

*Introduction to*  
**LOGIC**

EIGHTH EDITION

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*Irving M. Copi*  
*Carl Cohen*

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**LOGIC**

E I G H T H   E D I T I O N

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*This book is dedicated to the memory of our mothers and fathers*

## HOW THE ART OF REASONING IS NECESSARY

When one of his audience said, "Convince me that logic is useful," he said,

"Would you have me demonstrate it?"

"Yes."

"Well, then, must I not use a demonstrative argument?"

And, when the other agreed, he said, "How then shall you know if I impose upon you?" And when the man had no answer, he said, "You see how you yourself admit that logic is necessary, if without it you are not even able to learn this much—whether it is necessary or not."

—DISCOURSES OF EPICTETUS

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# PREFACE

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*In a republican nation, whose citizens are to be led by reason and persuasion and not by force, the art of reasoning becomes of the first importance.*

—THOMAS JEFFERSON

*Civilized life depends upon the success of reason in social intercourse, the prevalence of logic over violence in interpersonal conflict.*

—JULIANA GERAN PILON

There are obvious benefits to be gained from the study of logic: heightened ability to express ideas clearly and concisely, increased skill in defining one's terms, and enlarged capacity to formulate arguments rigorously and to analyze them critically. But perhaps the greatest benefit is the recognition that reason can be applied in every aspect of human affairs.

Democratic institutions require that citizens think for themselves, discuss problems freely with one another, and decide issues on the basis of deliberation and the weighing of evidence. Through the study of logic we can acquire not only practice in reasoning, but also respect for reason, and thus reinforce and secure the values we prize.

To help achieve these goals, a textbook of logic should contain an ample selection of illustrations and exercises that are of political, scientific, and philosophical interest. These should have been presented by serious writers in honest efforts to solve real problems. Ideally, they should include fallacies as well as paradigms of demonstration. This eighth edition of *Introduction to Logic* contains a substantial number of new examples of these sorts.

An introductory logic course is often the only philosophy course taken by college and university students. It is therefore desirable to include some philosophical issues and arguments in the logic course, if not to interest students in additional philosophy courses, at least to interest them in further thinking and reading in philosophy.

The rate of expansion of human knowledge, especially scientific information, has been accelerating so rapidly in recent years that there is an increasing danger that by the time many students graduate, much of the substantive material learned in their classes may already be out of date. It is only partly in jest that some research laboratories post a sign on their walls reading, "If it works, it's obsolete." There is also an increasing tendency for people to change careers at least once during their lifetimes. So the most valuable thing a student can learn in college is how to think: how to study, to learn, to acquire and process new information. Ideally, every course taken should contribute to this end. In fact, many do not. But it is squarely within the province of logic to focus on this supremely important task. The study of

logic can make a permanent and satisfying contribution to the intellectual life of every student. We have tried to make this new edition a more effective instrument for the achievement of this goal.

Some of the changes that have been made are these:

In Part One, thanks to some excellent advice from users of this book, we have moved the material on Deduction and Induction, and on Truth and Validity, from the status of Appendixes back into Chapter One. It is still true that not much use is made of this material until later in the book. But in the overview of Logic presented in Chapter One, these distinctions are essential. In Chapter Three the discussion of Fallacies has been reorganized: related Fallacies are discussed together; some subtleties are explained more fully; and all the chapter's exercises are taken from actual writings. Chapter Four has been reorganized extensively to eliminate the appearance of repetition in classifying definitions in diverse ways.

In Part Two, Chapter Eight has been revised extensively to highlight new ideas and to slow down the rate at which the student is exposed to them. The Logic of Relations, which made its first appearance in the Seventh Edition as Chapter Eleven, has been deleted. It apparently went more deeply into symbolic logic than users of the text for an introductory course in logic were interested in going.

In Part Three, Chapter Fourteen has been modified in various ways, the most obvious one being the enhancement of the treatment of expected value and the replacement of the discussion of gambling at chuck-a-luck by discussions of gambling at roulette and in lotteries. A new Chapter Fifteen, Logic and the Law, has been added, in which the concepts and principles introduced throughout the book are shown to apply to the uses of language and argument in legal settings and to the resolution of legal disputes.

Since the appearance of the previous edition, many readers, both teachers and students, have suggested changes in the book. In many cases these recommendations have been gratefully accepted. Among those whose communications were particularly helpful are Dr. Dennis L. Allison of Austin Community College at Rio Grande Campus in Texas; Professor Kent Baldner, Eastern Illinois University; Mr. Denny Barrett of Youngstown State University in Ohio; Professor Robert W. Beard of Florida State University; Ms. Amelia Bischoff of the University of Michigan's Residential College in Ann Arbor; Professor Frans van der Bogert of Appalachian State University in North Carolina; Professor Charles D. Brown of Auburn University in Alabama; Professor Ludlow Brown of Mercyhurst College, Pennsylvania; Professor D. E. Bushnell of Tulane University, New Orleans; Professor Claro R. Ceniza of De La Salle University in Manila, the Philippines; Professor John W. Copeland of Drew University, New Jersey; Professor William Cox of Macomb Community College, Michigan; Professor Theodore Drange of West Virginia University—Morgantown; Professor Daniel Flage of the University of Texas at Austin; Professor Richard H. Gatchel of Crafton Hills College, Yucaipa, California; Professor Louis R. Geiselman of Hibbing Community College, Minnesota; Professor Eugenio Carpuccio Gonzalez of Caracas, Venezuela;

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Earlier versions of the new Chapter 15, *Logic and the Law*, were read by Professors Robert Harris and Jerold Lax of the University of Michigan, and Professor Kenneth Kipnis of the University of Hawaii; their many helpful suggestions for its improvement were much appreciated.

Warm thanks are due to Helen McInnis, Executive Editor of Macmillan's College Division, for her expert editorial advice and unfailing helpfulness in preparing this new edition. We express our gratitude to Elaine W. Wetterau, Senior Production Supervisor, for her needed expertise and generous assistance in seeing this difficult volume through the press.

Most of all we thank our wives for help and encouragement in preparing this new edition.

I. M. C.  
C. C.



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PART ONE

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*Language*



# Introduction

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*. . . this we do affirm—that if truth is to be sought in every division of Philosophy, we must, before all else, possess trustworthy principles and methods for the discernment of truth. Now the Logical branch is that which includes the theory of criteria and of proofs; so it is with this that we ought to make our beginnings.*

—SEXTUS EMPIRICUS

*. . . bad reasoning as well as good reasoning is possible; and this fact is the foundation of the practical side of logic.*

—CHARLES SANDERS PEIRCE

## 1.1 What Is Logic?

Logic is the study of the methods and principles used to distinguish good (correct) from bad (incorrect) reasoning. This definition must not be taken to imply that only the student of logic can reason well or correctly. To say so would be as mistaken as to say that to run well requires studying the physics and physiology involved in that activity. Some excellent athletes are quite ignorant of the complex processes that go on inside their bodies when they perform. And, needless to say, the somewhat elderly professors who know most about such things would perform very poorly were they to risk their dignity on the athletic field. Even given the same basic muscular and nervous apparatus, the person who has such knowledge might not surpass the “natural athlete.”

But given the same native intelligence, a person who has studied logic is more likely to reason correctly than one who has never thought about the general principles involved in that activity. There are several reasons for this. First, the proper study of logic will approach it as an art as well as a science, and the student will do exercises in all parts of the theory being learned. Here, as anywhere else, practice will help to make perfect. Second, a traditional part of the study of logic has been the examination and analysis of fallacies, which are common and often quite “natural” mistakes in reasoning. This part of the subject gives increased insight into the principles of reasoning

in general, and an acquaintance with these pitfalls helps to keep us from stumbling into them. Finally, the study of logic will give students techniques and methods for testing the correctness of many different kinds of reasoning, including their own; and when errors are easily detected, they are less likely to be allowed to stand.

The appeal to emotion is sometimes effective. But the appeal to reason is more effective in the long run, and can be tested and appraised by criteria that define correct argument. If these criteria are not known, then they cannot be employed. The study of logic aims to discover and make available those criteria that can be used to test arguments for correctness.

Logic has frequently been defined as the science of the laws of thought. But this definition, although it gives a clue to the nature of logic, is not accurate. In the first place, thinking is studied by psychologists. Logic cannot be "the" science of the laws of thought, because psychology is also a science that deals with laws of thought (among other things). And logic is not a branch of psychology; it is a separate and distinct field of study.

In the second place, if "thought" refers to *any* process that occurs in people's minds, not all thought is an object of study for the logician. All reasoning is thinking, but not all thinking is reasoning. Thus one may "think" of a number between one and ten, as in a parlor game, without doing any "reasoning" about it. There are many mental processes or kinds of thought that are different from reasoning. One may remember something, or imagine it, or regret it, without doing any reasoning about it. Or one may let one's thoughts "drift along" in a daydream or reverie, following what psychologists call free association, in which one image is replaced by another in an order that is not logical. The sequence of thoughts in such free association is often quite significant, and some psychiatric techniques make use of it. The insight into people's characters gained by penetrating the flow of their streams of consciousness is the basis of a very effective literary technique pioneered by James Joyce in his novel *Ulysses*. Conversely, if a person's character is sufficiently well known beforehand, the flow of that person's stream of consciousness can be traced or even anticipated. Sherlock Holmes, we recall, used to break in on his friend Watson's silences, to answer the very question to which Dr. Watson had been "led" in his musings. There seem to be some laws governing reverie, but they are not studied by logicians. The laws that describe the movements of the mind in reverie are psychological, not logical principles. To define "logic" as the science of the laws of thought is to make it include too much.

Logic is sometimes defined as the science of reasoning. This definition is much better, but it also will not do. Reasoning is a special kind of thinking in which problems are solved, in which inference takes place, that is, in which conclusions are drawn from premisses. It is still a kind of thinking, however, and therefore still part of the psychologist's subject matter. As psychologists examine the reasoning process, they find it to be extremely complex, highly emotional, consisting of awkward trial-and-error procedures illuminated by



sudden—and sometimes apparently irrelevant—flashes of insight. These are all of importance to psychology.

The logician, however, is concerned primarily with the correctness of the completed process of reasoning. The logician asks: Does the problem get solved? Does the conclusion reached follow from the premisses used or assumed? Do the premisses provide good reasons for accepting the conclusion? If the problem gets solved, if the premisses provide adequate grounds for affirming the conclusion, if asserting the premisses to be true warrants asserting the conclusion to be true also, then the reasoning is correct. Otherwise, it is incorrect.

The distinction between correct and incorrect reasoning is the central problem with which logic deals. The logician's methods and techniques have been developed primarily for the purpose of making this distinction clear. All reasoning (regardless of its subject matter) is of interest to the logician—but with this special concern for its correctness as the logical focus.

## 1.2 *Premises and Conclusions*

To clarify the explanation of logic offered in the preceding section, it will help to set forth and discuss some of the special terms used by logicians in their work. *Inference* is a process by which one proposition is arrived at and affirmed on the basis of one or more other propositions accepted as the starting point of the process. To determine whether an inference is correct, the logician examines those propositions that are the initial and end points of that process and the relationships between them. *Propositions* are either true or false, and in this they differ from questions, commands, and exclamations. Only propositions can be either asserted or denied: questions may be asked and commands given and exclamations uttered, but none of them can be affirmed or denied, or judged to be either true or false.

It is customary to distinguish between *sentences* and the propositions they may be uttered to assert. Two sentences, which are clearly two because they consist of different words differently arranged, may in the same context have the same meaning and be uttered to assert the same proposition. For example,

John loves Mary.  
Mary is loved by John.

are two different sentences, for the first contains three words, whereas the second contains five; the first begins with the word "John," whereas the second begins with the word "Mary," and so on. Yet the two sentences have exactly the same meaning. We use the term "proposition" to refer to what such sentences as these are typically uttered to assert.

The difference between sentences and propositions is brought out by remarking that a sentence is always a sentence of a particular language, the