Science education in India

The study by Garg and Gupta[1] probes at the grassroots level of decline in interest in science education. The article presents facts illustrating a shift away from science at the 10 + 2 level and subsequently at the undergraduate level. This phenomenon has been analysed at other levels by many scholars[2–4] in recent years. While many suggestions have been given and the government has taken some initiatives, they have not yielded the desired results. The development of science and technology in any country will be a key factor in determining its status and power in an open economy, and we cannot afford to be left behind. While it is a matter of concern to see a fall in the number of youngsters seeking careers in science, it is disturbing to have a situation where scientists of excellence are hard to find. Mediocrity cannot challenge the impact of globalization on our economy.

We need to realize that students and their parents are also decision makers in the scientific future of our country and they appear to be more practical-minded decision makers. As pointed out rightly by Garg and Gupta[1], the IT sector and engineering courses have been drawing students away from basic sciences. However, another reason is that students of basic sciences have few job opportunities in our country. We have failed to find a remedy to this situation. We have not assessed the requirements of scientific manpower in our country and have failed to train/educate our students accordingly. Students have been over-produced, accompanied by a failure in standards. The demand for trained manpower in science is variable. It is therefore essential to ensure that we have a clear view about our requirements. A major outlet for the cream of our trained scientists has been the West, more so the US. This outlet appears to be narrowing down due to the US visa policies[5]. It is therefore urgent that policy decisions and steps are taken to ensure that we train youngsters based on our national requirements and also keeping the global opportunities in mind. It would be fruitful to attract foreign investments in the country, whereby our scientific manpower, which is competent, is utilized. Nobody does science for fun any more.

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RAJASHEKHAR PATIL

Department of Applied Zoology,
Mangalore University,
Mangalore 574 199, India
e-mail: shekhar1patil@yahoo.com

An unexpected discovery!

Rustom Roy[1] had occasion to point out recently the shortcomings of, and indeed the 'hype' that accompanies computer modelling of materials. His examples were taken from predictions regarding new 'superhard' materials. I have just come across an example in the field of electronic materials, that of gallium nitride – the source of the blue laser. I may be pardoned for my reference to a short research communication[2] in which it was stated that 'No photoluminescence (PL) was observed from InN/InAs samples. This is intriguing since InN is considered to have a direct gap of 2.07 eV but no PL measurements have been reported from it'. All the existing literature[3] based on theoretical calculations predicted an energy band gap of (wurzite structure) around 2.1 eV for InN. It may be mentioned that the series AlN–GaN–InN forms solid solutions and the blue laser usually involves an InGaN active layer.

A group of scientists from University of California, Berkeley[4] decided to investigate this anomaly in 2002. They had InN films grown by molecular beam epitaxy at Cornell, looked diligently for PL at the expected wavelengths, and found nothing. Scanning the output at longer wavelengths, they found strong PL near 0.7 eV in the infrared – off by 300%! 'An unexpected discovery' no doubt and one that prompted the team to suggest that a full-spectrum high efficiency solar cell could be fabricated out of the system using only two layers of indium gallium nitride, one tuned to a band gap of 1.7 eV and the other to 1.1 eV. On hindsight, comparison with the series AlAs–GaAs–InAs would have given a ballpark figure of 0.8 eV for the band gap of InN! What does this say about the state of theoretical predictions on a relatively simple system?

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D. N. BOSE

University Science Instrumentation Centre,
University of Calcutta,
92, APC Road,
Kolkata 700 009, India