style. All the same they fall into a few groups, with some inevitable overlap with regard to the materials and processes surveyed. Taken together, they represent a very impressive, panoramic portrayal of the advanced materials scene, both in India and in the western world. In terms of scientific content, quantitative engineering data, and analysis of materials strategy, the volume has a great value both for the research scientist and the design engineer. For the detailed thought given to structuring the symposium, for identifying so many eminent contributors from across the globe, and eliciting such excellent responses from all of them, Rama Rao deserves every appreciation and praise.

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**The C-DOT Story**. G. B. Meemamsi. Kedar Publications, Amritam A3, Sector 15, Noida 201 301. India. 1993. 150 pp.

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The book has a rather meaningful cover epitomizing the C-DOT story. A plant about to flower, labelled "quest", the same plant trampled and mistreated, labelled "inquest" and presumably the same plant recovered with many flowers and buds, labelled "conquest". Only a gardener knows what it is to plant a seed and nurse the sapling against odds. Padma Shri Meemamsi can very well fit the role of a gardener trying out a new kind of plant in an alien environment and be somewhat lucky to see the plant bear fruits after a near miss.

The story of the digital electronic telephone exchange in India did not start with C-DOT (1981). In fact C-DOT was a culmination of the efforts of a group under the direction of Meemamsi way back in 1965 when the rest of the world was also trying to field test their first attempts. The only guide then was a two-volume Bell System on ESS. Technology in terms of processor, memory and peripherals was primitive from todays standard. The world should be grateful to ESS for the birth of a transistor which eventually transformed the field of electronics. We read that the demonstration of the Indian ESS in 1973 was quite a bit of touch and go and the author recalls a remark of a colleague 'Sir, we did not perform puja and break the coconut to invoke the blessings of the switch. That's why this happened'. Perhaps, Meemamsi a technologist did not take this remark seriously, for that can be the only explanation for the unwarranted interference by politicians and their henchmen at a later date. Coconuts should have been broken not at the altar but on the head of...

C-DOT tried to break many new grounds. India took courage to give a chance to Indian technological competence, thanks to the high profile marketing of the idea at the highest level in the government by Sam Pitroda who set up an organization with a totally new work style which was conducive to obtain commitment from employees and a purchase strategy to cut down procurement delays to a minimum. Perhaps, the only thing they borrowed from almost all Indian projects was to promise too much, in a very short time and at a ridiculous R&D budget. C-DOT's R&D budget was 0.04 billion dollar as against in excess of 2.5 billion dollar spent by any multinational company (MNC).

C-DOT is an existence theorem in that it proved that one can set up a world class technology development team on the Indian soil, which demonstrated that the brain drain can be stopped or even reversed if one wanted to. People's sensitivity was the essence of C-DOT management with work environment egalitarian, not hierarchical. Such ideas in managing Hi-tech groups in India have become common these days but one can still pick up new ideas by reading the quest portion of the book.

Whereas C-DOT was chugging along fine, the problem was that 'C-DOT was born in a hostile environment, without the blessing of the top policy-makers of the department of telecommunication (DOT), the sole user of the technology to be developed by it'. DOT seem to have been driven by 'service before self-reliance' in an environment where MNCs backed by soft loans offered quick solutions to the problem of communication bottleneck.

One cannot find out from the book what exactly C-DOT really promised for Rs 36 crores in 36 months. Presumably they promised a field-tested 10,000 to 40,000 line exchange with an astronomical 800,000 BHCA (busy hour call attempts). When progress was slow C-DOT tried to establish credibility by producing in a hurry PABX (128 line) and RAX (256 line). The sideline of RAX and PABX became so popular that the entry of MNCs in that area failed even after some local companies had licensed foreign technology. No wonder the public relation cells of the humiliated MNCs were working overtime.

The fall of the Congress Government in December 1989 and takeover by the National Front Government provided an opportune movement for settling scores. Meemamsi explains the origin of the logo of C-DOT which when looked carefully is C and i. Does one need a flag more red than that, for the new government to want to put C-DOT in its place? India should be ashamed of what took place in terms of the witch-hunt of C-DOT in 1990. One can pick up almost any reason if one was determined to find fault with. What started as a serious technical review of C-DOT ended in a drama worthy of Bollywood (the popular name given to describe the Bombay film industry) and Sri. K. P. P. Nambiar exhibited an ability to serve as 'cat's paw', which surprised many who had known him as a no-nonsense technocrat. Antics of the minister Sri Unnikrishnan were no less peculiar. Whereas the committed team of C-DOT made one feel proud that 'India can do it', the witch-hunting crossed decency, making India feel naked in front of MNCs. It is to the credit of Sri Sundaram and Dr Shenoy that some honest evaluation of C-DOT was attempted.

But it seems the verdict was decided well before the facts to be examined by the committee were collected. It is a pity that the committee did not have a mature attitude to slippage, which are normal in such path-breaking projects. It is not that similar projects anywhere in the world did not have such slippages and cost overruns, except that they did not worsen the problem by mindless witch-hunting.

One can only wake up with a nightmare wondering what would have happened if the National Front Government had not fallen. C-DOT recovered and is well on its way to instal the first 10,000 line exchange. In the meantime technological obsolescence is setting in. Will the country give itself an MNC in the form of modernized C-DOT

or call it a nice experiment and bury C-DOT in the name of liberalization?

It is gratifying to read about the heroic efforts on the part of some individuals to prove 'India can do it provided . . .'. The C-DOT episode touched the conscience of the country in that the IITs and professional societies were provoked to decry what was being done to C-DOT, which stood as a symbol of India trying for a medal in the technology 'olympics'. India must come to grips with the issue of indigenous technology vs MNCs.

The book in some ways reflects the C-DOT culture of treating people as the most important resource, namely the book reads like a vote of thanks, full of names which sometimes reduces the effect of the ideas being presented. There are quite a few pictures, but the reproduction quality is wanting reminding one of a school magazine.

C-DOT story brings out, to quote from the book: 'In technology development projects such as Telecom, competition, subversion or blocking in some devious ways by multinationals is very common. Hence, unless there is a political commitment to support, the chances of success in such technology development are very slim'. Can one ask for a better commitment than at the highest level, but perhaps that was C-DOT's problem. It became too much of Sam Pitroda and the PM affair. Thus reviewer would hasten to add that in landmark projects individuals do make a difference and C-DOT was lucky in that it was every one that worked for C-DOT. C-DOT was lucky in staff but not in friends. Now that Meemamsi has got it off his chest, the reviewer hopes he will write a handbook on how to grow and nurture C-DOT-like organizations and help the new generation of dreamers.

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**Textbook of Modern Biochemistry (volume I).** Mukhtar Ahmed. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. 1995. 296 pp. price not indicated.

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The first impression on seeing this book with an attractive cover and printing is a favourable one. It is good to see textbooks produced in developing countries to suit their requirements and to be possessed by their students. What with the high cost of imported books and their multiplicity, it is increasingly becoming difficult to acquire all these in the libraries of universities teaching the courses. Students need to consult an affordable and dependable book for information occasionally, e.g. a formula or a reaction or a value. Any effort towards achieving this needs encouragement.

First for some good features in the book. In each chapter explanation is given for the terminology to help understand how words used were derived e.g. matrix – Latin for womb. Artificial sweeteners are listed. Methodology used in protein sequencing is described. Formulae of a large number of compounds are provided. The chapter on vitamins and coenzymes is particularly informative e.g. vitamin K action in gamma-carboxylation of glutamate. The acidic products derived from the amino acids are shown schematically. The diseases associated with metabolism are dealt with in detail. The layout and quality of print as well as reproduction of figures are reasonably good and makes it easy to read.

The book however needs a lot of editing, proof-reading and verification of facts. In many places the expression is muddled and the actual meaning is lost. The outstanding example of this appears right in the beginning itself. Describing the background title (meaning the cartoon on the cover page) it is stated: The final common metabolic pathway 'the citric acid cycle' for the oxidation of foodstuffs during which energy is produced in mitochondria. Only careful examination will reveal the meaning of the squares, rectangles and circles: acetyl CoA, citric acid cycle, respiratory chain, ATP. Why call it 'final common', or bring in 'foodstuffs' or introduce 'mitochondria' at this stage? The author claimed in preface that he tried 'to intensify the basic ideas . . . with the help of clinical examples'. It would then have been a more useful work but such examples are few. A number of printer's errors could easily have been avoided by careful proof-reading. Some factual errors in figures and in the text also crept in. Indeed some figures actually are confusing instead of clarifying. Why some titles of chapters were chosen cannot be deciphered e.g. chapter 12 'The Kreb's Cycle (1937)'. Why 1937 in parenthesis? Why allow the common mistake of 's in the name of Krebs?.

In a book published in 1993, the references given are old – 1970s or 1980s books and reviews; two most recent are in 1989 (page 268). Yet the book is given the title 'Modern'. None of the new textbooks of biochemistry or reviews have been mentioned, and obviously not consulted.

Given below are some errors or confused statements noted during perusal of the pages.

1. Subtitle 'Impact of biochemistry of medicine' should it not be 'On medicine'? Under section A, the word 'exaplains' spelled wrong; Leibig's life time should be 1803–1873, not 1973; other errors in item 8–10: Warburgs – Warburg, brough fame – brought fame, Kreb – Krebs, Gyorgi – Gyorgyi, radioisotops – radioisotopes, fundations – foundations, manod – Monod.
2. Contents pages: cell memebrane – cell membrane (p. 23). Ketogesis – Ketogenesis; Kreb's – Krebs' (There are a number of such throughout).
3. p. 3 Vander – van Der.
4. p. 21 Mitochondrial DNA is 'required for synthesis of mitochondrial proteins' – better to qualify 'some mitochondrial proteins', chromosoamal – chromosomal.
5. p. 47 'Mucopolysaccharidsis' – This section needs revision/rephrasing.
6. p. 57 Classification of amino acids in Table 4.6 – indispensable – is it not better to use the word 'essential'?
7. p. 58 'If the disulfide linkage (S–S) is not genetically programmed, the protein loses its biological activity' – gives totally wrong perception.
8. p. 72 The concept of absorption was not introduced in dealing with tlc.
9. p. 101 'Enzymes are specialized proteins which are synthesized in the living cells and catalyze biochemical reactions in various organs. They are also capable to catalyse the same reaction even out of the cells in the laboratory' – This is a typical example of improper expressions that mislead the reader. There are more such items in 10 listed 'fundamental facts