Unusual Animal Behaviour & Earthquake

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The zoo staff of Kamala Nehru Zoo, Ahmedabad observed some unusual behaviour by the zoo animals before the infamous Gujarat earthquake a few months back. Elephants, for example, spread their legs as if they were trying to maintain their balance, and made unusual sounds. A Crocodile basking on the ground suddenly moved quickly and jumped into the water. Otters, which were inside their burrows, suddenly came out and also jumped in their water pond; they also were seen running back and forth before earthquake.

Crows and other birds, perching on trees in the zoo, became very noisy. Kites near Kankaria lake were continuously flying in large numbers before and during earthquake. All our cage birds and animals were upset, flying or running inside their enclosure and vocalising.

During and after the earthquake, our greatest worries were the collapse of the enclosures causing injury to the animals as well as escape of carnivores, especially the leopard. Precautions were taken to load tranquilizing guns and close the main gate of the zoo, but fortunately only cracks developed in enclosures and they did not collapse.

After the earthquake, many people wondered whether animals had the ability to detect an earthquake. Since we had observed unusual behaviour before and during the earthquake in our zoo, I contacted many organisations and obtained some interesting information. A scientist by name of Dr. David Jay Brown was engaged in a scientific study in Los Angeles in 1990. He was working in his laboratory on the fifth floor of the University of Southern California Neuroscience building's Learning and Memory lab before an earthquake, with several other students, and three calm rabbits. Suddenly the rabbits became noticeably agitated. They start hopping around in their cages wildly for about five minutes, right before a 5.2 earthquake sent the whole building rolling.

More significantly, on February 4 , 1975 the Chinese successfully evacuated the city of Haicheng several hours before a 7.3 magnitude earthquake primarily based on observations of unusual animal behaviour. Ninty percent of the city's structures were destroyed in this earthquake, but as the entire city had been evacuated before it struck, nearly 90,000 lives were saved.

James Berkland, a retired USGS (United States Geological Survey) geologist from Santa Clara County, California claims to be able to predict earthquakes with greater than 75% accuracy rate simply by counting the number of lost pet ads in the daily newspaper, and correlating this relationship to lunar-tide cycles. This maverick geologist, has been meticulously saving and counting lost pet ads for many years. Berkland says that the number of missing dogs and cats goes up significantly for as long as two weeks prior to an earthquake !

Gravitational variations due to the lunar cycles create "seismic windows" of greater earthquake probability.

Unusual behaviour is difficult to define, and determining if there is a characteristic behaviour is not a simple, clear-cut process, although there are some distinct patterns which have emerged. For example, what appears to be intense fear, seems to be the cause of some animals vocalising for hours before an earthquake, and others to flee in panic. Instances of this type have been reported often. Equally characteristic is the apparent opposite effect of wild animals appearing confused and disoriented, losing their usual fear of people. Some other common observations are that animals appear agitated, excited, nervous, and overly aggressive. Unusual behaviour has been also reported in many species besides mammals as well, including fish, reptiles, and even insects. Deep sea fish, for example, have been caught close to the surface of the ocean on numerous occasions around Japan prior to earthquakes.

Some fish (catfish particularly) are reputed to become agitated before earthquakes, and at times have been reported to actually leap out of the water on to dry land. Snakes have been known to leave their underground places of hibernation in the middle of the winter prior to quakes, only to be found frozen on the surface of the snow. Mice are commonly reported to appear dazed before quakes, and allow themselves to be easily captured by hand.

Bees have been seen evacuating their hive in panic, minutes before an earthquake, and then did not return until fifteen minutes after the quake ended. Even creatures like millipedes, leeches, squid, and ants have been reported to exhibit abnormal prior to earthquakes (Miller, 1996).

A number of theories have been proposed to explain this phenomenon, and what the precursory signals that the animals are picking up on might be. Because many animals possess auditory capacities beyond the human range, it has been suggested that some animals may be reacting to ultrasound emitted as microseisms from fracturing rock.

Another reason may be fluctuations in the earth's magnetic field. Because some animals have a sensitivity to variations in the earth magnetic field, and since variations in the magnetic field occurs near the epicenters of earthquakes animals may pick up on this.

Marsha Adams, an independent earthquake researcher in San Francisco, claims to have developed sensors that measure low frequency electromagnetic signals which allow her to predict earthquakes with over 90% accuracy. Adams suspects that low frequency electromagnetic signals created by the fracturing of crystalline rock deep in the earth along fault lines are "biologically active", and that her instruments are picking up the same signals that sensitive animals do. As a result of this technology (whose details are a corporate secret), she says that her systems makes unusual animal behaviour observations obsolete.

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Tributsch has suggested that a piezoelectric effect may be at work here. When certain crystals, such as quartz, are arranged in such a way that pressure is applied along certain of the crystal axes, the distribution of positive and negative ions can shift slightly. In this way pressure changes produce electrical charging of the crystals surfaces. On the average the earth crust consists of 15% quartz, and in certain areas it can be as high as 55%.

According to Tributsch, the piezoelectric effect of the quartz is capable of generating enough electrical energy to account for the creation of airborne ions and during an earthquake. This electrostatic charging of aerosol particles may be what the animals are reacting to. Animals, also observed acting unusual in similar ways prior to thunderstorms, may have evolved a sensitivity to electrical changes in their environment.

Some people say that they feel an uncomfortable pressure on their head, or a persistent headache that lasts for weeks which suddenly vanishes moments before an earthquake. Because magnetite has been found in some animal brains, Berkland thinks that it is possible that animals may be reacting to their headaches caused by changes in the earth's electromagnetic field. He said that a dog was observed chewing on willow bark from which aspirin is derived - prior to an earthquake, and he believes that this was an attempt by the dog to self-medicate himself for the headache.

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Suggestion for small changes for heat control in animal enclosure

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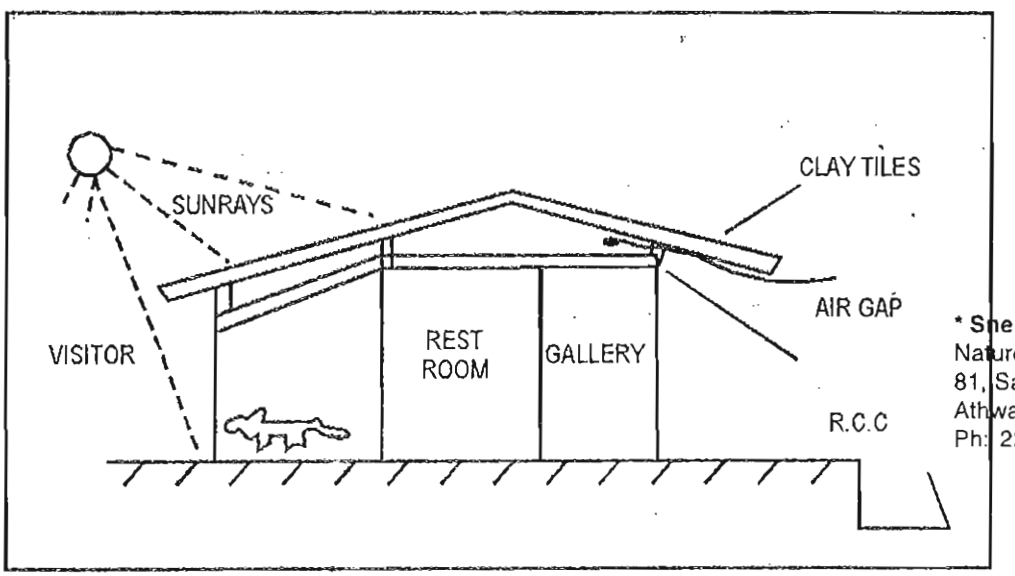
It was interesting to read about the Earth Tube Heat Exchanger in Zoos' Print, Vol. XVI, No.5, May 2001. I am a Mechanical Engineer and have experimented with alternate source of energy like wind and solar energy Based on my experience, if the tiger enclosure is given a second roof with Mangalore tiles with 40-50 cm gap above R.C.C. roof and also the tile roof is extended 1.5 meter on all sides, direct sunlight will not fall on roof (R.C.C.) and walls, and this will automatically reduce the room temperature by 3-5°C in summer. A similar result can be achieved by growing creepers and making it to cover the walls and roof of the enclosure. These inexpensive alterations can be done even by low-budget zoos to improve conductions for their animals.



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