

Expecting the Big One

Simon Winchester, *New York Times*, 1-14-10

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THOUGH it can offer scant comfort to the victims of the earthquake in Haiti, seismology is making some slight progress in its search for the holy grail of being able to predict dreadful events like that on Tuesday. New studies into ultra-slow-motion events deep underground called nonvolcanic tremors are showing vague but promising signs that the same kind of subterranean danger signals that allow us today to forecast when a volcano is about to erupt may one day offer some warning of the hitherto unpredictable nucleation — the explosive beginning — of an earthquake.

The most interesting studies are those that are proceeding, slowly and expensively, in Parkfield, Calif. (as it happens, just a little north of the road crossing where James Dean was killed in a traffic accident nearly 55 years ago). A deep hole has been drilled into the countryside there, directly into the San Andreas fault, which runs for 800 miles along the junction between the North American and Pacific tectonic plates.

The academic and government researchers who run the drilling program seek to find out what happens at the precise point of contact between two plates. It now appears highly likely that the very low impact, but still measurable, nonvolcanic tremors that the researchers have detected in boreholes deep beneath the San Andreas are in some way associated with the destructive earthquakes that occur at shallower depths above them. What the scientists would still like to determine is whether it might be possible to discern a nonvolcanic tremor's signature in the deep crust some useful time before a major earthquake happens far above.

This is highly relevant to the disaster in Haiti because the Enriquillo-Plantain Garden fault, the tectonic culprit behind Tuesday's earthquake, shares many similarities with the San Andreas: it is a strike-slip fault of about half the length (it runs from the Dominican Republic to Jamaica), it separates two plates (the North American and the Caribbean), for most of its length it is simultaneously locked solid and under severe stress, and it shears substantially every century or so. (The last time was in 1907, in Jamaica; scientists have long warned of a catastrophe — one day — involving Port-au-Prince.)

It is highly likely that the low-impact, nonvolcanic tremors measured in the San Andreas happen in the Caribbean also. If a real correlation between these tremors and earthquakes can be found, then science will turn out to be truly on to something. Such a relationship has not yet been discovered. But the tremors do seem to have some unusual bellwether characteristics: there seems to be a correlation, for instance, between their occurrence and such external phenomena as the tides and the phases of the Moon. A link to movements within the Earth's crust is at least a further possibility — and that is something that could not have been said five years ago. Hence the faintest glimmer of hope for progress.

But then what? If the geophysicists at the University of California at Berkeley, the United States Geological Survey, the California Institute of Technology and the Scripps Research Institute are convinced of a correlation, and then one day detect with their deeply buried devices a sudden swarm of nonvolcanic tremors, would they call the mayor of San Francisco or Los Angeles and issue a warning? And would the mayors then order a mass evacuation? And if they did, what if the scientists turned out to be wrong?

These are questions well worth asking — and asking even more stridently of a place that is somewhat less

sophisticated than California. If a similar swarm of data is noticed in the Enriquillo-Plantain Garden fault, would geologists try to warn the citizens of a city like Port-au-Prince? And even if the forecasts were right, would such a warning save lives, or would it set off panics more lethal than the earthquake itself?

The branch of seismology that deals with prediction is undoubtedly in a slightly better place than it was half a decade ago. But new questions arise with every step toward the grail, and the answers come too slowly to bring true comfort to anyone today, least of all the unfortunate people of Haiti.