CURRENT SCIENCE

Volume 60 Number 12 25 June 1991

CORRESPONDENCE

An industry in lethargy

In my review of *Mass Spectroscopy* (H. E. Duckworth, R. C. Barber, V. S. Venkatasubramanian, eds., Cambridge University Press) for this journal [see page 712, this issue], I hinted at the high cost, for developing countries, of import of sophisticated mass spectrometers in numbers. Mention of 'developing' countries *en passant* affords me a chance to grind a favourite axe. To mix metaphors, to grind this axe is to rub salt into the wound of science and technology policy in this country since independence in the hope of finding a bone of purpose wrapped in the rotting flesh. Has the purpose of policy (?!) adopted so far been just to cultivate exotic flowers, in the form of papers found acceptable for publication in journals in the West, to the greater glory of individual scientists? Sadly, the policy has nearly totally neglected an important and highly relevant aspect—encouraging the development of an instrumentation culture (including the commercial, mass-production/marketing facet of it) and generating design capability. Not of instrumentation alone. We have not redesigned a car since the original design was bought sometime in the early fifties. Nor have we improved on the pollution-spewing, two-stroke-engined, noisy and uncomfortable autorikshaw. News at hand is that a multicylinder, two-stroke engine will be the engine of the future because a forced fuel-injection mechanism has been designed, not in India but elsewhere, that overcomes many disadvantages. To the menagerie of the elements of high-cost personal transportation has been added a 'people's car' of Japanese design, and it is certain that Japanese design capacity will again be tapped (at high cost) for a more advanced design or for engines that can use alternative fuels. Why has no individual, private-sector company or publicly funded technical/research institute come up with indigenously designed pneumatic-tyred, electrically propelled vehicles that use overhead lines and run on captive power generated with diesel—yes, diesel—gensets operating at optimal speeds with optimal maintenance for clean, economic mass transportation? Examples from the transportation field are symptomatic of similar malaise in defence production, power generation, sewage treatment, disposal of pollutants, chemical engineering, or any field one might care to name.

If one were to consider fostering design capacity, books such as *Mass Spectroscopy* would be most useful. What I have in mind is creation of advanced demonstration laboratories attached to science/technology institutions or even museums where young people would work to reproduce early experiments such as those described in this book, after themselves fabricating necessary equipment in associated workshops. They would be encouraged to work out any modifications necessary to improve precision/resolution etc. of the early experiments using presently available techniques and finally fabricate something that is easy to operate, not neglecting the physiology and comfort of the operator/user in the final phases of design. No, it will not lead to publication of any papers, but I believe such activity would have the desirable fallout of cultivating 'design sense' and create a talent pool. Books of a similar nature are surely to be found in other fields such as magnetic resonance; instrumentation for separation, analysis and identification of complex mixtures; laser technology; defence-oriented optical-element manufacture; and development of various types of transducers. These can also be made use of in training in instrument fabrication. Why not get on with the task even if it be late?

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