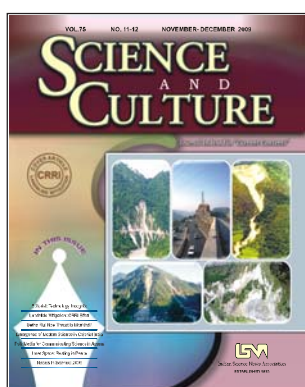


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EDITORIAL

TECHNOLOGY INCOGNITO



A witty friend of mine, a hydrologist and a veteran in river management, once remarked: “You know, nature’s own engineering is like the realm of a woman’s mind, nobody knows when and how it is going to address in our own sense. For instance, think of the atmosphere. Scientists have developed so many

mathematical models to understand and workout atmospheric events, but on many occasions in the scale of time and space they do not work”. In this regard development and management of roads can be another example. On the basis of different terrains, climates and traffic mobility, scientist and engineers have developed various models of roads, many of them have been tried also with satisfaction, even then in some cases they become unreliable in the scale of time. This is due to nature’s own way of activities which in many cases cannot be envisaged well in advance.

There are roads for light vehicles. There are highways for heavy traffics. There are roads through difficult terrains, like deserts and mountains, or wet regions.

In deserts, roads face two main constraints. One due to regular sand dusting on the roads, which is variable from time to time, rather season to season. Sands erode due to vehicular traffics. Another scissor is the thermal change. There are diurnal and seasonal variation of heat that the sun pours in the desert. In deserts, the seasonal thermal change and the diurnal fluctuation between day-time and night-time temperature cause stress on the road materials. The materials loose malleability, become brittle, weathering the roads.

Road construction in mountain terrain, frankly speaking, is the most challenging job. Think alone of the Himalayan regions. While constructing roads there experts have to consider vary many factors. The Himalyas is a young mountain, and so fragile. The entire mountains experience regular micro tremors which may affect roads, causing micro ruptures. In various places there is water seepage along the steep rocks along the roads. As a result the roads get spongy, and deteriorated. While constructing a road, special care has to be taken so that flora and fauna of the region are not disturbed. In fact, constructing roads there is a very complex proposition. This is also true in the case of roads of the North-Eastern’s hilly regions, Eastern and Western ghats as well.

Roads over the bridges over big rivers, like the Ganga, the Godavari and the Krishna, are also bring big challenges to our engineers. In their cases, special measures need to be taken to optimize vibrations of the structure of roads and columns on which the roads are built.

Another challenging job is the construction of runways in airports, where roads have to be very smooth, highly tolerable to thrusts during landing and take-off of the air-crafts. Rigorously treated proper materials are used in run-ways so that slightest humps are not created on the runways to avoid perturbation to a running air-craft.

In some of the areas, particularly semiarid, termite creates problem. Their nesting mounds growing deep widely under the grounds and spread through underneath the road destabilize its compact structure. This fragiles the road. Sometimes, to cure this problem is a challenging proposition to road-technologists. Flash floods due to severe rain and releasing of excess water from dams wash away the roads – another great challenge.

Due to global warming, glaciers on various mountains, including the Himalayas, are rapidly melting. Environmentalists consider it a severe problem. How this water stream percolating through rocks may affect road construction need to be investigated.

It is imperative that experts will agree, the issues as elaborated, do have active or passive links with nature's own activities. In many cases, nature's elusive engineering steers them, which the road technologists must take into account for their effort to construct ideal and stable roads. For examples, think about flash-floods and land slides. Road scientists try to tackle them with models prepared on the basis of identified parameters. In the case of flash floods, there are aspects, such as eddies, coherent resistance to embankment against throttled gust of water-flow, topographic conditions of the water-beds, etc. which are very much tricky to understand before catastrophe occurs. The same is true for land-slides also. In this case, the stability of soil strata and rocks is prone to micro tremor, seasonal thermal variation and crystal-hydrological change, operated by nature's technology incognito need to be studied, both basic and fundamentals, in unison with road-technologists and scientists. For this, university research centres and road researchers should jointly work, considering that road-research has become very much complex today. Protection of roads from various human activities is also an important issue. To tackle this problem, NGOs may be set up with people live along roads.

Such a venture, however, requires proper training to volunteers, with logistics and social security, rustling in employment potential. This may be less expensive than

the cost incurred by government machineries, such as public work departments. The tasks may be given to Panchayets (local self government) to sensitize local folks for involvement in a programme like road management.

Road is not only a path or way connecting points at distances, but road is more than that. Road is life, with the growth and development of roads, civilization grows as it grows along the river.

From this issue, we are introducing a new 'feature', entitled 'Cover Article' to highlight research activities of national interest. We begin with "safety and Efficient Management of Road Network in Landslide Prone Areas". This is a contribution from the Central Road Research Institute (CRRI).

Incidentally, the Central Road Research Institute, an IS/ISO 9001: 2000 R & D Organization, was established in 1952 a constituent Laboratory of the Council of Scientific and Industrial Research (CSIR). It is the premier national research organization planning in related areas. Recognized as a centre of excellence for carrying out R & D, consultancy and training of highway and transportation professionals, the Institute's activities comprise: bridge and

Instrumentation Engineering, Geotechnical Engineering. Pavement Engineering and Materials, Road Development Planning and Management, Traffic and Transportation Planning and Engineering. The Institute coordinates with various highway engineering research organizations both in India and abroad. We expect, the "cover story" published in this issue may be interesting to our readers. We solicit comments. □

Samarjit Kar

Editor's Note : This issue has been sponsored in part by the Central Road Research Institute (CRRI), New Delhi

Letters to the Editor

29th September 2009

Dear Professor Roy,

I sincerely apologise for the delay in responding to your kind letter of 27 August. I would feel honoured to be associated with Indian Science News Association and the journal Science and Culture.

Thank you for sending me a copy of the latest issue of Science and Culture, which really impressed me. Both the appearance and content of the journal have improved beyond recognition since I last saw the journal several years ago.

I can assure you that I shall certainly do whatever I can, by way of editing, writing popular science articles, and may be, contribute to the 'Notes and News' column if I am called upon to do so. I will consider it a privilege to contribute my mite as editorial collaborator to help the journal recover its past glory.

With warm regards,

Sincerely,

Biman Basu
*Former Editor, Science Reporter
Science Communicator and Consultant,
C-203 Hindon Apartments,
25 Vasundhara Enclave, Delhi-110096*

20th October, 2009

Dear Professor Roy,

I express my hearty thanks to you for publishing in verbatim the historical document on the content of the lecture delivered by Acharya J. C. Bose before the British Homeopathic Society (by invitation) in 1926 in the May-June issue of Science and Culture. But for your sincere effort, such a document could not be recovered in original form and be published for the interested readers of Science and Culture. This article will keep in record about various interesting observations made by Acharya Bose. You have brought out those to the present young generation to convey as to how a research-oriented mind of higher order actually works to bring out the hidden truths. Once again, I would like to congratulate you on your ceaseless efforts

to improve the standard of 75 year old 'Science and Culture' by giving youthful touch.

With my best regards,

Yours Sincerely,

N. C. Mandal
*Formerly Professor, Department of Biochemistry
Bose Institute, Kolkata*

27 July, 2009

Dear Sir,

I have appreciated very much the publication of the article "Century's Longest Solar Eclipse" by Amalendu Bandyopadhyay in 'Science and Culture' (May-June 2009 issue). This article is excellent as well as highly informative. Really speaking, the total solar eclipse of July 22, 2009 was a burning astronomical event for India especially in the International Year of Astronomy. The author has been able to explain all the details of a total solar eclipse in a mode which can be understood by any intelligent reader without any knowledge of astronomy – herein lies the author's potential of astronomy popularization. I have been benefitted much by this write-up. In the last para of the article the author writes "The satellite observations of cloudiness compiled by NASA show a minimum in the central line cloud cover just east of Patna". Accordingly, I along with my six students went to Barauni, a place about 100 km just east of Patna, with the objective of witnessing this eclipse and it was a grand success that we could view every phase of the totality of this eclipse (viz. Bailey's Beads, Diamond Ring and Corona), as has been explained by the author in his write-up.

Publication of three beautiful Photographs in colour on art paper is indeed an attraction with this publication. I have only one point – the author could have written a para on the age-old superstitions associated with a solar eclipse, prevalent in various countries of the world. But thank you very much for publishing this article in your esteemed science journal in time.

Yours faithfully,

A. K. Bose
*Formerly Professor of Physics,
Dinabandhu Andrews College, Kolkata*