shop ever get down to brass tacks – tackling the primary, and the more difficult question of creating terminology, scientific or 'merely' technical, in the 'regional' languages?

Latin and Greek, in which Renaissance scholars were adept, have been the sources for the invention of scientific terminology for European languages. It cannot be helped if Sanskrit has played (or can be made to play) an effective role as *the* source of terminology in India, primarily because rules of word-formation are both deep-running and clear-cut in the Sanskrit linguistic process. But the present usage of scientific and technical terms in Indian languages, even those derived primarily from Sanskrit, is not standardized and is, in some instances even unacceptable [e.g. *dhooma shakata* (='smoke cart') or its equivalent in the vernacular for 'steam engine']. The usage also differs from region to region [e.g. interchangeable (and somewhat incorrect) usage of *ushna* and *thaapa*, which differ in sense in different regions, for (thermodynamic) 'heat'; (*gharma* or *ushma* would do better)]. A concern with the elementary aspects of linguistics can help in the development of a scientific vocabulary (developing a standard terminology for science teaching with due deference to regional/cultural variations) for use in textbooks throughout India, leave alone the matter of writing 'popular science' for the common person. Bodies of eminent scholars, resembling *l'Academie Francaise*, must be formed in every state as adjuncts to the various 'Akademies' that already exist. Members of these 'akademies' must be persons who have attained eminence in writing in their regional languages but have yet not lost touch with certain regional folk elements/traditions. They must be able to command authority and recommend the usage of terms for recording technical information in Indian languages. They must also be able to arbitrate on matters of dispute in usage. Above all, presumably having, a correct scientific/technical background, must be able to hold constructive conclaves in order to act creatively in developing terminology with new words. If the educational policy is going to be to keep Indian languages alive and not allow them to get swamped, forgotten and replaced by 'convent school English', urgent action is needed.

1. Narottam Sahoo, *Curr. Sci.*, 2003, **85**, 124.

S. N. BALASUBRAHMANYAM

'Sarasakshetra',
Machohalli, Bapagram PO,
Bangalore 560 091, India
e-mail: snb@orgchem.iisc.ernet.in

Statistics and pure mathematics vs bibliometry science

With great interest I read the letter by Karandikar and Sunder[1]. So far as their conclusions are concerned, I agree with them. Also I appreciate their suggestion for the improvement of Indian journals and science in general. However, I disagree with the authors when they discredit an established subject like bibliometry science.

'We should be supremely wary before letting non-specialists dictate steps to take on specialized matter' write the authors. I wonder why a mathematician and a statistician enter in others' terrain and 'dictate conditions' to social scientists as in the case of bibliometrists?

History shows that in terms of religion and philosophy, the word science as such was used first in 1340 (ref. 2). One of the definitions of science is: 'The state or fact of knowing; knowledge or cognizance of something specified or implied; also, with wider reference, knowledge (more or less extensive) as a personal attribute. . . .'[2]. According to another definition science is the 'Knowledge acquired by study; acquainted with or mastery of any department of learning'[2]. In modern use the term science is: 'Often treated as synonymous with 'Natural and Physical Science', and thus restricted to those branches of study that related to the phenomena of the material universe and their laws, sometimes with implied *exclusion of pure mathematics*' (emphasis added)[3]. This restricted term for science was used for the first time in 1867 (ref. 3).

From the foregoing paragraphs we see that pure mathematics is not 'real' science. Should we discredit applied mathematicians? Should we not take their results seriously as they are not doing 'real' science?

What about statistics? Is it 'exact' science? According to one of the old definitions, statistics is: 'That branch of political science, dealing with the collection, classification, and discussion of facts (especially of a numerical kind) bearing on the condition of a state or community. In recent use, the department of study that has for its object the collection and arrangement of numerical facts or data, whether relating to human affairs or to natural phenomena'[4]. From physicists' point of view, statistics is: 'A branch of science, or a physical process or condition: *not absolutely precise* (emphasis added) but dependent on the probable outcome of a large number of small events, and so predictable; *statistical mechanics* (emphasized in original), the description of physical phenomenon in terms of a statistical treatment of the behaviour of large number of atoms, molecules, etc. esp[ecially] as regards the distribution of energy among them;.... '[4].

The following two examples show the problems of modern statistics.

(1) Temperature of a body is the average value of the motion of particles (atoms/molecules). Is their any statistical scientist who can pick out 'the' atom/molecule, which has the same temperature as that of the given sample?

(2) Take a piece of a radioactive substance. Is there any natural scientist, who could tell that in the following event 'this particular' atom/molecule will decay?

Do I have the right to discredit statistics as a subject, as in some cases it does not work and the produced results are 'predictions' and not 'exact'? Do I have the right to discourage the statistician?

In conclusion I wish to say that every subject, including bibliometry science, statistics and pure mathematics has its justification. It is wrong to condemn a particular subject, if it does not fit my views.

Not with confrontation but with co-operation and due respect for others' subject the natural and social scientists can learn from each other.

1. Karandikar, R. L. and Sunder, V. S., *Curr. Sci.*, 2003, **85**, 235.
2. Simpson, J. A. and Weiner, E. S. C., *The Oxford English Dictionary*, Clarendon Press, Oxford, 1989, vol. XIV, p. 648.
3. Simpson, J. A. and Weiner, E. S. C., *The Oxford English Dictionary*, Clarendon Press, Oxford, 1989, vol. XIV, p. 650.
4. Simpson, J. A. and Weiner, E. S. C., *The Oxford English Dictionary*, Clarendon Press, Oxford, 1989, vol. XVI, p. 570.

RAJINDER SINGH

Universität Oldenburg,
Fakultät V – Institut für Physik, AG,
Hochschuldidaktik und Geschichte der Physik,
PF 2503,
D-26111 Oldenburg, Germany
e-mail: rajinder.singh@mail.uni-oldenburg.de

Mathematics research

Arunachalam[1] and Narasimha Murthy[2] describe the fall in standards of mathematical research in India. It is important to assess at this stage, the quality of research publications by Indians or any other nationals. Also, it is important to find out how many research papers have practical relevance/utility in real life. Many papers are being published merely for the sake of publishing or for academic interest; otherwise researchers would perish professionally. It is necessary to find out how many of these research publications are being cited by other researchers.

One reason for fewer number of publications in India is attributed to the introduction of UGC pay-package by the Government of India for the teaching and academic staff. After the introduction of this pay-package along with modes of promotion, most of the academicians were not happy with the modes of promotion. They felt UGC pay-package did not give due credit to potentially good candidates in academics. It treats performers and non-performers on par with each other.

Of late, brilliant students in mathematics at the higher secondary level do not opt to continue higher education in mathematics. A larger number of students instead opt for the engineering stream. Those who fail to get admission into engineering or other professional courses only join mathematics at the graduate level. Also, because of lack of job opportunities students do not enrol in research programmes. In the recent past, mathematics graduates/postgraduates with computer diplomas have joined the software industry for lucrative salaries. So, only few students with a flair for mathematical research pursue higher studies in mathematics, with the result that no talented mathematician is available to teach mathematics at higher levels. Though appreciable progress is noticed in the international arena in mathematical, statistical and dynamical modelling, there is hardly any progress in these areas in India. Many research papers being published in mathematical and statistical dynamical modelling have no takers. These research problems have many real-life applications, but have hardly been utilized by researchers in day-to-day applications. If efforts are not made at an early stage, mathematics will die in a few years time in our country, because of the fact that very few students opt for mathematics beyond school level.

1. Arunachalam, S., *Curr. Sci.*, 2002, **83**, 353–354.
2. Narasimha Murthy, S., *Curr. Sci.*, 2003, **84**, 1500–1501.

S. RAVICHANDRAN

Directorate of Rice Research,
Rajendranagar,
Hyderabad 500 030, India

Prescribed burning

S. C. Joshi[1] points out that forest fires are one of the most important environmental problems in the Himalayas. Out of 34,286 km^2 of Uttaranchal forests, every year thousands of hectares of lands are affected by fire[2]. In the current year (2003) about 3000 hectares of forest area were charred by fire. Every summer, fire-weeks/fire-drills are organized by the forest department for prescribed burning of accumulated dry matter underneath forest canopy, with the aim to check catastrophic wild fires later in the dry spell.

But the so-called prescribed burning is mostly unorganized and causes no less damage than the accidental fires. A serious anomaly is that similar approach is adopted for all forest types. Prescribed burning is done during the dry spell that reduces the water availability to already thirsty vegetation. New recruits are damaged by the fire, which affects regeneration of the native species and paves way