Statistics on Science and Technology in Europe: Data 1985–1999. Office for the Official Publications of the European Communities, L-2985 Luxembourg. 2001. 174 pp. ISBN: 92-894-0176-1. Price: Euro 35.

In March 2000, at the Summit meet held at Lisbon, the European Council set itself the objective of making Europe the most competitive and dynamic knowledge-based economy, capable of sustainable economic growth with more and better jobs and greater social cohesion. Such systematic policy support needs both high-quality information on science and technology (S&T) and relevant analysis. That is precisely what this book under review provides.

This publication, produced by Eurostat, goes far beyond the usual statistics on R&D expenditure, R&D personnel, government R&D appropriations, and patents. For the first time, Eurostat has included data on innovation, employment in high technology sectors, and human resources in S&T. In addition, a separate chapter is devoted to future directions for the development of a new generation of S&T statistics.

All the information provided is based on data supplied by the Member States concerned, the Research Directorate General of the European Commission, the European Patent Office, and the OECD. In all, there are 45 tables, 79 figures and 5 maps. Wherever complete time series data are not provided (for want of space), one can find them in the CD-ROM version of this publication and in Eurostat's reference database, New Cronos.

The book is divided into three parts: research and development (4 chapters), knowledge growth and innovation (3 chapters), and looking to the future (chapter 8). Comparisons are made not only among the EU-15 countries, but also with Norway, Iceland, Japan and USA, and in some cases among regions of EU-15 countries.

In the past six or seven years, considerable advances have occurred in the science indicators movement. Both the European Communities and the OECD have contributed to these advances in no small measure. Till recently, the linear model of innovation [Research → Invention → Innovation → Diffusion] was thought adequate, but it is now realized that technology and innovation occur via much more complex processes. Technological innovation is no longer seen merely as an appendix to research; it is now seen as a complex interactive phenomenon that results from a mixture of knowledge and market requirements. It is therefore necessary for S&T indicators to reflect not only the economic but also the social impacts of S&T. This publication recognizes that S&T statistics should take these changed perceptions into account. It is time for going beyond the *Frascati Manual*, first produced in 1963, providing guidelines for collection of R&D statistics.

This book does not provide publication and citation indicators, nor does it cover international collaboration, perhaps because these are covered by the European Report on Science and Technology Indicators.

This reviewer is unable to appreciate why the European Communities and Eurostat are reluctant to use the ISO Standard two-letter abbreviation for countries, especially when they have used the two-letter country abbreviations when referring to the currencies of different countries.

On the whole, this is an admirable document, professionally compiled. Both the data and analysis are excellent. I recommend it to science policy analysts.

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The Amber Forest: A Reconstruction of a Vanished World. George Poinar Jr. and Roberta Poinar. Princeton University Press, 41, William Street, Princeton, New Jersey 08540, USA. 1999. 239 pp. Price: US$ 19.95/£13.95.

Scientific reconstruction of the past has helped human beings understand not only their origin and evolution, but also their position in the biological hierarchy. While a good deal of the prehistoric biodiversity on earth has vanished without trace, some of it has been preserved by a host of nature's 'curators', that after millions of years, humans have been able to reclaim and study them. Amber has proved to be one of nature's best curators and amber fossils have provided the best insights for reconstructing the prehistory of tropical forest ecosystems.

In *Jurassic Park*, amber fossils provided the key to bringing dinosaurs back to life. Scientists in the movie extracted dinosaur blood from mosquitoes preserved for millions of years in amber and used the blood's DNA to revive creatures that terrified audiences around the globe! In the book under review, George and Roberta Poinar use amber for a similar act of revival. They however, bring back an entire tropical forest ecosystem – one that prevailed on the Island of Hispaniola (Caribbean/ Dominican Republic) some 15 to 45 million years ago.

In the tropical forests of Central and South America and Africa live species of leguminous trees, popularly called 'algarrobo'. Algarrobo trees produce a resin from glands that occur in their petals, leaves, fruits, branches and trunks. Although the purpose of this resin is a subject of much speculation, once hardened, the droplets turn into amber, the much sought-after gem.

One species of algarrobo tree, viz. *Hymenea protera*, now extinct, dominated the canopy of the Caribbean forests 15–45 million years ago. This tree, thanks to its abundance and copious amount of amber that each tree produced, has singly trapped and preserved, in the most spectacular manner, a wealth of earth's prehistoric biodiversity. Including leaves and floral parts of its own kind, the algarrobo tree has preserved a few hundred species of organisms such as fungi, bryophytes, flowering plants, nematodes, mites, spiders, insects (predominantly ants), amphibians, reptiles, birds (feathers) and mammals (hair).

In its first chapter, the book vividly describes the process of formation of amber and how organisms get trapped in it, how amber gets fossilized and how it is obtained from mines. Organisms preserved in amber retain their original form and colour pattern, making identification to the level of genera possible. Further, it is apparent that the animals were entombed in the flowing resin

when they were still alive and active. Based on all these clues, the authors have been able to reconstruct the whole tropical ecosystem, including the dynamic processes (for example, a bee with pollen attached to its legs), as it had been in the past on one of the Caribbean Islands.

Chapter two, the longest section of the book, takes the readers through this reconstructed prehistoric ecosystem. Chapter three highlights the structure of the prehistoric tropical forests on the Island of Hispaniola and in chapter four the readers are oriented to the amber world, how to handle amber-containing fossils and more than all, how to tell imitations from the real ones. In two appendices, the authors provide details of the diversity of organisms in the Dominican amber.

It is amazing to learn that most genera of plants and animals preserved in amber collected from the Dominican Republic have living representatives either in the Caribbean or elsewhere in the tropical world today. Ants belonging to the genera *Aphaenogaster*, *Camponotus*, *Crematogaster*, *Dolichoderus*, *Leptothorax*, *Pheidole*, *Prenolepis*, *Solenopsis* and *Tapinoma* are amongst those identified in the amber fossils. Interestingly, these genera include species of ants which are some of the commonest and widespread amongst extant insects.

On the whole, the book is excellent in its presentation. The fossils have been beautifully illustrated with both coloured and black and white photographs. Additionally, the authors have enriched the book with their painstaking sketches, reconstructing prehistoric scenes. The overall style of writing is one of 'story-telling', taking the readers through a biodiversity-rich prehistoric world. For instance, the book starts with a prologue that reads as follows: "I lifted to the window, a nugget of golden Dominican amber entombing a small stingless bee. The sunlight infused it and illuminated the bee caught forever in flight – gossamer wings outstretched and perfectly preserved down to the last hair. Stark eyes appeared to be gazing at me… . Would the vistas of just one day be sufficient to reveal the wonders of life millions of years ago? What was the last fateful day like? And what events had taken place in the eras before this specimen arrived in my hand?'

This book should be of great interest to all students of biodiversity and palaeobiology as much as it would be to general readers. It is available as a paperback edition. Those who wish to get more details regarding this fine book may look up www.pup.princeton.edu.

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Annual Review of Biochemistry 2001. Charles C. Richardson *et al.* (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, CA94303-0319, USA. Vol. 70. 924 pp.

This volume begins with an introductory chapter giving a wonderful summary of the advances and turning points in the scientific career of Charles Yanofsky. Throughout the text Yanofsky treats us to many interesting metaphors. For example, we learn about how he was turned down by the undergraduate admissions committee both at Johns Hopkins and University of Illinois, graduate admissions committee at Caltech, and how one prominent biochemist wrote a personal letter advising him to seek a career in some area other than science! Much against his advice, Yanofsky pursued graduate work at Yale, became a faculty member at Case Western Reserve, and since 1958 has been at Stanford as a distinguished Professor. The low-key approach that Yanofsky uses to describe his work over five decades is a rare treat in our overhyped, oversold and overly solicitous world of science. Looking at the scientific contributions from his lab, among many, two are eminently noteworthy: establishing gene–protein colinearity, and elucidating the features of operon regulation by transcription attenuation.

The Editorial Committee responsible for organizing this volume takes a Noah's ark approach, presenting a parade of articles that cover areas, including DNA metabolism, signal transduction, mechanisms of enzyme catalysis, gene regulation, protein synthesis, protein engineering, cytoskelton, protein processing and degradation, that extend across species, except plants.

The chapter by D. Frick and C. Richardson is outstanding in conveying the idea of the complexity of initiation of DNA replication mediated by a class of enzymes called primases. There is intense current interest in learning about this novel class of RNA-synthesizing enzymes, which are distinct from the classical RNA polymerases. It offers an excellent review of the topic from the discovery of gene 4 protein in phage T7 as a priming protein, later designated as primase, and brings many studies into a coherent perspective. It also has the courage to be speculative, especially regarding the design of drugs to block bacterial or viral diseases. It goes on to present in detail a collection of primases, interacting partners and insights into mechanistic aspects. In addition, it has extensive summary charts and figures, which are useful for the person working in this area to grasp the text without having to read the remainder of the text!

The ability of proteins to recognize each other in a specific manner to form stable complexes is a hallmark of most cellular processes. The replication of duplex DNA by an assembly of enzymes and proteins that collectively constitute the replisome is an instructive example of finely-crafted biological machine. Through the case studies of *Escherichia coli*, phage T4 and T7 replisomes, S. Benkovic and colleagues review decades of research and show that our knowledge and understanding of this complex process has dramatically expanded. Whereas the chapter regarding work on *E. coli* which has been the centerpiece of the DNA replication field, and often reviewed in this series, is exceptional as an introduction to anyone interested in getting initiated into the area of DNA replication.

The chapter by J. Champoux discusses the structure, function and mechanism of DNA topoisomerases. Progress has also been made toward defining the regulation of topoisomerases *in vivo*. There has been a remarkably longstanding controversy over whether topoisomerase II contributes to scaffolding architecture of the eu-