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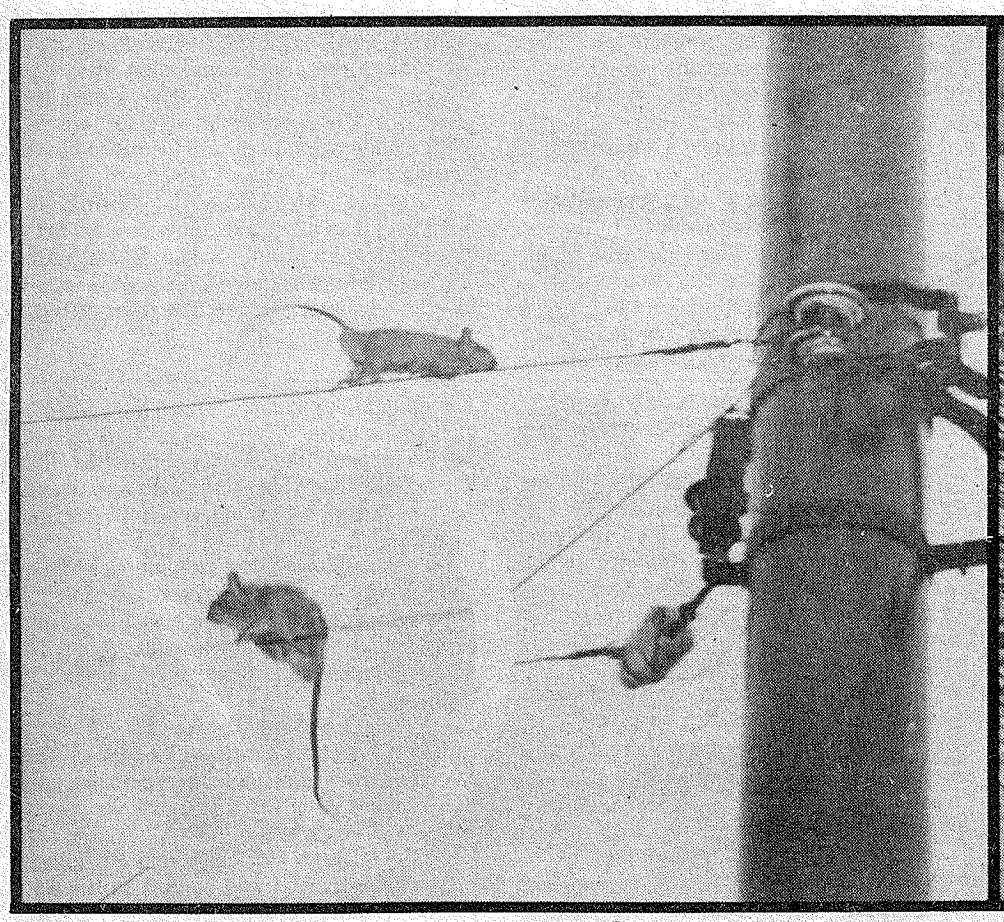

Rats scrambling up a power pole help predict an earthquake in China.

Before an earthquake, a frightened rabbit tries to escape to a rooftop. Photos by the People's Republic of China lent by Dr. Robert Wallace.

Strange events foretell earthquakes in China...

Dr. Wallace reports

Rats run out into the street. Columns, fans, sheets and balls of light shimmer in the air. The water in wells bubbles, and unusual electric currents flow through the earth. Horses shy, and pigs try to climb out of their styes. People hear rumblings, bursts of sound like frog croaks, and sounds like rushing water.

Do these phenomena sound like the stuff of serious scientific study or the scenario for the latest Hollywood disaster movie?

They are the former. These and other phenomena equally strange were observed just before the Sung Pan earthquake in the Szechwan Province of the People's Republic of China in 1976 and were used as the basis of successfully predicting the earthquake, according to Dr. Robert E. Wallace of Portola Valley.

Dr. Wallace, Chief Scientist of the Office of Earthquake Studies of the U.S. Geological Survey in Menlo Park, has just returned from a three week trip through the People's Republic of China. He and the delegation were studying earthquake prediction and earthquake engineering techniques used by engineers and scientists in China. Dr. R. B. Matthiesen of the Survey and Dr. Genevieve Dean of Stanford University were the other local members of the 12-person delegation sponsored by the National Academy of Sciences.

"I don't know how to assess it—it's just weird," Dr. Wallace commented. He noted the Chinese have had a dozen or more notable successes in predicting major earthquakes in time that people could be evacuated and lives saved. A United States group which studied the 1975 Haircheng earthquake concluded the prediction and evacuation saved tens of thousands of lives, according to Dr. Wallace. Even the devastating Tangshan earthquake was preceded by a number of anomalous events even though it was never officially predicted, Dr. Wallace said.

A key element in the Chinese system of predicting earthquakes is the large scale observation and reporting of these strange events by what the Chinese call "indigenous methods," according to Dr. Wallace. These are observations made by laymen—peasants, high school students and other amateurs—which have been highly organized through the communes, brigades, and other local governmental units.

"Before the 1976 earthquake 1297 accounts of this sort were reported by local observers and provided perhaps the most important basis for what turned out to be a highly successful prediction of a major earthquake," Dr. Wallace said. He noted that the Chinese also use the same range of sophisticated scientific techniques and instruments to measure effects which may precede an earthquake such as are used in this country. However, the short-term predictions, related particularly to timing and magnitude, are largely based on the indigenous methods.

A series of eight posters brought back from his trip and posted near Dr. Wallace's office give a sense of what the Chinese are taught to watch for before an earthquake. In one poster, long explanations in Chinese accompany colorful pictures of horses shying, fish jumping out of ponds, rats running out of houses, scared roosters, and immaculate black and white pigs jumping gracefully out of their sty. Another poster shows wholesome, healthy, industrious-looking Chinese making measurements. Some are studying light bulbs planted in the earth; some have meters in austere little rooms; some are measuring gas in wells; others are observing lights and sounds from neatly planted fields.

Some of the most mysterious eyewitness accounts were related to earthquake lights, which appeared as columns, fans, sheets and balls, according to Dr. Wallace. He said, "One fireball was seen which started at ground level and was about one meter in diameter at first. It shot up to ten or 15 meters and bent over in an arc, and the volume started shrinking. The light was mainly blue-white with a little red. A little white smoke swirled around the column of light, and a smell of garlic or sulphur was noted. Some people experienced nausea."

At another location a fireball burned a hole in the roof of a home, Dr. Wallace reported.

In another case, a technical member of a seismological group was surprised to find the water well of his station bubbling furiously just a few hours before the earthquake. According to Dr. Wallace, some of these phenomena are believed to be related to "outgassing," that is, an expulsion of gas trapped in the earth, perhaps by a strain or shift in the rocks just before the breaking and faulting which produce the earthquakes.

"The Chinese recognize outgassing as a rather common phenomenon prior to earthquakes. Why this has not been so commonly recognized in the U.S. I have no idea," Dr. Wallace said.

Other strange behaviors included double-blooming of fruit trees, one in the spring and a second after the fruit had set on the tree. This happened on peach, apple and grapefruit trees, Dr. Wallace reported.

Dr. Wallace commented on the Chinese methods, "We don't really know how to come to grips with some of these rather unusual phenomena, such as strange animal behavior," he said, "but the U.S. Geological Survey is funding three research studies in the area of animal behavior related to predicting earthquakes: one each at SRI International, the University of California at Davis, and the University of California at Los Angeles. Perhaps we can eventually find a scientific basis for using what now seem to be almost unbelievable phenomena."

The Chinese have certain obvious advantages in earthquake studies which are hard to duplicate in U.S. programs: 900 million people, a very tightly organized system of government, and more than 2000 years of recorded history of earthquakes.

Dr. Wallace was particularly impressed with the amazing historical records kept by the Chinese which provide a wealth of long term data. He has one slide showing earthquake cracks in the Big Goose Tower in Sian where 830,000 people were killed in 1556. These were the largest casualties ever recorded in an earthquake, larger even then the recent Tangshan earthquake which produced unofficial estimates of between 600,000 and 650,000 dead, he said.

"We don't have that kind of record to build predictions on," Dr. Wallace said. One of the theories suggested by the historical records is that some centuries may be more active than others. For example, earthquake activity in China was very high in the 50 years around 1550 and then died down. The Chinese feel they may be entering another active period after several centuries of quiet, Dr. Wallace said. "It has something to do with the geological processes which shape the earth."

Such long term cycles of earthquake activity could have some significant implications for California. Dr. Wallace speculated, "The question arises whether we in California have entered a quiet period or are still in an active one. From 1812 to 1906 was an active period in the Bay Area. We may well be in a quiet period."

Dr. Wallace is optimistic about developing a continuing, working level, program for reducing earthquake hazards between U.S. and Chinese scientists and engineers, particularly in the more open atmosphere following the overthrow of the "Gang of Four." "I believe we have a great deal that could be exchanged to our mutual benefit to counter the earthquake problem around the world," he said.

For several years, Dr. Wallace headed up a cooperative program in earthquake studies between the U.S. and the Soviet Union. "The earthquake threat is multinational and non-political," he concluded, "Close cooperation between the programs in such countries as the Soviet Union, the People's Republic of China, Japan and the U.S. can only be a benefit to all."

By Marion Softky