thought to be broken into tectonic plates that slide on the inner, more malleable, asthenosphere. Turkey rests on the relatively small Aegean plate, wedged between the larger African, Arabian and Eurasian plates.

"The earthquake in Idaho was more because of block movement than plate movement," says Ken Sprenke, a geologist from the University of Idaho in Moscow. Part of the Great Basin and Range geological province, the Lost River Mountain Range runs northwest through central Idaho 50 miles from Idaho Falls. This earthquake was the consequence of "normal" faulting; two blocks of the earth's crust shifting vertically, presumably the Basins falling and the Ranges rising. "It left a scarp [cliff] 15 feet high, 25 miles long and 15 feet wide," says Sprenke.

"The really interesting thing going on with this earthquake is the hydrology changes in the valley," says Spencer Wood of Boise State University in Idaho, who spent the weekend with students on a field trip to the earthquake site. "There are springs gushing from the side of Borah Peak, and the valley seems to be slowly flooding," Wood says. "Whether any new



A quake-freed boulder rolled into this Challis, Idaho, front yard. The quake created a 25-mile fault line (inset).

bodies of water will result is hard to say."

The three scientists agree that building construction played a major role in the loss of life from the two major earthquakes. They both struck sparsely populated areas. "People in Erzurum customarily build heavy adobe-walled buildings with no reinforcement," laments Toksoz. Says Wood, "It was an older, brick building that killed the two children in Challis." Sprenke says, "seismic risk maps for Central Idaho are seriously inadequate. Finally geologists might see that the Central Idaho seismic belt is something to be reckoned with."

— M. Wolfe

## For whom the bell? Toads—Poetic justice in the Arizona desert

This is the Okeechobee, Fla., Little League team thrashing the New York Yankees; this is Wally Cox beating out Burt Reynolds for the girl; this is Grenada invading the United States. "This is unlike anything I've ever seen," says Thomas Eisner, professor of biology at Cornell University in Ithaca, N.Y. Eisner and his colleagues were near a pond in the Arizona desert wrapping up a day's shooting for the television series "Nature," when cameraman Rodger Jackman said, "Let's just look around." A short time later Jackman stopped in his tracks and said, "What the heck is that?"

What Jackman, Eisner and Cornell graduate student Stephen Nowicki happened upon were dozens of spadefoot toads—among thousands present in the area—being sucked down into the mud. Some of the toads, *Scaphiopus multiplicatus*, were dead; others, in obvious distress, were dying—only their head, or head and trunk, projected above the mud's surface. The study team quickly discovered that the toads were being ambushed and killed by horsefly larvae, *Tabanus punctifer*.

"This was unusual, because everyone knows that frogs and toads eat flies," Eisner says. Now, here were the flies—in their larval stage—eating the toads (actually, the larvae sucked the toads dry of



Young toad lies helpless and dying in the mud as fly larva sucks its body fluids dry (left). In many cases, the larva appears a match in size to its prey.



Tom Eisner/Science

blood and body fluids and left the carcasses behind).

This is the first recorded observation of insects of that genus feeding on anything but invertebrates, although there have been documented cases of aquatic insects eating fish, tadpoles and frogs, the researchers report in the Nov. 4 SCIENCE. The larvae's *modus operandi* was subsequently confirmed in laboratory experiments with specimens captured at the scene. The larva appears to burrow, rear end first, into the mud, until the head and powerful mandibles are barely exposed. Then it waits for an unsuspecting toad (usually a young one) to wander by. The ambusher seizes the toad by the hind leg,

flank or midsection of the belly and pulls it down into the mud. The larvae inject venom, as well as sucking the animal dry, but it is a slow, painful death, the investigators suggest.

"The case... is a reversal of the usual toad-eats-fly paradigm," Eisner and his colleagues note. It is probable, they suggest further, that adult spadefoot toads might on occasion gulp down the very fly that as a larva digested one of the toad's childhood companions.

Eisner says he believes the phenomenon occurs throughout the world, "wherever horsefly larvae lurk. I no longer," he adds, "think anything's impossible."

— J. Greenberg