

Thereafter all attempts of the pioneer workers were thwarted and also adversely affected the outputs, mainly in terms of publications.

The present time is experiencing a drastic collapse, both qualitative and quantitative, paralleled to reduction in the number of workers in palynology, the basic reason being limiting factors such as scarcity of employment opportunities in this area because all recruitment policies are now oriented towards modern branches such as molecular biology, biodiversity and conservation. Palynology

now lies underutilized in the hands of a few saviours. Lack of manpower is a serious barrier in quality production as palynologists find it difficult to adopt modern techniques such as pollen fracturing, TEM-based pollen ontogeny studies, studies on male sterility and genetic basis of disease resistance contained in pollen. Such an area involves biotechnological assistance coupled with palynology, since pollen itself is a pool of genetic variation and studies involving DNA fingerprinting of male-specific character contained in pollen can provide informa-

tion on the plant as a whole. Pollen-based research is actually a plant-based research as pollen is a representative unit of the plant with pure and complete set of genetic characters. This is a subject which needs attention and time has come when 'pollen biotechnology' should emerge as a new discipline.

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## Values in science

The recent case of alleged misconduct in science at the National Centre for Cell Science (NCCS), Pune raises certain issues on ethics of practising science which often lead to conflict of interest among different scientific workers. In the recent past such controversies are on the rise reflecting a deterioration of ethical, moral and social values in every sphere of life and scientific community is no exception. Science is the search for truth and scientific endeavours that lead to half truths and fallacies are worse than doing no science. Basically values intersect with science in three ways. First, epistemic values which guide scientific research itself; secondly, the scientific enterprise is always embedded in some particular culture and values enter sci-

ence through its individual practitioners consciously or otherwise; thirdly, values emerge from science both as a product and process and may be distributed more broadly in the culture of an individual or a society. Actually a variety of values promote more robust knowledge where they intersect. The social values or research ethics are not always followed in science but they remain very important. The pursuit of scientific knowledge implies a certain set of characteristically 'scientific values', but the relevance of other values in the practice of science is thereby not eclipsed. In the case of NCCS, the problem of misconduct was independently taken up by the Society of Scientific Values (SSV) which rightly deserves applause for exposing the fault

and it is high time that they should be given more teeth and armoury to fight the deteriorating ethical and moral values of scientific research and to test the reality of fraud and misconduct which is spreading like 'cancer' in many institutions and specially among those who want short-term gains. Investigations into misconduct must quickly resolve the case and should not follow the path of politicians/bureaucrats whose cases linger in different trial courts for years. For the scientific community, once 'alleged' is always 'alleged'.

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## The march of neophilia: Time for the academic world to be cautious

The attraction for anything new has proved to be an important driving force for human civilizations through centuries. Newer discoveries and inventions that have changed the world have often been inspired by this deep inner desire for newer things. The term 'neophilia' that is now being used in different contexts has got a slightly different connotation. Though literally the meaning of the word 'neophilia' is attraction for the new, it is now being accepted by sociologists that this term can be used not to talk about

the attraction for the new, but obsession for anything new. And this is not the same desire that used to drive people towards newer inventions and discoveries. This attitude considered to be somewhat alarming in the Western society is probably taking its root in a developing country like India in a somewhat different fashion.

In a news item published in *New Scientist*<sup>1</sup>, it has been pointed out that the number of mobile phones discarded by Americans every year has reached about 100 million. This implies that people are

probably changing their mobile phones more than once in a year and whenever new models come out, a section of people, mostly young and in their twenties, is grabbing them. The manufacturers and those associated with the promotion of these new models are thus bound to benefit. The discarded phones on the one hand are causing environmental hazard, since mobile phones contain parts that have heavy and toxic metals. On the other hand, the whole exercise has a significant impact on the economy. Possibly

similar things are happening whenever new models of cars, televisions or any other consumer items are launched.

It is true that this is a typical problem of a developed country and we probably need not worry about this, at least for the time being. But neophilia has struck in our society also. This may not be all that subtle but the problem is probably affecting the society, cutting across economic status. And it is not always the attraction for newer consumer items. Attraction for newer academic courses and newer branches or sub-branches, particularly in the fields of science, technology and management that are now being offered as undergraduate courses, needs to be reviewed in this context.

Interestingly, some of the new subjects that are now offered at the undergraduate level were once considered only for post-graduate studies. Management courses, and courses like computer applications, microbiology, biotechnology, environmental studies, nanotechnology are just a few examples. It was earlier felt that students taking such courses must have spent at least three years at the UG level of study, that should be essentially a broad-based one. This line of demarcation appears to have disappeared. Often, the course contents are simply a new packaging for a number of old conventional topics picked up from different allied subjects. A cursory look at the syllabus of B Sc Electronics course of a few universities will reveal an overlapping of about 80–85% of the course content with

that of B Sc Physics. In fact, there are some electronics-based experiments in the B Sc Physics syllabus in some universities that have only been included in the M Sc Electronics syllabus of a few other universities. This is not surprising, but rather expected. Then why should we have a new course? Are we trying to attract the prospective students the way the producers of the consumer items do? Moreover, new subjects are being offered at the B Sc level in some universities that are not even a decade old. A large number of the so-called self-financed, modern courses are taught by guest and part-time faculty. Yet the students are interested in these courses.

Courses related to IT, nanoscience, and Bachelor's management are a few examples. The term 'self-financed' essentially implies that the students will have to bear the expenses of the course they plan to study. Right from teachers' salary to laboratory attendants' remuneration to the materials used in the laboratory, including a part of the non-recurring expenses are being taken from the students, i.e. from the parents who need to pump in significant amount of money for this. And the amount varies from institute to institute. So the viability of a course in a particular institution depends on the student intake. The whole process compels or encourages the concerned authorities to admit more and more students irrespective of their ability and background. Yet these courses with modern names and newer looks attract students. Probably

the new names give an impression to the concerned students and their parents, that anything 'modern' will fetch better jobs in the light of globalization.

It has been pointed out that neophilia does not affect people who are more than forty years old<sup>1</sup>. So it appears that though the parents may be hesitant about their wards joining such new courses, the younger people ultimately have their way. The promise of future prospects without substantiating data for these courses is another characteristic of the whole exercise. Proliferation of the so-called institutes offering the 'modern' courses irrespective of quality of the teachers is typically based on the neophilia of its clientele. This is a more serious issue compared to the attraction for a newer hairstyle or for a mobile phone or a particular type of consumer item. The whole composition of the academic world and the profile of educated mass may be changed through the process.

It is time that we take a serious note and have a balanced view regarding this matter.

1. *New Scientist*, 10 June 2006, p. 52.

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## Inulin storing plants could be the future source of liquid fuels

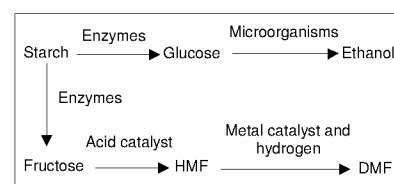
Biomass is usually rich in carbohydrates and fuels are oxygen-deficient. Carbohydrates such as starch and cellulose are the major sources of plant biomass. For making biofuels from them, these macromolecules are broken down to hexoses which are then fermented to ethanol using microorganisms. In comparison with hexoses ( $C_6H_{12}O_6$ ), ethanol ( $C_2H_5OH$ ) is relatively deficit in oxygen. Ethanol is being blended with petroleum in many countries. However, due to diminishing fossil fuels, new sustainable sources of energy are needed.

Dumesic and co-authors at the University of Wisconsin have recently described a

process for converting fructose into 2,5 dimethylfuran (DMF)<sup>1</sup>. The process basically involves conversion of starch by enzymatic hydrolysis to glucose and its isomerization to fructose by glucose isomerase. Fructose, rather than fermenting into ethanol, is used for conversion into hydroxymethyl furfural (HMF) by an acid-catalysed reaction which expels three oxygen atoms from fructose. HMF is immediately extracted in an organic phase to prevent side reactions. A carbon-supported copper–ruthenium catalyst allowed removal of two more oxygen atoms from HMF using hydrogen gas and in the process yielded the desired fuel DMF<sup>1</sup>.

Figure 1 shows conversion of starch into ethanol and DMF.

Though ethanol is being blended with petroleum in many countries, it has certain inherent drawbacks. Ethanol has low



**Figure 1.** Reactions for conversion of starch into ethanol and DMF.