

lighting conditions and the physical and thermodynamic properties of thermex, whilst other areas receive scant attention, e.g. irradiation sterilisation kinetics, diffusion properties and microbial reaction kinetics. Even the composition of foods is not particularly well covered.

A few other points that came to my attention are listed. Perhaps my most serious criticism is that references are badly cited and for many of the tables there are no quoted references. How do I pursue a reference cited as Hall (1959) or Saravacos (1968)? I could not find a reference list in the book; had this been omitted? Some of the references are quite old, particularly those on dielectric properties (1954). The definitions given for the dielectric properties do not relate to the values in the text. Some of the tables are poorly captioned or difficult to use because no explanation was provided. The unsteady state heat transfer charts are reproduced without any key to the meaning of the symbols. It would have helped to have just a brief definition of density terms such as Twaddell, Brix and Baume. Data are presented on the physical properties of nitrogen, but why not air or carbon dioxide (there was plenty of space)? Data are presented on the molecular weight and boiling points of forty-two refrigerants, but nothing of the SVP temperature relations or the latent heat values. Eggs are listed as a dairy product; powdered milk contains 12.5% water; the viscosity of milk is 1.6314 cP (no temperature quoted), and in one table the pH of apples ranges between 3.0 and 3.3 and in another table it is 3.8. I was, however, impressed with the table on bulk solids material classification, which is very comprehensive. The book has a good index but here also the space was not well used. Some very useful data have been presented but a brief explanation of some of the terms used would have made it a much more helpful book for students. I think that this text could have been significantly improved if the manuscript had been more closely scrutinised prior to publication. Many of these properties for which data have been presented are extremely complex and it is important to emphasise that foods, being of a biological nature, are subject to considerable variations in composition and physical property values. A simple statement of this fact should have been included for those 'non-food people' who may make use of this book to design food processing systems.

**M. J. Lewis**

**Developments in Sweeteners—3.** Edited by T. H. Grenby. Elsevier Applied Science, London, 1988. x + 322 pp. ISBN 1-85166-104-2. Price £43.00.

Trevor Grenby has maintained this third book in the sweetener series at the same high scientific standard. It contains chapters on 'Stevia' (Phillips),

'Progress in the Chemistry and Properties of Rebaudiosides' (Crammer and Ikan), 'Technical and Commercial Aspects of the Use of Lactitol in Foods as a Reduced-Calorie Bulk Sweetener' (den Uyl), 'Malbit and its Applications in the Food Industry' (Fabry), 'The Metabolism and Utilization of Polyols and Other Bulk Sweeteners Compared with Sugar' (Ziesenitz and Siebert), 'Sweeteners and Dental Health: The Influence of Sugar Substitutes on Oral Microorganisms' (Linke), 'Dental Advantages of Some Bulk Sweeteners in Laboratory Animal Trials' (Havenaar), 'Sweeteners in Special Foods for Diabetic, Slimming and Medical Purposes' (Jackson, Howells and Armstrong), 'The Food Manufacturer's View of Sugar Substitutes' (Mackay), 'Evaluation of the Usefulness of Low-Calorie Sweeteners in Weight Control' (Booth).

The book is well balanced in presenting two new naturally intense types of sweetener (stevioside and the rebaudiosides) along with the bulk sweeteners (malbit and lactitol), particularly in view of the latter's immediately favourable prospects. The chapters, however, vary in length of bibliography (7–226 refs). Moreover, they vary widely in subject matter, as can be seen from the titles, and strategy of approach. The chapter on sweeteners for diabetic, slimming and medical purposes is entirely practical whereas that of Booth on evaluation of the usefulness of low calories sweeteners is reflective and thoughtful in content.

Overall, the book is authoritative and indispensable for those working in this growing area of food ingredients. It is typically priced and highly recommended.

**Gordon Birch**