Preface

We live in a time when many cultural forces and academic trends are unfavorable to the study of logic. Accordingly, my goal in writing this book has been to provide a text that removes as many obstacles to the learning of logic as possible. These obstacles include a dull or wordy style of writing, a shortage of interesting exercises, and an imbalance of content.

It is difficult to overemphasize the importance of writing style in a logic textbook. While logic is undeniably technical at many points, *The Power of Logic* is written with the conviction that a cut-to-the-chase style is a great asset. I can only hope that I have remained loyal to that conviction.

The Power of Logic is written with the conviction that the tools of logic are indeed powerful, and that the study of logic is one of the best ways to increase students' skills in critical thinking. Rather than requiring the student to acquire powerful logical tools *only to apply them to relatively uninteresting arguments,* I hope that this book illustrates, chapter by chapter, that the tools of logic can be put to work in analyzing and evaluating significant arguments on important subjects.

The Power of Logic is written with the belief that the best introductory courses in logic include a combination of traditional logic and modern symbolic logic. Too much emphasis on the former leaves students unacquainted with the most powerful tools logic has to offer. Too much emphasis on the latter tends to produce students who can manipulate symbols but cannot apply logic to English arguments.

Finally, *The Power of Logic* is written with the conviction that students need more logic, not less. Accordingly, I have included enough material for a two-course sequence. This may be optimistic, but it is also realistic in this sense: It takes a lot of practice to become proficient in logic. Also, the further one goes in the study of logic, the more interesting the applications become. Thus, I have included chapters and sections in some of the relatively advanced areas of logic. I believe, and hope I've shown, that these areas can be made more accessible and interesting than is commonly supposed.

The study of logic increases one's ability to understand, analyze, evaluate, and construct arguments. For this reason, logic makes a vital contribution to the curriculum of the modern university. Accordingly, if this book does something to make logic a bit easier both to learn and to teach, it will have achieved its purpose.

Because it isn't always easy to keep students interested in logic, better ways to teach logic are, I assume, welcome. Consider the following pedagogical features of *The Power of Logic:*

- Each chapter includes numerous exercises designed to show the power of logic as a tool for (a) formulating issues in a revealing way and (b) evaluating significant arguments on interesting topics. Skim the exercises and I believe you will find a high percentage of *interesting* arguments to analyze and evaluate in every chapter, including the chapters on relatively technical topics.

- The writing is concise and lively throughout the text. You'll be the judge of this, of course! But if *The Power of Logic* is more readable than most texts that cover similar topics, then it has at least one very significant pedagogical advantage.

- A relatively simple set of definitions is provided for basic terms such as: *valid, invalid, strong, weak, deductively sound* and *inductively sound.* (For details, see Chapter 1.)

- The material on recognizing arguments is delayed until Chapter 3, after students have already seen a large number of examples of very simple arguments, examined the concept of argument form, and learned some basic forms of statement logic. This provides the students with helpful background information as they attempt to identify arguments, premises, and conclusions.

- Prior to the study of argument diagrams, students learn these argument forms: *modus ponens, modus tollens,* hypothetical syllogism, disjunctive syllogism, and constructive dilemma. This helps the student understand argument diagramming because it provides a better understanding of how premises combine as logical units.

- Exercises on argument diagramming are included in three chapters. This provides an opportunity to integrate the material on argument diagramming with the material on definitions and informal fallacies.

- Categorical syllogisms are treated prior to informal fallacies. This gives the students a better grasp of what a well-constructed argument looks like *before* they begin to learn how to identify the fallacies.

- Venn diagrams are introduced prior to the discussion of the Aristotelian approach to categorical syllogisms. The modern understanding of categorical statements is also introduced before the Aristotelian. Although the coverage of Aristotelian logic is detailed, the text is designed so that the Aristotelian material is optional—later chapters do not depend on it.

- The informal fallacies are organized into four groups that are relatively easy to explain: Fallacies Involving Irrelevant Premises; Fallacies Involving Insufficient Evidence; Fallacies Involving Ambiguity; and Fallacies Involving Unwarranted Premises.

■ Frequent summaries of key definitions and main points are placed in boxes throughout the text. These boxes help students stay on track.

■ The chapter on truth tables includes a discussion of the material conditional and its relation to the English if-then, emphasizes abbreviated truth tables, and provides numerous English-argument exercises.

■ The system of natural deduction for statement logic is entirely standard: eighteen Inference Rules (introduced in three distinct sections), Conditional Proof, and *Reductio ad Absurdum.*

■ In the chapter on predicate logic, the finite universe method of demonstrating invalidity is introduced *before* the inference rules. This provides students early on with a means of understanding the subtle differences in meaning that result from shifts in the placement of parentheses and quantifiers.

■ The chapter on induction includes standard material on statistical syllogisms, induction by enumeration, arguments from authority, Mill's methods, scientific reasoning, and arguments from analogy.

■ The exercises on arguments from analogy require the student to evaluate a *stated criticism* of each argument, which makes the exercises relatively easy to grade. The treatment of arguments from analogy includes a novel section on the use of *metaphors* in arguments from analogy.

■ The chapter on probability keeps the focus on argument evaluation. The exercises on Bayes' Theorem involve a wide variety of applications, including applications to philosophical issues.

■ The chapter on modal logic provides a system of natural deduction for modal propositional logic. The inference rules are introduced in three distinct sections to make the system easy to learn.

Various paths through this book are possible, depending on the time available, the needs of the students, and the interests of the instructor. In an ideal two-course sequence, most of the book can be covered. In the case of a quarter-long course, three main paths through the book are possible, though variations on each will readily come to mind:

I. A course emphasizing traditional logic, covering Chapters 1 through 6 and 10: Basic Concepts, Argument Forms, Identifying Arguments, Logic and Language, Categorical Syllogisms, Informal Fallacies, and Induction.

II. A course giving equal emphasis to traditional and symbolic logic, covering, say, Chapters 1, 2, 3, 5, 7, and 8: Basic Concepts, Argument Forms, Identifying Arguments, Categorical Syllogisms, Statement Logic (Truth Tables), and Statement Logic (Proofs).

III. A course emphasizing modern symbolic logic, covering Chapters 1, 2, and 7 through 9: Basic Concepts, Argument Forms, Statement Logic (Truth Tables), Statement Logic (Proofs), and Predicate Logic.

If you are on semesters, you can add a chapter or two to each scenario.

This text is not designed for self-mastery. It is for courses taught by instructors. Thus, I have not tried to answer every question that might come to a student's mind as he or she works on assignments. The dangers of a highly detailed approach are that students will miss the forest for the trees and/or that students feel that coming to class is unnecessary. I have tried to write a text that explains the crucial points but avoids excessive detail. I shall have achieved my purpose if instructors find that the text makes it a little easier to keep students interested and willing to take on the "next topic."

A comprehensive ancillary package has been developed to accompany *The Power of Logic:*

- An **Interactive Tutorial** can be accessed free of charge at *www.mayfieldpub.com/logic.* This Internet-based study guide provides students with numerous ways to test their understanding of logic. Features of the study guide include randomized quizzes on the text's chapters; a proof-checker that allows students to independently check their work and receive feedback; and exercises in constructing truth tables, abbreviated truth tables, Venn diagrams, and argument diagrams.

- A **Printed Study Guide** gives students the opportunity to review the text material and to work through exercises in addition to those in the text. The study guide provides chapter summaries, discussions of key concepts, supplementary exercises with answers, and additional discussion of selected answers for exercises in the text.

- The **Instructor's Manual** includes includes an answer key for every exercise in the text, chapter tests, and a final exam.

- The **Computerized Test Bank** contains the chapter and final exams from the Instructor's Manual (available in Windows and Macintosh formats). The questions can be edited and new questions can be added.

For more information on any of these ancillary materials, please contact your local Mayfield sales representative or the Marketing and Sales Department at (800) 433-1279. You can also e-mail us at *calpoppy@mayfield pub.com.*

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