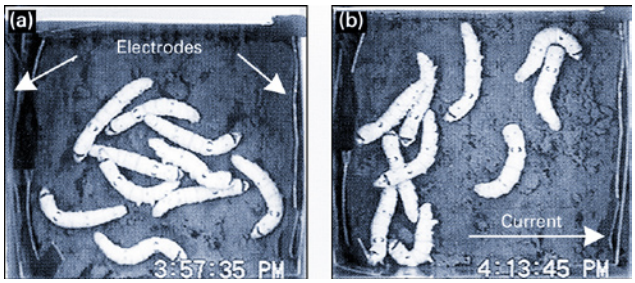
FIGURES

Figure 1

Reports that “fish and bugs aligned themselves in the same direction and jumped around before an earthquake” were reproduced in laboratory electric field experiments. We assumed they all quickly moved perpendicular to the electric current to minimize tissue discomfort, or tried to escape the current by jumping.

Left: Minnows, after application of a pulsed electric field in a lab. experiment. Beforehand the fish were swimming in random directions in the tank. Afterwards, they turned sideways-on to the electric current.



Right: Experiments on silkworms (bugs) showed the same thing (a) silkworms initially placed (b) re-aligning perpendicular to the direction of an introduced electric field.

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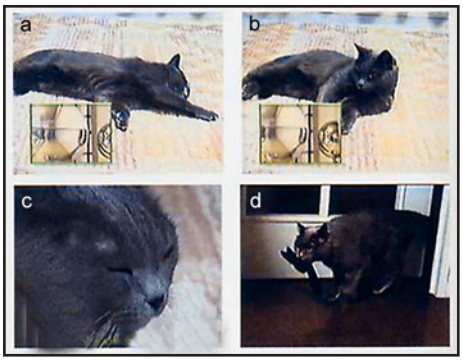
Figure 2



The sensitivity of cats to electric discharges was shown in a TBS (Tokyo Broadcasting System, Inc.) TV program called *Amazing Animals*. Right: In (a) a cat is asleep in a room adjacent to a van der Graaff generator. In (b) it reacts to an inaudible electromagnetic discharge. In (c) it shuts its eyes after each discharge. In (d) it leaves the room meowing in a distressed way carrying its owner’s socks in its mouth (as it would remove its kittens to protect them). A weather proverb says *When a cat washes her face it’s going to rain.* A cat’s eyes and whiskers are conductors of electricity, and it is quite possible a cat can detect an approaching thunderstorm 100km away. If it is moving at 20-30kph there will be rain in 3-5 hours. Similar washing behavior before earthquakes may be in response to EM fields.

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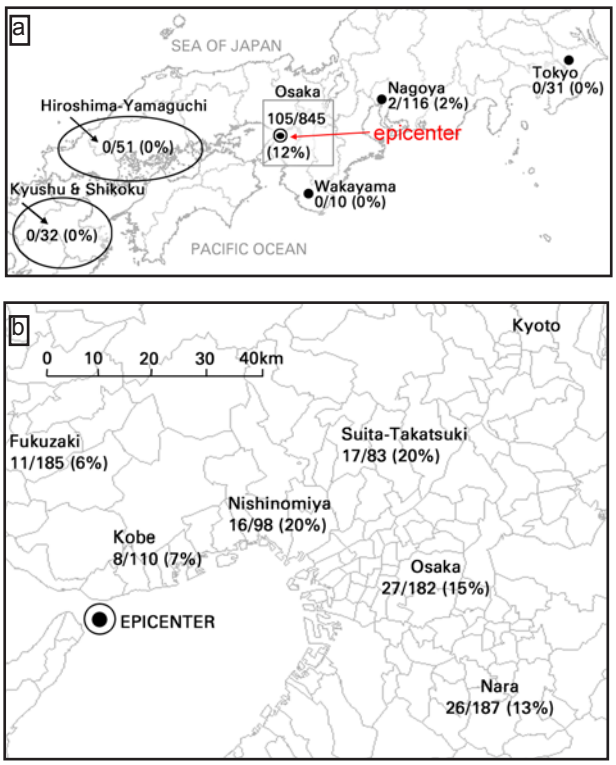

Figure 3

(a) A map of Western Japan and (b) the Kansai area, showing proportions of student survey respondents who woke up before the M7 Kobe Earthquake at 5.46am January 17, 1995. They were not normally awake at this hour.

Twenty percent of children within 100km from the Kobe epicenter woke more than a minute before the quake. Beyond 100km the response was no different from zero. Some students (8-10 years old at the time of the quake) said they were so scared they got into their mothers' beds. A chi-squared statistical test showed this 20% effect would be chance only one time in a trillion.

In Izmit, just before the 1999 earthquake a boy woke his parents, crying. His mother said she heard dogs howling like wolves and then the earthquake struck. They left their house just before it collapsed.

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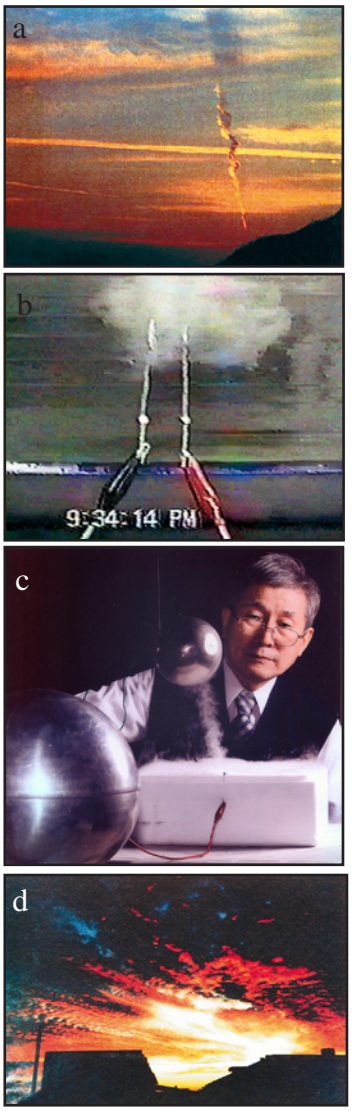
Figure 4



Earthquake Clouds:

Another proverb goes: *Fine weather fogs shroud the mountains before an earthquake*.

Earthquake clouds (strange cloud formations) have been reported before earthquakes. (a) shows a photo of a tornado cloud, taken the evening before the 5.45am Kobe Earthquake in 1995.

Professor Ikeya's team was also able to form fog (clouds) by creating intense electric fields in a super-cooled environment in the laboratory. In (b) clouds spread radially from the anode to the cathode. In (c) Professor Ikeya produces tornado-like (dragon-like) clouds by applying increasing voltages between a needle electrode and an upper gounded sphere. (In a supercooled atmosphere water droplets are produced in an electric field.)

Some people have linked autumn cirrus (parallel bands of cloud) seen from weather satellites to earthquakes in those locations and call them "earthquake clouds".

Earthquake Light (EQL)

Earthquake light is the various shapes and colours of light that appear on the ground or in the sky at the time of earthquakes and sometimes before. There are historical and recent accounts of EQL. (d) shows a photo of EQL taken before the Kobe Earthquake. This is not dawn; it was winter and the EQL was to the west.

A fault generating an intense electric field can explain legendary and contemporary reports of these unusual lights, clouds and fogs and other phenomena in the atmosphere and sky before large earthquakes.

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Figure 5

Electromagnetic pulses from a Van de Graaf generator brought a stag beetle out of hibernation from its winter bed of sawdust, right.

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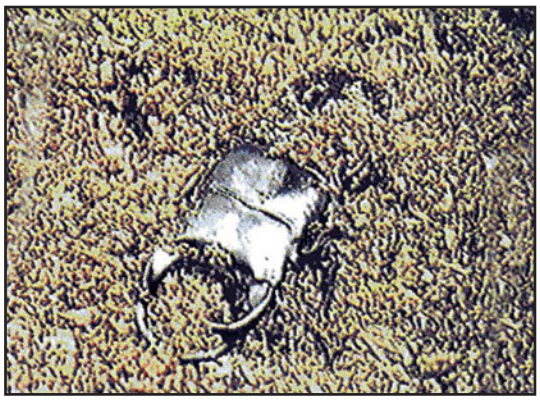

Figure 6

The catfish is normally horizontal and motionless in water, waiting for its prey. 20 hours before the Geiyo earthquake (Magnitude 6.7, 2001) this catfish, 240km from the epicenter, thrashed violently in its tank. Professor Ikeya and his students reproduced the same behavior in the laboratory (right) by creating an electric field in the tank.

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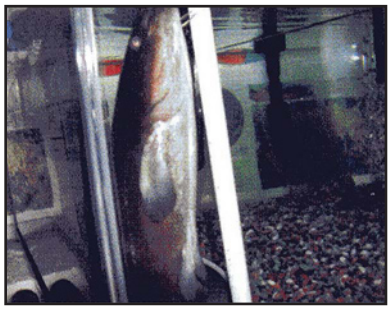

Figure 7

Subjected to bursts of high voltage in the laboratory the mimosa plant (normal in (a)), closes its leaves (b).

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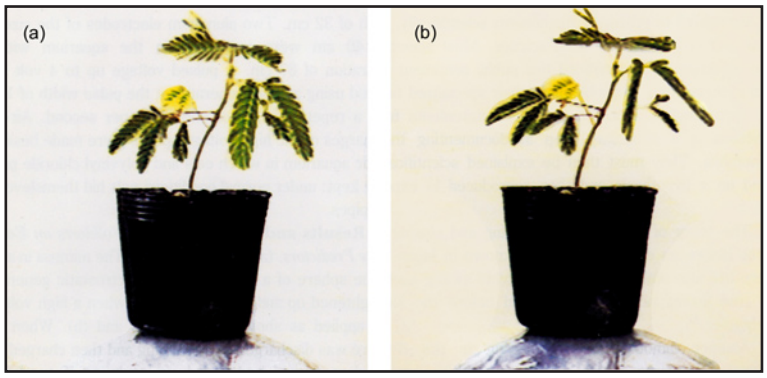

Figure 8

There is a Japanese proverb which goes: *Candle flames on temple altars bend like archery bows before earthquakes*. We were able to reproduce this phenomenon in the laboratory (see right). Candle flame is plasma composed of positive and negative ions and the flame is attracted down towards a strong electric field.

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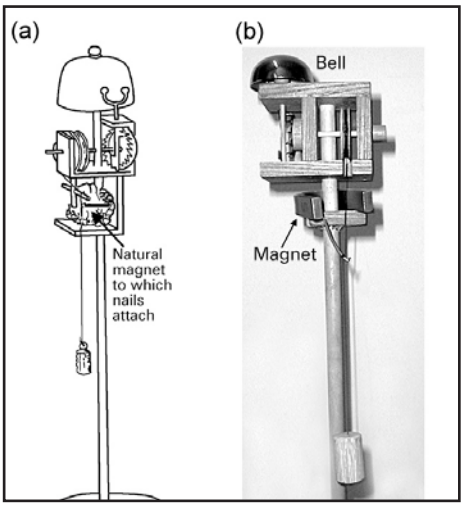
Figure 9



Two hours before the Ansei-Edo (Tokyo) earthquake (1855), a string of iron nails permanently attached to a large magnetic stone in a Tokyo store window display dropped off. The incident was reported in the *Ansei Chronicle* and led to the construction of an earthquake prediction device. Some scientists later attributed the phenomenon to a magnetic anomaly. However, the variation in the earth's magnetic field is very small before earthquakes so it may be attributable instead to magnetic disruption by an EM field generated by tectonic stresses preceding the quake. This same effect was produced in the laboratory in an electric discharge experiment. An earthquake forecasting device called EQ SIGN based on the early model is now on the market.

Above left. (a) a drawing in the *Ansei Chronicle* of the period, of the earthquake prediction device and (b) a recent reproduction in the laboratory. Right: A string of nails about to drop from a magnet on the introduction of an electric field.

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Figure 10

A Japanese proverb says, *When chickens do not eat, look doubtful and cock their heads in thought,* there will be an earthquake.The (video) photos show hens feeding normally at a chicken farm before (left) and during (right) electric discharges from a Wimshurst generator. (Though the discharges made a noise it was not considered loud enough to cause the reaction that followed.) After the pulses began, about 4000 hens fell silent, stopped eating, poked their heads out of their cages and watched the experimenter.

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