a plethora of terms. Of course, such technical terms become valuable as a shorthand in accurate communication at an advanced stage, but at an introductory level they serve only to erode interest.

Ingrouille has made great efforts to select and arrange material in a way that will stimulate the reader. Leaf arrangements, defence against herbivory (both physical and chemical), mycorrhizae, epiphytic plants and many other topics are given extensive treatment. There are times when more explanatory material would have been helpful, such as in the mechanisms of crassulacean acid metabolism and C4 photosynthesis, *r* and *K* selection (which are neither defined nor explained) and in the use of terms such as 'guerrilla' and 'phalanx' growth forms in vegetative extension of plants. The functional approach, however, is partially adopted, although it is not fully developed until rather late in the text.

My final complaint concerns the diagrams. Although the line drawings are individually clear and helpful, they are so crowded and complicated by detailed labels and terms that their clarity is often lost. Perhaps the publishers are to blame here, for the text format is open and attractive with wide margins, yet the figures are unacceptably dense and obscure.

Ingrouille has attempted an extremely difficult, perhaps impossible, task, and has in certain respects succeeded. I trust that the book will survive into a second edition, in which some of its present deficiencies could be ironed out. □

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■ Of related interest is the newly published *Green Plants: Their Origin and Diversity* by Peter R. Bell, a thoroughly revised edition of the earlier *Diversity of Green Plants* by P. R. Bell and C. L. F. Woodcock (3rd edn, 1983). Cambridge University Press, £16.95 (pbk).

Eighteenth-century fizz — John Mervin Nooth's improved version of Joseph Priestley's apparatus (1772) for dissolving carbon dioxide gas in water. The gas was produced in the lowest chamber by reacting marble chips with sulphuric acid; water into which the gas dissolved was contained above a valve in the middle vessel, and the bulb at the top provided a head of water to keep the gas under slight pressure. Such apparatus was used to produce simulated spa water and could be found in many homes of the period. The picture is taken from *Science Preserved*, a directory of scientific instruments from collections in the United Kingdom and Eire, compiled by M. Holbrook. Published by HMSO, price £35.

Teaching programs

John A. Campbell

Foundations of Computer Science. By Alfred V. Aho and Jeffrey D. Ullman. *Computer Science Press/W. H. Freeman: 1992. Pp. 765. £42.95, $56.95.*

COMPUTER science may well attract more money and attention at present than its academic neighbours in universities, but it is not yet as confident of its identity. Debates on "What should we teach?" still turn up fairly regularly. They take their most solemn form in the United States, particularly under the sponsorship of the Association for Computing Machinery. At least one of the curriculum reports to emerge from these debates looked like a giant inflated pudding, full of facts and more facts, with obvious risks to students' digestions. In a reaction against this dinosaur style, a counter-report published in 1989 argued for three concepts — abstraction, design and theory of computation — as unifying factors for a newer and leaner approach. Although the argument itself is not new, its latest manifestation has been the most successful: dinosaur puddings are now somewhat out of fashion.

Aho and Ullman have a deserved reputation for producing books that work well in particular fields of computer science, such as algorithms and compilers, as both authoritative reference sources and course texts. Here they have taken up the 1989 framework just mentioned and have expanded it into a book of a similar kind, dinosaur-like mainly in its length, its cover illustration of ponderous grey animals and its weight of 1.78 kilogrammes. The emphasis is on establishing a mathematical foundation for the subject and on treating those parts of it that benefit most from this approach: analysis of algorithms, data models and data structures, automata and grammars and their uses, and applications of standard logics. The authors expect that people who use the book with a course will already have seen introductory material on computing and programming; hence they regard the book as being helpful for second-year or later university teaching. But at the same time it has the traditional Aho-and-Ullman value as a reference source for readers in computer science and other sciences who need information of this type for professional reasons and who are used to handling heavy books.

The three aspects of the framework are not treated equally. Abstraction comes off best, as a distinctive and widely useful feature of computer science. 'Theory' here is primarily the mixture of abstraction and mathematics that has to occur in examination of data structures, algorithms, parsers and compilers, and simple digital circuits. The authors discuss all these applications. However, computability and the less 'applied' parts of the theory of computation receive relatively brief mentions. Lessons about the place of design in computer science are fairly frequent, even though they are more implicit than explicit, and undervalue the aspects of good design that are not reducible to a matter of mathematical–technical sophistication. These are observations, not criticisms; even in 765 pages, one cannot do everything.

To sum up, this is a valuable 'how to do it' book that explores much ground in the centre of the present territory of computer science. Its strength is in the technical details; coverage of 'how to appreciate it' and of issues (such as the relation of classical models of computation to alternatives like neurocomputing and subsymbolic computation) that are most likely to change the map of this territory in the foreseeable future is not part of its brief. In its own chosen region, it will probably be equalled by other books, but is unlikely to be bettered. □

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