Preface

I first taught logic in 1976, at the behest of Gareth Evans and John Mackie, for University College, Oxford. The text then in use was E. J. Lemmon's *Beginning Logic*, and though I have subsequently used a variety of books, Lemmon's remains one of my two favorites. The other is Gustason and Ulrich's *Elementary Symbolic Logic*. The strength of Lemmon's book is its system of natural deduction, and the strength of Gustason and Ulrich's, the variety and interest of their material on the symbolization of English. But I have never been completely satisfied with any symbolic logic textbook, and so I have added my own to the groaning shelves.

The inspiration for *Modern Logic* is not dissatisfaction, however—I have lived with that quite comfortably for years—but rather the appearance of the logic program *MacLogic* from the Machine-Assisted Logic Teaching project at St Andrews University. I wrote *Modern Logic* because I wanted to teach from a text with the same system of natural deduction as *MacLogic;* hence the systems in this book are essentially those of that program. But I recognize that there are many students who will resist, or will not have access to the equipment for, computer-aided instruction. So this textbook is quite orthodox: it is self-contained and *MacLogic* is not required for using it. However, for those who may be interested in a description of how the program works, I have included a brief appendix.

Modern Logic was written with a specific audience in mind. It is intended in the first instance to provide an adequate grounding in logic for undergraduates pursuing courses of study with a substantial philosophy component—in the United States, philosophy majors, joint majors, minors, and students in interdisciplinary programs such as cognitive science, and in the United Kingdom and elsewhere, students in equivalent courses of study. So the book is definitely not a 'critical thinking' textbook. In the second instance, *Modern Logic* is intended for courses which a mathematics, computer science or linguistics department would be happy to give credit for at the beginning level in their undergraduate programs. At various points in the book I have indicated developments of the subject matter with specific mathematical, computer science or linguistics interest, but in the space available, of course, I have not been able to pursue such topics in any detail. In the third instance, the book is intended for courses which satisfy the mathematics or 'formal thought' requirement that

some universities have. Its intellectual content, I hope, is at least as substantial as that of a good introductory calculus or computer science course.

The book has four parts, the material in Part IV being of a more advanced nature. I think that Parts I–III could be exhaustively covered in one semester only by going at a rather fast pace with a class of rather good students, though I have tried to write so that a considerable amount of self-teaching is possible. Typically, in a one-semester course, I have been able to cover most of Parts I and II and some of Part III, choosing in the latter between the semantics and proofs involving identity. For those who have the constraint of a one quarter course, or the luxury of a two quarter sequence, I have separated out monadic predicate logic in Part II from full first-order logic with identity in Part III, so that a coherent first course can be given based on Parts I and II alone. However, in order to avoid cognitive overload on students, the whole story about the semantic treatment of individual constants, though strictly a part of monadic predicate logic, is postponed until Part III. Parts III and IV together make a substantial second course, and I have found that Part IV by itself, supplemented with some extra reading, makes a good supervised independent study.

By inspecting the table of contents, instructors will easily see how to tailor the book to their own requirements, by omitting sections on which later material does not depend. Chapters 1, 2, 3.1–3.4, 4.1–4.8, 5, 6.1–6.5, 7.1–7.3, and 8.1–8.4, constitute the core of the book. For those who are going on to Part IV, I recommend Chapter 4.10 of the earlier material. And Chapter 8.5 is a prerequisite for Chapter 10.

There are some conventions which I have tried to follow consistently throughout the text. After Chapter 1, most sections finish with a number of exercises, arranged in roughly ascending order of difficulty; solutions to starred problems can be found at the end of the book. References for further reading are given at various points, though these are usually to convenient sources rather than original ones. Cross-references to other parts of the book are in two styles, verbose and terse, and in both styles may be context-sensitive. 'Example 4 of §5 in Chapter 3' is a verbose cross-reference, while its terse counterpart would be 'Example 3.5.4' (in terse style, the numbers are given in order of largest domain, chapter, to smallest, object-token identifier). But if these cross-references occurred in Chapter 3, they would be abbreviated to 'Example 4 of §5' and 'Example 5.4' respectively.

For those who are interested in such matters, camera-ready copy for *Modern Logic* was produced by the author on a Macintosh Quadra 700 and output to a LaserJet 4M. The text was composed in Nisus and transferred into FrameMaker for page layout; some graphical elements were created in CA-Cricket Draw III, and Chapter 11's giraffes are based on a ClickArt Studio Series image. The display font for the chapter numbers is Vag Rounded Bold and the text fonts are from the various Lucida families.[1] I am grateful to Louis Vosloo of

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Y&Y Software for technical assistance with fonts and to the staff of Oxford University Press for advice on page layout.

Probably the hardest part of writing a logic textbook is coming up with a sufficiently large and sufficiently varied set of exercises. There are over 900 problems in *Modern Logic*, some of them borrowed. I thank Simon and Schuster for permission to reprint the problems for Chapter 3.1 from *What is the Name of This Book?* by Raymond Smullyan. I have used about twenty problems from old Oxford exams; the bulk of these are in the symbolization exercises of Chapter 2.4 and in the symbolization and proof exercises of Chapter 8.3–4. I have also used problems from old tests of my own and I suspect that some of these may have been taken from other sources whose identity I do not recall. If so, I apologize in advance to their originators for failing to credit them.

I thank my beta-testers, Robert Berman, Anne Hunt, Norton Nelkin, Michael Ochoa, and Tracy Tucker, who taught from drafts of the book; David Boerwinkle for his proofreading help; and David Bostock, Kit Fine, Steve Kuhn, Xiaoping Wang and Timothy Williamson for suggesting a number of improvements. For reading the whole manuscript carefully, catching many errors, and making many invaluable suggestions, I am particularly indebted to Roy Dyckhoff, Stephen Read and two sets of readers for Oxford University Press, one of whom did it *twice!*

I thank the San Francisco Museum of Modern Art for permission to reproduce Giorgio de Chirico's 'The Inconsistencies of the Thinker' on the cover of the paperback edition of *Modern Logic*. Full details are on the copyright page.

Finally, I thank my wife, Marilyn Brown, for a number of ideas, one of which, that the book be called *Postmodern Logic*, I rejected with some regret.

New Orleans   G. F.
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