Watve also is 'not convinced that the Somnathpur structures are maize ears'. Why? If they were to be within the threshold of the maize model, there should not be any disagreement about their identity as well. Our paper stems from the fact that for some the structures are 'strikingly similar' to maize ears[1] but for others (e.g. Watve) they are not. Therefore we based our comparison on the null hypothesis that the maize-like structures are 'strikingly similar to maize'; in which case the structures and maize ears should be very similar in all (or at least most of) the traits that we can consider.

Further, if there is transmogrification it cannot occur in all the characters because by this the structure might lose its identity (cross the threshold). But in our study all the four traits considered showed MLS to be different from maize ears suggesting that MLS might not even be a transmogrified form of maize ears.

Finally, though it is a general feeling that breast size of female forms in our sculptures is exaggerated, it might not indeed be so: When an artist chooses models for aesthetic representation—take for instance present-day advertisements—he would certainly prefer those who/which are far distinct from the mean of the population (probably because instinctively we all have an appreciation for rare things). But the models thus chosen would certainly fall within the range of the population. In our study, we considered a wide array of genotypes of maize ears so that such extreme representations were also taken care of.

In summary, we do not agree with Watve that our analysis is grossly deficient.

1. Johannessen, C. L., Nature, 1988, 332, 587.

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SCIENTIFIC CORRESPONDENCE

Seismicity and the Tehri Dam

There have been a number of articles in *Nature*, *New Scientist*, Indian newspapers and magazines on the damaging Uttarkashi earthquake where a loss of more than 1500 lives has been reported. The earthquake occurred on 20 October 1991 and had a magnitude of 6.6 on the Richter scale. Its epicentre is not far from the 260-metre-high Tehri Dam under construction on river Bhagirathi in the central region of the Himalaya.

Gaur[1], has stated that the Uttarkashi earthquake may mark 'the onset of precursor phase preparatory to a major earthquake of magnitude greater than 8'. James Brune of Nevada University, USA, has warned in an article in *New Scientist* by Fred Pearce[2], that the greater risk of 'the big one' will be in the next few months, long before the Tehri Dam is completed. He further implies that it would take three major earthquakes of magnitude 8 or so to release the tension that has been building up along the seismic 'gap'. It is not understood how such frightening predictions could be made without adequate data base, systematic risk analysis, controversial status of gap theory and nascent level of the physics of the earthquake processes. Such danger warnings from seismologists scare the people and cause panic among them.

The *Bulletin of the Seismological Society of America* has brought out a special issue on 'The 1989 Loma Prieta earthquake and its effects'. This earthquake of magnitude 7 on 18 October 1989 occurred in the northern segment as against predicted rapture of the southern Santa Cruz Mountain region of the well-known St. Andreas Fault in California. In contrast to the above mentioned Tehri forecasts, Hanks and Krawinkler[3], after examining the data of the best instrumented region, state that 'the Loma Prieta earthquake is a reminder that earthquakes do not have to occur where we want them to occur or forecast them to occur and that our understanding of how and why earthquakes occur and recur, even along and near the best studied active crustal fault zone in the world is rudimentary and incomplete'.

The entire Himalayan region is prone to earthquakes and there have been four great earthquakes of magnitude greater than 8 between 1897 and 1950. The simple 13-year recurrence period (four earthquakes in 53 years) may suggest, as probably estimated by Brune, that since 1950 Himalayan region has accumulated unreleased stress for three more large earthquakes in the continent–continent collision zone between Indian and the Eurasian plates. However, area-wise data analysis of (i) general physicomechanical conditions of the collision zone, (ii) seismic transmission property, and (iii) maximum peak horizontal acceleration are not available. Any conclusion regarding stress accumulation in any particular 'gap' area may be debatable.

In a recent article in *Nature*, Seth Stein[4] has reported that in ten-year period (1979–89) 37 earthquakes of magnitude 7 and above occurred in the northern part of the Circum–Pacific plate boundary, which has been divided by McCan et al.[5] according to gap theory model into high-, medium- and low-earthquake potential seismic gaps. The findings are that out of these 37 earthquakes, four (11%) occurred in the high-potential seismic gaps, 16 (43%) in zones of intermediate potential and 17 (46%) occurred in the indicated low potential gaps. Stein, 'by way of analogy', states that 'Fatal attacks by grizzly bears are more common in Montana than in New York. Does this indicate a "bear gap" in New York so that an attack is now more likely there?'.

There are several factors, both known

and unknown, which cause damage by an earthquake in a particular locality. The earth scientists have yet to learn a lot before any reasonable predictions of earthquakes and seismic hazards in Tehri Dam area could possibly be made. Uttarkashi earthquake provides an opportunity to seismologists and earthquake engineers to make systematic measurements and credible analysis to assess the probability of failure of a rock-filled large dam during its projected life-span in the Tehri-Garhwal area.

1. Gaur, V. K., *Times of India*, 23 October, 1991.
2. Pearce, Fred., *New Scientist*, 2 November, 1991, p. 13.
3. Hanks, T. C. and Krawinkler, H., *Bull. Seism. Soc. Am.*, 1991, 81, pp. 1415.
4. Stein, Seth, *Nature*, 1992, 356, 387.
5. McCan, et al., *Pure. Appl. Geophys.*, 1979, 117, 1082.

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NEWS

Meeting discusses use of animals in research

Laboratory animals are the basic requirement of biomedical research and testing. To ensure reliability and reproducibility of results and to minimize the number of animals used, the quality of animals and selection of right model have to be ensured. Though animal experimentation has been in vogue in India since many decades, low priority has been accorded in most institutions to the quality of material and manpower needed for animal breeding, care and management.

To improve this situation, awareness has to be created not only amongst primary users of laboratory animals and caretakers, but also amongst senior biomedical-science planners and science administrators. Therefore the Laboratory Animals Information Service Centre (LAISC) at the National Institute of Nutrition (NIN), Hyderabad, organized a two-day meeting (21 and 22 February 1992) on 'Trends in laboratory animal science and technology—Indian perspective'. Senior scientists, including heads of institutions and departments from biomedical institutions, universities and pharmaceutical companies, participated. At the inaugural function a keynote address on 'Laboratory animals in service of mankind' was given by P. M. Bhargava.

Various aspects of laboratory animal science were discussed. Each subject was introduced by an expert and their presentations were followed by supplementary comments and general discussion (see box).

At the end of the meeting, a concluding session was held and specific recommendations made. This discussion was moderated by B. N. Dhawan, Director, CDRI.

The following specific recommendations were made:
(1) An ethical code for animal experimentation relevant to India should be prepared and the initiative and responsibility for this should come from scientists.
(2) Journals that publish experiments using laboratory animals must insist on basic information such as species, strain, age, weight, sex, experimental conditions including details of diet, genetic background, environment, etc. This point should be included in the instructions to authors.
(3) Grant-giving agencies that fund research projects pertaining to laboratory animals must insist on the above details in project proposals. In fact, in the project proposal, information on funds needed for purchase of good-quality animals, diet, etc. should be provided in a separate column. By clubbing this information under the head 'Contingencies', research workers do not give adequate thought to the actual amount that would be required for animal experimentation and end up using substandard animals and diet owing to paucity of funds.
(4) Mechanisms should be developed to provide orientation and training to research workers in the handling and care of laboratory animals.
(5) While planning experiments on

1.	Need for animal experimentation and influence of animal quality on animal experimentation; introduced by	M. S. Bamji, NIN and LAISC, Hyderabad
2.	Factors affecting quality of animals	K. R. Bhardwaj, Central Drug Research Institute Lucknow
3.	Human resource development	P. R. Masillamony Tamil Nadu Veterinary and Animal Science University Madras
4.	Ethical issues	T. Desiraju National Institute of Mental Health and Neuro Sciences Bangalore
5.	Alternatives to animal experimentation	U. V Wagh National Facility for Animal Tissue and Cell Culture Pune
6.	Role of national and international agencies in improving the standards of laboratory animal infrastructure and experimentation	