the stereochemistry of the cycloalkanes cataloged. It was made while I was a post-doctoral fellow in Jack Dunitz's laboratory, and was, with Dunitz and Shearer's analysis of cyclododecane in the same issue, the first three-dimensional X-ray structure determination, from single-crystal data, of an organic compound to be reported in *Helvetica*. (An earlier three-dimensional analysis of adamantane, by Nowacki in 1945, was based on 16 reflections measured from a powder sample.) Seeing the reproduction of the title of the paper brought back two memories. The first was of all-night sessions in 1958, seated in front of a then state-of-the-art electronic computer (*ERMETH*) that disgorged, with almost uninterrupted regularity, one structure factor every 62 s! The second was the recollection that, in those days, only articles written in one of the official Swiss languages were considered, and that the formidable Emile Cherbulliez would be passing judgement on my school-boy French!

Most of the reviews in this book on organic topics are in German, with the *Introduction*, Venanzi's article and the physical and structural reviews being given in English. However, even in these latter topics, most of the papers cited are in German. English language articles did not appear in the journal until the late 1960's, although, with characteristic Swiss business acumen, the editorial board cheerfully accepted paid advertisements in that language at a much earlier date! The acceptance of English, coupled with the opening of *Helvetica* to articles from outside Switzerland, did much to move the journal into the front rank of chemical periodicals, where it remains today. Articles in the Swiss languages still account for about 20% of the journal's contents, stubbornly resisting the spread of English as the new *lingua franca*. When I recently asked a Swiss friend, impressively fluent in English, why he and a senior colleague had elected to publish an important and lengthy article in *Helvetica* in German, when an English version would have attracted a much wider audience, he replied, 'Ah, but it would not have had the *exactness*!' A comment in the tradition of the quotation from Boileau cited by the editors as embodying Cherbulliez's editorial philosophy – Ce que l'on conçoit bien s'énonce clairement et les mots pour le dire arrivent aisément'. The more so in one's native tongue.

Books of this kind are not to be read at a sitting, but provide an unending source of historical gems when dipped into over time. Who would not rejoice to rediscover the series title from Firmenich AG – 'Sur l'arôme de viande de boeuf grillée', or the splendid 'Analysen alter Weine – 1834er Yvorne und 1840er Glacier' of 1919, whose authors assured their readers in closing that 'Zum Schluss sei neben der Wiedergabe dieser Analysenwerte immerhin erwähnt, dass beide Weine sich noch in guter Verfassung befanden. Der 1834er Yvorne war im Geruch reintönig, im Geschmack etwas hart, mit sogenannter Sulfatfirne. Der 1840er Glacier duftete stark nach Estern; im Geschmack war er etwas brandig'. More seriously, background literature references in hosts of contemporary papers are brought to life by these reviews, making easier, in Prelog's words, 'the task of evaluating the merits of one's predecessors'. This is an enjoyable pursuit, even when one is in danger of becoming a predecessor! For the young, who are in the vanguard of the advance of science, the work can be recommended as helping to instill a sense that they too will one day provide the shoulders for others to stand upon. All of the contributors are to be congratulated for their part in this wonderful labor of love. Not only Swiss chemists, but all with an interest in the development of chemistry should find the book stimulating and enjoyable. I don't intend to part with my already well worn review copy!

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Modern crystallography. Vol. 2. **Structure of crystals.** (Second enlarged edition.) Edited by B. K. VAINSHTEIN, V. M. FRIDKIN and V. L. INDENBOM. Pp. xx + 520. Berlin: Springer-Verlag, 1994. Price DM 119. ISBN 3-540-56848-4.

This is the second volume in the ongoing republication of *Modern Crystallography*, which has previously appeared in English translation in the Springer series in *Solid-State Sciences* (this volume as No. 21). A review of Vol. 1 of the second edition, by Douglas Dorset [*Acta Cryst.* (1995), B**51**, 264], has already been published earlier this year. The first edition of this volume was reviewed in 1983 by Professor J. Auleytner [*Acta Cryst.* (1983), A**39**, 272].

This second volume qualifies as a new edition solely on the basis of the addition of a 90pp. sixth chapter, entitled 'Advances in Structural Crystallography', written by Professor Vainshtein and nine colleagues. The earlier chapters remain virtually unchanged from the previous edition. Of 233 literature citations in these earlier chapters, only 18 cite work published after 1983. Of these 18, only six cite work published after 1990, and four of them are a general reference to the second edition of Vol. 1. The five original chapters deal with 'Principles of Formation of the Atomic Structure of Crystals', 'Principal Types of Crystal Structure', 'Band Energy Structure of Crystals', 'Lattice Dynamics and Phase Transitions' and 'The Structure of Real Crystals'.

The new chapter contains 11 sections, of widely varying quality, reviewing structural topics that came into prominence in the eighties and early nineties. Three sections are written by Professor Vainshtein himself. The first of these is a six-page review of fullerenes and fullerides, through 1992. The second, written in collaboration with V. I. Simonov, is a useful review of superconductivity and superconducting structures. Here literature citations are given through 1993. The third section reviews developments in the structural investigation of biomolecular crystals, with discussions of NMR methods and molecular dynamics calculations. Here, again, the bulk of the work discussed dates from before 1990, with but a brief mention of more recent achievements, such as the increasing use of MAD phasing and time-resolved studies using synchrotron radiation.

The remaining sections of the chapter are devoted to later developments in the crystal chemistry of silicates, the use

of X-ray analysis in the study of chemical bonding, modular structures, ordering in liquid crystals, Langmuir–Blodgett films and stimulated phase transitions in ferroelectrics. There is a perfunctory listing of databases as of 1993 and a six-page 'update' on organic crystal chemistry.

The pattern of revision in this volume follows that adopted for the first. The bulk of the original material is left untouched and an extra chapter is added to 'complement' the original material. Whereas such an approach may be justified where the original material is well established and relatively unmodified by recent activity, it is much less satisfactory where that activity has changed or greatly modified our perspective. Thus, simply to add a few pages to supplement descriptions of views and models now more than two decades old, as has been done in Chapter 6 for several of the topics of Chapter 2, is to lose an opportunity at best, and to produce a quite misleading impression at worst. As an example, the supplementary material on liquid crystals, while a concise summary of some of the structural discoveries of the eighties, leaves in place the thoroughly outdated pictures of the nature of nematic and smectic phases used as illustrations in Chapter 2. A similar criticism may be made with respect to many of the illustrations of biological macromolecules in that same chapter. Plywood cross sections and glass contour maps, while of legitimate historical interest, scarcely qualify as 'modern' in the sense that the series title seeks to portray. The text remains one of the few generalized treatments of the structure of crystals. However, in the absence of a systematic integrated modernization of the work, it is difficult to recommend it over competing and more truly modern (and usually more specialized) treatments or, indeed, over the earlier edition that justifiably found a place in every scientific library.

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Structure correlation. Edited by J. D. DUNITZ and H. B. BÜRGI. Two Vols. Pp. xxvii + 888. Weinheim: Verlagsgesellschaft mbH, 1994. Price DM 398. ISBN 3-527-29042-7.

I remember the first time that I held the entire Cambridge Structural Database in the palm of my hand. The occasion was at a crystallographic meeting in the United States, some 25 years ago. Details of the 4500 or so structures then recorded in the database had been transferred to a thin stack of microfiche transparencies, the hypertext of the day. In some excitement, I drew the attention of a senior colleague to this small miracle. 'Look,' I said, 'every molecular structure known, here in this stack of celluloid!' Calmly, he regarded the transparencies. 'An impressive achievement;' he responded, 'what are you going to do with it?' The comment and question were fair then, and remain so today when we consider the mightily enlarged Cambridge files and their companion inorganic and protein databases, the last growing exponentially and soon to be supplemented with the results of NMR measurements. These volumes by Dunitz and Bürgi and their co-authors seek to describe the present state of the achievement and to provide contemporary answers to the question of how to interpret structural information. There is little that is new in the work, at least not to anyone who has followed the trail of plenary and invited lectures and presentations given by the editors and many of their collaborators at crystallographic, chemical and biological meetings over the last decade, but the books offer a timely review of the present status of this important and rapidly expanding branch of crystallography.

One of the strengths of the work is that it reminds us, as crystallographers, of the astonishing range of questions and, occasionally, answers that derive from diffraction measurements and the different ways of interpreting these measurements; and the book does not even begin to touch on materials! We tend to focus on our successes, not unnaturally, but the book also reminds us of the many unanswered problems that remain, some of which may be outside the power of our methodology to solve. The key to our sense of success, of course, is that the diffraction method remains, for the moment, the predominant method providing data on the three-dimensional structure of molecules, and a knowledge of the three-dimensional structure of molecules is, to the crystallographer at least, the beginning of all wisdom. If the power of the diffraction method occasionally blinds us to its limitations, there are chemists and spectroscopists all too ready to remind us of them. We have moved beyond the stage of obscurantist denial that the crystal structures (as opposed to conformations) of molecules need not be the same as those of the molecules in solution. The penicillin molecule does have a β-lactam ring; ribonuclease in the crystal state cleaves RNA. However, the structure of a molecule in the crystal remains just that – the time- and space-averaged structure attributable to that molecule in that particular crystalline environment. However, chemistry and biochemistry take place predominantly in solution. Reactions involve changes in molecular structure. How can diffractionists with their data banks of static models hope to compete with the spectroscopists probing the dynamics of solution chemistry and molecular reactivity? Surprisingly well, as this book makes clear. It is necessary, however, to separate the questions asked and answers provided in the different parts of the book. This is because structure and correlation have different meanings in the different parts of the work. The interpretation of fine detail, inseparable from the arguments presented in the parts of the work dealing with small molecules, is mostly impossible, and largely irrelevant, for the interpretation of macromolecular structure discussed in the later parts, although as the structures of the steroid receptor enzymes emerge, the symbolically blind authors of Chapter 14 will be able to gauge their success in trying to map active sites from the diet of small-molecule structures fed to the unseen elephants.

For small-molecule structures, it is the particular contribution of the editors to have demonstrated how, by examining all the available structural data for a particular chemical fragment, correlations between the various structural parameters