Chemical and Enzymatic Synthesis of Gene Fragments, A Laboratory Manual. Edited by H. G. GASSEN and A. LANG (1982). x, 260 pages with 69 figures and 15 tables, DM78/approximately $48.75. ISBN 3 527 26063 3.

In the last 3–4 years the techniques for oligonucleotide synthesis have undergone a revolutionary development in speed and simplicity fully comparable to the revolution in DNA sequencing of a few years earlier still. Projects for DNA synthesis which not long ago would have consumed many man-years of post-doctoral work – and earned a Nobel prize – can now be contemplated as routine operations in any molecular biology laboratory.

The most rapid synthetic technique (the 'phosphite' method) will generate a 12 to 14-base oligodeoxynucleotide in a day, and an expert can run 8 syntheses simultaneously. Using the slower but safer (in two senses) 'phosphotriester' method, a group at I.C.I. synthesized a 514-base-pair DNA coding for a human interferon with about 3 man-years of work. This synthesis was completed 2 years ago, and development of the techniques has continued.

In these circumstances many molecular biology laboratories without particular expertise in organic synthesis must be considering how to add oligonucleotide synthesis to their armouries of available techniques. No doubt these laboratories would welcome a good comprehensive recipe book and guide to the selection of methods. Unfortunately the present volume, despite its subtitle, cannot be wholeheartedly recommended for this purpose. The book contains useful material, but – particularly at the price – the reader has the right to expect a work which is more comprehensive, more critical, more tightly edited, and which contains less dross.

The first article in the book (by Gait and others) is a straightforward and essentially complete account of the manual, solid-phase phosphotriester method with explicit instructions for all steps in the preparation, purification and analysis of oligonucleotides, using base-protected nucleosides as starting materials. The next two articles are concerned with the preparation of these starting materials, and with a new phosphorylation procedure respectively. Both, but especially the latter, are in the nature of research reports rather than manuals of standard techniques.

The next three articles describe the solid-phase 'phosphite' method. From the three articles together, the reader can assemble a complete, if somewhat terse, set of recipes for this technique. However, the editors have abdicated from their responsibilities entirely by allowing extensive repetition between the articles. Essentially every procedure (except for the preparation of the silica gel support) is given twice and most three times. There are differences in detail, but no discussion of what significance, if any, these differences might have. A similar duplication occurs in the section called 'Enzymatic synthesis of RNA fragments of defined sequence' in which two out of the three contributions describe the use of kinase and ligase to join oligoribonucleotides.

Of the remaining articles, the two most useful are those outlining analytical methods in general and 'wandering spot' sequencing in particular. Most of the other contributions, despite titles which seem to make large claims ('Construction of recombinant plasmids using pre-purified DNA fragments', 'Preparative isolation of oligonucleotides from chemically degraded DNA'), actually consist of single illustrative experiments, or of rather generalized discussion. Some of the latter (for example, the article on automated oligonucleotide synthesis) is interesting and unlikely to be published in other forms.

The index has been very poorly prepared; it contains few entries, a high proportion of which ('master copy', 'reference DNA', 'support', 'semiconductor', 'variable length plunger') will never be referred to by any reader. No attempt seems to have been made to remove Germanicisms – such as 'palindrom', '$NaJO_4$' and 'controlled' (= checked) – from the text.

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