the 1977 Carter regime, when Frank Press was the President's Science Adviser. In order to protect the role of basic research in science and at the same time meet the societal needs through the use of science, a unique initiative now called the Press–Carter initiative was taken by preparing a master list of research questions, involving the various scientific agencies in the government. This list was submitted to the cabinet to justify support for basic research in some of the science programmes that could fulfil the major societal needs. Appendices B and C of the book give this list in detail. Research groups and scientific agencies in India must look at these lists to frame their research agenda. It is tempting to quote one such research-oriented question that justifies the need for basic research to satisfy societal needs:

'What are the physical processes that govern climate? Greater understanding of climate could aid in the prediction of climate changes and allow time for measures to offset their impact.'

The book has devoted several pages to the large number of scientists' voluntary public-interest associations. It has highlighted the pioneering role played by individuals and groups of scientists, such as Einstein–Russell in the Pugwash group, Linus Pauling for the peace movement, Rachel Carson for the environmental movement and several other not-so-effective but serious movements that have influenced the functioning of the two ivory bridges in the US.

The book ends with a short but thoughtful chapter on the autonomy and responsibility of the scientists and the scientific community. It concludes by saying . . . 'they have been doing an important service to our society – one that has not been sufficiently noted and appreciated by society at large. They have prevented science from becoming either too subservient to the demands of government or, at the other extreme, a new establishment in itself, and have preserved the image and reality of the scientist as beneficent dissenter'.

The analysis in the book becomes relevant to a country like India and it is for this reason that the book needs to be taken seriously by the members of the scientific community and by the government agencies in India. In fact, it almost becomes necessary that one of the scientific agencies or science academies commission a study by social scientists who have some familiarity and understanding of how science has been pursued in India, and how the scientific community has responded, if at all, to the call of the society.

The Indian scientific community should introspect its role in the context of creating ivory bridges in India. The book, though not of interest to students of science, should certainly prove an eye-opener to the 'scientist-administrators' and 'citizen-scientists' in India.

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Microarrays for the Neurosciences – An Essential Guide. Daniel H. Geschwind and Jeffery P. Gregg (eds). The MIT Press, Cambridge, Massachusetts 02142, USA. 2002. Price: US $ 55.

A lot has been written, during the last few years, about microarray technology, definitely one of the most revolutionary techniques to have been invented to address problems relating not only to various diseases, but also to address basic biological questions. However, one aspect of modern biology, neuroscience, has probably not been subjected to a microarray-based analysis to the extent it deserves. In this context, the book under review comes as a refreshing change to all that has been written about microarrays so far. The book describes in an easy-to-understand language, the achievements of this amazing technology to understand the nuances of the central nervous system and also explains how it could be used for future research in the field of neuroscience.

The preface begins with a short description of the microarray technology and its important applications. It highlights the difference between using the technology in simpler systems such as cancer biology, yeast, bacteria, etc. and the more complex central nervous system. It then gives a wonderfully succinct, concise and wholesome overview of the various topics covered in the book. The first chapter by Gregg is of great help to neuroscientists to learn the basics of this technology. It gives a good introduction of the microarray technology by way of a general description, which is so simple that it will help any laboratory interested in establishing a microarray facility. Each step of the technique, starting from slide preparation to data analysis, is explained. The chapter also provides information on laboratories where pioneering research has been done in this field. The second chapter by D. Wells and his colleagues deals with microarray scanning and data acquisition. Axon is the world leader in this field, and Wells *et al*. have expectedly given a good account of this important component of the microarray technology. Details of background subtraction and normalization have been explained. While all aspects of background fluorescence have been covered, starting from array creation, choice of dyes, etc. this chapter also deals with all the other important technical aspects of microarray scanning and data extraction. Such details are usually not easily available, which makes it an important aspect of this book. The third chapter by S. Shah and S. Shams specifically deals with various aspects of informatics involved in the whole process. Although this is the most important aspect of microarray technology, several researchers limit the use of informatics to the final step of data analyses. This chapter lucidly describes usefulness of informatics in the initial stages of array fabrication as well, besides dealing at length with the intricacies of image generation and analysis, quantitation, principal component analysis and data analyses. P. Ramm and colleagues describe the widely discussed subject of data mining. Even though so much has been written about statistical approaches for microarray data analysis, this chapter presents a refreshingly new look. The use of original data figures in the form of plates makes it easy to understand this slightly complicated aspect of microarrays, and makes interesting reading.

L. W. Whitney and colleagues discuss specific use of microarrays in neuroscience and focus on radioactive probes. Both glass as well as membrane- and filter-based arrays are discussed. The important difference between using homogeneous cell lines and heterogeneous

tissues is highlighted. However, the chapter is too short, lacks focus, and it could have been fused with one of the chapters discussing microarrays for neuroscience. The first objective for studying differential gene expression in neural tissues is to generate cDNA libraries specific to neural tissues. L. W. Chiang and colleagues deal at length with intricacies of making nervous system-specific cDNA clones, and discuss various steps, including cDNA library construction, validation, trimming, PCR amplification, re-sequencing, etc. A simple and logical method has been described, which can be easily adapted for any system.

T. A. Awad, D. J. Lockhart and C. Barlow describe adaptation of the affymetrix oligonucleotide array technology for studying differential gene expression in the nervous system. Although the basic technology is described in more detail than was perhaps required, the chapter does explain its use in neural systems in sufficient detail. Several techniques have previously been described for using human postmortem fixed tissues for gene expression analysis. V. M. D. V. Deerlin *et al.* illustrate the use of preserved brain tissues for microarray analyses. This is important, given the difficulty in obtaining fresh samples as well as the inherent inaccuracy of data obtained from cell lines. Perhaps, it is one of the best-written materials available for extraction of RNA from preserved human tissues. The chapter includes useful tips on modes of preservation (that should be suitable for future RNA extraction), length of storage, microdissection, linear amplification of RNA, and use of isolated RNA for gene expression studies. M.-C. Potier and colleagues highlight a specific problem related to the nervous system, i.e. the presence of a heterogeneous population of cells. The chapter describes the recently developed technique of single-cell multiplex RT–PCR and its extension to incorporate a larger number of genes in microarrays. The chapter elegantly describes the development and use of a neurochip for studying neural transmission. A full-scale microarray experiment for 94 genes amplified from a single cell has been described.

D. H. Geschwind and S. Nelson address the important problem of identification of novel genes related to the nervous system, by simply following a suitable RNA/cDNA subtraction step with a cDNA microarray screening. Finally, S. Fuhrum *et al.* discuss several statistical approaches to understand and extricate information on cellular networks and pathways from gene-expression experiments. Methods for interpretation of sets of data arising from several independent microarray experiments are also discussed. They have mentioned several 'checks' for confirming the 'clustering' results. Specific examples from the nervous system have been used to describe extraction of useful information on gene regulatory networks from microarray data sets.

An important feature of this book is that detailed protocols are given at the end of each chapter. Easy flow diagrams have been incorporated, the text uses simple language and several web addresses have been incorporated that help to easily obtain valuable information. The subject that the book addresses is extremely important and relevant, given the lacunae in our understanding of brain function and development, as well as diseases related to the nervous system. The book is hardbound, not too bulky and easy to carry with an attractive cover. It is a must for neuroscientists and molecular biologists alike.

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The Math of Money. Morton D. Davis. Springer Verlag, D-69121 Heidelberg, Germany. 2001. 199 pp. Price: £ 20.50/ SFr. 52.97/DM 59.81.

In the investment world today, with scams of every conceivable variety ruling the day, what is it that guides individuals in their financial decisions? Most of us, as we approach our greying years, develop simple thumb rules to get by: when and how much money to put into the PPF, when to invest in certain kinds of stocks, what to expect from life insurance, what to expect from a pension scheme, and so on; a few opt to depend upon brokers – sometimes with disastrous and most unfortunate consequences. But probably only a small number amongst us have the mathematical training or expertise needed to analyse investment options in any objective sense. In *The Math of Money*, author Morton Davis – an emeritus professor of mathematics – offers a way of looking at financial matters and baffling investment conundrums, areas where intuition and common sense lead one astray all too easily. (Einstein once said, in a very different context, that common sense is far from common. This would certainly seem to hold in the world of finance!) The topics covered in the book include bonds, mortgages, retirement plans, psychology of investing, call options and statistics.

Say you buy a dishwasher for Rs 6000. Rather than pay the full price at once, you opt to make 13 consecutive monthly payments of Rs 500 each, starting right away. This means that you borrow Rs 6000 and repay Rs 6500, with Rs 500 going into interest. Since it takes a year to repay the amount, the effective interest rate is Rs 500/6000 or about $8\frac{1}{3}$% per annum, right? Wrong – the effective interest rate is nearly $16\frac{1}{2}$%! (To get the true rate one must solve the equation

$$500\left[\left(1+\frac{r}{1200}\right)^{12}+\left(1+\frac{r}{1200}\right)^{11}+\ldots 1\right]=6000\left(1+\frac{r}{1200}\right)^{12}.$$

The solution is $r = 16.38$; but numerical methods are needed to get this figure!)

Or say you have a broker for your financial decisions. You are hoping to invest in a 'miracle stock' – one that doubles in just three years. You know from past experience that only one stock in a thousand is of this kind. Your broker claims to have a good nose for smelling out miracle stocks; when shown a miracle stock he identifies it as such, 90% of the time, and if shown a non-miracle stock, this too he identifies correctly 90% of the time. So the next time you randomly select a stock, you consult him; and he claims that it is a miracle stock. What is the probability that it is indeed a miracle stock? It must be quite good; about 90%, right? Wrong – in fact it is less than 1%!