

CURRENT SCIENCE

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CORRESPONDENCE

Merit and mockery

Most academic and scientific jobs in our country are available in government organizations. Over the years, the ratio of the number of job seekers to the number of available vacant positions in these sectors has increased many fold. However, given the importance of these sectors for developing human resources and strengthening scientific and industrial bases, meticulous recruitment of meritorious, innovative and efficient persons is essential. Unfortunately, in most cases, these criteria are overlooked.

Whenever vacancies arise for such positions, these organizations place formal advertisements in the leading newspapers stating, 'Applications are invited from Indian citizen for ...' to fulfil the norms, rules and regulations set by Indian law in this regard. However, it is an open secret that in many cases more favoured candidates are already around to occupy the available position. Obviously, the other aspiring persons being unaware of the real position, also apply for the same post. The treatment of these job aspirants during the 'mock' interview is saddening.

All will undoubtedly agree that interviews are conducted to assess the merit of a person for the job, not to expose his ignorance. The technical skill, awareness, outlook, temperament and above all knowledge on the particular field should be tested. On the contrary, the (biased) interviewer ask questions that do not help to reveal merit but highlight the 'imperfections' of the candidate, just to keep him at bay.

Is it ethical just to pretend during interviews? Is it a healthy practice in the overall interest of the organization and, in turn, for the country to have farcical interviews? Do interviewers ever think how much mental agony the candidate has to undergo when treated unfairly during a job interview?

When too many persons chase a few jobs, the employer is privileged because of the opportunity to pick up the best of the aspiring candidate. However, this may be true for a job in private organizations and may not be applicable for government jobs, where there are a lot of 'pushes' and 'pulls'. But should the interviewer be neutral and judicious, they could safeguard the interests of meritorious candidates.

B. K. PADHI

*Department of Biochemistry,
Bose Institute,
Calcutta 700 054, India*

Biotechnology

The write up by A. S. Rao on 'Biotechnology; What's in a name' (*Curr. Sci.*, 1996, 70, 955) makes interesting reading. Today, every biologist in India wants to be called a biotechnologist and why not. After all, as the Hungarian scientist rightly said, even pig rearing is biotechnology.

It is true that all our biotechnology institutions from the top downwards, are managed by biologists or those who have tinkered with biology. Universities and national laboratories are racing with each other to start biotechnology departments not bothering to see if they can find correct persons to man these new units. Some industries have also jumped on the bandwagon and have started bottling old wine in the new bottles. This is not all. Universities have also introduced, special admission tests to mislead the young to think that biotechnology programmes are professional programmes. No doubt, some

new techniques such as cloning, PCR, ELISA, manipulation of cells and the genetic material have been developed for use by all biologists. Mere using these techniques does not make a biologist a biotechnologist.

In the sixties, it was the craze for molecular biology and today, it is biotechnology. Like all other things, this craze will also slowly subside. This is reflected by the decrease in the number of students who take the all-India admission tests for postgraduate programmes in biotechnology. Our national funding agencies, instead of bringing together biologists of all types together, have only helped in creation of closed pockets by liberally funding programmes that were already in existence. While in some advanced countries the new techniques have helped in improving old biological processes, despite substantial support for this new area since the past two decades, nothing worthwhile has come out. All that has happened is new name plates and boards have come up all over. Perhaps, things could have been different had our managers been trained biotechnologists!

P. TAURO

*Department of Microbiology,
College of Fisheries,
UAS, Mangalore 575 002, India*

We now probably have a very large number of molecular biologists besides biotechnologists. True discrimination between a technique and a discipline or branch of knowledge is lost now. A major thrust of biotechnology involves genetic manipulations to produce a new useful entity. How does a biochemist, a botanist

or zoologist working with a few enzyme estimations call himself a molecular biologist/biotechnologist/molecular virologist competent to teach and research in biotechnology, molecular genetics, molecular biology, virology or whatever? These areas require skills in a host of techniques and an interdisciplinary background is a must, as evidenced only by high quality research publications in relevant areas. Unfortunately, masquerading is common, with little regard for actual quality work, real expertise, relevancy and students' development in a discipline.

Graduate and postgraduate syllabi are decades old, though the school and pre-

university syllabi have been improved, though not necessarily in terms of practical training. Teachers rarely care to update themselves qualitatively in all respects, resulting in the destruction of the graduate and postgraduate education system.

Is there a remedy? Yes, when the sensitive, educated professionals react at qualitative level all over the country, flood with letters the Central and State ministries, the Vice-Chancellors, Director/Director-General/Chairman/Secretary of Institutions, etc., for changes in the Acts of Universities to include accountability, relevancy and competency both in academics and administration.

We should now create urgently a watch dog agency for ensuring quality education, and to control scandals. Will such people get together in large numbers in different places and demand quality? Continuous consistent lobbying should give results rapidly. The sceptres of WTO and IPR should urge us into action.

M. V. NAYUDU

S-1, 8-3-825/5/2,
Yellareddyguda,
Hyderabad 500 073, India

OPINION

Global errors in science: Traps of chance and prejudice

K. N. Ganeshiah

Despite the awareness that the chances of a given ticket holder winning a lottery are dismally poor and sufficiently low enough to inspire any buying, several lakhs of people buy lottery tickets every month and lottery has been surviving as a successful enterprise. Clearly the inspiration for the buyer does not come from those millions who have lost their rupees but from that occasional lucky winner who bags several lakhs of rupees. His smiling face printed in the magazines makes news and several more millions are induced to buying tickets; though they all are mostly bound to lose, again there is another lucky winner who helps maintain the buying chain and the lottery continues to survive. Thus unlike that of the proverbial chain, the strength of this lottery chain is reflected not in its weakest link (the million losers) but in the strongest link (the lucky winner).

Surprisingly, a similar process of occasional 'discovery' seems capable of sustaining a chain of false inventions in science on a global scale. Such a possibility has recently been pointed out by Bill Amos¹ from the University of Cambridge and discussed in the columns of *Nature*^{2,3}.

Assume that a certain interesting pattern (irrespective of how one wishes to define

it⁴) has been proposed by a research worker in a symposium and that 20 of the participants are inspired to test it after their return. Even if the pattern does not exist, the laws of probability ensure that purely by chance one out of these 20 would find evidence for the pattern ($p < 0.05$). He would obviously be prompted to publish it because of his faith in the statistical significance of his experimental results and also because they are supporting what has already been held by others. The remaining 19 who could not get the 'expected' results may either feel less confident of their experimental protocols or more frequently do not find it interesting enough to publish the non-significant results. Occasionally some of them who do attempt to publish⁴ might find it hard to convince the referees against a pattern that is probably already making news.

Now assume that the paper published by the lucky scientist who got the results 'right' is read by a thousand research workers world over and that they would attempt to repeat the experiments. Again by the rules of probability, 50 of them would find the pattern to be true (< 0.05) and among them 10 would find it very highly 'significant' ($p < 0.01$). Even if only 30 of these 50 publish their results,

it leads to a chain of the publications demonstrating a pattern that indeed does not exist!!

Chance and prejudice as traps

What happens next? Does this global chain of errors continue? Or would the self-correcting mechanism of science set it right? Certainly as a preliminary step, the scientific community is likely to celebrate this news and the scientists would begin working further on this pattern that has by now become 'established'. As I argued elsewhere⁴, 'every pattern shown or demonstrated has the same effect as a miracle would have on the spread of a religion or the religious belief'. Such an error where a pattern is 'found' while it does not exist is termed Type I error in science and has the likelihood of not being noticed because of two reasons: one, the prejudice and the other the trap of chance.

First, scientists generally suffer from a prejudice of looking for only significant results—a syndrome that has been perpetuated by their incessant obsession to find patterns⁴. Consequently they have an instinctive desire to search for the existence of patterns, such that any work that does not find the pattern gets less or no