The first chapter is an overview of isoprenoid biosynthesis by the volume editor, David Cane. This provides a summary of isopentenyl diphosphate (IPP) synthesis and its metabolism to a broad range of higher isoprenoids. The second chapter, written by a group from Purdue University, describes the formation of mevalonic acid from acetyl CoA, with particular reference to HMG CoA reductase. This section has a good coverage of the literature and comparisons of this key regulatory enzyme in plants, animals and bacteria. It also has some helpful coloured 2-D illustrations of the active site of the enzyme.

It is not often these days that a novel biosynthetic pathway is discovered. This occurred in isoprenoid formation a few years ago, when it was found that IPP can be formed through a non-mevalonate pathway. This is the route to higher isoprenoids, such as the carotenoids. Michel Rohmer was at the forefront of this discovery. Indeed, the pathway is often called the 'Rohmer pathway' in his honour. It is good to see, therefore, that he has contributed an excellent chapter on the work leading to its discovery and the current state of knowledge of the sequence of intermediates.

The next chapter describes the properties of IPP isomerase and prenyltransferases. Given the breadth of this topic, I would have liked to have seen a longer review. Chapter 5, written by Wise and Croteau, details monoterpene biosynthesis. As one would expect from these experts, this is an excellently written review of the field and an enjoyable read. The editor, David Cane, has written the next chapter on sesquiterpene biosynthesis, with an emphasis on cyclisation mechanism: lots of good chemistry here to get one's teeth into.

Chapter 7 moves from the chemistry and biochemistry of the pathway to cloning and expression of terpene synthase genes. At a mere 14 pages, this seems somewhat out of place and the topic could have been included in the appropriate chapters elsewhere. The following chapter, on diterpene biosynthesis, has been written by undoubted experts in the field, Jake MacMillan and Mike Beale. It covers a wealth of information on the four kinds of GGPP cyclases especially with respect to reaction mechanisms.

The next three chapters describe the pathway from squalene to triterpenoids and sterols, starting with squalene synthase, then key enzymes in cholesterol formation and finally cycloartenol and other triterpene cyclases.

Chapter 12 summarizes carotenoid genetics and biochemistry in 30 pages. Yes, I am biased, but I think more could have been included, especially on regulation and genetic engineering. The final two chapters cover protein prenylation and ginkgolide biosynthesis, respectively.

Overall, this volume is a very useful reference text that will be worthy of purchase by libraries and perhaps by those with a keen interest in isoprenoids, if they can afford the price. Inevitably, in such a fast moving area, some of the information is already out of date, but I think that there is still sufficient important fundamental material to justify its purchase.

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Comprehensive Natural Products Chemistry, Volume 3: Carbohydrates and Their Derivatives Including Tannins, Cellulose and Related Lignins
B. Mario Pinto (Volume Editor), Pergamon, an Elsevier Science Imprint, Oxford, 1999, 939 pp., ISBN 0-08-043155-0. Price EUR 387.50, US$ 387.50.

The first thing that might strike a reader about Volume 3, even before its weight, is its title. The title of this volume is convoluted and, like the proverbial camel, seems to have been created by a committee. Taking the cast in order of appearance: 'carbohydrates'—fine; 'and their derivatives'—OK; 'including tannins'—not really, unless we regard *all* natural organic products as carbohydrate-derivatives because their source can be traced back to glucose 6-phosphate; 'cellulose'—well, surely it goes without saying that the world's most abundant carbohydrate will be included in a comprehensive book on carbohydrates; 'and related lignins'—this one really had me stumped (related to what?).

The contents of this megalith of a volume (939 large pages) make a welcome addition to the reference shelf. Any multi-author work tends to be patchy, with parts of the topic covered more thoroughly or more masterfully than others; this volume is no exception. For example, perhaps of particular interest to readers of *Phytochemistry*, the volume contains a block of 7 chapters on plant-specific products (starch, pectins, celluloses, hemicelluloses, lignins, hydrolysable tannins and condensed tannins): some of these chapters focus on the structure of the substances

under discussion (celluloses, condensed tannins), others on their biosynthesis; turnover and biodegradation receive scant coverage. Although this approach has the advantage that the authors have been able to concentrate on their personal areas of expertise, one is led to question the claimed 'Comprehensiveness' of the series. The chapters also vary greatly in their depth of coverage and length: that dealing with lignin (by Lewis and colleagues) is notable for its thoroughness.

The 'comprehensiveness' of the book is also open to question in respect of the range of natural products covered. Topics you might look for in vain in this volume include fructans, chitin, oligosaccharides, hydroxyproline-rich glycoproteins, arabinogalactan-proteins and ascorbate. On the other hand, there is quite detailed coverage of sugar nucleotides (e.g. in Mohnen's excellent chapter on pectin biosynthesis) and of certain sugar phosphates (scattered in various chapters).

Another chapter with a particularly phytochemical flavour is that on the 'alkaloids' that can inhibit glycosidases. This chapter contains a valuable directory of such compounds; however, the emphasis is on their therapeutic use and on their use as laboratory tools to investigate glycoprotein processing rather than on their biosynthesis or roles in the organisms (mainly plants) in which they occur. The discussion of plant growth inhibition by one such alkaloid, nojirimycin, is rather off-target in claiming that cell wall loosening is caused by the action of *exo*-glycanases on xyloglucan. However, the effect of castanospermine on cell elongation is highlighted and appears to be an interesting area requiring further study.

Half the volume is devoted to the chemistry and enzymology of carbohydrates that either are of general occurrence in living organisms or are unique to non-plant organisms. Many of these chapters appear to be well produced and are a valuable model of what we should hope will one day be achieved in *phyto*chemistry. Topics covered well include *N*-linked glycoproteins, some *O*-linked (Ser/Thr but not Hyp) glycoproteins, glycolipids, glycosaminoglycans, lipopolysaccharides, and bacterial peptidoglycans. This last topic is covered by Bugg in an exemplary chapter showing a thorough and logical compilation of both structure and biosynthesis, including reaction mechanisms, highly accessible to the non-specialist and containing ideas that may well prove transferable to phytochemistry.

In conclusion, this is a heavy tome, with some considerable strengths, and a mass of facts. Whether enough of these lie within the reader's (Department's) field of interest to warrant purchase of the 9-volume work, at $3744, can only be judged by test-driving the book, which I strongly recommend.

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Comprehensive Natural Products Chemistry, Volume 4: Amino Acids, Peptides, Porphyrins and Alkaloids
J.W. Kelly (Volume Editor), Pergamon, an Elsevier Science Imprint, Oxford, 1999, 429 pp., ISBN 0-08-043156-9. Price EUR 387.50, US$ 387.50.

Natural products excite our notice not only because of their intrinsic *scientific* interest but because of their huge importance in agriculture, medicine and indeed social anthropology. No one can look at the structures of complex natural products and not marvel as to not only 'why' but 'how' they are made. Consequently, many studies are still focused on the pathway, genetics and control of the biosynthesis of these molecules.

This is a not a small book, and it is part of a large series. The executive editor, Professor Otto Meth-Cohn, remarks that it is surprising indeed that this series is the first to attempt to produce a 'comprehensive' overview of natural products beyond the student text level, and as such it is greatly be commended. But the reason for its primacy is surely to be found in Peter Medawar's comment: ''Biology is not hard in the sense that physics can be hard. If biology is hard it is because of the number and nature of things that one must hold in one's head at one time.'' There is just a lot of literature out there!

The present volume concentrates on molecules in which nitrogen is a major component—amino acids, peptide, porphyrins, alkaloids and so on. It contains 14 chapters, which are fairly evenly matched in terms of mass though more variable in terms of range and scope.

Koji Nakanishi and Jeffrey Kelly kick us off with, respectively, a useful historical perspective and a short but well paced piece on the biosynthesis of mainly aromatic amino acids. Other more specific chapters include ones on protein palmitoylation and glycosylphosphatidylinositol biosynthesis (these are possibly a little