of the state, at very subsidized rates, it would be reasonable to expect that they will someday repay by contributing to developments back home. However, the fact that a sizeable number prefers to emigrate leads to a malaise that is perhaps best understood by the term 'brain drain'.

My contention is that migrating to the West cannot be the best professional strategy for all kinds of scientists, and indeed in some areas of biological research, notably ecology and biodiversity conservation, it would be a sensible strategy to stay back or return after receiving training in the West. Two, seemingly disparate streams of activity may be identified in biological sciences research, namely cellular and subcellular biology (including biochemistry, molecular biology, etc.) and organismic biology (physiology, ecology, biological conservation, etc.). In most problems it is the question being asked which is of paramount importance, and the application of research techniques can often blur the distinction between these two disparate areas. For instance, in an ecological study of mating patterns of birds, a molecular biology technique (such as DNA fingerprinting) may be employed to understand the exchange of genetic material among individuals.

An individual biological scientist, in an attempt to maximize his/her professional success is of course free to migrate, with the least consideration about 'brain drain'. However, a molecular biologist may work on a process, which is unlikely to be influenced by geographical location. A molecule is the same whether it is being studied in New York or New Delhi. Similarly, a basic life process being studied using standard models such as *Drosophila*, *E. coli* or the white rat is unlikely to be influenced by where and, in which part of the world the study is being done. In all probability, such work pursued in the West, generally yields better results for reasons which are well known (these include the availability of state-of-the-art facilities and a good working environment).

But as regards field ecology, the location of the study area matters. Biological scientists, with an inclination towards organismic biology, who migrate to the West, leave behind an area of immense richness and a plethora of interesting research problems which arise out of the complex interactions in the tropical world. Also, and significantly, since much of this biodiversity is gravely threatened, there is an urgent need for scientists to find solutions for its conservation. This brings us to the crux of our argument that, given a choice, it is a better professional strategy for a scientist from India to stay back or return. Not only has the wealth of biodiversity in India been properly documented and classified; hidden underneath, there are interesting ecological relationships which have not yet been fully and properly understood by the application of the methods of modern scientific inquiry. Consequently, by taking up novel problems in a biodiversity-rich area, one can earn a name for oneself very soon.

An analogy could be made to that of an artist who, in a certain sense, draws sustenance from the disorder and squalor of his underdeveloped, native country. The career of India's foremost political cartoonist, R. K. Laxman would be an apt example because it throws some light on the type of dilemmas which can confront an ecologist on the threshold of emigration. Early in his career Laxman was offered a job with a London-based newspaper, but due to some reason he kept postponing his departure, much to the chagrin of his prospective employer and to the annoyance of his friends, who predicted that like everyone else, Laxman too would eventually settle in the US. But, as Laxman writes in his autobiography[1]: 'People who were celebrating my potential British citizenship had no idea of the nature of my work. Perhaps they thought of me as one among the doctors, engineers, businessmen, shopkeepers who happily emigrated and continued to do their work abroad. But mine was a different profession. The conformity and uniformity of that country's social life and the propriety in political conduct would have reduced me to a mediocre illustrator of events. I would have missed the multifaceted, colourful life of India, whether social or political, that I lived with and understood. Finally, I decided that it would be a great mistake to uproot myself and succumb to the glamour of living in a foreign country.'

A possible extension of the above argument is the suggestion that it is only worthwhile for ecologists to stay back/return to India and that other biological scientists are better-off abroad. However, clearly that is not being said here. Secondly, whether foreign-trained Indian scientists who decide to walk on the road less travelled by can manage to get worthwhile jobs back home and can perform as well as they would do in the West, is an altogether different matter.

1. Laxman, R. K., *The Tunnel of Time*, 2000, Penguin India.

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Evaluating palaeontology and palaeontologists

A well-written article by Mukund Sharma (*Curr. Sci.*, 2002, **82**, 913–917) emphasizes the fading of the field of palaeontology in India. Though it is in the hands of policy-makers to take a firm decision concerning rejuvenation of palaeontolgy in India, palaeontologists have to unite to present a correct perspective of this science before the general public and get a positive response from the decision-makers.

A few points which have either not been emphasized or not adequately dealt with in the article need to be addressed. Palaeontology is suffering, first because of the traditional approach of the palaeontologists, especially in the era of multidisciplinary sciences, and secondly because of lack of awareness among people about its potential role in society and nation-building. For example, it is

not known to the lay people that petroleum, is nothing but a fossil fuel. Despite new scientific developments and technologies that have added precision in exploration process, palaeontology continues to be in demand. Moreover, the objectives of social relevance – 'save the animals' and 'save the forests' – cannot be realized unless the society is made aware of origin, evolution, significance and consequences of possible extinction of certain genera and species.

In the past, most of the significant palaeontological discoveries were made by amateur palaeontologists. Now, for professional palaeontologists, palaeontology should not be a science of merely describing fossils; it must involve the functional morphology, behavioural significance and functional adaptation of the organisms. In the present scenario, these are areas where concerted efforts by scientists are required. Such research would involve computer applications, simulation and use of advanced software in phylogenetic studies.

Truly, palaeontology has been removed from the syllabi of many universities/colleges not because it has lost its utility, but because it has not been presented as a useful subject. It is time to come out of the shell of descriptive palaeontology, which though important, cannot be overemphasized. In this connection the funding agencies and research organizations must provide some guidelines and identify thrust areas in palaeontological research. In addition, more job opportunities and funding must be provided to upcoming palaeontologists to help them contribute to the field by pursuing research in virgin areas. Palaeontologists have a role in medical sciences, specifically in dentistry and orthopaedics. In USA anatomy, a subject in the curriculum of medical science, is still taught by vertebrate palaeontologists. On a personal level I have been guiding postgraduate students of dentistry and applying my expertise in solving dental problems. Palaeontologists can come up with new and innovative ideas to make their researches more useful and appealing to people.

Emphasizing the laboratory experiments and modeling in the field of palaeontology, is the need of the hour. The taphonomical researches can be done by simulating the depositional conditions in the laboratory and by observing and controlling the settling velocities of fluvial channels and marine currents. Deformation patterns of fossils can be studied by computer simulations. Their evolutionary patterns and functional morphology can be studied using computer-aided designs. By observing a regular pattern, a future model can be predicted in the line of evolution. Such studies are possible by providing advanced but inexpensive software (FEA, CAD/CAM, PAUP, MacClade, LogPlot, etc.), and training facilities to deal with the software and other new analytical instruments. The new technologies used by zoologists in genetic studies may be used for precise results. In the developed world, the changing face of palaeontology is a reflection of these new and advanced methodologies.

It is true that the common man is not aware of palaeontology. This is because he has not been introduced to it at the school level. In India, palaeontology is a part of geology, which is taught only at the graduate level. Schools do not incorporate palaeontology or evolutionary biology in their syllabi, nor do we have teaching staff at the school level, conversant with new developments in palaeontology and capable enough to give up-to-date basic knowledge to the students. It would be in the fitness of things to introduce geology–palaeontology at the school level so that school-going children could think of something different in terms of a career, other than becoming a doctor or an engineer!

The innovative researches in palaeontology get hampered due to working constraints, especially in the research institutes. In these institutes, the sanctioned projects emphasize more on the collaborative geological study of an area, including palaeontological finds. The palaeontological data recovered from that area are generally used to build maximum up to palaeonenvironment/palaeoclimate. The pressure of an approaching deadline does not leave scope for innovative research. Such problems may be avoided by identifying the expertise or recruiting highly specialized palaeontologists devoting their time to study the functional aspects of the fossil finds. They may be given a fellowship, contract job or a permanent job too. This would certainly draw more people towards contributing to quality research in palaeontology.

In several leading Natural History Museums of the world, a prominent and vital group of scientists, is actively engaged in research on various aspects of palaeontology. They contribute to the development of the museum besides promoting advanced work in palaeontology. In India, the Natural History Museums simply serve as picnic interests of the general public and do not have any provision for research in natural science. For this reason, no innovative ideas or new researches are being added to the exhibits. Museums must become an integral part of people's awareness programme and children's education as in the Western countries. People should come to the museum to interact with leading palaeontologists and learn more about evolution. Better curatorial staff with scientific aptitude and research temperament could be recruited in the Indian museums to emphasize on the importance of palaeontology to the general public, especially children.

It is hoped that the points raised above would stimulate the scientists and scientific organizations to come forward and take a positive step towards salvaging palaeontology as a science, so that it may graduate from a position of 'science of the past' to 'science of the future'.

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