Teaching in research institutions

'Teaching and research: inventing a connection' has been a subject often bemoaned but has not found a solution for several years[1]. The appeal to research institutes for promoting teaching in a research environment is unlikely to get the attention of the ivory tower research institutions. Many of the government-sponsored research establishments have sought a 'university' status, but mainly to promote Ph D programmes for their own researchers. Several recommendations have been made (including those of the Yash Pal Committee on Higher Education) that a 'university' should have a very strong undergraduate teaching programme, with senior professors taking the responsibility of teaching the undergraduates. The case of Richard Feynman teaching undergraduate courses at Caltech is often quoted. Unfortunately, our universities have still left the undergraduate teaching in the hands of the affiliated colleges where the environment of research is missing to a large extent.

If research institutes have to undertake teaching programmes, as proposed in the editorial, the following issues would have to be addressed.

• While recruiting fresh scientists in research institutes, their ability to teach as well as do research has also to be assessed.

• Existing researchers, at all levels, must be encouraged (and perhaps trained) to teach at least 30% of their time. They must also introduce the students to the research areas that they are working on, in a manner that the students are attracted to research as a career (a la Feynman style!).

• How the research institutes would interact with a large number of undergraduates needs to be discussed as a policy in the councils of these institutions and suitable guidelines evolved.

• In evaluating research scientists, their contribution to teaching must also be suitably assessed in considering promotions.

• Research scientists involved in teaching must also be involved in setting up examination papers and evaluating students for the degree examinations.

• A final year B Sc student must be mentored by a research scientist and preferably encouraged and trained to publish at least one research paper jointly with his mentor. The final evaluation must also consider the extent of research training that has been imbibed by the student.

• Finally, the responsibility of teaching in research institutions is bound to affect the culture of our research institutions. In the beginning it may affect the research output of the institution but in the long run, the contribution by young student researchers is bound to have a positive impact on research in India. How will our research institutes phase in this activity?

Are our research institutions willing to take these responsibilities? Can the funding agencies have any influence on the autonomous research institutes? These issues must be squarely addressed before we have the pious hope of teaching being introduced in our research institutions.

1. Balaram, P., *Curr. Sci.*, 2009, **97**, 5–6.

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Biological specimen preservation

Most of the biological specimens are preserved for various scientific researches and for keeping records of type specimens and voucher specimens in different museums. Specimens are generally preserved in different strengths of formalin and few other preservatives like alcohol, buins-fluid, etc. Certainly there persist problems of loss of colours in due course of time when these preservatives are used. The body colour is a considerable parameter to the taxonomy of biological specimens. Due to many other disadvantages of conventional preservatives like alcohol and formalin, museums world-wide are looking for alternatives to both.

A simple experiment was set up for a one-year period to test for quality control of the preserved specimens. Two pairs of glass bottles containing fresh specimens of *Cyprinus carpio* (exotic fish) with golden colour were preserved in 10% buffered formalin. The bottles were stored in two different locations; one pair each, one in varied range of room temperature as control (10–35°C) and the other in constant temperature of 15°C in the refrigerator. After one-year period, it was observed that the specimens stored in room temperature have lost their body colour, whereas those in the refrigerator have retained the golden colour. The result of the experiment revealed better quality control in the refrigerator with less hardening of the scales and other body tissues compared to the control.

The retention of body colour was also best in the experimental storage system in the refrigerator. This finding will of course be helpful for preservation of small amounts of specimen in the kitchen refrigerator and simultaneously pave the way for future development of better preservation technique for specimens of scientific interest.

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