PREFACE (1993)

'I only took the regular course.'
'What was that?' inquired Alice.
'Reeling and writhing, of course, to begin with', the Mock Turtle replied;

Lewis Carroll, *Alice's Adventures in Wonderland*

The Mock Turtle's reply, 'reeling and writhing' on the one hand gives a flavour of some of the subject matter of this book and, on the other, describes a common reaction of students when faced with the concepts of DNA topology. Since the description of the DNA double helix in 1953, the importance of DNA and the basic features of its structure have been widely appreciated by both scientists and non-scientists alike. However, it has more recently become clear that there are many deformations of this model structure that have important biological consequences. Prominent amongst these are the 'topological' deformations: supercoiling, knotting, and catenation. Unfortunately, a full appreciation of these aspects of DNA structure requires the grasp of concepts that can prove difficult for both students and more advanced researchers. We have written this book with the aim of explaining these ideas simply to allow a wider appreciation of DNA topology. We begin with a basic account of DNA structure before going on to cover DNA supercoiling, the definitions of linking number, twist and writhe and the free energy associated with supercoiling. The rather more complex description of DNA lying on a curved surface and its application to the nucleosome is then considered, followed by the phenomena of knotting and catenation. The final chapters deal with the enzymes that alter DNA topology (DNA topoisomerases) and, most importantly, the biological significance of the topological aspects of DNA structure.

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