

LOGIC

An Introduction

LIONEL RUBY

Professor of Philosophy

Roosevelt College

J. B. LIPPINCOTT COMPANY

Chicago · Philadelphia · New York

Part Two

Deductive Logic

Preface

In that delightful 17th-century comedy, *The Bourgeois Gentleman*, Moliere describes Monsieur Jourdain's quest for an education. Jourdain, an unlettered nouveau riche, has employed several tutors to impart culture to him. In the first lesson, the instructor in philosophy endeavors to teach him the difference between prose and verse. Prose, the instructor informs him, is what one normally speaks. Astonished and delighted, our simple friend hurries off to tell his wife that he has had the distinction of speaking prose all his life without being aware of his own powers. In a similar fashion, the average person would probably also be amazed, if not delighted, to learn that he has been reasoning in syllogisms all his life, without being aware of his logical powers.

There are several types of mental activity that are classified under the general head of "thinking," such as daydreaming or reverie, remembering, reaching decisions, and so on, but the science called "logic" is concerned with the type of thinking known as "inference." Inference is a mental activity in which we say, "This is so because that is so," or "This is so; therefore, that is so." Inference, in other words, is present whenever we assert that a given statement is true because another is. Whenever we furnish evidence for our beliefs, whenever we answer the challenging question "Why?" with a "Because" and state our reasons or evidence for believing as we do, we engage in the "logical type" of thinking. We have been logicians all our lives without knowing it.

But though all of us, like M. Jourdain, speak in prose, we may do so well or badly. Similarly, though all of us draw inferences, our evidence may or may not be sufficient to justify our conclusions. It is perhaps unnecessary to call the reader's atten-

tion to the fact that he is well acquainted with persons who reason unsoundly. The distinction between sound and unsound inference is a familiar one. And it is this distinction which is the central theme of logic defined as the science of valid inference. Logic is the study of the principles that determine whether inferences are justified or unjustified. This does not mean that the logician is in possession of a secret lore, or that he has a vested interest in certain special principles called "logical," but only that he seeks to clarify what all of us are doing whenever we engage in reasoning.

Some popular criticisms, confusions, and misunderstandings of logic and the use of logical principles call for comment. We find an attitude of hostility toward logic in the following statement by the Chinese writer, Lin Yutang:

Humanized thinking is just reasonable thinking. The logical man is always self-righteous and therefore inhuman and therefore wrong, while the reasonable man suspects that perhaps he is wrong and is therefore always right. (*The Importance of Living*, The John Day Co., 1937.)

Mr. Lin objects to self-righteous individuals who regard themselves as infallible. This is truly an undesirable characteristic and logicians will join with Mr. Lin in deploring this attitude. Few persons, perhaps, are so vividly aware as logicians of the difficulties in attempting to demonstrate that any factual proposition is true. And it is to be hoped that the logical individual will, above other men, never forget that perhaps *he* is wrong and the *other man* right. The reader may also be assured at this point that logicians are only human.

"A misunderstanding which we shall call the "fear of logic" is based upon the assumption that logic tends to falsify experience in some mysterious manner. This "logophobia" is expressed in the following remarks from a speech delivered in the House of Commons by Austen Chamberlain, British Foreign Minister in the years following World War I:

I profoundly distrust logic when applied to politics, and all English history justifies me. [Ministerial cheers] . . . Instinct and experience alike teach us that human nature is not logical,

dence. And it is indeed hard to be consistent in applying the same standards to others as to ourselves, as is illustrated by the amusing "inflections" of the adverb "firm," in "I am firm; you are stubborn; he is a pigheaded fool." An English newspaper that asked its readers for other examples of this sort of thing received the following among many others:

"I am righteously indignant; you are annoyed; he is making a fuss about nothing."

"I am sparkling; you are unusually talkative; he is drunk."

"I am beautiful; you have quite good-looking features; she isn't bad-looking, if you like that type."

Modern psychology emphasizes the role of emotion in human behavior. Studies in the psychology of crowds and in mass behavior reveal the ineffectiveness of the appeal to reason in many situations. The studies in "psychodynamics," which use the methods of psychoanalysis in explaining individual and cultural phenomena, reveal the influence of the so-called "unconscious" factors in human behavior. From these and like studies there emerges a picture of the human mind as a kind of dark Dostoevskian cavern in whose labyrinthine gloom strange and irrational visions brood. We shall acknowledge our debt to the psychologists and social scientists who have revealed the hitherto unsuspected irrationalities in man's nature. Nevertheless, Aristotle was right in saying that man is *capable* of rationality, and insofar as we seek rational consistency in our thoughts, or verifiable knowledge (in the science of psychodynamics as well as in other fields) logic is relevant.

It is perhaps unnecessary to add that logic is not the whole of life. Not only are we sometimes illogical, but large areas of experience are also *non-logical* or *non-rational*. An experience of joy or sorrow is neither logical nor illogical; it is simply an experience. There are areas in which logical analysis may be inappropriate, as in writing lyrical love verses. And certainly logic does not supply the dynamic energies necessary for action. But to the extent that we are interested in acquiring verifiable knowledge, we must concern ourselves with the criteria of proof and the adequacy of evidence, and it is here that logical principles are appropriate.

A word now as to the general plan and contents of this book. There are three parts, each of which discusses an indispensable aspect of the enterprise of rational thinking. The careful thinker will be interested in language, the instrument of thinking; in the soundness of his arguments; and in the truth of his assertions. Part One is concerned with linguistic and semantical problems; in Part Two we shall discuss the principles of valid inference or sound reasoning; and in Part Three we shall examine the methods employed by the sciences of nature and society, seeking to determine the methods whereby these disciplines attempt to furnish us with logically justifiable beliefs. In the classroom approximately 20 per cent of the time might be devoted to Part One, about 50 per cent to Part Two, and 30 per cent to the last part.

In the narrow sense of the term "logic" (defined as the study of valid inference), only Part Two is concerned with logic. But logic is interpreted more broadly throughout, as the study of valid inference and its applications in the search for truth. To this end we shall study the nature of language as a preliminary to the study of validity, since we must understand exactly what is being said before we can analyze reasoning, and in Part Three we shall study the problem of applying the rules of inference to the subject matter of the sciences. This third part, which discusses scientific methods, is concerned with the field usually called "inductive logic."

Our discussion of valid inference, or deductive logic, is largely based upon the so-called "classical tradition" in logic that began with Aristotle. Though this logic was developed in the Middle Ages, it remained largely unmodified until the 19th century. The prestige of the classical logic was once so great that it was believed that it represented the science of logic in its final form. Modern logic has shown that the older logic was incomplete in that it does not cover all of the logical forms that can be investigated by a more generalized "symbolic" logic. The newer logic has also shown that the whole of logic may be systematized as a rigorous formal science in "mathematical" form. The logical tradition remains unbroken, however, since the older logic has been incorporated into the new. We shall note some of the newer developments insofar as they

extend, and require clarification of, the classical doctrine. Our emphasis, however, will be on logic as a part of general education, and on the use of logical principles in the clarification and analysis of everyday discourse.

The author wishes to thank many friends, including colleagues and former students, for their helpful comments and criticisms. In particular he is greatly indebted to Professors A. C. Benjamin of the University of Missouri, Millard S. Everett and Wayne A. R. Leys of Roosevelt College, Douglas N. Morgan of Northwestern University, and Warner A. Wick of the University of Chicago for their very valuable suggestions and criticisms. Special thanks are due also to Mrs. Louise Landes for stylistic criticisms, to Mrs. Elizabeth Bianchi for several useful suggestions, and to Miss Virginia Briska for typing the stencils in the experimental edition. The author's indebtedness to other writers is too great to be detailed, but mention should at least be made of the works by Cohen and Nagel, Frye and Levi, and Castell.

Specific acknowledgment is made in the text to the works from which quotations are drawn. The following authors and publishers gave their kind permission to quote excerpts from their publications: Appleton-Century-Crofts, Inc.; *The Chicago Daily News*; *The Chicago Sun-Times*; *The Chicago Tribune*; The Clarendon Press; Coward-McCann, Inc.; Felix Frankfurter; Ginn and Company; Harcourt, Brace and Company, Inc.; Harper and Brothers; Harper's Magazine; Henry Holt and Company, Inc.; Houghton Mifflin Company; Alfred Korzybski and the Non-Aristotelian Library Publishing Co.; Little, Brown and Company; Liveright Publishing Corporation; The Macmillan Company; *New Republic*; Prentice-Hall, Inc.; G. P. Putnam's Sons; American Association for the Advancement of Science, Charles Scribner's Sons; Simon and Schuster, Inc.; Time, Inc.; Whittlesey House; and the Yale University Press.

LIONEL RUBY

Preface to the Second Edition

This revision was undertaken with three main purposes in mind: to make the exposition clearer and thus to make the book more efficient as a teaching instrument, to replace illustrations that had become "dated" or which were of doubtful pedagogical value with new examples of more enduring interest, and to add a discussion of some of the techniques of symbolic logic. The discussion of symbolic logic will be found in Chapter 13. An appendix explaining the use of the Venn diagrams for testing syllogisms has also been added.

With some few exceptions this is a revision rather than a re-writing of the original book. Though there is scarcely a page on which there has not been some alteration; though sentences, paragraphs, and in some cases entire pages have been re-written; though the order of the sections or exercises has occasionally been revised, nevertheless the only extensive re-writing occurred in the final chapter. I have tried to point up the logical elements in discussions of values and to soften the somewhat polemical tone of the first writing. Other important changes: the former Chapter 13, on Dilemmas, is now the final section in Chapter 12, and much of the discussion and exercise material on Complex Propositions in the old edition is now incorporated into the new chapter on Symbolic Logic.

Among less important changes I may note the elimination of truth-functional symbols in the discussion of Compound Propositions in Chapter 12. These symbols are used for the first time in Chapter 13. I have also substituted the expression "negated conjunction" for "disjunction." Since many writers use the latter term for what I call "alternation," this change will eliminate some of the confusion of students when they read

other texts in logic. I still prefer the name "alternation" for alternations!

I wish to thank Professors Douglas N. Morgan and Warner A. Wick for their generous help in contributing criticisms and suggestions for the improvement of the original draft of Chapter 13. I also wish to thank my wife for catching many obscurities in exposition.

LIONEL RUBY

CONTENTS

<i>Preface</i>	vii
PART I LANGUAGE AND LOGIC	
1 <i>Disputes: Verbal and Otherwise</i>	3
A few examples · The analysis of disputes	
2 <i>The Meaning of "Meaning"</i>	16
Semantics and logic · Signs and symbols · Communication · The arbitrariness of meanings · Etymologies · Growth and change in language · Some errors of symbolism	
3 <i>Ambiguity</i>	45
The meaning of ambiguity · The analysis of ambiguity · The types of ambiguity · The fallacies of ambiguity	
4 <i>The Uses of Language</i>	66
Neutral, emotive, and directive words · The three purposes of discourse · Appropriate and inappropriate language · The logical and non-logical uses of language	
5 <i>The Definition of "Definition"</i>	88
The importance of definition · Two basic distinctions · The types of definitions · The criteria of an adequate analytical definition · Plato and the rules of definition · Truth and falsity in definitions · The construction of definitions	

PART 2 DEDUCTIVE LOGIC

- | | | |
|----|---|-----|
| 6 | <i>Logic and Argument</i> | 127 |
| | Argument and assertion · The law of rationality and evasions thereof | |
| 7 | <i>Syllogisms, Propositions, and Terms</i> . . | 154 |
| | Introduction to the syllogism · The categorical proposition and its parts · The class-analysis of subject-predicate propositions · Affirmative and negative propositions · Universal and particular propositions · The four types of categorical propositions · The distribution of terms | |
| 8 | <i>The Analysis of Categorical Syllogisms</i> . | 176 |
| | The definition of the syllogism · Basic words in the analysis of categorical syllogisms · Preliminary analysis of categorical syllogisms · The rules of the categorical syllogism · The diagramming of syllogisms · The corollaries, figures, and moods · A note on deductive systems | |
| 9 | <i>Semantics and the Syllogism</i> | 205 |
| | The need for semantical analysis · Sentences in irregular forms · Equivalent propositions | |
| 10 | <i>The Syllogism and Everyday Discourse</i> . | 226 |
| | Syllogisms and ordinary discourse · A syllogism has three and only three terms · The analysis of syllogisms in everyday discourse · The enthymeme · The sorites · The relations between terms generalized | |
| 11 | <i>The Relations Among Propositions</i> . . . | 245 |
| | Relations with respect to truth and falsity · The seven relations · The square of opposition · The existential import of categorical propositions · The traditional "laws of thought" | |

- 12 *Compound Propositions and Syllogisms* 272
 Compound propositions · Hypothetical propositions and syllogisms · Special aspects of hypothetical propositions and syllogisms · Alternative propositions and syllogisms · The conjunctive proposition and the negated conjunct · The dilemma

- 13 *Symbolic Logic* 300
 What is symbolic logic? · Truth-functions and truth-tables · The meaning of "⊃" · Ordinary implication and material implication · The interdefinability of truth functions · Complex propositions and bracketing · Truth tables and argumentation · Complex arguments

**PART 3 THE LOGIC OF TRUTH:
 SCIENTIFIC METHODOLOGY**

- 14 *Truth and Probability* 327
 Deduction and induction · Validity and truth · The meaning of truth · The meaning of empirical probability · Probability and the syllogism · A priori probability · The calculus of mathematical probabilities

- 15 *Hypotheses and Scientific Method* 358
 Concerning the proof of a proposition · Problems, facts, and hypotheses · The logical analysis of an example of scientific thinking · Some general considerations concerning hypotheses and negative experiments · Supplementary comments on the eight steps · The problem of verification in history and the law courts

- 16 *Cause and Effect: the "Experimental Methods"* 397
 The significance of causal analysis · The definition of "cause" and "condition" · The discovery and

	testing of hypotheses of causal connection · The "experimental methods" · Causality in the social sciences · The fallacies of causal analysis	
17	<i>The Nature of Inductive Reasoning</i>	433
	The meaning of generalizations · The truth or probability of generalizations · The justification of inductions · Analogy and scientific method · Anal- ogy and argumentation · Miscellaneous fallacies	
18	<i>Statistics</i>	459
	The need for statistics · Statistical descriptions · Statistical averages · Measures of dispersion · Cor- relations · Statistical inductions and sampling pro- cedures · Fallacies in the use of statistics	
19	<i>Logic and Evaluations</i>	489
	"Statements of fact" and evaluations · Values as ex- pressions of preferences or attitudes · Standards of value—ends and means · Are morals "relative"? · Conclusion	
	<i>Appendix</i>	509
	THE VENN DIAGRAMS: The Venn diagrams for categor- ical propositions · The Venn diagrams for syllo- gisms	
	<i>Index</i>	517

Part One

Language and Logic

Disputes: Verbal and Otherwise

Section I: A Few Examples

I. Scene: A college dormitory at 1:00 A.M.

A “bull session” is in full swing. Bill and Jim are arguing a frequently debated question: Are all men created equal?

BILL: I tell you that men aren't equal. People who say that men are created equal just don't know what they are talking about. Use your own eyes! Do you *see* the equality of mankind? Don't we see that everyone is different from everyone else? Don't people differ in their abilities and in their physical, mental, and moral endowments? Don't intelligence tests show that some individuals are near-geniuses and others are non-geniuses? In my opinion Thomas Jefferson uttered preposterous nonsense in the Declaration of Independence when he wrote, and I quote, “We hold this truth to be self-evident, that all men are created equal.” This so-called truth is not evident to me, so it can't be self-evident! In my opinion this so-called truth is actually a falsehood.

JIM: I am sorry, Bill, but you are the one who doesn't know what he is talking about. Men *are* equal, and I agree completely with Jefferson. The equality of mankind is the foundation of our democracy. No man has the right to special privileges from which others are excluded because of their race, religion, or color. Every person is entitled to equal opportunities, and no one should suffer discrimination because he belongs to a minority group. The equality of mankind is the basis of our legal system, which tells us that all men are equal before the law. Do you deny that? Are you in favor of racial and religious discrimination?

BILL: No, Jim, I don't believe in racial and religious per-

secution or discrimination. But I repeat once more: men aren't equal. Why, most people don't even have the intelligence to distinguish honest men from crooks, especially in elections, and that's why we have so much corruption and inefficiency in our government. Your equality is a myth . . .

2. Another night

TOM: Russia is certainly not a democracy, no matter how long and often Russians may claim it to be so. In Russia there are no opposition parties, and no man dares to oppose the edicts of the ruling class. There are no guarantees against arbitrary arrest, and anyone may be held without trial if he criticizes the government. I believe it is impossible to have democracy unless you have capitalism and free enterprise, for when the state controls a man's job it has the power of life and death over him, and his freedom has disappeared. His actions and his thoughts must then be subservient to the state.

JACK: And I say that Russia is a democracy. In Russia every man is guaranteed a job and is free from the worst of all fears, namely, economic insecurity. There is no such thing as involuntary unemployment in Russia. And Russia recognizes the principle of equality for all races and religions and for the sexes. Women have equal rights with men in economic, political, and spiritual activities. Russia is a democratic country.

TOM: Russia is not democratic since there is no freedom, not even "economic freedom." There are no free labor unions, since labor unions are not permitted to strike for higher wages or for better working conditions. Striking is considered an act of treason against the state. You can't have democracy when union leaders are stooges of the party and its bosses. There is no involuntary unemployment in Russia, true, but this is because the state assigns jobs to the workers, who must take the jobs whether or not they like the work or the wages . . .

The disputes you have just read are examples of a type of discussion which is all too common. Disputes of this type are futile and frustrating. The argument gets nowhere, no one ever convinces anyone else, and the dispute proceeds endlessly if continued in the vein described, until the disputants give up because of mutual exhaustion. They will then part company,

each experiencing a sense of profound pity or contempt for the other, and each thinking that "there are none so blind as those who will not see."

Disputes of this type are usually called "verbal disputes," or "verbal disagreements." Such "disputes," as we shall see, may not be *actual* disagreements, the disagreement being such only in *appearance*. Before we attempt to analyze them, however, we shall examine a "real" disagreement.

3. A real disagreement

BEN: If we wish to eliminate strikes and lockouts in the United States, then we ought to require the arbitration of all labor disputes. The Australians have had compulsory arbitration for a great many years, and they have reduced strikes to a minimum.

SIDNEY: On the contrary. *The 1939 Year-Book of Labour Statistics*, published by the International Labour Office, shows that for the decade 1929-1939 Australia was the world's third highest nation in the average number of days lost each year because of strikes and lockouts. In Australia they lost 61 days per 100 employees; in the United States only 36 days were lost.

BEN: Your statistics are out-dated. For the three year period 1951 to 1953, the figures are 40 days lost in Australia as compared with 80 lost in the United States. For 1954 to 1956, the figures are 37 for them and 56 for us.

In Dispute 3 the parties are in *actual* disagreement. They are in disagreement over whether the compulsory arbitration of labor disputes has or has not been successful in eliminating strikes in Australia, and they are in disagreement over whether or not compulsory arbitration would eliminate strikes in the United States. It is not our concern here to determine whether one of these parties is right, the other wrong. The point is that **they are engaged in a genuine dispute.**

Let us now return to our examples of verbal disputes. In Dispute 1 Bill and Jim *appear* to be in disagreement over the proposition that all men are equal. Bill says that men are not equal; Jim says that they are. But we soon find that Bill and Jim have used the word "equal" in different senses. By "equal" Bill means similarity in physical and mental attributes; by "equal"

Jim means that all men are entitled to justice, that is, to the same privileges and opportunities. Though each has used the same word, each means something quite different from what the other means.

Bill and Jim believe that they are in disagreement over certain facts, but actually they may not be. Each may be right in what he affirms, and wrong only in claiming that he necessarily disagrees with the other. For Bill and Jim defined the word "equal" in different ways, and if we now translate what Bill and Jim *said* into what they *mean*, we shall find that their "dispute" may be summarized in the following manner:

BILL: Human beings are not possessed of the same physical and mental qualities.

JIM: You are wrong, Bill. All men are entitled to justice.

BILL: And I assert that men do not have the same physical and mental qualities.

In other words, Bill and Jim are not necessarily in disagreement on any issue whatsoever. They think that they are in such disagreement only because they overlook the fact that the innocent word "equal" has been used in more than one sense. When this is pointed out to the disputants they will probably abandon their original dispute at once. They may then go on to discuss some other related question, but they will not continue a type of discussion which can never get beyond its starting point.

We see, then, that some disagreements are such in appearance only. Dispute 3 was a real or actual disagreement concerning certain facts, but Dispute 1 was a dispute only in appearance. Our discussion indicates that we must distinguish between real (or genuine) and merely apparent disputes. In a *real* dispute the parties actually disagree; in an *apparent* dispute they think they are in disagreement but actually are not, or may not be. A verbal dispute is an apparent dispute in this sense, for in such disputes the possible actual agreement of the parties is concealed by the fact that they use a key word in more than one sense. In such disputes the parties believe that they are in actual disagreement concerning some specific issue, but they may be in entire agreement over the facts and differ only in the manner in which they use the key term. When a key term is used in more than one sense the parties may be in agreement, or they may be in disagreement, but the

difference in the usage of the key term prevents them from knowing that they are in agreement, or, if in disagreement, from knowing the precise issue over which they differ.

In Dispute 2, the term "democracy" is obviously used in two different senses. Tom is actually saying that the Russian people lack certain freedoms. Jack asserts that there is no economic insecurity in Russia. This is what they really mean in asserting that Russia is or is not a democracy. There is thus no actual disagreement in the propositions asserted by Tom and Jack. But of course to point out these things to disputants will not automatically settle all their differences. When a verbal dispute has been eliminated, the participants become aware of the fact that they have been using the key word in different senses, and there may be nothing further to discuss. But they may also not regard this difference in senses as legitimate, and they may go on to discuss how a word should or should not be used. They may question the allegations of facts as stated by their opponents. Or they may claim that their opponents are not using the key word in its commonly accepted sense. The main point is that there may be no actual disagreement in positions *as originally stated*.

The same type of analysis is often applicable when agreements, rather than disagreements, are verbal rather than actual.

An agreement may also be such in appearance only, because of the different senses in which words are used. Such agreements are *verbal agreements*. For example, the United States, Great Britain, and the U.S.S.R. agreed at the Yalta and Potsdam "summit" conferences that democratic governments would be established through free elections in Poland and elsewhere. The words "democracy" and "free" were not precisely defined, and it soon became apparent that the parties had entirely different notions as to what the words meant. They were in fundamental disagreement concerning policy, but their disagreement was concealed by their acceptance of words which they interpreted differently.

Another example: Grey says "I agree" when Brown argues that God exists. But when Brown uses the word "God" he means the personal God of the Jewish-Christian tradition, while Grey accepts John Dewey's definition of God as "the natural forces and conditions—including man and human association—that

promote the growth of the ideal and that further its realization." Dewey's God is not a supernatural God, but rather a name for certain natural conditions. The Jewish-Christian conception of God is quite different. Brown and Grey have thus confused an agreement in words with an agreement concerning facts. They were in actual disagreement and in apparent agreement. Their agreement was only in the use of the same word. They were actually talking about different things, almost as if one person were to say, "I believe that X is the best candidate," and for the other to answer, "Yes, I agree that Z is the best candidate." Brown might have been horrified if he knew just what it was to which Grey was agreeing. It is, in general, easier to become religious by definition than by conversion.

We may define a verbal agreement as an agreement which is such in appearance only, in which the possible actual disagreement of the parties is veiled by the fact that a key term is used in different senses.

We shall now state a basic principle of all intelligent discourse: In order to agree or disagree with another person both parties must be in agreement with respect to all of the key terms used in their discussion. Paradoxically, it is impossible to disagree with another person without agreeing with him (on the meanings of the terms). Otherwise our discussions move at cross-purposes and there is no meeting of minds.

The basis of all verbal agreements and disagreements lies in the ambiguity of words. An ambiguous word is one which may have more than one meaning, so that it is capable of being understood in more than one sense. These variant meanings give us the equivalents of several different words which happen to be spelled in the same manner. A "spade," meaning a garden implement, has only a remote connection with a "spade," meaning a suit in a deck of cards. These are the equivalents of two different words spelled in the same manner. Now, if we imagine a conversation during a bridge game, during which one of the players (a suburbanite who likes to garden) remarks that he has "three spades" (meaning garden implements) and his partner contradicts him with "You can't have any; the spades have all been played," we would have the basis for a verbal dispute similar to those we have already examined. The two disputants would be talking about altogether different things. (It is perhaps

unnecessary to call the reader's attention to the unwritten law among bridge players which makes it a heinous crime to make such remarks during a bridge game.)

A possible misunderstanding should be cleared up at this point. We cannot define a verbal dispute as a "dispute over words." A "dispute about words" may be a real dispute, as in the following:

PAUL: When most persons mention the word "religion" they refer to membership in some church and to the belief in a personal God.

JOE: I disagree. I believe that most persons use the word "religion" to signify that some person or persons have a whole-hearted devotion to certain social ideals and objectives.

This is a real dispute as to the manner in which most persons use the word "religion." Paul and Joe are in disagreement concerning word usage. Similarly, if Paul argued that religion really means "belief in a personal God," and Joe denied this, this would also be a real dispute, for Paul and Joe would be in genuine disagreement. A real dispute may also occur over the correctness of a "value judgment," i.e., over whether something is good or bad. The sole determining element is this: Are the parties in actual or merely apparent disagreement?

A verbal dispute, then, is not a genuine dispute *in the terms in which the dispute is formulated*, for when the parties use a key word in two different senses they are talking about different things. They must use this key word in the same sense before they can determine whether they are in agreement or disagreement. They may differ over the way in which the key word ought to be used, and this will be a genuine disagreement, but this is not the way in which the issue presents itself in a verbal dispute.

A verbal dispute, then, is a merely apparent dispute in its original formulation, but it is a merely apparent dispute of a special variety: one in which the parties use a key word in different senses. In a verbal dispute the parties believe that their statements cannot both be correct, whereas actually they may be. Each may be correct in accordance with the sense in which he employs the key term. But in a real dispute the parties cannot both be correct. Only one of them can be right, though of course both may be wrong.

Section II: The Analysis of Disputes

In our study of logic we shall learn the principles of correct reasoning, but we shall also learn how to apply these principles to examples. Theory without practice is almost useless in a subject such as this. We shall, accordingly, apply the principles we have just learned to the analysis of some examples. Practice will make the reader adept at the analysis of disputes. He will then be better able to recognize verbal disputes when they occur in his everyday conversations and may thus avoid falling into the traps to which such disputes expose the unwary. And, if it is not too risky an undertaking, the reader may also be able to help others avoid the futile types of disputes.

Every dispute should be examined in terms of the 5-step analysis which we shall now state. The first three steps should be applied to all disputes in order to determine whether they are verbal or non-verbal. If the third step is answered in the affirmative, then the dispute is a verbal one, and the remaining steps should then be worked out to show that there may be no actual disagreement.

1. What is the point in disagreement, or the issue in dispute?
2. State the sentences expressing the essential positions asserted by the disputants.
3. Do the parties use a key term in different senses so that there is no "meeting of minds"? If so, state the ambiguous term.
4. State the different senses in which each disputant employs the ambiguous term.
5. Restate the essential sentences as asserted by the disputants in Step 2 above, except that you must now replace the ambiguous term in each of these sentences by the variant definitions of this term as found in Step 4. The ambiguous term must not appear in these restated sentences.

We shall illustrate this method of analysis by applying it to Dispute 2, page 4.

The results of the analysis will be as follows:

1. Is Russia a democracy?
2. TOM: Russia is not a democracy.
JACK: Russia is a democracy.
3. "Democracy" is used in different senses by the disputants.

The 5-Step Analysis--an Illustration.

Bill: "I believe in church cooperation because I think it scriptural for one church to help another.

JOE: "I don't believe in church cooperation, because I think for one church to forfeit its independence."

Analysis:

1. Point at issue: Is congregational cooperation alright.

2. Positions: Bill--It is right.

Joe: It is not right.

3. Terms used in different senses? Yes.

4. Terms used how: Bill--One church helping another;

Joe: One church forfeiting its independence.

5. Rewrite: Bill: Is right for one church to help another

Joe: Is wrong for one church to forfeit its independence.

4. TOM: Democracy means a government which guarantees freedom to all individuals.

JACK: Democracy means a system in which all men have economic security.

5. TOM: Russia is not a country in which the government guarantees freedom to all men.

JACK: Russia is a country in which all men have economic security.

Note that the sentences as stated in Steps 2 and 5 should be identical except with respect to the key term and its definitions. The key term is used in Step 2; its definitions are stated in Step 5.

The analysis indicates that the parties are not necessarily in genuine disagreement, so far as they have stated their positions. The dispute should, therefore, be abandoned in its original form. When the parties find that their original "dispute" has vanished, one of several things may happen. They may then find that they are in essential agreement with each other, each granting that democracy may be properly defined in the two senses. They may say, "We see that the word 'democracy' may be used in different senses, in one of which our question would be answered affirmatively, in the other negatively. Our original question should therefore be answered 'yes' or 'no,' depending upon what one means by 'democracy.'" But the disappearance of the original dispute may also initiate new disputes. Tom may accuse Jack of "misusing" the term democracy, and they may then discuss the question as to whether democracy may properly be defined as Jack defined it. Or Jack may accuse Tom of the same error. In any case, if the parties cannot agree on what they mean by "democracy," it is futile to discuss the question as to whether or not Russia is a "something-we-know-not-what."

Disputes may also arise over statements of fact made by the parties. Is it true that men and women enjoy freedom in the democracies? Is it true that Russia guarantees economic security to all? It is obvious that the possibilities of new verbal disputes also lurk in these questions. What do "freedom" and "economic security" mean? Our analysis of verbal disputes does not dispose of all problems, but it does eliminate a dispute in which the parties themselves do not know what, if anything, is at issue between them.

A warning is necessary at this point. We have emphasized the importance of "defining one's terms." But let us not use this method of analysis for the purpose of quibbling. Let us not be hypercritical where such criticism is unimportant, i.e., where it is reasonable to suppose that the parties use their words in substantially the same ways. When words are sufficiently understood for the purposes of a given discussion, then it is a waste of time to argue over definitions. But an awareness of the linguistic problems of argumentative discourse is always necessary, and most of us err in being too uncritical.

Exercises

- A. In the following group, distinguish the real disagreements from those which are merely apparent. Which of the merely apparent disputes are "verbal"? Which are non-verbal? **Check your answers by asking yourself the question: Can both of the parties be right? If they can, then there is no real dispute.**
1. **BLACK:** The earth has been in existence for only 100 million years.
BLUE: And I contend that the earth is at least 5 billion years old.
 2. **ROY:** When I say it's propaganda, I mean it's a pack of lies, for that is what propaganda means.
RAY: You are mistaken. Propaganda really means any act of influencing or persuading another person to some predetermined end.
 3. **HARRY:** George Washington was the first president.
HENRY (who is slightly deaf): You are mistaken. John Adams was the second president.
 4. **SAM:** Picasso is a great artist because of his profound sense of form, space, and light.
SEYMOUR: In my opinion, his sense of form, space, and light is superficial, rather than profound; so he is not a great artist.
 5. **SAM:** I like Picasso's paintings.
SEYMOUR: I don't. I think they're terrible!
 6. **ED:** Monogamy is the ideal form of marriage relationship.
ERNEST: I believe that polygyny is the ideal form.

7. MILDRED: The American people approve of monogamy.
MYRTLE: The Moslems approve of polygyny.
8. GEORGE: The correct spelling is l-a-b-o-r.
GODFREY: And I say that the correct spelling is l-a-b-o-u-r.
(Would it make any difference if Godfrey were an Englishman?)
9. ETHEL: The junior Senator from Alaska is a propagandist.
MARCIA: He is not.
(Ethel and Marcia may be engaging in a verbal dispute, but then again they may not be. Explain.)

B. In the following exercises, analyze each dispute in terms of the 5-step analysis. Also note whether you think that the parties would abandon their disputes after the analysis is completed or whether they would be likely to disagree over some other question.

1. WALTER: Senator X is a liberal, for he believes in freedom. He supports our system of free enterprise and opposes the extension of bureaucratic regulation of business. He is opposed to all attempts to limit the freedoms of speech, press, and assembly. He stands four-square against totalitarian systems and wishes to keep us from moving in that direction.

WARREN: And I deny that he is a liberal. He voted against federal aid to education, which indicates that he is not concerned over the welfare of the common man.

2. JOE: A tree which falls in an uninhabited forest does not make a sound when it crashes to the earth. There is no one there to hear any sound, and when no one can hear a sound, the sound does not exist.

AL: There certainly is a sound when the tree crashes in an uninhabited forest. The crash of the tree sets up longitudinal wave motions in a transmitting medium, the air. These longitudinal waves are present in the atmosphere whether or not anyone is present, and so there is sound present.

JOE: But no one's auditory nerve is affected. No sensation is produced through the organs of hearing, and no one can have the mental experience of hearing if no one is in the forest. So you are mistaken in saying that there can be sound in an uninhabited forest.

3. JOHN: I believe that the Western Powers were wholly justified in shooting the Nazi leaders at the close of World War II. But I believe that it was wrong to try them for the violation of international law, for the simple reason that they

could not have been guilty of violating something which did not exist. It was wrong to condemn them for violating international law, for there is no such thing. Law exists only when a governing body enjoys complete power over the persons within its jurisdiction and issues commands to those persons. Such commands are backed up by "physical sanctions," the power to enforce the commands by physical force. There is no world government, so international law is nonexistent.

PHILIP: And I believe that the Nazis were properly tried for having violated international law. They did violate that law, for they violated the moral, social, and political codes which govern the conduct of nations. International law has existed for a long time. There have been international courts and tribunals; there are treaties which are binding on the nations which sign them. The Nazis violated the moral codes of mankind. They were guilty of deliberate and premeditated murder, and so they were properly tried and properly executed.

4. STACE: The Nazis were guilty of morally monstrous deeds. They violated the basic principles of all moral systems. These principles require that we should be just to our fellow men and that we should respect the integrity and dignity of our fellow human creatures.

SUMNER: But morality is relative to the approval of a particular group. The mores can make anything right, and so if the German community or group approved of the Nazis' conduct, then the Nazis acted quite morally. Of course, *we* don't approve of their conduct; *we* don't choose to behave that way, and people who acted like the Nazis would act immorally in the United States.

5. The Chicago Art Institute recently presented a show devoted to abstract and surrealist art. Differences of opinion were rife among the spectators. Jane, for example, said that the paintings were great works of art, for they expressed the mechanical dynamism of our contemporary industrial world and the psychological frustrations which accompany living at high speed. John, on the other hand, said that this "modernistic stuff" could not be great art, for these paintings did not depict anything recognizable in the real world, nor, he added, do they express noble thoughts and feelings.
6. During the 1930's, estimating the number of persons unemployed in the United States became a popular pastime

for statisticians. These estimates often varied widely. On one occasion the National Association of Manufacturers asserted that there were only 3 million unemployed; the CIO claimed that there were 7 million unemployed. Assuming that the disputants made their estimates on the basis of statistics gathered by competent sources of information, how do you account for this difference in figures? Explain why this dispute may have been a purely verbal one, and analyze accordingly.

1. Verbal dispute.
2. No disagreement
3. The 5-step analysis of disputes.

The Meaning of "Meaning"

Section I: Semantics and Logic

In the first chapter we noted the importance of the linguistic aspects of reasoning. We saw how inattention to the meanings of terms may result in a failure to communicate. We saw how unawareness of the pitfalls into which language may lead us will sometimes result in a verbal dispute. When we engage in such disputes we confuse disagreements over the meaning of words with disagreements over the manner in which such words are applied to a particular situation, but we do not know that this is what we are doing.

Our analysis of disputes raised a number of problems and questions concerning language usage. Some of these questions, and others which may have occurred to the reader, are the following:

1. Does each word have a correct meaning? Does a word *really* mean one thing and not some other thing, so that some senses in which a word is used are legitimate, others illegitimate?
2. If we answer the above questions in the affirmative, how are the correct meanings determined? Does the etymology of a word give us its correct meaning?
3. May an individual define a word to suit himself?
4. What is the meaning of ambiguity and how does it arise?
5. What is a good definition?

The answers to these questions all involve the problem of meaning, the basic problem in the relationship between language and reasoning. This problem will occupy our attention in the remainder of Part One. We shall be concerned with the influence of language on thinking and reasoning, in order that

we may know what we are doing when we use words in discourse. Knowledge of the principles of meaning will also enable us to eliminate some of the obstacles to clear thinking arising from the improper use of language and help us to avoid falling prey to various kinds of linguistic confusions.

The relationship of language to thinking is much closer than is commonly suspected, and linguistic investigations may yield surprising results. For example, the children in an underprivileged neighborhood did very poorly in an intelligence test which contained questions such as, "A hand is to an arm as a foot is to a ———." It was later discovered that "is to" was an unfamiliar concept to these children. When "goes with" was substituted for "is to," their I.Q.'s immediately increased. Similarly, a public opinion poll phrases its questions in a specific manner. Phrased in a different way, the "public opinion" sought for might reveal quite different results.

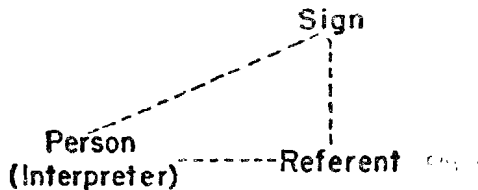
The general study of meaning, in particular the study of the meanings of words in their relationship to the things for which they stand, is called "semantics." The term "semantics," derived from the Greek word *sema*, which means "sign," was introduced into modern usage by the French linguist Michel Bréal, in his *Essai de Sémantique*, published in 1897. "Semantics," however, is but a new name for a type of linguistic investigation which is almost as old as philosophy itself, though only in recent years has this subject emerged as a full-fledged discipline. Today it refers to a vast and complex field of investigation, into which our present discussion will offer only a few glimpses. It is also important to note that the interests of writers on semantics are very diverse. Thus we find that some writers are primarily interested in the anthropological aspects of language and in the origin of language (Malinowski, Whorff, Koffka, Köhler). A number of logicians are interested in the analysis of systems of signs (Carnap, Morris). A third group is interested in the psychological analysis of meaning (Ogden, Richards, Walpole). Finally, we note a group of writers who call themselves "General Semanticists" (Korzybski, Hayakawa, Stuart Chase). These writers believe that semantics may be usefully employed as a therapeutic agent for the elimination of social maladjustments and personal neuroses. But all writers on semantics have in com-

mon a concern with the problem of meaning. We turn now to the nature of this problem.

Section II: Signs and Symbols

To say that words have meaning is to say that they refer to something other than themselves. To "refer to something other than itself" is to function as a *sign*. Thus all words are signs, and all meaning-situations are sign-situations.

A sign-situation involves three aspects: The sign, such as a word, which in itself is simply a noise or a mark on paper; the thing signified, or referred to, which we shall call "the referent"; and persons or interpreters who refer to or who are referred to the referent. Thus a sign is something which refers to something for someone.* This three-fold aspect of sign-situations may be shown in a "triangle of reference," viz:



Signs may be divided into two major types, natural and conventional. A natural sign is an event in our experience which

*The expression "refers to something" requires a qualification and a cautionary remark. Some signs are exceptions to the rule, for some words have no referents. Examples are such words as "and," "or," "not," "all," "some," etc., which serve certain logical functions, and ejaculations such as "ouch," "wow," and "yippee," which merely express feelings without designating referents. But the rule will hold for all other types of words, and we shall ignore this qualification in the following discussion.

Though we shall speak of referents as "things," for simplicity's sake, the reader should note that referents are not necessarily physical objects in the external world, i.e., things which can be seen and touched. They may be events, activities, relations, conditions, and so on. We must therefore reject such views as those of Stuart Chase, as expressed in his *Tyranny of Words*, that words have meaning only when they refer to "something real enough to be kicked." Referents may be abstractions, such as "energy"; or feelings, such as those of pleasure and pain; or creatures of man's imagination, such as dragons and other mythical monsters. The words "centaur" and "mermaid" have referents, though none such exist in the physical world of space and time. We do not confuse the referents of the world of the imagination with the referents of the real world when we know what we are doing.

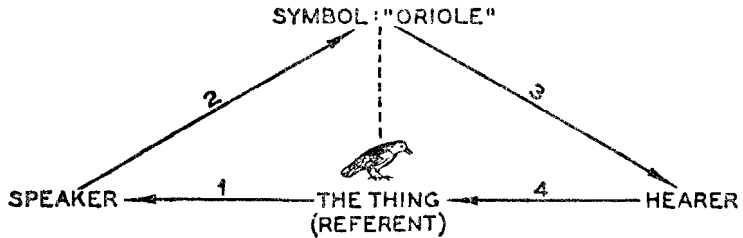
refers to some other event because our experience has taught us that the two events are associated or connected in some fashion. Thus, a Kansan sees a dark cloud on the horizon, and he interprets what he sees as the sign of an approaching tornado. The cloud is a natural sign of the tornado. A conventional sign, which we shall call a "symbol," is an artificial construct made by human beings for the purpose of referring to something. A symbol is a sign which is deliberately employed in order to convey a meaning. Symbols become part of a language when human beings agree that they shall "stand for" given referents. Symbols are signs, but not all signs are symbols.

One or two details may be noted before we leave these definitions. Some objects may combine the functions of natural and conventional signs. Thus, a thermometer which indicates that the temperature is 100° F. on a July afternoon combines both types. The movement of the mercury is a natural sign of heat, but the fact that the degree of heat is called "100° Fahrenheit" is established by convention. It should also be obvious that many symbols are nonverbal. A yellow line drawn on your side of a highway symbolizes "Do not pass here." Road-markers, numbers, diagrams, codes, shorthand systems, gestures, or even the use of lanterns in the "Ride of Paul Revere" ("one if by land and two if by sea") are all symbols. We should also note that though symbols refer to things other than themselves, they may also be interesting for their own sakes. A theme song on a radio program is a symbol of a certain type of entertainment, but the theme music may also be enjoyed for its own sake. Word-symbols may of course also possess aesthetic qualities, as in poetic expressions.

Section III: Communication

Successful communication occurs only when a speaker and hearer make the same connections between symbols and the things which they are intended to signify. The hearer must be referred to the referent to which the speaker wishes to direct his attention. The typical form of the process of successful communication may be illustrated by the following diagram, which combines the triangles of reference for both the speaker and the hearer:

*of the
Linguistics*



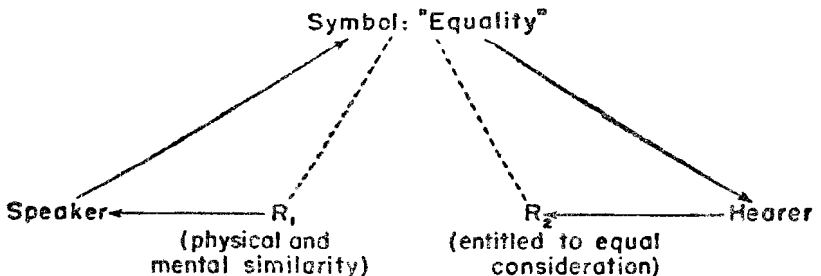
Arrow 1 represents the situation in which the speaker thinks of something before he has found the word he wishes to use. (The word and the referent may also come to the speaker's mind simultaneously.)

Arrow 2 represents the finding of the word to stand for the thing. (The connection between the word and the thing is indicated by the broken line.)

Arrow 3 indicates the word coming to the attention of the hearer.

Arrow 4 indicates that the hearer's mind is referred to the referent.

The diagram indicates that the hearer has correctly interpreted the symbols used by the speaker. Communicator and communicatee have the same terms in mind. But this happy consummation is not always attained, as we have already noted in our discussion of verbal disputes. Failures in communication occur when the symbol refers to different referents, for the speaker and hearer. Let us symbolize these different referents by R_1 and R_2 . The triangles of reference will then appear as follows:



Successful communication occurs only when the reference is the same for both the speaker and the hearer. But note that the symbol may refer the hearer's mind to much more than the ostensible referent. It may indicate fine shades of subtle meanings, reveal the personality of the speaker, and so on.

Section IV: The Arbitrariness of Meanings

A symbol is a sign the meaning of which has been conventionally agreed upon. A symbol, such as a word, designates a referent by agreement or convention. Human decisions are thus required in order to establish the meaning of symbols, and such decisions are arbitrary ones, since "arbitrary" means "resting on a judgment which is not fixed by rule or law." This means that any object may be given any name which we choose to confer upon it. Names arise as a result of human agreements, or stipulations. This is illustrated in its purest form by the procedure whereby new words are coined today, as when chemists invent a new name for a new element. The procedure is wholly conventional and proceeds in something like the following manner: "Let us call this new element 'argon.'" This is a stipulation entered into by mutual consent. This naming activity is arbitrary in the sense that any other name might have been given to this element, such as "aeron," a name earlier suggested.

No generation ever makes up its living vocabulary as a whole in this manner, since we inherit most of our words from our linguistic tradition, and certainly language did not originate by such conscious stipulations. "We can hardly suppose," as Bertrand Russell said in *The Analysis of Mind*, "that a parliament of speechless elders met together and agreed to call a cow a cow and a wolf a wolf." Many names come into being by unconscious and unnoticed affirmations in usage, and they come to be accepted in the same manner. In such cases the stipulation may be said to be implicit, but in order that a word may retain its meaning there must be constant and renewed acts of affirmation. These go on daily when we reaffirm (implicitly) that "house" will stand for an architectural edifice of a certain sort. We are at liberty, however, subject to certain limitations, to change the word at any time.

Though all symbols result from human decisions, note that a few symbols resemble their referents, so that their relationship

to their referents is not a *merely* arbitrary one. We refer to onomatopoeic words, which sound like their referents, i.e., words such as "bow-wow," "buzz," "boom," "crack"; and to iconic signs, which look like their referents. Examples of iconic signs are diagrams, maps, and sketches. Nevertheless these signs are also symbolic by convention and agreement.

The conventional or arbitrary nature of symbols has not always been recognized. At one time it was believed that words have a "natural" relation to their referents, i.e., that the relationship was grounded "in the nature of things." We shall call this view the "natural theory." In Plato's dialogue, *Cratylus*, Socrates asserts that there is a natural connection between words and things. He believed that the gods call things by names which are naturally correct, but that human beings often erroneously call things by wrong names. The Garden of Eden incident, in which God asked Adam to name all things, is a variant of the natural theory, for Adam, as God's agent, would presumably give things their "right" names. Hebrew would then be regarded as the natural language. The natural consequence of such a view is that all other languages are incorrect, and this indeed is the assumption which underlies the story of the Tower of Babel, concerning the supposed origin of the multitude of languages. The babelization of tongues is described as a punishment for man's presumption in seeking to reach too high. Inventions of new international languages such as Esperanto and Basic English may be regarded as efforts to remove these consequences of sin.

The natural theory was aptly criticized by the English philosopher John Locke, in his *Essay on the Human Understanding*, with the remark that if names were natural, all human beings should speak the same language. The natural theory was also rejected by Aristotle. "By a noun," said Aristotle, "we mean a sound significant by convention . . . nothing is by nature a noun or name—it is only so when it becomes a symbol." (*De Interpretatione*.) This is the view which we accept.

Names are thus neither right nor wrong in a logical sense—they simply are what they are. Words may be appropriate or inappropriate according to aesthetic standards; they may be in accordance with customary usage or not, but the criteria of truth and falsity are not applicable to the names we use for referents. This is not to deny the great importance of aesthetic and custom-

ary standards, especially the latter. There is a significant sense in which words may be said to be "right" or "wrong." A student of botany is expected to be able to identify flowers by name, and if he is unable to identify members of the Polemoniaceae family correctly he may fail to receive credit in the course. Communication requires that we use words in their customary senses. Failure to know the "right name" in this sense is usually due to ignorance. We must learn the conventionally-agreed-upon names of things. XIX

Nevertheless, words *are* the results of stipulations, and it follows that writers or speakers may present their own individual stipulations for the meanings of any words. When Mr. Hugh Walpole, in his *Semantics*, tells us that whenever he uses the word "interpret," he will mean "to be affected by," he has violated no rule of language or logic. But writers should exercise some restraints in exercising their freedom to stipulate their own meanings if they desire successful communication with an audience. Mr. Walpole's stipulation is an unusual one, for it requires, as he says, that we speak of a window "interpreting" a stone when the stone breaks the window. The novelty of this usage may result in a blockage of communication for many readers. But the "freedom to stipulate" sometimes enriches the language when novel usages win general acceptance.

The courts also place certain restraints upon individual stipulations. It would be no defence in a suit for libel to plead that when you called Jones a "swindler," you had previously stipulated that whenever you used the word "swindler" you should be understood to mean "native-born citizen." Custom also places limitations on our complete freedom to stipulate meanings. A young man who informed a young lady that he would mean "Darling" whenever he called her "Monster" might have difficulty in securing her affection. We may also note that many writers conceal their novel stipulations and thus mislead their hearers or readers. When the Japanese conquered a large part of Asia during the thirties, they stated that they were setting up a "Greater East Asia Co-prosperity Sphere." "Co-prosperity" was used in a highly novel sense, without notice as to what the Japanese had in mind. In contemporary political discussions, words like "democracy" and "freedom" are also used in novel senses by many writers.

In this section we have noted the arbitrary and conventional character of all symbols. Symbols are the results of stipulations, conventions, and agreements. Names are not "natural." Thus, several types of answers are possible to the question "Why is a certain thing called by its name?" We may answer that we call it by that name because it is customary to do so, or because we choose to, or because that name appears appropriate to us. The procedure of conferring proper or personal names on children is typical of the naming procedure.

A boy is called "John." This is an arbitrary act in the sense that we might have called him by any other name. The parents' reasons for calling him "John" rather than some other name are wholly external to the naming activity as such. His parents may have wished to give him his father's name or to honor a biblical hero, but these are "external" reasons. The fact that a new-found planet is called Pluto rather than Mickey Mouse, because it is customary to name planets after Greek divinities, is simply an aesthetic reason of appropriateness. The naming process is an arbitrary matter.

The reader may now raise the question: Does the etymology of a word determine its meaning? And is this not a nonconventional and nonarbitrary determination of meaning? But the fact that the English language obtained many of its words from Romance, Germanic, and Greek roots does not argue against the theory that the relationship between a symbol and referent is an arbitrary one. "House," for example, is derived from Germanic roots, i.e., *Haus*; and *Haus* in turn was derived from an earlier language; but somewhere in the past the begetting of these words was the result of the arbitrary naming activity. When we call a self-moving vehicle an automobile, from the Greek root *autos* (self) and the Latin *mobilis* (movable), it may appear that the choice is not a wholly arbitrary one. But the ancients (or their predecessors) had no such reasons of appropriateness when they used *autos* and *mobilis* for these referents. Etymologies do not affect the arbitrary nature of the naming process.

Section V: Etymologies

The subject of etymologies, briefly touched on at the end of the last section, deserves further attention. Etymology is a branch of philology which deals with the derivation of words

and traces them back to their immediate or remote sources, thus giving us the history of individual words. Etymologies often throw important light on the meanings of words and sometimes reveal significant meanings not previously noted or understood. But though it is always interesting and generally useful and instructive to know the roots and origins of the words in our intellectual currency, the source of a word does not determine its present meaning. Linguistic changes and customs control in these matters, so that etymologies are logically irrelevant with respect to the present meanings of words. If human beings agree to use a certain word to symbolize a given referent, the inconsistency of the present usage with the original meaning is irrelevant. Thus the word "democracy," in its original sense, meant government directly by the people. Today the word has been extended in its meaning, and has a customary application to representative forms of government. If this is the referent of the term today, then the narrow etymological meaning is no longer the only meaning. The former meaning has not necessarily been superseded by the new meaning; a new meaning has been added to the former one.

Most etymologies are genuinely enlightening in clarifying the meanings of words, and the study of the roots of words is always fascinating. To cite some examples, the word "philanthropist" is derived from two Greek roots: *philein*, to love, and *anthropos*, man. A philanthropist is a "lover of mankind." Similarly we have "philosopher," which combines *philein* and *sophia* (wisdom). *Sophia* is the root of sophisticated and sophistry, words in which knowledge, rather than wisdom is emphasized. Sophomore combines *sophos* (wise) and *moros*, a Greek word meaning fool. This derivation reveals a penetrating insight.

Some etymologies are merely interesting without being useful. It is interesting to know that the beverage "gin" got its name from its origin in Geneva, Switzerland, but that the homonym "gin" in Whitney's "cotton gin" was an abbreviation of "engine."

Etymologies may also be misleading. Many words have meanings today which bear no significant relationship to their root words. Examples are "knave," from the German *Knabe*, or boy; "spinster," which originally meant "one who spins";

"assassin," an eater of hashish; and "orchestra," which originally meant the dancing place in a Greek theater. Or, consider the use of the word "barbarian." Its most important sense today refers to cruel and savage people. The word comes from the Greek, where all foreigners were called barbarians, without exception. The word originated among the Greeks to designate the languages of foreigners, which, they said, sounded like "bar-bar-bar." The word "barbarian" also carried a connotation of contempt, since the Greeks considered themselves to be a superior people. But our use of "barbarian" today dates from its application to the "foreigners" who overran the Roman Empire, committing many acts of vandalism and horror in the process. The point of this illustration is that the "real" meaning of barbarian is not "foreigner," though this is the word from which it is derived.

The last examples point to a very important truth, namely, that etymologies do not give us the "real" meanings of words. Words mean what we agree that they shall mean, since all symbols are established by "conventions" or agreements. Barbarian does not *really* mean foreigner, though that is the word from which it is derived. The present meaning of the word "etymology" itself is a case in point. The derivation of the word is found in two Greek words: *etymos*, true, and *logos*, which means "word" or "law." The earlier etymologists accepted the natural theory, and held that the true meanings of words could be traced through their shapes. But modern linguists mean by etymology the history of words, in which we simply trace words back to their roots, or at least as far back as possible.

Our conclusion is that etymologies are interesting, useful, instructive and enlightening, but that they are logically irrelevant in the sense that they do not determine what the meaning of any word is today. Etymology could give us the "true" meanings of words only if there were an original "natural" language from which all other languages had been derived. But we have rejected the notion of such a natural language. At best, then, etymologies can take us back to the original words, but if these original words have no etymologies of their own, then they came into being by actual or implied acts of stipulation. Words mean what we decide that they shall mean, or what custom decides. As Humpty-Dumpty sagely remarked in *Through the*

Looking Glass, "The question is, Which is to be master . . . ?"
We or the words?

Section VI: Growth and Change in Language

We have been discussing some of the formal aspects of semantics, and we have learned that meanings are the results of affirmations. In the next section we shall presently discuss some of the linguistic errors which result from a failure to recognize the correct principles of symbolism, but first we shall examine some of the historical aspects of language growth and change so that the reader may be able to place the theoretical aspects of the subject within the perspective of living language.

Languages are not "made"—they grow. They are not manufactured as complete wholes except in artificial languages such as Esperanto, and even this international language is based upon familiar Latin roots. The origin of language is a subject shrouded in mystery, a subject of which nothing certain is known. There are, of course, many theories as to how languages originated, but these are merely speculations. As examples of such theories, some of which have received amusing nicknames, we may cite the following: The "Bow-wow," or "Ding-dong" theory holds that the first words were onomatopoeic, or imitations of the sounds of nature. The "Pooh-pooh" theory (for the expression indicating contemptuous indifference) holds that the first words were expressions of strong emotion. The "Yo-he-ho" theory, that words originated in work activities for the purpose of expediting such work, is illustrated by the singing of the Volga boatmen as they pull on their ropes. But as noted, these theories must be regarded as nothing more than suggestive guesswork.

The researches of anthropologists into the languages of primitive peoples have uncovered linguistic elements which may have been *stages* in the growth of language. One such element is a type of verbal usage called the "holophrase," in which a single word stands for a complete sentence or thought. A single word may stand for "There are fish in the stream," but the language in which this word appears may contain no word for "fish" as such. This suggests that language may have begun with words for complete activities or experiences rather than with words for individual objects. Thus the whole appeared before the

parts; sentences before the parts of speech. A single word combined the functions of both subject and predicate.

A later stage in the development of language may thus involve a breaking down of the holophrastic sentence into its parts. Specific names will be given to things, to their qualities, to activities, and to relations. Further development then goes on in two directions, towards the process of analysis, or breaking a thing down into its parts, and towards synthesis, which involves the process of building up a whole from its parts. Classes are broken down into subclasses (analysis) and individual things are joined together into classes of things (synthesis).

Language and thought are of course indissolubly united in these developments. Language develops with thought, and thought develops with language. Whether thinking is possible without language is a question we need not discuss here, but it is certain that thought would be extremely limited without language. And it is thinking which finds distinctions among things which were formerly thought to be alike, and which finds resemblances among things which were formerly thought to be different. Language reflects these developments in thinking by adding new words to the vocabulary as new distinctions and generalizations appear, and words, in turn, help thought in making further distinctions and classifications.

Different languages reveal different stages in the developments toward analysis and synthesis. When we find a word which covers a very large group of things and find no words for important distinctions within the group, this may indicate that the process of analysis has not been carried through, or it may mean that the distinctions were not considered important enough to warrant new names. Thus, among the Hopi Indians, the same word stands for "He is running" and "He was running." The modern Slavic languages have the single word "finger" to signify both fingers and toes as these words are used in the English language. We have carried the process of analysis into the general class of digits of the hands and feet. The failure to distinguish these digits by different words may indicate that the distinction was not considered of sufficient importance to require separate names. On the other hand, the failure to carry the process of synthesis far enough is found in some primitive languages, such as the Tasmanian, which have words that

designate the species within a genus without having words for the genus itself. Thus the Tasmanian has names for different types of trees, but no name for "tree" as such. In such cases further synthesis may be required. (The absence of a synthesizing word does not necessarily mean that the similarities were unnoticed.) A contrary fault is found in persons who look at all trees as if they were simply "trees," without being able to distinguish one variety from another.

Languages which make fine discriminations may reveal lack of generalizing power, and languages which have general words may lack discriminating ones. The most developed languages are those which are richest in words designating both discrimination and generalization. These words, however, are invented only after thought has done its job of noting distinctions and similarities.

Human interest is responsible for these developments in language. Frequently, interest in certain generalizations or distinctions disappears, and words then fall into disuse. This frequently happens in cases where the discriminating process has been carried too far for general interest. An English journal, *Tid-Bits*, once noted the fine distinctions made by previous generations with respect to the dismemberment of flesh and fowl at the dining table. Where we use the single word "carve," they "allayed" a pheasant, "disfigured" a peacock, "spoiled" a hen, "tranced" a sturgeon, and so on. Words designating different types of collections of living things, depending upon the type of creature involved, also seem to be losing out in general speech. Thus we have such words as "herd" of cattle, "flock" of sheep, "pack" of wolves, a "shoal" of fish, "covey" of partridges, "bevy" of larks, etc. These distinctions may become of lesser importance to city-dwellers, but this would mean a loss of richness in the language.

Thus far we have noted some of the general factors in the growth and change of language. We shall now note some more specific types of change, change being omnipresent in language, which is a living, dynamic thing. Old words take on new meanings, and new words are invented for familiar referents. Custom is king in these matters, but custom supersedes custom. Thus the meanings of words are narrowed, extended, or completely changed through use. "Paper" once referred only to papyrus,

but now refers to many other substances. Its meaning has been extended. "Surgeon," on the other hand, has had its meaning limited in sense, since it once referred to anyone who worked with his hands. Words may also change their forms without change of meaning, as in changes in spelling.

We also find new languages growing out of old ones. Thus the "Romance" group of languages (French, Italian, Spanish, Portuguese, Romanian) developed out of Latin in western Europe, and similarly all of the European languages, as well as the Hindu Sanskrit, probably developed out of a common mother tongue. Similarities such as those found in the English "mother," Greek *meter*, Latin *mater*, Russian *mat*, and the Sanskrit *mata*; or among the English "two," the Greek and Latin *duo*, the Russian *dva*, and the Sanskrit *dvau* make a common origin probable. Their common "progenitor" language is assumed to be the "Indo-European" root language, though no historical evidences of this language have been found. This Indo-European language is a hypothetical construct. It is worthy of mention here that the so-called "Aryan race" is the supposed race of people who spoke this hypothetical root language. Nothing whatsoever is known concerning the characteristics of this race, if indeed there was such a race, though many pages have been written concerning the glorious "blood-qualities" of this people.

Why do languages change in these ways? Linguists have noted such reasons as mishearing, misunderstanding, defective memory, imperfect speech organs, laziness, the desire to be distinctive in one's utterance, the need to express new ideas, and the desires for clarity, euphony, and economy. We may also note the influence of foreign languages on each other. Gradual and unnoticed changes develop in time into very large modifications of the original language.

Change is not all, of course, for language customs do endure—sometimes over very long periods of time. There are also various ways in which we attempt to stop the flow of change in usage. The dictionary, for example, attempts to fix the definitions of words, but even such "fixed" definitions give way to new usages, and many dictionary definitions become obsolete in time. Dictionary definitions are written by scholars who are specialists in their respective fields, and these scholars tell us

how words are used in terms of the prevailing customary usage. The writer of a dictionary definition is a historian rather than a law-giver, a judge rather than a legislator. Dictionaries do not lay down laws of usage which command us to use words in certain ways. The usefulness of the dictionary lies in its giving us information as to the commonly accepted senses of words in order to facilitate successful communication.

A word is also required here as to the authoritativeness of dictionary definitions. We must always remember that a few very important words have no universally accepted meanings, and there is thus no genuine custom which we can follow. The word "propaganda" is a case in point. There are almost as many definitions of propaganda as there are individuals who define the word. Words like "truth," "morality," and "beauty" are words which have been defined and redefined for the past 2,000 years and the search for adequate definitions of these terms is not yet concluded. Obviously the dictionary cannot solve these problems, for no one has as yet solved them. In a discussion concerning the meaning of "beauty" the dictionary can do no more than help to initiate discussion; it cannot settle the matter.

It is because of the changing meanings of words in daily use that scientific and professional terminologies are invented. Ordinary words become ambiguous by acquiring new meanings, and science requires precise and unambiguous terms so that misunderstanding of referents will be reduced to a minimum. Technical vocabularies are accordingly invented, as in the biological sciences, where Latin names for diseases, plants, and animals are used. Latin terminology is also a great convenience for international communication. Since these words are not in daily usage, custom cannot modify them. Considerations of this sort led Professor Spearman, the English psychologist, to propose abandoning the word "intelligence" in psychology and to employ as a substitute the symbol "G-factor" for the referent which many psychologists have in mind when they employ the term. Instead of speaking of an individual's "intelligence quotient," one would speak of his "G-factor quotient." The ambiguity of the term as presently used would thus be eliminated.

The practice of inventing new vocabularies, however, also has some disadvantages, particularly in the social sciences, where unique terminologies make scientific writings unintelligible to

the uninitiated. There is also the danger that the invention of a professional vocabulary for items of common experience, may result in a pretentiousness of diction that may conceal a barrenness of thought, as in the professional report that "clinical observations and statistical correlations reveal that pre-adolescents exhibit multiform tendencies and predispositions toward variant and differential patterns of behavior." What is meant here is that it has been observed that young children do not all act in the same manner. A different type of professionally obscure language is found in the writings of some philosophers, such as in those of Heidegger, the contemporary German existentialist philosopher. It is said that his German readers must have his German writings translated into German before they can understand him.

We have emphasized the element of change in language, but again, we must remember that the great body of words is relatively permanent and unchanging. Language is like a tree; its leaves change with the seasons, but its roots are relatively stable. Shakespeare used many words which have become obsolete, but the great body of his vocabulary has the same meaning today as it had in the sixteenth century.

Section VII: Some Errors of Symbolism

In this section we shall note some of the important errors which result from the failure to understand and apply the principles of symbolism studied in this chapter. Our list is not exhaustive, of course, and we shall also have occasion to note other types of errors of symbolism in later chapters. The discussion of the four errors noted in this section will also help to clarify the meaning and implications of the principles of symbolic usage.

1. The magical power of words

This error results from the failure to note that words are mere "noises" which acquire meaning through their association with referents. It is a primitive superstition that the "name" has a mysterious power or magical potency. Primitives believe that words have a causal or magical influence over events. This superstition lies behind the "abracadabra" of the medicine man, the "Open Sesame" which caused the cave door to open for Ali

Baba, and the practice of tribesmen who change their names after being cursed, so that they may escape the evil which has become attached to their names, and thus to themselves. It is common practice for primitives to burn the name of their enemy even after his body has been destroyed. J. G. Frazer, in *The Golden Bough*, reports that the Malagasy soldier refuses to eat kidneys, for the word for kidney in his language is the same as the word for "shot"; thus he believes that he will be shot if he eats kidneys.

Another form of verbal magic is found in the belief that some words are so holy and sacred that they must never be uttered by man. Among the ancient Hebrews the name of God, "Yahweh" or "Jehovah" was "unnamable," and its actual utterance was forbidden in both speech and prayer. God could be spoken of only by the use of the substitute word or surrogate "Adonai," meaning "The Lord." Hades, the Greek god of the world below, was called Pluto (the giver of wealth) in ordinary conversation because people feared to pronounce the dreaded name of Hades. The prewar Japanese believed that the name of their emperor was sacred. A peasant, in ignorance of the emperor's name, named his son "Hirohito" and committed hara kiri when he discovered his error.

Words have no causal influence on events; they can bring neither luck nor disaster through the airwaves set up when they are spoken. But from primitive times until today superstitious beliefs abound. We "knock on wood" after noting our good fortune; the dice player pleads with the dice and uses such endearing expressions as "Little Joe" and "Big Dick" to influence the bounce; the bettor on horses believes in the magical potency of the name. All these exemplify the belief in the magical power of words to influence events.

We may note, finally, the use of *euphemisms*, i.e., the use of an agreeable expression for a disagreeable event. We avoid mentioning the word "death," and say "passed on," "went to his reward," "departed," "sleeping," and so on. These circumlocutions are used to transform evil into good. It is as if our refusal to mention the awesome word would somehow obviate the disaster itself. Euphemisms, however, may also be used in non-magical ways, as noted below.

2. Words as guarantees of existence or value

We often overlook the fact that the referent of a word may be a creation of human imagination. This error has two aspects. We may assume that the existence of a word guarantees the existence of a corresponding thing in space and time. But proof must be offered for the existence of facts; the mere utterance of the word is insufficient. The existence of the word "Devil" does not guarantee the existence of an actual Lucifer or Beelzebub waiting for those who fail to take out the appropriate fire insurance. When we speak of the "State" or "consciousness" as *things* separate and apart from the "entities-in-relation" to which these terms refer, we commit the same error in the form known as *hypostatization* or *reification*.

A second aspect of this error is the assumption that "good" words guarantee the existence of good things and "bad" words guarantee bad things. The manner in which propaganda organizations and advertisers use the emotional associations attached to value words in order to manipulate their audiences requires little comment. Orators and demagogues use attractive or unattractive names in order to mislead us. The proverb says that "we give a dog a bad name and then hang him." Men stand condemned in the public eye merely because they have been called "Reds," "communists," "reactionaries," or "fascists." Similarly, organizations confer "good" names upon themselves in order to mislead the public. A magazine fostering race prejudice was called *The Galilean* and it was published by The Fellowship Press. A communist-front organization which supports aggression by communist nations and opposes defensive measures by anticommunist nations may call itself "The People's Committee for Peace." The use of a "good" name does not guarantee the existence of a good thing.

Euphemisms may also illustrate the use of words as guarantees of facts, as in the use of "tourist" for "third class" on ocean liners or on Russian trains, where "third class" has been changed to "third category," since the Russians have abolished all class distinctions. The use of euphemisms, however, is not necessarily an error of symbolism. Social conventions may dictate the avoidance of words with disagreeable associations, and the substitution of a pleasant term for an unpleasant one may sometimes

give us a more realistic description of a situation, as when a Home for Incurables changed its name to Institution for Chronic Diseases. The new name gave the patients a more hopeful attitude, and it is also more in the spirit of medical science, which may some day find cures for diseases now considered incurable.

But in no case, of course, does the name actually guarantee either the existence or the value characteristics, good or bad, of the referent to which it refers. A rose, as Juliet remarked, would smell as sweet though called by any other name.

3. The "real" connection between words and things

All meanings are arbitrary. Failure to recognize (or denial of) this arbitrariness results in a third semantical error. This error occurs when we think of words as "really belonging" to certain referents, as if there were some indissoluble or "real connection" between them. The error occurs in certain typical forms.

A "young lady" now famous among writers on semantics approached an astronomer shortly after the planet Pluto was discovered, and asked him how it was that the astronomers knew that the newly discovered planet was *really* Pluto and not some other planet. The error lies in the assumption that names "belong" to certain things and to no others. This type of error is also the source of much humor. Thus Gracie Allen asks a male acquaintance whom she had just met to call her "Gracie." To his remonstrance that he hardly knows her, she responds, "Why, just as soon as I was born my mother called me Gracie, and she didn't know me at all."

The belief that some words "really mean" some referents, or that certain things "must" be called by certain names, assumes that the thing could not be called by any other name. To say "Pigs are so-called because they are such dirty animals" illustrates this point. But names seem to belong to things only because they have become associated with these things; the connection is always an arbitrary one.

A variant of this error is found in the belief that communism *really* means one of its definitions, as when it is said that Russia is *really* not a communist state. Or that the form of government in the United States is *really* that of a republic, so that

it is *wrong* to call the United States a democracy. But all names are arbitrary designations for their referents, and if the American people wish to emphasize certain aspects of their government which are called democratic, there is no linguistic law which forbids them from doing so, Custom is supreme in determining the usage of words. No thing can once and for all pre-empt the use of any name for itself.

As previously pointed out, the expression "Things should be called by their right names" does have a legitimate meaning, if we do not interpret "right" names as "real" names. For success in communication, words should be used in their customary meanings. If most people think of a "free" society when the word "democracy" is used, then it is improper for a speaker to call a totalitarian state a democracy merely because he chooses to do so or because he has a peculiar and private undisclosed definition of the term in his mind: The use of words in this manner is dishonest if there is a deliberate intent to mislead people into thinking that the speaker has their referent in mind when he actually has another. This subject will be discussed more thoroughly in the chapter on "definition."

It may be helpful to distinguish the error of "real connection" from the error of "words as guarantees of existence." In the latter error we mistakenly believe that the existence of a word guarantees the existence of the thing to which it refers ("We have the word 'dragon'; therefore, dragons exist now or once existed"). In the former error we find that a word is used to refer to a certain referent and assert that this word and no other can be used to designate this referent, on the ground that the association is a nonarbitrary one.

It is one thing to say that the king of the underworld must be called the devil, because that is his right name; it is a different error when we say that the existence of the word "devil" is in itself proof that there is a king of the underworld.

4. The use of words without referents

Human beings sometimes use words without thinking of the referents to which they refer. This type of evil is sometimes encouraged by educational systems in which students repeat words and formulas without understanding their meaning. Justice O. W. Holmes had this type of error in mind when he

admonished us to "think things, not words." In general, it is good educational practice for students (or readers generally) to translate what they read into their own words in order to be sure that they are avoiding this evil, for "one's own words" usually have clear referents.

George Orwell, the English critic, in *Modern English Writings*, describes this vice as involving the use of "meaningless words." "In art criticism," he writes, "words like romantic, plastic, values, human, dead, sentimental, natural, vitality" are "strictly meaningless, in the sense that they not only do not point to any discoverable object but are hardly expected to do so by the reader." Mr. Orwell exaggerates, but his remarks call attention to a serious fault in the type of writing to which he refers. One may also question the use of the expression "meaningless words," on the ground that a word without meaning (such as "higher-gloob") is, strictly speaking, not a word at all. Mr. Orwell means that writers often use words without having any definite referents in mind.

What we refer to by this error, then, is *not* the use of meaningless expressions, such as are found in the following amusing example of "double-talk" (from the work of the master in this field, David Ross):

We have a lot of *fun*, and do you know, the entrain does not findle the boiler, either. After all, who am I to shrake the leavings? I am a mere bildring. My life is neither frenner or planrate. The pen is the outgrabe of the mome, the hordling always does the gets.

No words are meaningless in themselves, but words are often used without meaning when the writer or speaker uses them without having referents in mind. But the reader should be cautioned against making this charge against a writer, for the unintelligibility of a piece of discourse may be due to his own inadequate vocabulary. "No cenobites are troglodytes" contains words unfamiliar to many persons who speak the English language, but it is unexceptionable as a meaningful sentence.

Confusions also abound with respect to the use of "abstract" words, i.e., words of wide generality such as the words cited by Mr. Orwell. Stuart Chase, for example, often speaks of abstractions as if they were necessarily meaningless because their refer-

ents are not "real enough to be kicked." As examples, he cites such words as "capitalism," "fascism," "communism," and "democracy." But these words have meaning, however they may be used by careless writers and however ambiguous they may be. One should take the trouble to find out exactly what a writer means when he uses these words, though it is undoubtedly true that many persons use them without having any specific referents in mind. When Max Weber writes in his *Sociology of Religion*, "We shall examine the influence of religious ideas on the development of an economic spirit or the ethos (ethics) of an economic system," his language is highly abstract, but he means something by these words. Such highly abstract language may be undesirable in terms of "good style," but that is another matter.

Our point is that we should be sure that we have referents in mind when we use words. The reader may ask himself, for example, just what he has in mind when he uses expressions such as "God is Love" or "Love your enemies." And what specific referents are referred to when it is said that "Capitalism exploits the working class"? The hearer of this statement may suspect that the speaker has no referents in his mind. It then becomes appropriate to ask that the words be translated into concrete language in order to make the ideas clear. The ultimate test of meaning lies in the "cash value" of the words used, i.e., in the actual existences to which they refer.

Exercises

The following exercises should be analyzed and discussed in terms of the material covered in the relevant sections of the chapter. Since these exercises are designed to test the student's comprehension of the text, the relevant principles should be mentioned in connection with the student's analyses.

A. Signs and Symbols

Classify the following signs as natural or conventional:

- a. A chemist dips litmus paper into his test tube. He interprets the sign, red, or the sign, blue, as meaning acid or base.

- b. During the invasion of France in 1940 the Nazis put weird wailing sirens on their Stuka bombers in order to terrify the Allied soldiers.
- c. A work of abstract art which we do not "understand."

B. *The Arbitrariness of Meanings*

1. Humpty-Dumpty said: "There's glory for you." "I don't know what you mean by 'glory,'" Alice said. Humpty-Dumpty smiled contemptuously. "Of course you don't--till I tell you. I meant, There's a nice knock-down argument for you." "But 'glory' doesn't mean 'a nice knock-down argument,'" Alice objected. "When I use a word," Humpty-Dumpty said in a rather scornful tone, "it means just what I choose it to mean, neither more nor less." "The question is," said Alice, "whether you *can* make words mean so many different things." "The question is," said Humpty-Dumpty, "which is to be master—that's all." (Lewis Carroll, *Through the Looking Glass*, Ch. VI.)
2. The Book of Genesis (II, 19-20): "And out of the ground the Lord God formed every beast of the field, and every fowl of the air. And brought them unto Adam to see what he would call them, and whatsoever Adam called every living creature, that was the name thereof. And Adam gave names to all cattle and to the fowl of the air, and to every beast of the field." Mark Twain wrote that one of these animals gave Adam great difficulty and he appealed to Eve for help: "What name shall I give to this animal?" "Call it a horse," answered Eve. "But why a horse?" "Well," said Eve, "it looks like a horse, doesn't it?"
3. Parson Thwackum, in Henry Fielding's *Tom Jones*: "Religion is not manifold because there are various sects and heresies in the world. When I mention religion, I mean the Christian religion; and not only the Christian religion, but the Protestant religion, and not only the Protestant religion, but the Church of England."
4. Our own conclusion is that, if by autocracy is meant government without prior discussion and debate, either by public opinion or in private session, the government of the USSR is, in that sense, actually less of an autocracy than many a parliamentary cabinet. (Beatrice and Sidney Webb, *Soviet Communism: A New Civilization?* Scribner's, 1936, p. 479.)
5. "I believe in democracy, but in a democracy which is made

up of 100 per cent white, Protestant, and native-born American citizens."

C. Etymologies

1. Look up the etymologies of the following words and state whether you consider their etymologies useful or misleading:

a. propaganda	d. gentile	g. liberal
b. varsity	e. bolshevik	h. radical
c. polite	f. pagan	i. conservative
2. Comment on Jespersen's remark that "we get no further at all towards understanding what a tragedy is when we are informed that the word must once have meant 'goat song.'"

D. Growth and Change in Language

George Orwell translates the following passage from *Ecclesiastes* into what he calls "Modern English of the worst sort":
Ecclesiastes: "I returned, and saw under the sun, that the race is not to the swift, nor the battle to the strong, neither yet bread to the wise, nor yet riches to men of understanding, nor yet favor to men of skill; but time and chance happeneth to them all."

Modern English: "Objective consideration of contemporary phenomena compels the conclusion that success or failure in competitive activities exhibits no tendency to be commensurate with innate capacity, but that a considerable amount of the unpredictable must invariably be taken into account." ("Politics and the English Language," *New Republic*, June 17, 1946.)

E. The Errors of Symbolism

Check the following for possible errors of symbolism. Note whether the error involves the Magical Use of Language, Words as Guarantees of Existence or Value, the "Real Connection" between Words and Things, or the use of Words Without Referents. Explain your answers. One of each of these errors will be found in the first four examples.

1. The French call it "*pain*," the English call it "bread," but its real name is "*brod*."
2. An Arab was being cursed by a compatriot. He threw himself on the ground in order that the curse-words might fly harmlessly over his head.
3. You ask, do I favor the "right to work" law which is being debated in the State legislature? Of course I do. The "right

- to work" sounds very good to me. I can't see why anyone would be against the right to work.
4. "For Portsymasser and Purtsymessus and Pertsymiss and Partsymasters, like a prance of findigos, with a shillto shallto slipny stripny." (James Joyce, *Finnegans Wake*.)
 5. The Divine is properly so-called.
 6. Speak of the Devil and he's sure to appear.
 7. In Norway many people believe in trolls. Children say that trolls must exist, for otherwise how could people paint pictures of them?
 8. "Mother, when I was born, how did you know that I was Charlie and not some other little boy?"
 9. The following answers are given by children:
 "Could the moon have been called 'sun' and the sun 'moon?'"—No.—"Why not?"—*Because the sun makes it warm, and the moon gives light.*
 Roc (6½) admits that God might have changed the names: "Would they have been right or wrong?"—*Wrong.*—"Why?"—*Because the moon must be the moon and not the sun, and the sun must be the sun.*
 "But if everyone had called the sun 'moon' and the moon 'sun,' would we have known it was wrong?"—*Yes, because the sun is always bigger, it always stays like it is and so does the moon.*
 "Why is the sun called what it is?"—*Because it behaves as if it was the sun.* (Jean Piaget, *The Child's Conception of the World*, Harcourt, Brace, 1929, pp. 81-4.)
 10. In the fourth inning of a baseball game between the Chicago Cubs and the Cincinnati Reds, the first Cincinnati player made a hit. The narrator, Bert Wilson, announced, "Fans, that was the Reds' first hit, but you will note that I did not mention the fact that the Reds had made no hits in the first three innings. If I had, and the next man had made a hit, hundreds of fans would have written protesting letters to me telling me to keep my big mouth shut."
 11. A gelding is a horse which has ceased to be entire.
 12. Wilfrid Lay, an English writer, was pleading for greater frankness in sex discussion in families. He advocated that parents should not stress concealment of the body in the home; in fact, he urged, "parents should sometimes appear before their children in *puribus naturalibus*."
 13. The United States is not a "great democracy," for our forefathers established a great republic. A democracy is a

country where the people rule directly, not through their elected representatives.

14. It is improper to call the "American Revolution" a *revolution*, because the word really means a fundamental change in the basic social, economic, and political institutions of a country. There have really been few real revolutions in the history of mankind, such as were the French Revolution of 1789 and the Russian Revolution of 1917.
15. From Lewis Carroll's "Jabberwocky":
 'Twas brillig, and the slithy toves
 Did gyre and gimble in the wabe:
 All mimsy were the borogroves,
 And the mome raths outrabe.
16. Wherefore, be it resolved: To resolve every universally considerate wish evoking critical-concept into a reasonably efficacious resistance-eliminating inanimate-device of time-saving-calculability and contiguous-service time-synchronization, that may be factorable from "possibility" to "probability," thus intent to streamline man's competitive-volition, unknown to him, into a scientifically designed direction-of-least-resistance, upon the occasion of his each and every initial-dislodgment from habit-inertia. (R. Buckminster Fuller, *Nine Chains to the Moon*, J. B. Lipincott Co., 1938.)
17. During World War II, a bill before the Illinois legislature proposed that no liquor could be called "whiskey" if it contained more than 50 per cent neutral spirits. A spokesman for the liquor industry stated that stocks of whiskey in Illinois were already low, and that if the bill were passed stocks of whiskey would immediately decrease by 75 per cent.
18. The word "God" has meaning; therefore it refers to something. But the word as we use it refers to nothing else than a supernatural being; therefore, the supernatural being, God, exists.
19. Abraham Lincoln once asked an audience, "If I call the tail of a horse a leg, how many legs will the horse then have?" "Five," they responded. "No," answered Lincoln, "calling a horse's tail a leg doesn't make it one." (Did Lincoln's audience commit an error of symbolism? Did Lincoln also commit a semantical error? Discuss.)
20. Herbert Spencer's definition of evolution: "A continuous change from indefinite, incoherent homogeneity to definite

coherent heterogeneity of structure and function, through successive differentiations and integrations."

21. Spencer's definition was parodied by Kirkman, as follows:
 "Evolution: A change from a nohowish, untalkaboutable, all-alikeness to a somehowish, and in general talkaboutable not-all-alikeness by continuous somethingelsefications and sticktogetherations."
22. In 1937, when Hitler and Mussolini were in power, Stuart Chase collected a hundred responses from various persons as to their reactions to the word "fascism." He asked those questioned to tell him what kind of picture came into their heads when they heard the term. A few of the answers mentioned by Chase were:

Schoolteacher: A dictator suppressing all opposition.

Governess: Obtaining one's desires by sacrifice of human lives.

Lawyer: A state where the individual has no rights, hope, or future.

College student: Hitler and Mussolini.

Schoolboy: War. Concentration camps. Bad treatment of workers. Something that's got to be licked.

Author: I can only answer in cuss words.

Elevator starter: I never heard of it.

Chase then quotes the following definition of fascism by Harold Laski:

"I suggest the conclusion that Fascism is nothing but monopoly capitalism imposing its will on the masses which it has deliberately transformed into slaves. The ownership of the instruments of production remains in private hands."

Chase states that the "student of semantics" will react to this definition as follows:

Meaning in the form of a row of abstractions does not satisfy him. He finds three high-order terms equated and an inference applied to one or all of them: private property = capitalism = fascism. He is immediately suspicious of the identification of three timeless, spaceless, descriptionless entities. He never saw an "ism" imposing its will. He asks what are the referents for "private ownership," "monopoly capitalism" and "fascism." He wonders what is meant by "capitalism imposing its will on the masses," re-

membering that this is a stock phrase in socialist propaganda . . . "Ownership of the instruments of production" troubles him as another stock phrase. He recalls how Berle and Means in their *Modern Corporation and Private Property* show that many legal "owners" of large corporations have nothing to say about their property . . . "Private hands" worries him more. He knows that whatever titles private persons may hold to property in Germany or Italy, the Government jolly well tells them when, where, and how much to let go of.

He is not disposed to argue with Mr. Laski, because the apparent meaning has faded into a series of semantic blanks. Laski is not necessarily wrong; he is saying nothing worth listening to.

But should one not be afraid of fascism and fight against it? The student of semantics is not afraid of evil spirits and takes no steps to fight them . . . If the armies of Mussolini or Hitler invade his country, he is prepared to fight. But he refuses to shiver and shake at a word. (Stuart Chase, *The Tyranny of Words*, Harcourt, Brace, 1938, pp. 188-93.)

Discuss the following:

- a. Of which error of symbolism is Laski guilty, according to Chase?
- b. What is Chase's attitude toward abstractions, such as "fascism"?

The fallacy of symbolism.

Ambiguity

Section I: The Meaning of Ambiguity

There are many obstacles in the path of successful communication, but ambiguity is undoubtedly the worst offender. An ambiguous word is one that may be understood in more than one sense. Thus a symbol may be interpreted differently by speaker and hearer; communicators and communicatees are at cross-purposes and there is no meeting of minds.

Most of the words in any language have more than one referent. This is in many ways a boon rather than an evil, for the range of possible meanings in any limited number of words is greatly increased. Our vocabularies are enlarged when one word has different meanings in different contexts; the single word then becomes the equivalent of many different words. In many cases the differences in referents may be on a "large" scale, as when the word "secretary" refers in turn to "a person who attends to correspondence," "an executive officer in the government," "a writing desk," and "a South African bird with long legs." There are many other words in which the differences in the referents are of a more subtle nature, the shifts in meaning being less obvious, as in the different ways in which the word "man" is used in the following contexts:

All *men* are mortal.

The child is father to the *man*.

Those were the days when *men* were *men*.

What a piece of work is *man*! How infinite in capacity!

The football team is *undermanned*.

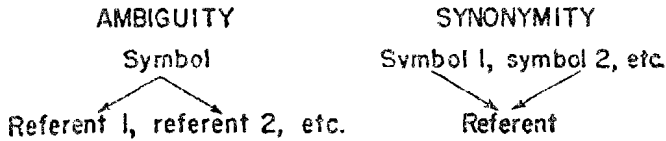
Successful communication occurs only when the reader correctly interprets the symbols used by the writer. In our discus-

sion of the "triangle of reference" we showed how this occurs. When the communication is successful then the communicator and the communicatee have their minds referred to the same referents; they have the same *terms* in mind. They have "come to terms." But ambiguous words are obstacles to such happy consummations; communication is frustrated. We have already noted examples of such frustration in our discussion of the manner in which ambiguous words like "democracy," "equality," and "law" may lead to verbal disagreements. When such failures of communication occur, the speaker and the hearer have different referents in mind.

But note that ambiguity is an evil only when it results in these frustrations of communication. In scientific discourse, where the aim is to achieve clear and precise reference, ambiguity is an unmitigated evil. But there are other fields of thought in which ambiguity may have certain desirable effects. This is the case in poetry, where ambiguity may sometimes contribute to the poetic effect by suggesting a rich aura of implied meanings: "Life is a tale told by an idiot, full of sound and fury, signifying nothing"; "Faith is the substance of things hoped for; the evidence of things not seen." In this manner poetry approximates the effects produced by music, which, among all of the arts, is certainly the most expressively ambiguous. One of the great charms of music lies in the ambiguity with which it expresses moods, so that each hearer may interpret the musical score in his own way. Ambiguity also has more mundane uses. Diplomatic language has developed the art of saying things ambiguously so that failure to agree will be masked by "face-saving" language. Finally, the ambiguous aspects of words are exploited as a rich source of humor. Gagsters and punsters thrive on the double-meanings of words. Our primary interest, of course, is to learn how to avoid ambiguity in scientific discourse.

Ambiguity is the direct opposite of synonymity (the use of synonymous words). An ambiguous word refers to several referents; in synonymity a single referent is referred to by several different words. "Spade" refers to at least two referents: a playing card and a garden implement. Fool, lout, simpleton, oaf, dunderhead, ninny, nincompoop, addle-pate, and dope, all refer to the same referent, or to substantially the same referent,

since few synonymous words are absolutely identical in meaning. The difference between ambiguity and synonymy may be revealed schematically:



Section II: The Analysis of Ambiguity

Though many words have more than one meaning, the context of surrounding circumstances will usually clarify the sense in which the word is used. The initial ambiguity is often completely eliminated by the context. We shall be primarily concerned with examples in which the ambiguity is not eliminated by the context, with a resulting blockage of communication. In the verbal disagreements studied in Chapter I we saw examples of ambiguity that were not clarified by the context, at least not for the persons participating in the discussions. In this chapter we shall examine the different ways in which ambiguity may result in the failure of communication.

When two or more interpretations of an author's language are possible, the reader does not know what is in the author's mind. We should be clear as to the task of the logician in analyzing instances of ambiguity. The logician cannot eliminate ambiguity; his primary task is to call attention to the fact that ambiguity occurs and to show the different ways in which it occurs. The logician can also help to make the reader sensitive to ambiguities in places where ambiguity might be unsuspected. The logician can also advise the reader to find out what was in the author's mind before the reader interprets ambiguous language. The reader's task here may be likened to that of a judge whose task is to decide what the legislature meant by the ambiguous language in a law. The court will investigate the circumstances in which the law was passed, the remarks of legislators concerning the intent of the law, and so on. In other words, the context will be studied for light on the probable meaning of the words.

We shall examine the manner in which ambiguity occurs in the use of words, phrases, and sentences. Ambiguity, as we know, is a fruitful source of humor, and we shall note some of the entertaining aspects of its various forms. Humorists deliberately use the ambiguities of language in various kinds of jokes and "gags." Finally, we shall examine some of the "fallacies" of ambiguity. This aspect of ambiguity is of greatest interest to the logician. The failure to recognize ambiguity often results in misinterpretations of meanings and in erroneous inferences.

Section III: The Types of Ambiguity

I. Simple ambiguity

By *simple ambiguity* we shall mean the fact that single words or phrases may refer to more than one referent, even after we have examined their contexts. Verbal disagreements are based upon this type of ambiguity. Any statement containing a word which is ambiguous in its context exemplifies this vice: "The early Christians were communists." Since the word "communist" has more than one referent in this context, ambiguity exists. "Communist₁" means one who favors a system of social organization in which goods are held in common; "communist₂" means an advocate of "the dictatorship of the proletariat." Before we affirm or deny the truth of a statement we should find out what the writer means. Questions may also involve simple ambiguity, as in "Do you believe in God?" "God" means different things to different persons, and a yes-or-no answer is inappropriate until we learn what referent the questioner has in mind. Spinoza, for example, defined God as "everything which exists." Spinoza was a deeply religious man whose pantheistic philosophy was permeated with devotion to God. The Catholic Church, however, has condemned his pantheism as equivalent to atheism.

Simple ambiguity is closely related to "vagueness," but should be distinguished from it. An ambiguous word has several distinct referents; a vague word lacks precision and definiteness in its reference. Thus, the question, "Has there been any progress during the past 2,000 years?" involves the use of the vague word "progress." The reader spontaneously responds to such a

question with his own questions: "Progress in what sense? In spiritual growth? In the advancement of the common man? In a material sense?" The word "progress" is vague rather than ambiguous, for in each case it means "advancement toward a definite goal," but the question does not specify the goal involved.

Vagueness, rather than ambiguity, will also be found in the following incident. In the summer of 1947 General Eisenhower was reported to have said that "the United States Army is a 'poor second' to that of Russia." Congressman Short asked, "In what sense?" In quantity? In quality? The United States Army has never been equal to the Russian army in size either in war or peace. Here too, "poor second" is not ambiguous, since it means "far behind the first," but its meaning is not precise.

Questions containing vague words cannot be answered without further clarification of their meaning. We should also note how careful thinking may result in the discovery that "clear" words are actually vague. Thus, the question "Is this building moving?" may appear to be clear. But we must ask: "In relation to which frame of reference?" In relation to the sun, this building is moving at a speed of eighteen miles per second. In relation to the earth, however, it is stationary.

Simple ambiguity has two forms, written and oral. The phonetic sound "tiers" may stand for two different words: "tiers" and "tears." An amusing example of oral ambiguity based on this sound is found in the following:

A reporter was describing a scene at the House of Commons to another reporter. "There, on the floor of the house, stood the Prime Minister speaking," he said, "back of him were the members of the Cabinet, in front of him sat the members of the Opposition, and in tiers around him sat the other members of the House."

The second reporter was very young and very earnest. "Not really *tears*," he exclaimed. "Poor chaps!" (Albert Levi and Albert Frye, *Rational Belief*, Harcourt, Brace, 1941, p. 108.)

Simple ambiguity lies at the basis of much humor, especially in puns, as in Wordsworth's remark, "If I had a mind to, I could write like Shakespeare."

2. Amphiboly

"I shall lose no time in reading your manuscript," the noted critic wrote to the aspiring young author. Should the author have been pleased with this message? Would the critic read his manuscript soon or never?

The critic's remark is an example of an amphibolous sentence. Its meaning is ambiguous though no word in the sentence is ambiguous. The ambiguity results from the way in which the words are put together in the sentence.

Amphiboly refers to the fact that the meaning of a sentence may be ambiguous, not because any of its words are ambiguous, but because the grammatical construction of the sentence permits several interpretations as to its meaning. The amphibolous sentence is capable of being understood in more than one sense. This may result in a failure in communication. A sentence combines words in order to express a thought. The referents have a certain relationship in the mind of the speaker. The grammatical construction of the sentence may fail to direct the hearer's mind to the relationship referred to by the speaker. The logician calls the reader's attention to these factors. The grammarian seeks to teach writers how to make themselves clear.

Vivid examples of amphiboly are found in humorous exaggerations of this fault. Thus, the following account was reportedly given by a newspaper reporter, with reference to the departure of the famous prewar dirigible from the Lakehurst airport: "The Graf Zeppelin was leaving the Lakehurst airport. Among the last to enter was Mrs. Smith, lone woman passenger. Slowly her huge nose was turned into the wind. Then, like some huge beast, she crawled along the grass . . ."

Grammarians have noted a type of error similar to amphiboly in the error called "the dangling participle," as in "Zooming along under her own power, Jane was fascinated by the spectacle of the glider before her." The participle "zooming" seems to refer to Jane. The words are unambiguous, but ambiguity results from the manner in which they are put together.

A famous historical source of amphiboly is found in the Delphic oracle, in ancient Greece. The oracle was certainly the most astute diplomat who ever lived and also the Nostradamus

of its time, except that, unlike Nostradamus, the oracular pronouncements were right 100 per cent of the time. This success was due to the use of amphiboly. The oracle was consulted on the eve of great undertakings, in order to obtain its "inspired" predictions as to success or failure. The oracle always retained its reputation for infallibility because of the manner in which it made its pronouncements: "Apollo says that the Greeks the Persians shall subdue." Cyrus, the Persian King, sent messengers to the oracle for a prophecy concerning a projected war. The messengers were informed that "the King yet lives that Cyrus shall depose." The variant interpretations of these statements are obvious.

Amphibolous sentences of the type just noted may be called *completely* amphibolous in that the reader does not know how to interpret them correctly. In most cases, though two or more interpretations are possible, it will generally appear that one interpretation is more reasonable than the others, either from the context or the customs of speech. Thus, when a law court is presented with an amphibolous document, the "reasonable" interpretation will be applied. For example, a licensing agreement between the holder of a patent and the manufacturer provided that the manufacturer would pay the patentee "50¢ a unit for producing 5,000 units or less, and 30¢ a unit for all units of an output of over 5,000 units." The manufacturer claimed that when the output exceeded 5,000 units he was obligated to pay 30¢ per unit for *all* units produced. The court ruled that the agreement meant "50¢ for the first 5,000 units and 30¢ for all units in excess of 5,000." Otherwise the patentee would receive less royalties for a production of 6,000 units than he would receive for 4,000.

It is impossible to state whether a sentence is true or false until we understand its meaning. An amphibolous sentence must be given a definite interpretation before we can judge it as true or false. For example, a man says, "All women are not fickle." By this he may mean either that "some women are not fickle" or that "no women are fickle." If the speaker is available we should question him to determine what he meant. If he is not available, how shall we interpret the statement?

Note that the sentence takes the "All . . . are not . . ." formation. The logician adopts a rule of interpretation here,

stating that all such statements shall be read as if they meant "Not all women are fickle" or "Some women are not fickle," unless he has clear evidence from the context or elsewhere that the speaker meant "No women are fickle." In the sentence "All human beings are not perfect" the speaker probably means "No human beings are perfect," but in "All Russians are not communists" he probably means "Some Russians are not communists."

Other types of amphiboly that require interpretation are such sentences as "All agree with me who are not ignorant of the facts." This may mean either "All who agree with me are persons who are not ignorant of the facts" or it may mean "All who are not ignorant of the facts agree with me." The speaker may mean either one, but in the absence of further evidence, the grammarian will adopt the latter interpretation as the more likely one.

3. Ambiguity in emphasis

A unit of discourse may make different kinds of sense depending upon which of its parts we accent or emphasize. We should always seek to give writings the emphasis which the author intended them to have, but when the writing is ambiguous in this respect, the reader may be unable to determine where the proper emphasis lies. The full and complete meaning of a sentence may even require that we hear it spoken. Thus the invitation "I hope that you will come to dinner" may accent "I," "you," or "dinner" when it is spoken. When you leave, you say, "The dinner was very good." You may accent "dinner." It is for this reason that classroom instruction is superior to mere reading for most students, since the instructor gives oral emphasis to the most important words.

Ambiguity of emphasis occurs when a reader does not know which parts of a writing deserve chief emphasis. Troublesome cases of this sort occur when a writer presents somewhat conflicting points of view, as in Book V of Plato's *Republic*, concerning the nature and status of women in his ideal state. The reader will find "equalitarian" remarks such as, "The only difference between men and women consists in the fact that women bear and that men beget children," and "The differences between men and women do not justify different types of edu-

cation for the two sexes. Women as well as men, should be trained to qualify as rulers of the state." But elsewhere Plato says that "women are inferior to men in all pursuits followed by each." Again, that "men and women possess the same qualities and differ only in their comparative strength and weakness." Does Plato believe that women are essentially the same as men, or does he hold that the weaker sex is the inferior sex? No one can answer this question with certainty.

When summaries are made of writings, ambiguity of emphasis may create similar difficulties. The summarizer should emphasize the most important elements. When excerpts and quotes are given they should be truly representative of the author's meaning. Summaries, however, open the door to many errors of carelessness or deliberate misinterpretation, to be discussed further under the "fallacies of ambiguity." Book reviewers are often accused of "not having read the whole book" when the author thinks that his position has been misinterpreted. The reviewer's misinterpretation, however, may be due in whole or in part to the author's failure to make his points clear. Or the author may state somewhat conflicting positions, as in the selections from Plato's *Republic*.

A different type of problem concerning emphasis or "accent" occurs in problems of punctuation. Literary scholars seek to interpret Shakespeare's meanings accurately, but there are variant readings of many of the plays. The Folio and the Second Quarto editions, the oldest sources, differ in many important respects. Consider the different possible readings of Hamlet's speech to Guildenstern (II, 2, 315). The Neilson and Hill version of the speech, based upon the Quarto version, is stated as follows:

What a piece of work is a man! How noble in reason! How infinite in faculty! in form and moving! How express and admirable in action! How like an angel in apprehension! How like a god!

The Everyman's edition, following the Folio version, prints the lines as follows:

What a piece of work is man! How noble in reason! how infinite in faculty! In form and moving how express and admi-

rable! in action how like an angel! in apprehension how like a god!

4. The ambiguity of significance

By this type we refer to statements whose semantical meaning may be clear, but whose factual significance is not. A statement may contain no ambiguous words, its sentence structure may convey an unambiguous meaning, and it may contain no ambiguities of emphasis. But its significance may be "ambiguous." As an illustration, consider the statement that there were 454 deaths due to traffic accidents in the United States during the Thanksgiving holiday weekend last year. The significance of such a statement is ambiguous in many respects. An isolated fact means something, of course. We all deplore the large number of deaths reported. But its full significance would require knowing whether the number was higher or lower than the number killed during the previous year's holiday weekend, and whether the figures for a non-holiday weekend are higher or lower.

It should be apparent that alertness to this kind of "ambiguity" is almost synonymous with the scientific attitude. Every statement whatsoever will have different kinds of significance depending upon its context or surrounding circumstances. It should also be obvious that this kind of "ambiguity" is not a genuinely semantical problem. We deal with it here only because it concerns a kind of uncertainty to which readers should be alerted, and because ambiguity in its broadest sense refers to doubtfulness or uncertainty.

Many other examples of such ambiguous isolated statements come to mind. "There are 3 million unemployed in the United States." Up or down since last month? In comparison with last year? What is the normal number of unemployed even in periods of "full employment"? Many statements are ambiguous to the uninitiated though not to the well-informed. "You have 5 billion germs in your mouth." What is the significance of that fact to a non-physiologist? In all the examples cited we find statements whose referential meaning is unambiguous, but whose significance is subject to varying interpretations.

The significance of many statements is ambiguous until we

answer the questions: "Who said it?" and "under what circumstances?" In the fall of 1947 a United States Congressman said, "We will be at war with Russia in one month." Who was the speaker? A responsible or an irresponsible talker? When we listen to criticism of the foreign or domestic policies of the federal administration, we should of course judge these criticisms on their own merits, but we should also be concerned with the background of the critic. Is he a member of the opposition party? Is he blindly partisan? In the absence of coercive evidence we will give greater or lesser weight to criticism depending upon the stature of the critic. If the speaker is thought to be impartial, greater weight will be given to his criticism. In a law court great weight is given to statements which are called "admissions against one's own interest."

Another important distinction concerns the question as to whether a statement is being made in jest or in earnest. "Smile when you call me that" is a type of comment which emphasizes the ambiguity of significance. Persons whose humor is "dry" often make ironical or sarcastic statements that should not be interpreted literally.

An amusing example of the ambiguity of significance occurred when the late Heywood Broun, a wit among drama critics, once wrote that a certain actor, *J*, was "the world's worst actor." Broun was sued for libel and acquitted. Sometime later, *J* appeared in another play, and Broun, reporting the performance, wrote: "Mr. *J* was not up to his usual standard last night."

Section IV: The Fallacies of Ambiguity

Thus far we have noted four different types of ambiguity. When confronted with ambiguities we are not certain as to how we should interpret (1) single words or phrases, (2) the sense of a sentence, (3) the emphases or accents desired by the writer or speaker, or (4) the significance of a statement. The careful reader will be alert to the presence of these uncertainties. He will ask the appropriate questions in order to get information that will help to interpret the statements correctly.

A fallacy of ambiguity is a distortion of meaning or an error of reasoning based upon an incorrect interpretation of

an ambiguous word or phrase. These errors of reasoning usually occur in use (by the writer). Distortions of meaning, on the other hand, occur in interpretation (by the reader).

Note that the presence of ambiguity is not, in itself, an "error." If a friend tells us that he shot a secretary (meaning a bird) on his last safari to Africa, we may or may not be aware of the ambiguity of the word "secretary." If we jump to the conclusion that he shot a beautiful female of the human species, this would be an error resulting from our faulty interpretation of the ambiguous word. We shall now examine two major fallacies arising from the various types of ambiguity: equivocation and accent.

1. Equivocation

The fallacy of equivocation is an error of use, rather than of interpretation, i.e., it is committed by writers and speakers rather than readers and listeners. It occurs when a writer (or speaker) uses an ambiguous word (or root or phrase) in more than one sense in a given unit of discourse, such equivocal use resulting in an unjustified inference. Some examples: A speaker says: "I am sure that communists really believe in God. It is generally agreed that for its followers communism is a religion, and religious people believe in God." The term "religion" is used in two different senses. Communism is a religion in the sense that its followers show an ardent devotion and fidelity to its tenets, but it is not a religion in the traditional sense of "conviction of the existence of a Supreme Being." The failure to distinguish these meanings resulted in an unjustified inference.

Our second example involves the ambiguous term "law." In its legal sense law means a rule regulating human conduct established by an appropriate governing body. In science, a law refers to the uniform behavior of natural events, i.e., to an order or pattern in nature that is regarded as unvarying under the given conditions. An example is the law of gravitation. It is impossible to "violate" such a law, nor can it have exceptions, for if there is an exception the behavior is not uniform and there is no law. A convenient way of distinguishing the two senses of law is to say that a law of nature is a *description* (of nature); a

legal or civil law is a *prescription*, a command. Now suppose one were to argue as follows:

Science has discovered many laws of nature. This is proof that there is a God, for a law implies the existence of a lawgiver, and God is the great Lawgiver of the universe.

The term "law" is used equivocally in this argument. Law in the sense of an order or command implies the existence of a lawgiver or commander, but law in the sense of a description does not.

Equivocation may of course be used deliberately for the purposes of wit and humor. "Your argument is sound, nothing but sound." Thus Benjamin Franklin's pun, "If we don't hang together, we'll hang separately." Or the absurd syllogism, "Some dogs have shaggy ears. My dog has shaggy ears. Therefore, my dog is some dog."

Note that equivocation can occur only if the ambiguous term is used at least twice in the same unit of discourse. When an ambiguous word is used only once, this is simple ambiguity. It goes without saying that equivocation should be avoided in our discussions. A word should be used in the same sense throughout a unit of discourse. If we do not use our words consistently there can be no communication or reasoning. xv

2. Accent

The fallacy of "accent" is an error which results from giving an obviously improper accent or emphasis to the words in a sentence or to the ideas in a unit of discourse.

Such improper accenting or distortion of meaning may be done deliberately, in order to deceive, but usually occurs where there is ambiguity of emphasis. Misinterpretations may then occur because of careless writing or careless interpretation. We shall note three typical ways in which the fallacy occurs:

a. The incorrect emphasis of the words in a sentence

The commandment says, "Thou shalt not bear false witness against thy neighbor."

If one were to stress the word "neighbor," implying that it is permissible to bear false witness against those who are not our neighbors, this would be an obvious misinterpretation.

b. The incorrect interpretation of amphibolous sentences

If one were to interpret the example given earlier (p. 50) as meaning that *Jane* was zooming along under her own power, the amphibolous sentence would be misinterpreted.

c. Incorrect summaries

When a summary is made of an author's statements, it should represent his most important thoughts. When a unit of discourse is improperly summarized, the fault may lie, of course, with the author, whose meaning was not clear. On the other hand, the summarizer may distort the author's meaning either carelessly or with the intent to deceive. We shall now examine some of the forms in which this type of accent occurs.

The reader should always be on the alert when excerpts from a writing are presented. Dishonest examples of "excerpt-lifting" abound. A dramatic critic writes that he "liked all of the play except the lines, the acting, and the scenery." He is quoted as having said that "he liked all of it." Ironical remarks are open to this kind of misinterpretation. A schoolteacher tells her civics class that "communism is the best type of government if you care nothing for your liberty or your material welfare." She is quoted as having said that "communism is the best type of government." Unwitting errors of the same sort occur when a student fails to distinguish between a lecturer's own views and those which he quotes, or even between a speaker's own views and those which he attacks.

The careful thinker will always be on his guard against quotations taken out of their context and he will ask, "Let's have the whole of that quotation." This does not mean that quotations are improper, but only that quotations should be fair and accurate representations of the meaning of the author.

Newspaper headlines purportedly summarize the news, but may distort the meaning by improper emphasis. The "headline reader" is thereby misled. "Let me write the headlines," an editor once said, "and I care not who writes the news." Advertisements may achieve similar results by the use of large case type in bold letters. The "come-on" elements will be presented in large letters, and the less attractive ones will be minimized by the use of small type. A famous example is one that was

used by Barnum to advertise the first Canadian concert of the Belgian violinist, Ysaye. It read,

**THEIR EXCELLENCIES,
THE PRINCE AND PRINCESS OF BELGIUM**
have been asked whether they
**WILL ATTEND THE CONCERT OF YSAYE,
WORLD'S GREATEST VIOLINIST**

A form of summary called "special pleading" or "stacking the cards" is perhaps of greatest importance in this connection. Speakers emphasize only those elements in a report which suit their purposes and omit the rest. This may be permissible practice for debaters and lawyers who seek to win a case, but it is not in the spirit of the seeker after truth. Thus, in the days when India was struggling for its independence, rioting was frequent. A pro-Indian spokesman on a radio panel was denouncing the British for their callous disregard of elementary decency and reported an incident in the House of Commons in which the Conservative members of parliament "stood up and cheered" when informed that the British Army in India had killed 500 Indians. His audience was profoundly shocked by this report. But another speaker on the same program then read from the full Parliamentary report of the incident. This report stated that many British soldiers had been killed during the rioting, that about 500 Indians had been killed, and the report ended with the Prime Minister's declaration that the government intended to preserve law and order at all costs. (Cheers from Conservative benches.)

Accent, of course, is sometimes a fruitful source of humor when the incorrect interpretation of accent or emphasis is deliberate. Thus, Humpty-Dumpty says to Alice: "They gave it me—for an unbirthday present." "I beg your pardon?" Alice said with a puzzled air. "I'm not offended," said Humpty-Dumpty.

Another: "Would you—be good enough"—Alice panted out, after running a little farther, "to stop a minute—just to get one's breath again?" "I'm *good* enough," the King said, "only I'm not strong enough. You see, a minute goes by so fearfully quick. You might as well try to catch a bandersnatch!"

Exercises

I The Four Types of Ambiguity

A. Simple Ambiguity

1. Find seven different senses of the words "right," "good," and "fast."
2. Find the important ambiguous words in the following questions. Show how each question might be answered "Yes" and "No" and thus lead to verbal disputes.
 - a. Were the early Christians communists?
 - b. Do conservative senators vote right?
 - c. Will Hitler be regarded as a great historical figure by future historians?
 - d. Is there "rock and roll" music in this room *now*?
 - e. Is the inside of a ripe watermelon red before it is opened?
3. Identify the ambiguous terms in the following, and state two senses in which these terms may be understood:
 - a. John just broke a record.
 - b. I have two diamonds, two spades, eight clubs, and one heart.
 - c. A cub reporter was assigned to report a social gathering. "Among the most beautiful young ladies present," he wrote, "was our genial mayor, J. S. Zipf." When asked to explain, he insisted, "Well, that's where he was."
 - d. "Beauty is truth, truth beauty,"—that is all
Ye know on earth, and all ye need to know. (Keats)
 - e. Here the Red Queen began again. "Can you answer useful questions?" she said. "How is bread made?"
"I know that!" Alice cried eagerly. "You take some flour—"
"Where do you pick the flower?" the White Queen asked.
"In a garden or in the hedges?"
"Well, it isn't picked at all," Alice explained, "it's ground—."
"How many acres of ground?" asked the White Queen.
"You mustn't leave out so many things." (Lewis Carroll, *Through the Looking Glass*, Chapter IX.)
(Which special type of simple ambiguity is found in this item?)
4. In the following examples is the "word-trouble" vagueness or ambiguity? Explain your answers. (If it is ambiguity, point out two meanings of the ambiguous term.)

- a. Even in the summertime one should not use too much salt.
 - b. A statute provides that no vehicles shall be allowed in a public park.
 - c. Rent control is inconsistent with the American way of doing things.
 - d. Socialism is not a democratic type of political system.
 - e. Is semantics a science?
 - f. Thomas Jefferson hoped the United States would have a rebellion every twenty years.
 - g. Bishop Gore: "Christianity has not failed; it has never been tried."
Graham Wallas: "A religion that can exist for 1900 years without being tried has failed."
 - h. The trouble with common sense is that it is so uncommon.
5. Criticize the following in terms of the necessity for successful communication:

A speaker at a meeting of philosophers stated that he had found that every philosopher who uses the words God and Religion means something different from what other philosophers mean. But, he argued, this was quite proper, since every person who uses these words actually does mean something different from what other people mean.

B. Amphiboly

Point out at least two different interpretations of the amphibolous sentences below and note which interpretation seems most reasonable to you. The first example indicates the general method of analysis.

1. Some years ago, a *Chicago Daily News* sportswriter wrote that Jim Jeffries, in Hollywood to make a movie, was asked, "I say, Jeff, do you think you could whip Joe Louis?" "Son," answered Jim slowly, "I've whipped better men than Joe Louis." "And right here," said the writer, "came the argument. Did the old boilermaker mean that he had whipped better men than Joe Louis IS or than he HAS whipped?"
2. "Hercules the dragon will slay."
3. Wanted: Young girls to sew lace trimmings on the eleventh floor.
4. After the general watched the lion perform, he was taken

to the city hall and fed twenty-five pounds of meat before a large crowd.

5. While we were eating a young man the son of the proprietor came in.
6. Serve the meat when thoroughly stewed.
7. Newspaper headlines:

U. S. MISSIONARY	HALT WORK ON
HELD BY REDS IN	FILM TO HONOR
MOSCOW SAFE	U. S. WAR HEROES
8. How much is 3 times 2 plus 4?
9. All men are not evil.
10. "Where never is heard a discouraging word, and the skies are not cloudy all day."
11. All are prejudiced who know only one side of the facts.
12. An insurance policy read, "This policy shall be incontestable on no grounds other than non-payment of premiums."
13. In a lease given by White to Smith, Robinson guaranteed that Smith would fulfill his obligations, in the following document: "I hereby bind myself to White for the true and faithful performance of the agreement on the part of Smith in case Smith should die within three years I agree to pay up to that time and deliver the property to White as above stated."
14. From Kant's *Fundamental Principles of the Metaphysic of Morals*:

In this manner, then, results a harmony like that which a certain satirical poem depicts as existing between a married couple bent on going to ruin, "O, marvellous harmony, what he wishes, she wishes also"; or like . . . the pledge of Francis I to the Emperor Charles V, "What my brother Charles wishes, that I wish also (viz. Milan)."

C. *Ambiguity in Emphasis*

Note the manner in which the following items may take on different meanings when we accent different words, by punctuation or otherwise:

1. Last summer Susan went to a pretty little girl's camp.
2. Nothing is too good for you.
3. From the collegiate magazine, *Ohio State Sundial* (quoted in *Time*, Nov. 11, 1946.):

HE: I suppose you dance?

SHE: Oh, yes, I love to.

HE: Great! That's better than dancing.

4. Woman without her man is a beast. (Hint: Try using an exclamation mark after "woman.")
5. In an English class, the teacher was explaining the use of the past perfect tense in "had had." An exercise was given to John and Jim involving the use of "had" and "had had." The result: "John where Jim had had had had had had had had had had had had had the teacher's approval." Interpret the sentence by supplying the proper punctuation marks in order to give it sense. (Hint: Use a semicolon in the sentence.)
6. The Elizabethan translators of the Bible always italicized words which the translators added to the text in order to make the text clear. In I Kings, 13:27 we find the following: "And he spake unto his sons, saying, Saddle me the ass. And they saddled *him.*"

D. The Ambiguity of Significance

Disregard any possible semantic ambiguities in the following, and note two different interpretations of the significance of the statements.

1. A sea captain and his first mate alternated in writing the happenings of each day in the ship's log. One day the mate drank too much, and the next day he found the entry, "The mate was drunk today." He was very much annoyed, but the captain justified the entry on the ground that the entry was true. The next day the captain (who was a sober man) opened the log and found the mate's revenge in the notation, "The captain was not drunk today."
2. Department store sales in dollars are two per cent higher than last year during the same month.
3. The United States has a stronger military establishment today than it had in 1953.
4. You will find that congressmen from the farm states pay more attention to the demands of their constituents than they do to the broader problems of the general welfare.

II The Fallacies of Ambiguity

A. Equivocation

1. In the following examples, find the term which is used in two different senses, and state the two meanings:
 - a. Business is business.

- b. Those were the days when men were men.
 - c. Lawyers tell us that the common law has two branches: the criminal law and the civil (noncriminal law), and yet they frequently distinguish the common law from the civil law.
 - d. "In the United States we have political freedom; in Russia they have economic freedom. Since both kinds of freedom are desirable, the United States should move toward Russia's economic freedom, and Russia should move toward our political freedom."
 - e. Love, as in tennis, means absolutely nothing.
2. In the following, explain how the fallacious conclusion is based on the use of a term in more than one sense:
- a. Since tall basketball players are tall men, it must follow that good basketball players are good men.
 - b. A poor man does not have the right to compel his rich brother to help him financially, so he shouldn't feel that he has any right to such help.
 - c. A crust of bread is better than nothing. Do you also agree that nothing is better than true love? Then you must agree that a crust of bread is better than true love.
 - d. No news is good news. Strikes and lockouts are no news. Therefore, strikes and lockouts are good news.
 - e. The maintenance of a nuisance is, of course, a crime. Now, Junior is a little "nuisance." Therefore, his maintenance is a small crime. (How many terms are used equivocally in this one? Explain.)
 - f. Improbable events happen almost every day. But what happens almost every day is a very probable event. Then improbable events must be very probable events.

B. *The Fallacy of Accent*

1. A whiskey is widely advertised under the name BONNIE ANGUS, A BLEND. The law requires that the label state an analysis of the contents. This reads: "ALL THE WHISKIES IN THIS BOTTLE ARE AT LEAST 5 YEARS OLD.
28% whiskey, 72% neutral spirits."
2. Plato said that women are always inferior to men.
3. In an article entitled "The Ethical Teachings of Jesus," which appeared in the *Outlook*, in 1910, Dr. Lyman Abbott, pastor and publicist, argued as follows to prove that Christianity is not hostile to the rich man:

My radical friend declares that the teachings of Jesus are not practicable, that we cannot carry them out in life, and that we do not pretend to do so. Jesus, he reminds us, said, "Lay not up for yourselves treasures upon earth"; and Christians do universally lay up for themselves treasures upon earth; every man that owns a house and lot, or a share of stock in a corporation, or a life insurance policy, or money in a savings bank, has laid up for himself treasures upon earth. But Jesus did not say, "Lay not up for yourselves treasures upon earth." He said, "Lay not up for yourselves treasures upon earth *where moth and rust doth corrupt and where thieves break through and steal.*" And no sensible American does. Moth and rust do not get at Mr. Rockefeller's oil wells, nor at the Sugar Trust's sugar, and thieves do not often break through and steal a railway or an insurance company or a savings bank. What Jesus condemned was hoarding wealth. (Reported by Upton Sinclair in *The Profits of Religion.*)

4. A newspaper headline:

ATOMIC WAR

unlikely says senator

5. The professor made the following comment on a student's thesis: "Your thesis is both good and original. Unfortunately, the good things in it are not original and the original things are not good." If the student were an expert excerpt-lifter, how might he commit the fallacy of accent?

The Uses of Language

Section I: Neutral, Emotive, and Directive Words

In Chapter 2 we examined the manner in which words act as symbols for referents. The types of referents symbolized by words are things, ideas, states of mind, emotions, relations, attributes of things, and activities. When words act as symbols for referents, we say that symbols are used in a "cognitive" or "referential" manner. Words are used in this manner whenever we wish to communicate information to others. But the communication of information is only one of the purposes for which human beings use language. Language is also used to evoke emotional attitudes and feelings and to direct the activities of others.

With rare exceptions all words symbolize referents in the "cognitive" manner. But in addition to such references the speaker may wish to express his own emotional attitudes, to arouse the emotional attitudes of others and to get others to act in a certain way. We shall therefore speak of the three uses or purposes of language: the informational use, the expressive use, and the directive (or practical) use. (The expressive use has two aspects, the expression of the feelings of the speaker and the evocation of feelings in the hearer.)

X-X-X
=

Words thus have three functions. They are symbols which point to referents. But they may do more than that. "To close" refers to an activity. But when the verb is used in its imperative sense, as in "Close the window," it calls forth activity on the part of others and becomes a "directive" word as well as a referential one. Similarly, some words may stir emotional attitudes in the hearer. The word "kiss," for example. This word is a symbol for an activity, the act of osculation, whereby two persons salute each other mutually by the touching of the lips. But in addition to its referential function, the word may stir an

emotional attitude in the reader. When words have the purely (or almost purely) cognitive or intellectual function, we shall call them neutral symbols. When they stir emotional attitudes we shall call them emotive symbols. Directives form a third group.

Whether a word has a neutral or emotive significance to a hearer (or speaker) depends upon the past experiences of the individual. The word "moon" has a neutral meaning to an astronomer, an emotive meaning to a lover. "Sex" has a neutral meaning to a biologist, an emotive meaning to an adolescent. The distinction is a relative one, depending upon the particular experiences of the individual. A word may be neutral to an individual in one context, emotive in another; neutral at one time and emotive at a later time. "Bread" was a neutral word for Frenchmen before 1940; an emotive word in 1945. These individual associations with words are the basis for the "word-association" tests used by criminologists in crime detection. Words associated with the crime will arouse emotional responses in the guilty person, whereas they will be neutral to the innocent.

Thus words are "neutral" or "emotive" depending upon the effects which they have on us, not because of characteristics inherent in the words themselves. Nevertheless, since there are large areas of experience shared by most human beings within a group, we can reasonably presuppose that *some* words will tend to arouse emotional responses in the hearers. "Pencil" and "paper" are neutral words to most persons, but words such as "God," "atheist," "love," "Red," and "Fascist" will be emotive. These emotive words arouse attitudes of "for" and "against," approval or disapproval.

The importance of context should also be emphasized. When a political scientist writes that "Caesar aspired to be dictator" or "Mussolini was the dictator of Italy," the word "dictator" has a primarily neutral significance, though emotional overtones may not be altogether absent. But when a well-known Chicago newspaper constantly referred to Franklin Delano Roosevelt as a "dictator," the word had a primarily emotive significance. The newspaper sought to arouse the feelings of fear and hatred in the reader. In order to know whether a word has a neutral

or an emotive significance for a speaker, we must know something about his background, intention, and purposes.

Section II: The Three Purposes of Discourse

There are three major uses or purposes of language: the informational, expressive, and directive. We speak in order to inform others ("The diameter of Betelgeuse, the largest star, is 300 times that of the sun." "Jane left for Florida yesterday.") We speak to express our feelings ("Great!" "Bravo!" "The dirty dog!") or to affect the feelings of others, as in tales of horror, or in poetic lines such as "Comes the blind Fury with the abhorred shears, and slits the thin-spun life." Finally, we speak in order to influence the actions of others. ("Do unto others as you would have others do unto you." "Release that woman!") All of these uses are indispensable in communication. Man is a rational animal, but a large part of his speech and thought is concerned with nonrational matters. In our social relations we greet people with conventional expressions, we tell anecdotes to amuse our friends, and we state our feelings of approval and disapproval for a host of things and activities.

It is doubtful whether any person uses language in a manner which exemplifies only one of the purposes noted. Our purposes usually are mixed. Consider the sentence, "Capitalism is a horrible conspiracy to exploit the workers and to grind the faces of the poor." Assuming that the speaker sincerely means what he says, we shall find all of the uses of language in this unit of discourse. The speaker wishes to inform his hearers that capitalism has certain effects on the lives of human beings. (His language is, of course, ill-adapted to its informative purpose.) The sentence is also expressive. We detect that the speaker is emotionally moved by the "crimes" of capitalism; his sentence is a kind of agonized cry. The words are also intended to affect the feelings of the hearer so that he will sympathize with the victims. Finally, the speaker has a directive purpose in mind. He wishes to move the hearer emotionally so that the hearer will do something about the plight of the workers and the poor.

With this reminder that all the uses of language may be found in a single unit of discourse, we turn to a detailed examination of the purposes of discourse. Though language is mixed, the mixture is made up of distinguishable elements.

1. The informative purpose of discourse

The desire to inform others concerning facts, i.e., that something is or is not the case, is obviously a major purpose of communication. Little comment will be required, except to note the types of words which best fulfill this function of discourse. If it is one's purpose to inform others concerning facts, neutral words * will be most appropriate, since emotive words * may arouse the reader's emotions and interfere with his understanding of the facts. Emotion tends to distort the judgment; it is also a highly individual factor, and emotive words may affect different hearers in different ways. In the ideal type of scientific discourse, then, emotive words will be eliminated insofar as this is possible. It would be impossible, however, to dispense with all words having emotional significance for readers of books on contemporary political issues, for many key words will inevitably arouse emotions in some readers. Vague emotive terms such as "reactionary" should be avoided, and words like "communism" should of course be used with great caution. But since some persons *are* communists, it is merely a matter of pure information to call them such, even though the word is also an emotive one for many readers.

The speaker who desires to inform will also avoid "question-begging" epithets, i.e., words which prejudge facts, or take disputed conclusions for granted. An example of this occurs when we refer to an accused person as "that criminal" before he has been proved guilty. Good informative language will be made up of statements which are readily verifiable. This point is constantly applied in courts of law. If a witness states that an injured man "has not walked normally since the accident," an objection will be raised to the use of the word "normal." The witness should describe the facts, the exact manner in which the injured man walks. "Not normal" prejudges the issue; testimony should describe facts on which the jury may base its own judgments.

2. The expressive purpose of language

Language may be used to express one's own feelings or to affect the feelings of others, or both. Emotive words are often

* That is, words that would be typically considered as such.

appropriate in this use of language, but we should bear in mind that the types of words used are not reliable indicators of the purpose of the speaker. The fact that a speaker uses emotive words does not prove that he is expressing his own feelings or that he desires to affect the feelings of others; contrariwise, he may use neutral words when he wishes to stir emotion. We are presently concerned with the *purpose* we call expressive, and not with emotive words as such.

a. The desire to express one's own feelings

We use language in spontaneous expressions of feeling, as in "Ouch!" ~~or the groan of the patient in the dentist's chair.~~ Profanity furnishes many examples of this use of language, ~~for example, "Damn it!"~~ Astonishment is spontaneously expressed in words like "Bro-ther!" Frequently the use of language in this manner appears to be without the intent to communicate anything to others. But when we say "How terrible!" or "How perfectly divine!" we not only express our own feelings, but we also indicate that the referent has a certain valuable or disvaluable quality. We thus communicate some information, even though very little.

We may also note a type of expression which appears to be "talk for talk's sake," a kind of perpetual motion of the larynx. Some people may talk just to "let off steam" or "to get a load off their chests." Such expression of feelings has a practical value in acting as a safety valve for pent-up emotions. The Catholic confessional and the session in the office of the psychiatrist may make use of this type of expression for therapeutic purposes.

The presence of the "self-expressive" purpose of language is not always obvious. Poetry is often written for self-expressive purposes, and so also are many sentences written by critics of poetry, as in the rhapsody:

Each poet, from Homer to our own day, has been to some extent and at some point, the voice of the movement and energy of poetry; in him poetry has for the moment become visible, audible, incarnate, and his extant poems are the record left of that partial and transitory incarnation. (Mackail, *Lectures on Poetry.*)

The writer is expressing his feelings in these remarks, in addition to whatever other purposes we may find. Frequently, too, we find writers who fall in love with words and use them because of the emotional satisfaction derived from their use. Goethe, in discussing free will, said, "The word 'freedom' sounds so beautiful, that we cannot do without it, even though it should designate an error."

b. The desire to affect the feelings of others

Various motives are included within this aspect of expressiveness. We may seek sympathy from the hearer or desire that he share in our gladness. We may seek to stir his emotions as a means to a practical end, with an ultimate directive purpose in mind. This very important use of expressive language will be more fully dealt with under the "directive" purpose. Another very important use of this aspect of expressive language is the "poetic use," which we shall use in a broad sense as referring to the creation of literary works for artistic purposes. The poet's primary purpose is to convey an experience to the reader. It is not the poet's primary aim to instruct us through the communication of information or to move us emotionally so that we will act, but to affect our feelings, attitudes, intelligence, and imagination in such a manner that we will live through an enriching experience as an end in itself.

We must remember that the purposes of discourse are never pure and rarely simple. The poet may also communicate information, and he may also arouse our desire to correct social maladjustments, as in Steinbeck's *Grapes of Wrath*. But unless he succeeds in what we have called the poetic function of language, his work will be a tract, and not a poem.

We must repeat again that though some words are most appropriate for a particular purpose of language, this is not a "one-to-one" relationship; that is, types of words and the purposes of discourse are not correlated as a button is correlated with a buttonhole. The poet does not necessarily use a "poetic" language. In the past, of course, academicians sometimes promulgated rules concerning the kinds of words they considered admissible in poetry. To cite one example, in France, during the 1820's, only "noble" words were considered appropriate in poetry. Lytton Strachey (*Landmarks in French Literature*) states

that the use of the common word *mouchoir* (handkerchief) actually produced a riot in Paris during a performance of *Othello*. But the idea is still prevalent that poetry uses only emotive words. Consider, for example, the following experiment by Thouless (~~How to Think Straight~~, Simon & Schuster, 1939). Thouless took the lines from Keats' "Eve of St. Agnes,"

Full on this casement shone the wintry moon,
And threw warm gules on Madeline's fair breast,

and rewrote them, substituting neutral words for the emotive ones, to read,

Full on this window shone the wintry moon,
Making red marks on Jane's uncolored chest.

Thouless triumphantly noted that the poetic effect disappeared. But his lines are a parody and do not prove that poetry cannot be written except in emotive language. The poet seeks to evoke feelings and attitudes and will thus make liberal use of emotive words, but such words are not necessary to create poetic effects. ~~It is simply not true that poetry must use~~ "poetic" words. Robert Frost writes poems containing an unusual amount of neutral words, as in the first lines of "The Death of the Hired Man" (*Complete Poems of Robert Frost*, Henry Holt and Company, 1949):

Mary sat musing on the lamp flame at the table
Waiting for Warren. When she heard his step,
She ran on tiptoe down the darkened passage
To meet him in the doorway with the news
And put him on his guard. "Silas is back."

The poet aims at an effect in the mind of the reader. If he achieves his aim he has created a poem.

3. The directive purpose of language

The directive purpose refers to a speaker's desire to arouse others to action. To this end he may use the type of words we have called "directives," such as verbs in the imperative mode. Thus: "Vote for Zipfl!" "Live dangerously!" "Workers of the

world, unitel!" But the directive purpose may be present without the use of such directives, or "motivators." Frequently, the speaker who wishes to get others to act will choose to accomplish his purpose in a more subtle manner, for fear that a direct appeal may cause suspicion or resentment. Every parent has used the method of suggestion rather than direct appeal to get action from a small child: "Now, you wouldn't want . . . would you?"

But the readiest manner in which speakers get individuals to act without the use of directive words is through an appeal to the emotions. Psychologically, a very close connection is found between our emotions and our tendencies to act, since all emotions tend to seek fulfillment in action. Love and hate make us want to do something. Our resentment against injustice or what we conceive to be injustice stimulates us to take up arms against it. The speaker who wishes action will thus seek to stir emotions as an indirect means of achieving his purpose.

A classical example of the manner in which emotive language is used to stir action is found in Mark Antony's funeral oration in Shakespeare's *Julius Caesar*. Here are a few lines from the oration:

If you have tears, prepare to shed them now.
 You all do know this mantle: I remember
 The first time ever Caesar put it on;
 'Twas on a summer's evening, in his tent,
 That day he overcame the Nervii:
 Look, in this place ran Cassius' dagger through:
 See what a rent the envious Casca made:
 Through this the well-beloved Brutus stabb'd;
 And as he pluck'd his cursed steel away,
 Mark how the blood of Caesar follow'd it,
 As rushing out of doors, to be resolved
 If Brutus so unkindly knock'd, or no;
 For Brutus, as you know, was Caesar's angel:
 Judge, O you Gods, how dearly Caesar loved him!
 This was the most unkindest cut of all.

The Roman mob finally leaves Antony, resolved to wreak their vengeance on the traitors who stabbed their beloved Caesar, whom they had previously suspected of the desire to become a dictator over them.

Emotive words and the expressive use of language are thus well adapted to stirring emotion which results in action. But neutral words and the informative use of language may also stir emotional attitudes which lead to action. A prospectus which states that "thousands of your fellow-Americans are making thousands of dollars each year raising minks" will stir the emotion of cupidity and lead to investment of one's savings. "The X nation is mobilizing its troops" is informative, but will stir action. The lack of correlation between the language used and the purposes of the speaker may be illustrated by examining the sentence: "Here comes a lion." A circus attendant might use the words to convey information; uttered by a child, the words might express delighted rapture; but if the lion had just escaped from its cage, the words would direct us to take cover.

The importance of emotion-stirring words in directing action is implicitly assumed in *The Fine Art of Propaganda* (Harcourt, Brace & Co., 1937), by The Institute for Propaganda Analysis. The writers attempted to classify the devices and techniques of the propagandist, who seeks to influence the actions of others. Among the emotion-stirring devices listed were the following:

Name calling. The use of "bad names" attached to individuals or groups, such as "Red," "Fascist," "radical," and "reactionary." These words usually stir emotions of dislike and hatred and result in action against those so referred to.

Glittering generalities. The use of "virtue words" or phrases such as "the American Way," "our Christian civilization," "the family is the bulwark of the nation," and "Uncle Sam." When these honorific slogans are attached to individuals and groups, we tend to act favorably toward them.

Testimonials. The fact that "important people" approve of a program will stir the attitude of reverence and imitation. Contrariwise, the fact that "bad people" are for or against a program will stir feelings of aversion and result in action contrary to theirs.

Plain folks. The speaker talks to us as if he were one of us common people, "just an ordinary Joe," even as you and I. We trust him; he has aroused the sentiment of "belonging." We act as he suggests.

Band wagon. "Everybody else is with us, why not you?" Man is a gregarious animal and hates to be apart from the crowd. We hop on the band wagon.

Ceremonial language is another form of directive language. Greetings such as "Nice day," "Foul weather, isn't it?" or "Pleased to meet you" are not necessarily spoken to convey information. Social intercourse requires the use of language rituals, and we utter ceremonial phrases in order to establish a friendly attitude in the person spoken to. Feelings of communion are stirred, leading to the type of action desired.

We may note finally that directive language may be used in order to *prevent* action. This is often accomplished by the deliberate use of neutral words. Just as emotive words may arouse an emotional attitude toward "neutral" events, so "neutral" language may create an attitude of indifference toward events which would normally stir strong feelings within us. Apologists for foul deeds customarily use this type of language. They tell us not to believe in "atrocities" stories, which, they claim, are "nothing but propaganda." But the atrocities may really exist, and the reader may thus fall a victim to "propaganda against propaganda."

Section III: Appropriate and Inappropriate Language

We have distinguished the uses of language and have noted that most discourse is mixed. Each type of usage is a legitimate one—in its proper place. Poetry, eloquence, ringing calls to action, and eulogies have their honored and legitimate places in discourse, and no sensible person will wish to disparage the use of emotive words in these fields. As logicians, however, it is important that we should know what we are doing and it is at least equally important to know what others are doing when they speak to us. We shall now examine some "misuses" of language, by which we mean the use of inappropriate language within the specific context. When we are interested in receiving information, we want facts and not an emotional harangue. To use emotive language in a scientific discourse is a misuse of language, as would be a technical explanation of chlorophyll in a poem about daffodils.

When a biologist reads a report of an experiment, he

wishes the unvarnished truth, facts without emotional coloration. When the same biologist attends a rally of his political party he is willing that his emotions should be stirred with respect to social programs and ideals. Action requires emotional motivation, for purely thinking beings would probably make no distinctions between good and evil. When the biologist opens his morning newspaper and reads about a recent strike, about conditions in Europe, or a discussion of election issues, does he desire information or emotional stimulation? Obviously, in order to act intelligently, he must know what the facts are. A newspaper editor may quite legitimately express his own opinions about national policies, but he should not write his editorials in the news columns. The same considerations hold when we listen to a political speech. The political speaker is quite naturally a partisan for a point of view. But if he is worth listening to, if he expects to convince men of good will who want to make intelligent decisions, he should present facts on which to base such decisions. But the actual state of affairs is well described in the following:

Overstatement, understatement, half-truths, distorted logic, innuendo, and sheer intellectual dishonesty characterize the utterances of far too many of our public men. They bandy opprobrious terms about, in describing each other. This juvenile penchant of many American public men serves, upon analysis, to demonstrate the contempt in which they hold the electorate. It is not sufficient, for their purposes, that the electorate be informed fully and correctly, and then permitted to draw its own conclusions . . . They seek to inflame rather than to inform. They seek to excite passion rather than reason. They appeal to fear instead of intelligence. And, in so doing, they evidence a contempt for the body politic and its ability to understand the issues of the day. (Milburn P. Akers, *Chicago Sun-Times*.)

As samples of inappropriate language let us examine the two following news items:

Renewing Republican demands for a congressional investigation of our occupation program, Senator C today accused the administration of inflicting a "deliberate policy of mass starvation" upon Germany, without distinction as to age, guilt or innocence. The policies we have pursued, the senator as-

serted, have "degenerated into the callous and inhuman practices of the Nazis themselves." . . . Senator C attributed the starvation policy to a "conspiratorial clique" of "vengeful fanatics" in the administration who formulated the Morgenthau plan to impose a Carthaginian peace upon Germany.

The Virginia vigilantes tried to lynch labor in the House again last week. For one bad moment it seemed that they might get away with it. They didn't. But in the effort they identified some of the men and forces willing to join their mob. The *New York Times*, for instance, was right out in front holding the rope . . . indeed, the daily press was almost all there. So was Southern democracy . . . Representative Howard W. Smith, Virginia banker and axe man for the Byrd machine, was, as usual, the instigator.

The reader's reaction to these passages will of course be influenced by whether or not he considers the statements *true*. Though it is easier to detect faults when we disagree with the speaker, the candid reader will recognize, nevertheless, that both of these selections use very intemperate language. Note the substitution of question-begging epithets, such as "starvation policy," "tried to lynch labor," etc., in place of the facts on which the conclusions ought to be based. Note the emotionally toned words: "degenerated," "vengeful fanatics," "lynch," "mob," and "axe-man." These words are calculated to arouse fear and hatred in the reader. There is very little information; the reader has only a vague idea as to what events are taking place. An intelligent citizen demands facts on which to base his decisions and attitudes. Even though one's sympathies are with labor, one should object to such items as the second sample, for only knowledge of the facts will enable one to successfully meet unfair criticisms of labor's position. These examples are flagrant misuses of emotive language in situations in which statements of fact are required.

An opposite type of inappropriateness that we touched on earlier consists in writing in a detached, cool, objective, "scientific" manner to gloss over unpleasant facts. George Orwell has noted some typical examples of the use of neutral words in such writings:

Defenseless villages are bombarded from the air, the inhabitants driven out into the countryside, the cattle machine-

gunned, the huts set on fire with incendiary bullets: this is called *pacification*. Millions of peasants are robbed of their farms and sent trudging along the roads with no more than they can carry: this is called *transfer of population* or *rectification of frontiers*. People are imprisoned for years without trial, or shot in the back of the neck or sent to die of scurvy in Arctic lumber camps: this is called *elimination of unreliable elements*. ("Politics and the English Language," *New Republic*, June 24, 1946.)

Section IV: The Logical and the Non-Logical Uses of Language

1. The truth values of sentences

The logician is interested in language with respect to its "truth-values," i.e., he is interested in statements insofar as they are true or false. A statement is true or false in the logical sense when it is capable of being verified or disproved by evidence. Not all statements are true or false in this sense, nor do speakers always seek to make "truth-value" statements. Many poetic utterances are obvious examples of statements to which the criteria of truth and falsity in a logical sense are irrelevant. The poet may use metaphorical language which has "poetic truth" (i.e., adequacy in terms of feelings and attitudes), but not literal truth. To examine every poetic utterance as if it were intended to be literally true is not only to grossly misinterpret the poet's purpose but is a common cause for the inability of many persons to appreciate and enjoy poetry.

Thus, when Wordsworth writes, "The river glideth of its own sweet will," his statement is not false; scientific truth is irrelevant. When Shelley writes of the skylark,

Hail to thee, blithe spirit,
Bird thou never wert,

"he did not really mean to deny that the lark belongs to the class *aves*," as it has been well remarked. When Macbeth said "Life is a tale told by an idiot, full of sound and fury, signifying nothing," his statement must not be interpreted literally, though it does contain a profound judgment concerning life and is, in a sense, verifiable. One should, therefore, not read poetry for a collection of informative sentences. One may find true state-

ments in poetry, but the reader who picks up Wordsworth's "I Wandered Lonely as a Cloud" for botanical knowledge concerning daffodils would be sadly mistaking the poet's purpose. A poem is not a proposition, but an experience.

The logician is interested in language insofar as it states propositions, i.e., statements which are either true or false. The grammarian tells us that there are four types of sentences, declarative, interrogative, imperative, and exclamatory. Obviously, ordinary questions are neither true nor false, nor are imperatives, or commands. Thus, neither "Is the window open?" nor "Close the window" make statements which are true or false. Declarative and exclamatory sentences, on the other hand, may be propositions. Poetic utterances such as those quoted above are declarative sentences which are not propositions. A declarative sentence is a proposition when it states that something is or is not the case, in a manner verifiable by factual evidence. Exclamatory sentences such as "The Cubs won!" and "How rapidly he played that difficult passage!" are obviously sentences which make statements concerning facts, in addition to expressing the satisfaction and amazement of the speaker.

Questions and commands, we agree, are not propositions. But we must look beneath the surfaces of some questions and commands. For example, a "rhetorical question" is not intended as a genuine question but as a concealed statement. Thus when someone says, "What's the world coming to, anyway?" he is not requesting an answer but saying, "The world really is in bad shape."

Most interesting to the logician are the "complex questions." These are genuine questions, but they are like propositions in that they carry concealed assumptions that certain facts exist, i.e., that certain propositions are true (or false). For example, during a trial the prosecuting attorney snapped, "Tell me sir, have you stopped beating your wife? Answer yes or no!" This is a complex question because it contains the assumption that the witness *has* been beating his wife, and either a yes or no answer would acknowledge the truth of this assumption.

A complex question, of course, may be legitimate or illegitimate depending upon the nature of what it assumes. Thus, if the witness *had* been beating his wife, this would have been a

legitimate complex question. We shall call a complex question "legitimate" when either (1) its fact-assumptions are true or (2) both speaker and hearer are willing to accept them as true. When the facts assumed are obviously true to everyone, as in "What reasons were primarily responsible for the admission of Alaska as the forty-ninth state?" we do not usually call the question complex, though it is. The question assumes that Alaska was admitted as the forty-ninth state.

The important thing, of course, is to be alert to complex questions when they make illegitimate assumptions. Such questions present traps into which the unwary may easily fall. When we are asked, "Why is it that labor leaders are so much less concerned with the general welfare than are the leaders of business?" the reader's tendency is to say, "You know, that never occurred to me. I wonder why it is so." He immediately puts his mind to work helping the questioner. But before we seek explanations of a fact, we should be sure that the fact exists. We should critically examine the truth or falsity of the assumptions concealed in questions.

Similarly, commands may contain concealed assumptions. In "Be careful" we assume that a dangerous situation exists. The apprentice who was asked to bring the journeymen a left-handed monkey wrench was victimized by an illegitimate command.

2. Ought Sentences and Evaluations

Difficult problems of interpretation arise when we seek to classify "ought" sentences and "evaluations" in terms of our distinction between the logical and the non-logical uses of language. Let us note the nature of these problems.

Ought sentences. Consider the sentence, "One ought never to tell a lie." Does this sentence convey information? Does it express the feelings of the speaker and affect those of the hearer? Is it a directive statement? Is it perhaps all three combined? The word "ought" requires close examination.

The word "ought" is used in at least **three different senses**, logical, conditional, and unconditional. Thus, in "If you worked out the addition correctly, you ought to have gotten the sum of 625," the word ought is used in a purely logical sense. In "If you want to keep in good physical shape, then you ought to keep regular hours," the word is used in a conditional man-

ner. i.e., you are advised to keep regular hours on the condition that you want to keep in good physical shape. The third use is unconditional or categorical: One ought never to tell a lie. No condition is stated; the ought is stated without any ifs, ands, or buts.

Our example of a sentence containing the logical use of "ought" is one which clearly involves a proposition: The sum of these numbers is 625. This is an informative sentence. The example of the conditional "ought" is also easily translatable into a proposition: Keeping regular hours is a means toward keeping in good physical shape. This is an informative sentence which is often used with a directive purpose. It is the third use, the use of "ought" in an unconditional or categorical sense, that raises serious logical difficulties. What exactly does it mean? Can it be translated into a proposition?

"One ought never to tell a lie" may be interpreted as a command; if so, then it is not a proposition, for a command, as we have seen, is neither true nor false, as "Close the window." Perhaps it is a concealed type of conditional "ought" statement, and should be interpreted conditionally, even though the condition is not explicitly stated. Such an interpretation would give us something like: "One ought never to tell a lie if he wishes to have a good reputation" (or some other condition). This conditional "ought" could then be translated into a proposition. Or perhaps the unconditional "ought" sentence may simply express the emotions of the speaker, in particular that he hates lying and liars, and perhaps he also hopes that others will feel the way he does about lies. This translation tells us something about the speaker but does not yield a proposition.

Some ethical theorists would accept none of these translations. They tell us that categorical "ought" sentences are not really commands, not merely expressions of emotion, and that to translate them into conditional statements destroys their distinctively unconditional character. In other words, these sentences are unique in meaning. An adequate discussion of this problem, however, would take us beyond the scope of semantical analysis.

Sentences containing evaluations. By "evaluations" we mean statements which assert that something does or does not possess a specific kind of value. Our discussion will be limited,

however, to moral and aesthetic values. We shall consider sentences which declare that persons are morally good or evil or that things are beautiful or ugly. Consider the sentence: "Picasso's paintings are great works of art." How shall we classify this sentence—as informative, expressive, or directive? Does the statement tell us something about Picasso's paintings or does it merely tell us something about the speaker? When Churchill, in one of his eloquent speeches, referred to Hitler and Mussolini as "those wicked men," was he giving us information about Hitler and Mussolini or about himself? Or about himself and them?

The problem, simply stated, is this: If evaluations give us information concerning the thing evaluated, then they are statements of fact and, like all statements of fact, will be true or false. On the other hand, if they are mere expressions of the feelings or emotions of the speaker, then they are simply forms of expressive language, and neither true nor false concerning the thing evaluated. Under the latter interpretation, the evaluations quoted above would be equivalent to the following sentences: "I like Picasso's paintings"; "I hate Hitler and Mussolini." We must also consider the possibility that evaluations contain concealed "oughts." Perhaps they mean "This is the way I feel about Picasso and Hitler, and you ought to feel as I do."

Evaluations, of course, often purport to be statements of fact. Most persons would regard the following as an example of a *false* evaluation: "The homes in the slums of Chicago are architecturally more beautiful than the homes of the movie stars in Beverly Hills." But if this is false, it is a "factual statement" of fact and not a mere expression of the feelings of the speaker. Our present interest in these sentences, however, lies in calling attention to the semantical problems involved in evaluations. The solution of these problems, if there is a solution, must be found in the sciences of ethics and aesthetics. Further discussion of these questions will also be found in Chapter 19.

11-11-69

11-29-70

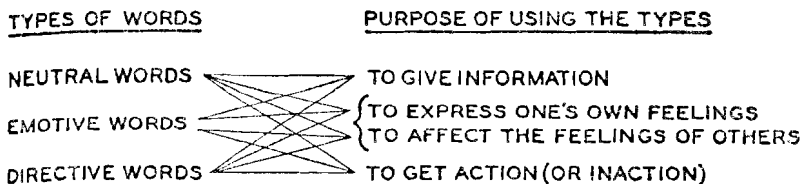
11-16-71

11-17-72

11-27-73

Exercises

1. Explain the following diagrammatic summary of the types and purposes of language:



2. Identify what appear to you to be emotive words in the following. Are these words necessarily emotive in nature? Are they usually emotive? Are they emotive to the writer? Explain. *Book - 25*
- "Our opponents are petty bourgeoisie, capitalists, fascists, hycnas, hangmen, cannibals, lackeys, flunkeys, mad dogs, white guards, and renegades." (From a communist pamphlet.)
 - Mr. Winston Churchill, in his *A History of the English-Speaking Peoples*, makes frequent use of the following words: royal, throne, scepter, realm, banner, clarion.
3. Identify the emotive words or phrases in the following and translate them into "neutral" language:
- I have never seen such a stubborn fool.
 - The starry-eyed, breast-beating world-savers, do-gooders, and global thinkers are ganging up on American patriots.
4. State the purpose or purposes which are probably fulfilled by the following:
- A thing of beauty is a joy forever.
 - How do you do?
 - Blessed are the meek.
 - Hatred and happiness are not compatible.
 - A man's best friend is his dog.
 - "I think there must be something in the place," said Mrs. Nickleby, "for, soon after I was married, I went to Stratford with my poor dear Nickleby, in a post-chaise from Birmingham—was it a post-chaise though!" said Mrs. Nickleby considering; "Yes, it must have been a post-chaise, because I recollect remarking at the time that the driver had a green shade over his left eye . . ."
5. The following items are from James Harvey Robinson's *An Introduction to the History of Western Europe* (Ginn and Com-

pany, 1931). Show how each item illustrates a different function of discourse:

- a. We must learn, above all, to study sympathetically institutions and beliefs that we are tempted at first to declare absurd and unreasonable. The aim of the historian is not to prove that a particular way of doing a thing is right or wrong as, for instance, entrusting the whole government to a king, or forbidding clergymen to marry. His object is to show how a certain system came to be introduced, what was thought of it, how it worked and how another plan gradually supplanted it.
 - b. Louis XIV exhibited as woeful a want of statesmanship in the treatment of his Protestant subjects, as in the prosecution of disastrous wars.
 - c. New Zealand, during the closing decade of the nineteenth century, became famous for its experiments in social reform.
6. In the following items what is the chief purpose of the discourse? If there is more than one purpose, is one subordinate to the others? Which type of words are most important in each selection? Do you consider the language used in each case appropriate for the speaker's purpose? Is there any sense in which you consider the language inappropriate?
- a. We will answer their demand for a gold standard by saying to them: You shall not press down upon the brow of labor this crown of thorns, you shall not crucify mankind upon a cross of gold. (William Jennings Bryan)
 - b. I warn John L. Lewis and his communistic cohorts that no second carpetbag expedition into the Southland, under the red banner of Soviet Russia and concealed under the slogans of the CIO will be tolerated. If the minions of the CIO attempt to carry through the South their lawless plan of organization, if they attempt to demoralize our industry, to corrupt our colored citizens, to incite race hatred and race warfare, I warn him here and now that they will be met by the flower of Southern manhood, and they will reap the bitter fruits of their folly. (Speech in the U. S. House of Representatives, June, 1937.)
 - c. The things which will change "the world" are the great discoveries and inventions, the new reactions inside the social organism, and the changes in the earth itself on account of changes in the cosmical forces. These causes will make of it just what, in fidelity to them, it ought to be. The men will be carried along with it and be made by it. The utmost they can do with their cleverness will be to note and record their

course as they are carried along, which is what we do now and is that which leads us to the vain fancy that we can make or guide the movement. That is why it is the greatest folly of which a man can be capable, to sit down with a slate and a pencil to plan out a new social world. (William Graham Sumner, "The Absurd Effort to Make the World Over," from the *Essays of William Graham Sumner*, Yale University Press.)

7. Rewrite the selection in Exercise 6b above, substituting neutral words and phrases for the emotive language used by the speaker.
8. The following "definitions" appeared under the title "Primer for New Voters," in Sidney J. Harris's column, *Strictly Personal*. Does the reader share Mr. Harris's indignation?

"Public servants"—officeholders who belong to your party.

"Bureaucrats"—officeholders who belong to the other party.

"Necessary expenditures for public welfare"—a padded payroll when your party is in office.

"Look at the record"—the partisan presentation of a mass of falsified statistics, half-truths, glittering generalities, and empty platitudes.

"Great statesmanship"—when your party has a strong leader.

"Political dictatorship"—when the other party has a strong leader.

"The Constitution"—a noble document that every politician is for, hardly any politician has read, and virtually no politician understands.

"Liberty and Justice"—what a candidate begins talking about when he is afraid to discuss his record.

"Will of the people"—the result of an election in which not more than 40 per cent of the voters go to the polls to elect a candidate they had no voice in choosing, after a campaign of insults and outright lies. (From *The Chicago Daily News*, Oct. 1, 1946.)

9. Which of the following items are propositions?
 - a. Render unto Caesar the things which are Caesar's.
 - b. What immortal hand or eye could frame thy fearful symmetry?
 - c. No women are fickle.
 - d. My darling!
 - e. Much have I traveled in the realms of gold.
 - f. We hold this truth to be self-evident: that all men are created equal.

Handwritten mark: A checkmark with the number 7 written above it.

10. Identify the complex questions (or commands) in the following. Where assumptions concerning facts are found, state whether you regard the assumptions as legitimate or illegitimate. In some cases you may wish to qualify your answer by noting the circumstances under which the assumptions may be regarded as legitimate.
- a. "Why did God become Man?" (This was the title of a book by the philosopher Anselm during the Middle Ages: *Cur Deus Homo?*)
 - b. Is God omnipotent?
 - c. Does God exist?
 - d. Why did Grover Cleveland defeat Benjamin Harrison in the presidential election of 1888?
 - e. Why did the United States declare war on Germany immediately after Pearl Harbor?
 - f. Do human beings have the power of mental telepathy?
 - g. Will the resurrection be in the flesh or in the spirit only?
 - h. Have you given up your evil habits?
 - i. How do you account for the great popular support for restrictions on unions?
 - j. Explain why democracy has been successful in the United States.
 - k. Explain why comic books are responsible for juvenile delinquency.
 - l. How do you explain the fact of mental telepathy?
11. Do the following statements exemplify the logical or the non-logical use of language? Justify your answers.
- a. Woman's place is in the home.
 - b. Many Americans think that it is sinful for cousins to marry.
 - c. Cannibalism is morally wrong.
 - d. Unemployment is the most important problem facing capitalism today.
 - e. Dante is a greater poet than Edgar Guest.
 - f. When the great spirit of Abraham Lincoln looks through the long corridor of time upon the party he founded, he sees that from the day of his passing on the torch until the last day of the Republican party in office, it held aloft the light of inalienable liberties of men. (Herbert Hoover)
 - g. Comment on the following: In his *Philosophy and Logical Syntax*, R. Carnap writes that to say "Killing is evil" is the same as to say "Do not kill," i.e., it is a command in misleading grammatical form, the expression of a wish, and therefore neither true nor false.

12. Identify the three types of "ought" in the following, and indicate whether or not these sentences are translatable into propositions.
- Your car ought to run OK now.
 - You ought to sleep more if you want to gain weight.
 - I ought not to do unto others what I would not want them to do unto me.

I. The Use of Language
 II. The Study of Words,
 III. The Use of Language in Science;
 IV. Appropriate and Inappropriate Language;
 V. The Logical and Non-Logical Use of
 Language.

The Definition of "Definition"

Section I: The Importance of Definition

In Oscar Wilde's play, *Lady Windermere's Fan*, the Duchess says: "Do, as a concession to my poor wits, Lord Darlington, just explain to me what you really mean."

"I think I had better not, Duchess," answers the Lord. "Nowadays to be intelligible is to be found out."

When we define our terms we explain "what we really mean," with all the risks attendant thereto. But if we desire to avoid obfuscation and discussions which move at cross-purposes, we must give definite and precise meanings to our terms. A definition sets a term within its proper boundaries, and the injunction "Define your terms!" is of first importance.

Throughout the discussions in the previous chapters we have frequently noted the importance of definition. Our discussion of ambiguity in verbal disagreements revealed the importance of defining one's terms. Whether or not all men are equal depends upon what we mean by "equal." The answer is Yes or No, depending upon the senses in which the term is understood. To say that a word has different senses is to say that it may be defined in different ways. Similarly, diplomatic questions concerning whether or not a certain nation has fulfilled its international obligation under treaty to institute "free" and "democratic" governments in areas within its control will depend upon the definitions of these terms.

The most important question in many discussions is "What do you mean by ——?" For example, *Euglena*, a water organism, behaves like a plant under some conditions and like an animal in others. Is *Euglena* a plant or an animal? Neither? Both? Our answers will depend upon our definitions of plant

and animal. Is *Forever Amber* an obscene novel? Exactly what do we mean by "obscene"? We can now appreciate the importance of Voltaire's famous remark, "Before I will discuss anything with you, you must define your terms."

The subject of definition is of very wide scope. We shall examine many of its aspects in the discussion which follows. But before we do so, we must note two important distinctions among the ways in which words refer to their referents, i.e., in "extension" and "intension," and as "abstract" and "concrete." These distinctions are indispensable to an understanding of the nature or definition of definition, and we now turn to these distinctions.

Section II: Two Basic Distinctions

1. The extension and the intension of terms

The first distinction is that between the extension and intension of terms. We shall also employ synonyms for these terms: extension is synonymous with denotation; intension with connotation.

The term "human being" has meaning in two different ways. On the one hand it refers to all those creatures who are members of the family of mankind: Mark Antony, Cleopatra, Joe Kelly, Hi Ginsberg, and so on. "Human being" *means* the creatures we have mentioned. In one sense, then, a term means the objects to which it applies. This kind of meaning is called the "extensional" meaning. The extensional meaning of "football player" covers such individuals as Eckersall, Red Grange, Jay Berwanger, Sid Luckman, Otto Graham, and others. Observe also that general terms may either denote the individuals to which the term applies or they may denote subclasses of the general class. The general term "dog" refers to the subclasses, terriers, beagles, poodles, in its extensional meaning, as well as to the individuals, Fido and Rover. "Extensional meaning" covers both of these types.

But terms like "human being," "football player," and "dog" have meaning in a second sense: "human being" means "rational animal." This gives us the term's "intensional" meaning. A term, then, denotes the objects to which it is correctly applied (extensional meaning) and it connotes those character-

istics possessed by the objects to which it applies (intensional meaning). Most dictionary definitions give us the intensional meanings of the words being defined.

We say that Julius Caesar is included in the extensional meaning of "man." Why? Because he has the characteristic of a man, such as animality, rationality, etc. It is the intensional meaning of "man" which determines the application of the term to Julius Caesar. "Man" means "rational animal" in its intensional sense, and it means Caesar as part of its extensional sense. Whenever we answer the question, "Why is X included under the extension of a term?" we think of the characteristics which an object must possess in order to be included within a certain class. The statement of these characteristics is the term's intension. The intension of the term "President of the United States" is "chief executive officer." The intension of "football player" is "athlete who plays in a game in which a large inflated ball is carried, thrown, and kicked, etc." The intension of a term, as we have noted, is what is usually called its definition. The extension, on the other hand, simply refers us to the set of objects to which the definition applies.

Let us now consider some of the ways in which extension and intension are related to each other. Examine the following terms: physical being, living being, animal, mammal, dog, spaniel. Note the varying quantities in the extensions of the terms as we move from left to right in the list. "Physical being" covers more objects than "living being," for "physical" covers inanimate as well as animate objects. The classes in our list are ordered in accordance with their relative sizes. The extensions get smaller as we go from left to right.

Now consider the intensional meanings of these terms. "Dog" connotes more, i.e., more characteristics, than does "mammal." A dog has all the characteristics which come under the definition of "mammal" plus those special characteristics which distinguish dogs from other mammals. Examining our list once again, we find that the terms at the right connote more than those at the left.

We see then the basis for an "inverse" correlation: in our list the extensions decrease from left to right, but the intensions increase from left to right. The intension and the extension of terms vary inversely. This is generally true, but the law of in-

verse correlation we just mentioned requires a qualification. The term "crow" has less intensional meaning than the term "crows not over five feet tall," i.e., it connotes fewer characteristics, but the extensional groups of the two terms are identical, since there are no crows over five feet tall. This means that there may sometimes be no decrease in extension accompanying increasing intension. But there is always decreasing intension with increasing extension. Our revised law: As extension increases, there is decreasing intension; as intension increases the extension will either decrease or remain the same. Y Y X

One further point concerning extension. The smallest possible extension is one which refers to a single individual, which may be thought of as a class having only one member. The name "Trixie," for example, denotes a single individual, and this is the case for all proper names.

Extension and intension are thus intimately related, but they refer to objects in different ways—extension to a listing of the individuals who fall within its quantitative scope, intension to the qualities or characteristics of the individuals. XXX
When we are asked, Which is the larger class—dogs or cats? we think of the extension of each. When we are asked, Which is the friendlier animal? we think of the intensional aspect of the terms.

We shall now draw a distinction between two types of intension, *subjective* and *conventional*. By subjective intension we refer to the characteristics which may come to the mind of a given person when he thinks of "dogs." The subjective intension refers to the individual associations attached to a term in any given individual's mind. These associations will not be exactly the same for any two persons, nor indeed are they always the same for the same person. "Dog" arouses connotations in my mind which differ from those in yours, for our experiences with dogs have been different, and my associations may be different tomorrow from what they are today. To one man the dog is a friendly animal; to another he is dangerous. The conventional intension, on the other hand, refers to those characteristics which are considered necessary and sufficient for regarding an object as belonging within the extension of a term. A definition usually states the conventional intension of the term. The conventional intension states the elements which all dogs are known to have in common, and this type of intension does not vary from

person to person. Thus, Peter may regard Rover with affection; John may regard him with aversion. Peter thinks of a friendly animal when he thinks of dogs; John, of an unfriendly animal. Their subjective intensions differ. But both agree that Rover is a dog, since the conventional intension of "dog" is the same for both. They do not disagree with respect to the essential characteristics which distinguish a dog from other animals. In other words, the context of our experiences with dogs influences our subjective intensions, which we may call the "marginal" associations aroused in our minds by a term, but it does not affect the conventional intension.

Another related distinction is that between logical and physical identity. When a bookkeeper adds up a balance, the word "dollar" means exactly the same thing every time it is used, for one dollar is logically identical with any other dollar. The conventional intension of "dollar" is *exactly* the same on each occasion of its use. Physically, however, no two objects in the world are identical. No two paper dollars are exactly the same physically. No two snow-flakes are exactly alike, and it is only the grossness of our vision which makes two grains of sand appear to be alike. No two fingerprints are alike physically. But when we say that the FBI took A's fingerprints and that they also took B's fingerprints, the use of the term "fingerprint" is logically identical on each occasion.

2. The abstract and the concrete

We think about things in different ways. We may think of dogs "in general," i.e., of the conventional intension of "dog." When we think of "triangularity," we think of those characteristics possessed by all triangles, whether they be large or small, colored blue or red, whether they be equilateral, isosceles, or scalene. We may think of "man" as a "rational animal." In all these cases we are thinking abstractly. On the other hand, we may be thinking of Rover, or of John, or of this triangle, Δ ; these are examples of the concrete.

Words are not abstract or concrete because of something in the words themselves. "Humanity," "triangularity," "beauty," and "justice" are called abstract words because they refer to referents "abstractively," that is, we use them to refer to the general qualities possessed by a group of things. Words are abstract because of the way in which we use them; it is the word's

designation which makes it abstract or concrete. The important distinction is between two ways of thinking. When we think of an individual object or situation in all of its fullness of individuality, we are thinking concretely. When I think of Abraham Lincoln, the fine day we had yesterday, or the fact that the roller on my typewriter is loose, I am thinking concretely. But when I think of the mortality of all men, or of the principle that the volume of a gas is related functionally to its temperature, I am thinking abstractly. Language is concrete when it refers to individual things which can be perceived by the senses; "abstract" language refers to those qualities or attributes which are possessed by the concrete objects within a certain class.

It should be obvious that a given word may be used in an abstract or in a concrete sense. "A pencil" refers to the general characteristics possessed by all pencils, and is an abstraction. "My red pencil" refers to a concrete entity. When I read Pascal's: "Man is but a reed, the weakest in nature, but a thinking reed," I think of man in an abstract way. But when someone tells me that he talked to a man on the bus, I understand "man" as referring to a specific person, i.e., a concrete entity.

The concrete and the abstract are correlative terms, i.e., these terms mutually involve each other. When we speak of the abstractions triangularity or humanity we refer to those characteristics which all concrete triangles or men have in common. Humanity or triangularity do not "exist" apart from individual men and triangles, but this does not mean that abstractions are "unreal." The abstractions refer to characteristics that are actually possessed by the concrete things. We call an object a "man" because he possesses the qualities to which the abstraction refers. We can think of those qualities, or attributes, or relations, apart from the specific individuals in whom they are "embodied," even though the qualities cannot "exist" apart from the concrete.

Exercises

1. Which items, among the following, are part of the conventional intension of "athlete"? In answering this question consider whether a dictionary would use any of these phrases in its defini-

tion of "athlete." Which items are part of your subjective intension when you think of "athlete"? Which items should be included within the extension of the term?

- | | |
|------------------------------|-----------------------------------|
| a. Jim Thorpe | g. sound in wind and limb |
| b. football players | h. having great physical strength |
| c. Joe Louis | i. chess players |
| d. jockeys | j. having sportsmanlike attitude |
| e. being a good runner | k. barflies |
| f. having competitive spirit | l. ping-pong players |
2. Arrange the following terms in the order of extension, so that the term having the largest extension will be at the top of the list; the one with the smallest extension at the bottom:

a. quadrilateral	✓	1
b. square	○	2
c. figure	○	3
d. rectangle	✓	4
e. parallelogram	○	5
f. plane figure	○	6

Now arrange them with the term having the maximum intension at the top of the list, decreasing the intension as you go down.

3. Compare the extensions of "living human being" and "living human being with a heart," and explain why this requires a modification of the rule that "the extension and the intension of terms vary inversely."
4. H. W. B. Joseph: "The intension of the term 'baby' does not increase or decrease with fluctuations in the birth rate." Comment.
5. Distinguish the following terms as abstract and concrete: pencil, ketule, man, humanity, John X. Jones, the first man in line at the 1958 World Series.
6. Proper names may become common nouns, as "a Nero," "a Waterloo," "a Quising." But do proper names as such possess connotation? Does "John F. Smith" connote anything?
7. Comment on the following items from Korzybski's *Science and Sanity* (The International Non-Aristotelian Library Publishing Co., 1948) in terms of the distinction between logical and physical identity:
 - a. Now, returning to the analysis of the object which we called "pencil," we observe that, in spite of all "similarities," this object is unique, is different from everything else, and has a *unique* relationship to the rest of the world. Hence, we should give the object a *unique name*. Fortunately, we have already become acquainted with the way mathematicians manufacture

To _____ Date _____

QUADRILATERAL...is the name given to a plane figure with four straight sides...A quadrilateral whose opposite sides are parallel is a parallelogram...If the angles of a parallelogram are right angles, the figure is a rectangle. If the sides of a rectangle are equal, the figure is a square.

(World Book, p. 6685)

an endless array of individual names without unduly expanding the vocabulary. If we call the given object "pencil₁" we could call another similar object "pencil₂," etc. In this way, we produce individual names, and so cover the *differences*. By keeping the main root word "pencil," we keep the implications of daily life and also of *similarities*. (p. 381.)

- b. And so individualizing (indexes) and temporal devices (dates) etc., should be used *conjointly*. Thus, obviously chair₁¹⁶⁰⁰ is not the "same" as chair₁¹⁹⁴⁰, nor is Smith₁^{Monday} the "same" as Smith₁^{Tuesday}. (p. xxxvi.)
8. S. I. Hayakawa, writes that "one of the premises upon which modern linguistic thought is based" is the premise that "no word ever has exactly the same meaning twice." He continues, "The extent to which this premise fits the facts can be demonstrated in a number of ways. First, if we accept the proposition that the contexts of an utterance determine its meaning, it becomes apparent that since no two contexts are ever *exactly* the same, no two meanings can ever be exactly the same. How can we 'fix the meaning' even for as common an expression as 'to believe in' when it can be used in such sentences as the following?

'I believe in you.' (I have confidence in you.)

'I believe in democracy.' (I accept the principles implied by the term democracy.)

'I believe in Santa Claus.' (It is my opinion that Santa Claus exists.)

"Secondly, we can take for example a word of 'simple' meaning like 'kettle.' But when John says 'kettle,' its intensional meanings to him are the common characteristics of all the kettles John remembers. When Peter says 'kettle,' however, its intensional meanings to him are the common characteristics of all the kettles he remembers. *No matter how small or how negligible the differences may be between John's 'kettle' and Peter's 'kettle,' there is some difference.*

"Finally, . . . if John says 'my typewriter' today, and again 'my typewriter' tomorrow, the extensional meaning is different in the two cases, because the typewriter is not *exactly* the same from one day to the next (nor from one minute to the next); slow processes of wear, change, and decay are going on constantly. Although we can say, then, that the differences in the meanings of a word on one occasion, on another occasion a minute later, and on still another occasion another minute later are *negligible* we cannot say that the meanings are exactly the same." (S. I. Hayakawa, *Language in Action*, Harcourt, Brace, and Co., 1941, pp. 49-50.)

Discuss this selection from Hayakawa in terms of the following:

- Does the ambiguity of "believe in" prove that this phrase never has the same meaning in different contexts? Compare "I believe in you" and "Jim believes in Joe."
- Does the "kettle" example take into account the distinction between subjective and conventional intension?
- Does the "typewriter" example take into account the distinction between logical and physical identity?

Section III: The Types of Definitions

There are several types of definitions, each appropriate for different needs and purposes, though all definitions seek to enlighten the hearer by clarifying the range of the application of a word. We shall consider three types of definitions: (1) word substitution, (2) explicating the extension or denotation of a word, and (3) explicating the conventional intension or connotation of a word. We shall call the latter type "analytical," since it analyzes an abstract concept. Each of these types gives us the range of application of the word, but in different ways, and each type is appropriate for certain purposes and inappropriate for others.

I. Definition by word-substitution

When we are engaged in working out crossword puzzles we are usually interested in this type of definition, i.e., one which provides us with synonymous terms. "Alar" is a four-letter word meaning "wing-shaped." There are many other occasions in which synonyms are all that we desire. Thus, a reader confronted with the sentence "No cenobites are troglodytes" would probably turn to the dictionary. He will learn that a cenobite is a member of a religious community, such as a monastery or convent. "Troglodyte" has the synonym "hermit." He is informed that **two different words designate the same referent and that we may substitute one of these words for the other.**

A synonymous definition has value in that it substitutes a familiar word for an unfamiliar one. The same result may be obtained by the use of a familiar antonym, or word of opposite meaning. Thus, the meaning of "atypical" is clarified when we learn that it means the opposite of "typical." Correlatives, or related terms which presuppose each other, such as husband and wife, may be used in a similar manner.

2. Extensive or denotative definition

Every student has had the experience of being called on to define a technical term in class and saying, "I can't define it, but I can give an example." Actually, giving an example is a form of definition, for it clarifies the meaning of a term by citing its extension or denotation.

Let us give some examples of extensive definitions: Fascism means the type of government which prevailed in Italy, Germany, and Japan during the thirties and which still prevails in Spain (1959); "A 'pun' refers to the manner in which the word 'hang' was used in Benjamin Franklin's warning." Note that these are extensive definitions of "extensive definition." An extensive definition presents an example or list of examples to which the term applies.

When an extensive definition is accompanied by a demonstrative gesture which specifies the referent by actually pointing to it, we have what is called definition "by demonstration," or "ostensive" definition. Examples: "This is an ocarina," "That is an aileron." We *point* to a specimen of the class of things denoted by the term and call it by its name. The "demonstrative" gesture may also occur in a figurative sense, as in "The sound which you will hear in a moment will be the tone of a bassoon." "The color 'violet' is the color which you will find at the extreme right end of the spectrum."

The demonstrative method of defining is an important pedagogical element in the educative process, for it is the method whereby a child learns many of the words in his early vocabulary. Helen Keller has vividly described the manner in which she first learned that the word "water" meant that which was flowing over her hands from a fountain. A great educative virtue of this method is its vividness. It eliminates the dangers of mere bookish knowledge or the vice of "thinking words, not things," to use a phrase of Justice O. W. Holmes, and thus prevents us from losing ourselves in abstractions. John Dewey, America's most important philosopher of education, has constantly emphasized the value of personal experience, in this direct sense or in an imaginative sense, in understanding new concepts.

But extensive definitions also have many weaknesses. They tell us nothing about the nature of the objects to which the term

III. As to kinds of definitions - there are definitions:
1. By synonymy,
2. By example,
3. By analysis.

THE DEFINITION OF "DEFINITION"

refers. Just what type of government existed in Germany and Italy during the thirties? This question must be answered before we can pretend to an understanding of the term "fascism." We should also note that an extensive definition presupposes at least some understanding of the intensional meaning of the term, since we could not identify Germany as an example of fascism unless we had some notion of what fascism means in its intensional sense.

More serious is the basic vagueness of an extensive definition. Suppose we point to the United States as an example of a "free-enterprise" system. Are our subsidies to businessmen and farmers part of what we are pointing to? A classic example of the vagueness of reference that may accompany the gesture of pointing is illustrated in the narrative of J. H. Weeks, in his *Among Congo Cannibals*:

I remember on one occasion wanting the word for table. There were five or six boys standing around, and tapping the table with my forefinger, I asked, What is this? One boy said it was a *dodela*, another that it was an *etanda*, a third stated that it was *bokali*, a fourth that it was *elamba*, and the fifth said it was *meza*. These various words we wrote in our notebook and congratulated ourselves that we were working among a people who possessed so rich a language that they had five words for one article.

But later Weeks discovered that,

One lad thought we wanted the word for tapping; another understood that we were seeking the word for the material of which the table was made; another had an idea that we required the word for hardness; another thought we wished a name for that which covered the table; and the last, not being able, perhaps, to think of anything else, gave us the word *meza*, table—the very word we were seeking.

There are of course many ways whereby we may eliminate some of these ambiguities. If Weeks had been able to ask, "What is the name for this article of furniture?" instead of "What is this?", the gesture of tapping would have been unambiguous.

In closing our discussion of extensive definition we shall consider very briefly, an interesting theoretical problem. It is this: Are some terms indefinable?

The English philosopher, G. E. Moore, in his *Principia*

It is to be the intensional of the analytical definition

1. The intensional

2. The extensive

3. The analytical

Ethica, has argued that "good" is an indefinable term, comparable in its indefinability to such a term as "yellow." If the reader is not aware of the difficulties presented by the attempt to define a color quality in its sensuous sense, let him consider how he would define "yellow" to a person who had been blind from birth. But discussions concerning whether or not a given term is indefinable may easily degenerate into verbal disputes unless we recognize the ambiguity of the word "indefinable" and draw a distinction between different kinds of definition. When it is said that "yellow" is indefinable, what is usually meant is that it is impossible to give this term an analytical definition, for yellow is a simple quality, and only complex entities (which have "parts") may be analyzed. But certainly "yellow" can be defined extensively, i.e., by demonstration to a person with normal vision by pointing to an example, and an extensive type of definition may be given for the word "good" whatever our conclusion may be with respect to the possibility of analyzing this term.

3. Intensional, connotative, or analytical definition

Example: Democracy is a system of government in which the people periodically elect their governing officials in free elections and which guarantees the ideals of freedom and equality. Note how this definition differs from those previously discussed. Here we are not given a synonymous term, or a demonstrative gesture, or a mere list of democratic governments. We are given the intensional or connotative meaning of the term, i.e., an analysis of the referent which we have in mind when we speak of "democracy." Henceforth we shall use the term "analytical" for this type of definition. (We are not concerned as yet with the adequacy of any particular example of this sort.)

Analytical definition is far and away the most useful of the three types we are considering, and when we speak of "definition" we usually refer to this type of definition. For example, in a discussion concerning the existence of God, one of the speakers asks for a definition of the term. An analytical definition would normally be expected, since it would be quite inadequate to define by a synonym, such as "Deity," and an extensive definition is not feasible. Similarly, it is definition in the analytical

sense which is required when such vague or ambiguous terms as democracy, communism, art, or religion are used.

When we ask, "What is poetry?" we are not satisfied with the extensive definition: "Milton's *Paradise Lost* is an example of a poem." Nor is there a useful synonym of the word "poetry." What is desired is a clarification of the nature of the referent. It is only when the referent of a synonym is clearly understood that we are satisfied with a synonym for an unknown word. This was the case in our substitution of "hermit" for "troglodyte," where an analytical definition was not called for. But if the reader had been unfamiliar with the referent of the word "hermit," then this term might have required analysis.

ixx In the next section we shall examine some of the criteria of an adequate analytical definition. But before turning to these criteria we shall examine the structure of an analytical definition. And henceforth we shall employ two new technical terms, *definiendum* and *definiens*, to designate the two formal parts of every definition. The *definiendum* is the word being defined; the (*definiens*) is the defining part of the definition. In a definition such as "Man is a rational animal," "man" is the *definiendum*; "rational animal," the *definiens*.

With respect to structure, the *definiens* of an analytical definition has two parts, which are usually called the *genus* and the *differentia*. In our definition of "man," "rational animal" is the *definiens*. "Animal" is the *genus*, and "rational" the *differentia*. Genus is used in a special sense, as meaning the general class of things to which the *definiendum* is assigned, and *differentia* refers to the special characteristics possessed by the *definiendum*. Thus, in our previous definition, we may say that "animal" is the *genus*, or general class to which man belongs, and that rationality is his *differentia* within the class of animals. If "man" were defined as "an animal," the definition would be incomplete, since no *differentia* is stated.

We should also note that the logician's distinction between *genus* and *differentia* is not an absolute one. For example, a whale is a marine mammal of fish-like form. But we might also define a whale as a marine or fish-like creature which is a mammal. Which term is called *genus* will depend upon the aspect which we wish to emphasize as appropriate to the purpose of the definition. But all analytical definitions tell us that something

belongs to a general class of things and that it is distinguished from other members of its class by certain characteristics.

The manner in which the differentia distinguishes the definiendum from other things within the general class may take varied forms. Here again the purpose of the definition will be the controlling factor. In scientific definitions we find an emphasis on the manner in which things are produced, or the manner in which they produce certain results. Thus, a metal may be defined by a layman in terms of its qualities of hardness, heaviness, malleability, etc. But a chemist defines it as "any chemical element which combines with oxygen so as to form a base." (A base is a compound which combines with an acid so as to form a salt.) In contemporary physics concepts are defined in terms of operations. But we will find genus and differentia in all analytical definitions.

Exercises

- A. Which types of definition are found in the following?
1. Labor unions are organizations such as the United Steelworkers, the Auto Workers, the Brotherhoods of Machinists, Teamsters, etc.
 2. Capitalism is a system in which there are large accumulations of capital.
 3. Erne means a sea-eagle.
 4. The symbol \leq means "included in the class of."
 5. Exercise 1 was an example of a denotative definition.
 6. A sexagenarian is a person who is in his sixties.
 7. Left means the opposite of right.
 8. A parent is a person who brings children into this world.
 9. A mule is an animal which is half horse and half donkey.
 10. An explorer is a bum with an excuse.
- B. In the following definitions, what is the definiendum? The definiens? Identify the genus and differentia in each definiens.
1. A lady is a woman of good breeding.
 2. The soul is a psychic substance.
 3. A good citizen is one who pays his debts and obeys the laws.
 4. A lemur is a small mammal related to the monkeys. They are mostly nocturnal, with fox-like faces and soft fur, and are of about the size of a cat.
 5. "The concept of length involves as much as, and nothing

more than, the set of operations by which length is determined [e.g., laying a measuring-rod along a straight line]." (P. W. Bridgman, *The Logic of Modern Physics*.)

Section IV: The Criteria of an Adequate Analytical Definition

We shall now discuss the criteria, or "rules," to which an adequate *analytical* definition must conform. Five criteria will be considered:

1. The rule of equivalence.
2. The rule concerning essential characteristics.
3. The rule concerning clarity.
4. The rule against circularity.
5. The rule that definitions should be positive, not negative.

Most of our discussion will be devoted to the rule of equivalence; we shall give the other rules a less extended treatment.

1. The rule of equivalence

The definiens should be equivalent to and convertible with the definiendum; it should be neither too broad nor too narrow.

"A triangle is a plane figure having three (straight) sides" is a definition which satisfies the rule of equivalence. The definiens "plane figure having three sides," refers to exactly the same entities as are referred to by the definiendum "triangle." These referrals are identical or equivalent. Furthermore, the definition is convertible, by which we mean that it can be turned around or reversed in direction. We can say with equal truth: "A plane figure having three sides is a triangle."

Another way of checking equivalence or convertibility is to apply the "all" and "only" test. If our definition is an equivalent one, then we should be able to say that all triangles and only triangles are figures having three sides. We can, so the definition is an equivalent one.

When a definition fails to satisfy the requirement of equivalence, it will be either too broad or too narrow. A definition of a dog as a four-legged mammal would be too broad. By "too broad" we mean that the definiens covers too much ground, i.e., "four-legged mammal" applies to many animals other than dogs, such as cats, cows, horses, etc. No equivalence here. We

circle and angles language.

can say that *all* dogs are four-legged mammals, but not that *only* dogs are such.

"Too narrow," on the other hand, means that the definiens fails to apply to each and every entity referred to by the definiendum. The definition of a triangle as a "plane figure having three equal sides" would be too narrow, for it fails to include isosceles and scalene triangles. Here again we find a failure to pass the *all* and *only* test. In this case *only* triangles are figures having three equal sides, but it is not true that *all* triangles have such sides.

equal sides

When a definition fails to pass the "all" test, it is too narrow; when it fails to pass the "only" test, it is too broad. The definition of a Christian as "a person who accepts the doctrines of Jesus as stated exclusively in the New Testament, and without reliance on tradition" is too narrow, for we cannot say that *all* Christians are thus described. Catholics would be excluded from the ranks of Christians if we accepted this definition. On the other hand to define a Christian as "one who believes that God created the world and governs it" is too broad, for we cannot say that *only* Christians believe this. Jews and Moslems also share this belief.

Let us now work out more precisely what is meant by saying that an equivalent definition is **convertible**. Consider again the definition of man as a "rational animal." If this is an equivalent definition, we should be able to say that "all rational animals are men," in addition to being able to say that "all men are rational animals." * In an equivalent definition, each of these statements will be true. An equivalent definition is like a mathematical equation. If $2 + 2 = 4$, then $4 = 2 + 2$.

We shall now symbolize this test for equivalence. Let "W" stand for Word, i.e., the definiendum, or the word being defined. Let "D" stand for the definiens, or the defining part of the definition. We should be able to make the following true statements if the definition is equivalent:

All W's are D's. [All men (W's) are rational animals (D's).]

All D's are W's. [All rational animals (D's) are men (W's).]

In testing definitions, we should ask two questions: (1) Are all W's D's? (2) Are all D's W's? If the answer to both questions

* "All rational animals are men" has the same meaning as "only men are rational animals." The "all" and "only" test again.

is Yes, then the definition is an equivalent one. If the answer to the first question is No, then the definition is too narrow; if it is No to the second question, the definition is too broad.

Here are some additional illustrations of this testing procedure: "Democracy (W) is a system of government in which the chief executive is elected by the people (D)." We ask the first question: Are all W's D's? The answer is No, for England is a democracy in which the monarch, the chief executive, is not elected. This definition is too narrow. Another: "A triangle (W) is a plane figure (D)." This will fail to pass the second question (Are all D's W's?) for there are plane figures which are not triangles (squares, circles, etc.). This definition is thus too broad. The "too narrow" definition failed to cover all cases denoted by the definiendum, "democracy"; the latter describes all triangles, but too much else besides.

The following definition fails both tests: "Man (W) is an animal with hair on his chest (D)." This is not true of all men, and there are hairy-chested animals which are not men.

The rule of equivalence is the most important of the criteria of an adequate definition, and the vices of being too broad or too narrow are the Scylla and Charybdis on which most definitions founder. But equivalent definitions are not easily constructed, except, of course, in mathematics, where the notion of equivalence symbolized by " \equiv " is a familiar one. But when we deal with key words such as religion, beauty, art, and propaganda, we find that the quest for adequate definitions is never-ending. As an example of the difficulties we encounter in these fields, consider the problem of defining "religion." It appears inadequate to define religion without some reference to belief in a God, but Confucianism and Buddhism do not involve such beliefs. It would be presumptuous indeed to say that creeds which hold the allegiance of almost a third of the human race are not religions. John Dewey, in *A Common Faith*, has argued that it is utterly impossible to find an adequate equivalent definition of religion. If this is so, then we must be satisfied with something less than perfection and must seek to clarify the range of the term as adequately as may be possible.

It should be obvious that an adequate definition cannot be constructed on the basis of rules, nor can a definition be checked for adequacy on the basis of rules alone. Familiarity with the

*Did you look
at the
rule of
equivalence?*

subject matter is indispensable in order to apply the tests. One must know the facts concerning religion or political institutions in order to check definitions in those fields. *The rules merely tell us how to use our knowledge.*

2. The definiens should state the essential characteristics of the definiendum

By "essential characteristics" we refer to characteristics which are important in terms of the purposes for which the definition is required. "Essential" is thus used in a relativistic manner, since what may be essential for one purpose is not so for another. If we were interested in a definition of "man" in order to contrast men with the lower animals, it would not be satisfactory for most purposes to define man as "the animal who can fly a jet plane at supersonic speed," nor as "the animal capable of laughter," which is an equivalent definition, as the former is not. An unessential characteristic is usually referred to as an "accident."

In a political discussion concerning conservatism and radicalism, a definition of "conservative" may be requested. To define a conservative as "a man with good sense" may or may not be true of conservatives, but the definition would not state an essential characteristic for the purpose of the given discussion.

3. The definiens should clarify the nature of the definiendum

A definition should clarify the nature of the thing defined. It should inform and enlighten the person addressed. Typically, neutral or informative language, rather than "poetic," "literary," or expressive language, will be appropriate, and figurative terms will be avoided. "Sickness is Nature's protest against the misdirection of her forces" is a "poetic" type of definition and would be inappropriate in a scholarly essay in biology. A good definition will also avoid obscurity, i.e., the dark and non-transparent. (Is this a figurative definition of "obscurity"?)

The admonition against obscurity requires care in its application. That which is obscure to one person may not be so to another. To the uninformed all things are obscure. The type of audience addressed should be taken into account. Technical material that is obscure to the general public may be quite clear

to the average college student. The test should be: Would a reasonably well-informed person in the audience being addressed find the definition obscure? If one cannot confidently answer this question in the affirmative, then he should not criticize the definition on this ground.

This discussion, of course, is relevant to definitions which aim at literal accuracy. We should not confuse this type of definition with those which aim at humor. The formulating of witty definitions is a popular pastime, and such definitions may give us penetrating insights as well as delightful humor, e.g., "A politician is a man who sits on a fence with his ear on the ground"; "Deliberation: the act of examining one's bread to determine on which side it is buttered," or Oscar Wilde's definition of a cynic: "One who knows the price of everything and the value of nothing." The reader may also recall Sydney Harris' "definitions" on page 85.

4. An analytic definition should avoid word-substitution

Word-substitution, as we have seen, is a legitimate form of definition for many purposes, but it is not satisfactory when we desire an analysis of the nature of the referent. The present rule has several aspects. **The definiens should not repeat the definiendum, nor should it state synonyms, antonyms, or correlatives of the definiendum.** To commit these faults is to be guilty of "circularity."

a. Do not repeat the word being defined.

Polonius informs the King and Queen of Hamlet's strange condition:

Your noble son is mad;
Mad call I it; for, to define true madness,
What is't but to be nothing else but mad?

A rose is a rose and a spade is a spade, but these are not definitions. The same fault is found in a definition of literature as "writing which has a literary quality," or of democracy as "a system of government which uses democratic procedures." These require no comment. But note that the rule does not forbid the following type of definition: "A good citizen is a citizen who seeks to promote the common welfare." The repetition of "citi-

zen" in the definiens is unexceptionable, since only the meaning of "good" in "good citizen" is in question. Note also that the purpose of the definition is always a controlling consideration. A definition of a Communist for legal purposes as "A person who holds a membership card in the Communist party" clarifies the nature of the referent for a given purpose.

b. Do not use synonyms or antonyms or correlatives

"A morally good man is one who acts virtuously" substitutes the synonym "virtuously" for "morally good." But if we were looking for clarification of the meaning of "morally good" so that we may know to what kinds of conduct it refers, it is not helpful to be told that we may substitute the term "virtuously" for "morally good." This immediately raises the question: But, what is virtue? Morally good action? Synonyms are not adequate substitutes for analysis.

To define "right conduct" as conduct which is "not wrongful" merely gives us an unhelpful antonym, mere word-substitution once again. Finally, as an example of the use of an unhelpful correlative term, consider the definition of "cause" as "that which has an effect." But nothing can be called a cause unless it has an effect, and an effect cannot be called such unless it had a cause. But what is the analytical meaning of these terms? This question is not answered.

5. A definition should be positive rather than negative

The reason for this rule should be obvious. "A man is a creature who does not breath through gills" is true, but of little help. This negative definition covers all plants, all land animals, all whales. A merely negative definition will be too broad unless it mentions everything in the universe which is not the thing being defined, and even this kind of completeness would give us no analysis of the term being defined.

Most negative definitions are not guilty of these absurdities, however. The term being defined will usually be contrasted with some closely related terms in the same "universe of discourse," as in the following: "A Protestant is a Christian who is not a Catholic." When we have a complete list of the items within a universe of discourse, as in knowing that there are just three types of triangles, we may formulate a precise negative

definition of a scalene triangle by saying that it is neither isosceles nor equilateral.

Note, however, that there are some negative definitions which are quite satisfactory even as analytical definitions, as in defining a bachelor as "an adult male who is not married," or in defining parallel lines as "straight lines which do not intersect no matter how far extended."

In general, this rule should be taken as a warning that we should "accentuate the positive" and seek to avoid the pitfalls of most negative definitions. In any case, the controlling consideration in testing analytical definitions is this: Does the definiens give us an adequate analysis of the subject-matter?

Exercises

- A. Check the following definitions for equivalence. Apply the two test questions to each and state whether the definition is equivalent, too narrow, too broad, or both too broad and too narrow. Remember that it is not possible to answer the test questions intelligently unless you have a good understanding of the relevant subject matter.
1. Amnesia is a form of mental disease.
 2. A dog is a domesticated animal having four legs.
 3. A Moslem is a person who believes in one God.
 4. A Catholic is a person who believes in the divinity of Christ.
 5. Assuming that elementary and high school girls are not properly called "coeds," we may define a coed as a female student who attends a school of higher learning, such as a college or university.
 6. A circle is a figure whose radii are equal.
 7. Poetry is a form of literature written in metrical language.
 8. An alcoholic is a person who drinks large quantities of alcoholic beverages.
 9. A phonograph is a device for the recording and reproducing of sounds.
 10. A man is a featherless biped. (An ancient Greek once plucked a chicken in order to criticize this definition. Why?)
 11. Fascism means a totalitarian government in which a dictator rules.

12. Capitalism is a system of industrial organization which develops large scale production.
 13. Propaganda means any attempt to influence the opinions of others.
 14. A cause means the invariable antecedent of any event.
 15. Check the following definitions of a "beautiful object":
 - a. Something which possesses formal design and is pleasing to the eye or ear.
 - b. Something which exhibits unity in variety.
 - c. Something which causes a certain kind of mental state in the spectator, in which thought and emotion achieve a harmonious equilibrium.
 - d. Pleasure regarded as the quality of a thing. (Santayana.)
- B. Check the following definitions for violations of rules 2-5. Note that a definition may violate more than one rule, e.g., an antonymic definition. Also note whether you think the definition a satisfactory one despite the fact that a rule is violated. It may be helpful to apply these rules in the following order: (4) Does it contain synonyms, etc.? (5) Is the definition positive? (2) Does it state essential characteristics? (3) Is it obscure? (Use rules 2 and 3 only as "last resorts.") Be precise in explaining your answers. The first four examples illustrate each of the four rules:
1. Poison means something which has a toxic effect.
 2. Tickling may be defined as "an intensely vivid complex of unsteady, ill-localized, and ill-analyzed sensations, with attention distributed over the immediate sensory contents and the concomitant sensations reflexly aroused."
 3. A Republican is one who does not favor government controls to advance the economic welfare of the average man.
 4. A human being is an animal who knows how to use chopsticks.
 5. By "mental" we mean what is not physical.
 6. A conspiracy is a collusion in machination.
 7. A bald man is one who does not have a full head of hair.
 8. A lady is a woman in whose presence a man behaves like a gentleman.
 9. Peace means the absence of war.
 10. A good man is one who always does the right thing.
 11. Time is the moving image of eternity. (Plato.)
 12. A communist means a person who is dissatisfied with everything.
 13. Faith is the substance of things hoped for; the evidence of things not seen. (St. Paul.)

14. Life is that which distinguishes living from non-living things.
15. The du Pont Company formulated the following definition of nylon: "A generic term for any long-chain synthetic polymeric amide which has recurring amide groups as an integral part of the main polymer chain, and which is capable of being formed into a filament in which the structural elements are oriented in the direction of the axis."
16. A star is a stellar body seen in the heavens at night.
17. A moral man is one who does not lie, steal, or live intemperately.
18. A fanatic is a man who redoubles his efforts after he has forgotten his aim. (Santayana.)
19. Social dancing is a stilted form of perambulation slightly impeded by a semicooperative member of the opposite sex.
20. A crossword puzzle has been defined "an intensively rectangular and essentially heterogeneous concatenation of dissimilar verbal synonyms, i.e., similitudes, replete with internal inhibitions, yet promulgating extensive ratiocination and meticulously designed to promote fulminating vituperation, dispel hebetudinosity and develop speculative, contemplative, introspective, deliberative, and cogitative faculties."

Section V: Plato and the Rules of Definition

The criteria for an adequate definition were worked out by Plato (427–347 B.C.), and his dialogues are a rich mine of material in definition analysis. The following passages present a highly condensed version of his *Euthyphro*, in which the definition of piety is discussed. The selections are from a translation published by the Macmillan Company.

A word as to the background of the conversation. Euthyphro is on his way to the court to swear out a warrant against his father for murder. It appears that Euthyphro's father had become incensed against a drunken overseer who had killed a slave. The overseer was bound up hand and foot and thrown into a ditch. He died of exposure while awaiting a decision concerning his punishment. Euthyphro believes that his father is guilty of murder and that moral duty, or "piety," requires that he have his father prosecuted. In reading these passages, note the irony so characteristic of Socrates in his conversations with the self-opinionated. After reading this selection answer the questions at the end.

SOCRATES: Good heavens, Euthyphro! Surely the multitude are ignorant of what makes right. I take it that not everyone could rightly do what you are doing; only a man who was already well advanced in wisdom.

EUTHYPHRO: That is quite true, Socrates.

SOCRATES: Was the man whom your father killed a relative of yours? Nay, of course he was: You would never have prosecuted your father for the murder of a stranger?

EUTHYPHRO: You amuse me, Socrates. What difference does it make whether the murdered man was a relative or a stranger? The only question that you have to ask is, did the slayer slay justly or not? But my relatives are furious with me; so little do they know the divine law of piety and impiety.

SOCRATES: Tell me, then: what is piety and what is impiety?

EUTHYPHRO: Piety means prosecuting the wrongdoer who has committed murder or sacrilege or any other such crime.

SOCRATES: But many other actions are pious, are they not, Euthyphro?

EUTHYPHRO: Certainly.

SOCRATES: I did not ask you to tell me one or two of all the many pious actions that there are; I want to know what is the essential form of piety which makes all pious actions pious. [1]

EUTHYPHRO: Well, then, what is pleasing to the gods is pious, and what is not pleasing is impious.

SOCRATES: Beautiful, Euthyphro. Now you have given me the sort of answer that I wanted. Whether what you say is true, I do not know yet. But of course you will go on to prove the truth of it. . . . Now, the same action is pleasing to some gods, and displeasing to others; dear to Zeus, but hateful to Cronos. So the same action will be pious and impious at the same time? [2]

EUTHYPHRO: Well, I should say that piety is what all the gods love and that impiety is what they all hate. I think that the definition is right this time. [2a]

SOCRATES: We shall know that better in a little while, my good friend. Now consider this question. Do the gods love piety because it is pious, or is it pious because they love it?

EUTHYPHRO: They love it because it is pious; it is not pious because they love it.

SOCRATES: Then piety is not what is pleasing to the gods. Piety, and what is pleasing to the gods, are different things. My question, Euthyphro, was, What is piety? But it turns out that you have not explained to me the essence of piety; you have

been content to mention an attribute which belongs to it, namely, that all the gods love it. [3]

EUTHYPHRO: But, Socrates, I really don't know how to explain to you what is in my mind. Whatever we put forward always somehow moves around in a circle, and will not stay where we place it. [4]

SOCRATES: I would rather that our definitions had remained firm and immovable than have all the wisdom of Daedalus and all the riches of Tantalus to boot. But I will do my best to help you to explain to me what piety is: for I think that you are indolent. Don't give in yet. Tell me; do you not think that all piety is just? [5]

EUTHYPHRO: I do.

SOCRATES: Well, then, is all justice pious too? Or while all piety is just, is a part only of justice pious, and the rest of it something else?

EUTHYPHRO: I do not follow you, Socrates.

SOCRATES: Yet you have the advantage over me in your youth no less than in your wisdom. But, as I say, the wealth of your wisdom makes you indolent. Exert yourself, my good friend: I am not asking you a difficult question. What I mean may be explained by this illustration: odd numbers are part of numbers, so that where you have the odd you must also have number, though where you have number, you do not necessarily have the odd. Now I think you follow me?

EUTHYPHRO: I do.

SOCRATES: Well, then, this is what I meant by the question which I asked you: is there always piety where there is justice? or, though there is always justice where there is piety, yet there is not always piety where there is justice, because piety is only part of justice? Shall we say this, or do you differ? [6]

EUTHYPHRO: No; I agree. I think that you are right.

SOCRATES: Now observe the next point. If piety is a part of justice, we must find out, I suppose, what part of justice it is. Now, if you had asked me, just now, for instance, what part of number is the odd, and what number is an odd number, I should have said that whatever number is not evenly divisible by two, is an odd number. Is it not so?

EUTHYPHRO: Yes.

SOCRATES: Then you see if you can explain to me what part of justice is piety.

EUTHYPHRO: Well, then, Socrates, I should say that piety is that part of justice which has to do with the attention which is

due to the gods, and that what has to do with the attention which is due to man, is the remaining part of justice. [7]

SOCRATES: But what result is accomplished by our attention or service to the gods?

EUTHYPHRO: I think that nothing is dearer to them.

SOCRATES: Then piety means that which is dear to the gods? [8]

EUTHYPHRO: Most certainly.

SOCRATES: Do you not see that our definition has come around to where it was before? Surely you remember that we have already seen that piety, and what is pleasing to the gods, are quite different things. . . . Then we must begin again and inquire what is piety? Do not deem me unworthy; give your whole mind to the question, and this time tell me the truth. For if anyone knows it, it is you; it cannot be that you would ever have undertaken to prosecute your father for the murder of the overseer unless you had known exactly what piety is. You would have feared to risk the anger of the gods, in case you should be doing wrong. So tell me, my excellent Euthyphro, and do not conceal from me what you hold it to be.

EUTHYPHRO: Another time, then, Socrates. I am in a hurry now, and it is time for me to be off.

Exercises

The questions refer to the material immediately preceding the numbers in brackets.

1. Which type of definition did Euthyphro offer? Why is Socrates dissatisfied with his answer?
2. Why is the second definition more satisfactory to Socrates? How does he criticize it?
- 2a. How does Euthyphro amend the second definition?
3. Explain how Socrates demolishes the definition of piety as "that which is pleasing to the gods."
4. What is Euthyphro beginning to discover?
5. Note Socrates' new and more constructive approach. He is looking for the genus of "piety." Under which general class does he place it?
6. Are piety and justice equivalent to each other? If not, which is the larger class or genus?

7. In what way does Euthyphro attempt to state the differentia of an analytical definition?
8. Why is Euthyphro guilty of "reasoning in a circle"?

Section VI: Truth and Falsity in Definitions

In our discussion of the criterion of equivalence in definitions, we made an assumption which was not explicitly stated; namely, that a definition could be true or false. Thus, in testing the definition "Man is a rational animal" we asked, "Is it true that all men are rational animals?" and, "Is it true that all rational animals are men?" Our interpretation, based upon the assumption that definitions may be true or false, is usually referred to as the "realistic" interpretation of definitions.

We must now consider a different theory of definition, one which holds that definitions are neither true nor false. This point of view is called "nominalistic." The nominalist draws a sharp distinction between definitions and factual propositions. "Germany and Russia signed a mutual assistance pact on August 23, 1939" is a factual proposition and is of course either true or false. But a definition, according to the nominalist, is nothing but a stipulation or declaration as to how a word will be used by the speaker and is thus neither true nor false: "Let 'G' factor stand for the ability to solve problems." This view is expressed by Whitehead and Russell, in their *Principia Mathematica* (Cambridge University Press, 1910, p. 11):

A definition is a declaration that a certain newly-introduced symbol or combination of symbols is to mean the same as a certain other combination of symbols of which the meaning is already known . . . A definition is concerned wholly with symbols, not with what they symbolize. Moreover it is not true or false, being the expression of a volition, not of a proposition . . . Definitions are merely typographical conveniences.

The nominalistic point of view is also expressed by Frye and Levi, in their *Rational Belief*. These authors present a test to determine whether a given sentence is a factual proposition or a definition. Their test is: Can you substitute the word "means" for the word "is" in the sentence? If you can, they say, then the sentence is a definition, and neither true nor false. Examine

the sentence, "The Eiffel Tower is taller than the Washington Monument." Since "means" cannot here be substituted for "is," the sentence is a factual proposition. But "Man is a rational animal" permits the substitution into "Man means a rational animal" and is thus neither true nor false.

According to the nominalistic interpretation, it is not *untrue* to define "man" as "any book with a blue cover, weighing more than two pounds." We can say only that this is not the customary meaning of the word "man" in the English language, or that such a definition would serve no useful purpose. Definitions, in other words, are classified as customary or uncusomary, useful or useless, but not as true or false. Definitions are regarded as nothing but stipulations as to how we shall use a given word, so that the definition "Man is a rational animal" may be translated into "Let the word 'man' stand for 'rational animal.'" An act of stipulating is like a command, or a directive, or other imperative types of statements, neither true or false.

The controversy between the realists and the nominalists over the truth values of definition often overlooks the fact that we may stipulate a definition of "definition" itself. In other words, not even the word "definition" has a "real" meaning. But, this point aside, when we examine the purposes for which definitions are required we shall find that the role of stipulation varies with the purposes of definition. Let us examine some of the situations in which definitions are called for:

(1) When a new technical term is introduced into a scientific discussion, a stipulative definition is appropriate, as in "Let 'G-factor' stand for 'the ability to solve problems.'" Similarly when a vague or ambiguous term is central to a discussion the speaker may stipulate that he will use the term in one and only one of its senses.

Such stipulative definitions are neither true nor false. In an earlier chapter we learned that words are affixed to referents by acts of affirmation which are logically arbitrary, that there are no "real" names of things and that the naming activity is neither true nor false. Definitions introduced as typographical conveniences, to save space and time, are also mere stipulations: "Let '<' mean the same as 'are included in the class of'"; "Let 'definiens' mean the same as 'the defining part of a definition.'" "

In these stipulative definitions we are not concerned with truth or falsity or even with the customary meaning (if there is one) of the symbols being defined. The only question is: **Are they useful for the intended purposes?** Note also that the rule of equivalence in analytical definitions is inapplicable to such definitions. We do not think of asking whether the definition of "G-factor" as "problem-solving" is either too broad or too narrow for we are dealing with a command or stipulation rather than with a description which might be true or false.

(2) Sometimes a question arises as to whether a term is being used in its customary sense. Custom must be checked in such cases by referring to a standard dictionary or to the appropriate literature or speech habits. But it is inappropriate to speak of definitions as true or false in terms of custom. We should merely note whether the definition is customary or uncustomary.

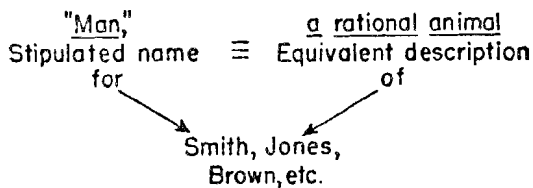
(3) There are many theoretical discussions in which we desire a "true" definition. Let us suppose that we are discussing poets and poetry. A speaker says that there is very little poetry in Shakespeare's plays, but we discover that he defines poetry as meaning "verse with rhyming couplets." We object that this is not a correct definition of poetry, that it is too narrow. The speaker retorts that he stipulates that this is what he will mean whenever he uses the word. But we regard his definition as not only incorrect but as useless, since it is not even descriptive of what most people mean by poetry. This indicates that we are not satisfied with an arbitrary stipulation; we are seeking for an equivalent definition of the term.

Dictionaries give us the customary meanings of a term, but we may find these customary meanings unsatisfactory, as in the dictionary definition: "Poetry is language which expresses beautiful thoughts and feelings." This definition will not satisfy us if we regard T. S. Eliot as a poet, for he does not express "beautiful thoughts and feelings." We continue our search for a definition that will adequately describe the common characteristics in the writings of Homer, Dante, Shakespeare, Keats, Yeats, Eliot, and others. When we ask for a definition of poetry we want a description of the characteristics which are common and peculiar to these works; we wish to know the qualities which all poems have in common, but which are not possessed

by other writings. In other words, we want an equivalent definition. The definition, "Poetry is language which expresses beautiful thoughts and feelings," does not describe its subject matter correctly. It is not an equivalent definition.

A definition, of course, gives the meaning of a symbol. We do not define a thing, such as a chair, but the word "chair," and we do not define a poem, but the word "poem." But "poem" refers to what is common among certain kinds of writings, and an adequate analysis of its meaning will state the characteristics common and peculiar to these writings, for these are what we have in mind whenever we use the word. An equivalent definition, then, is true insofar as it correctly describes what we have in mind when we seek to refer to these common and peculiar characteristics. A definition which purports to do this and fails will be a false definition.

(4) It is important to note, however, that even a realistic or descriptive definition involves a stipulation. Thus, an equivalent definition involves two aspects, stipulation and analysis. On the one hand, there must be the stipulation, explicit or implicit, that the word "poetry" will be the name for the works of Shakespeare, *et al.* The use of the word "poetry" for these works is of course a mere arbitrary stipulation, and thus neither true nor false. The second aspect, analysis, requires that the definiens contain a description of the common and peculiar characteristics of these writings. Similarly, the definition of man as "a rational animal" has these two aspects: (a) We stipulate that the name "man" will be used to designate beings such as those who go to ball-games, movies, dances, polling booths, and so on. We stipulate that the definiendum shall designate such referents as these. This stipulation is an arbitrary one. (b) We then analyze the nature of these referents who are arbitrarily called "men." The two aspects, which correspond to the extensional and intensional aspects of meaning, may be illustrated by a diagram:



We might have called the referents Smith, Jones, and Brown, "palookas." Such "calling" would not be false, though it would be uncustomary. If we adopted this new name, then it would again be true to define "palookas" as "rational animals."

Definitions of words such as propaganda, love, religion, law, usually require realistic descriptions of the common and peculiar characteristics of the referents. When we use such words as these we have a vaguely apprehended notion as to the characteristics of the referents, and desire to refine our crude notions by careful analysis. Conflicts over the meanings of these words are not mere conflicts as to the customary usage of these terms, since custom differs from custom, and many writers misunderstand the nature of the referents involved. A good definition thus contributes to knowledge.

Exercises

1. Comment on the following, from Frye and Levi, *op. cit.*, p. 24: Note that of a definition we may ask, Is it meaningful? and Is it useful? but we cannot ask, Is it true? It is impossible to question the truth of a definition. Definitions are neither true nor false, simply because the test of truth or falsity is not applicable to them. A definition is merely the explicit resolution to use words in a certain manner. When Euclid says, "A scalene triangle is one having three unequal sides," he is to be understood as saying, "Henceforth I shall use the words scalene triangle to mean triangle with three unequal sides." There is no issue of truth or falsity here. A definition is a linguistic convention. It is a stipulation, to all intents and purposes a command, and is indeed to be treated as logically and analogous to an imperative statement. "Shut the door!" True or false? Neither, certainly. "Let the words scalene triangle have the meaning triangle with three unequal sides." True or false? The same.
2. Are the following definitions real or nominal?
 - a. A triangle is a plane figure having three sides.
 - b. "Let us use the term 'triangle' for 'any plane figure having three sides.'"
 - c. A man, understood as denoting Smith, Jones, etc., is a marine animal having the appearance of a fish.

3. What stipulation is required to make the following a true definition? "A man is a creature that lives in water and breathes air through its gills."
4. Discuss the following problems in definition with reference to the nominalist-realist controversy. Do the definitions aim at stipulation or true description?
 - a. Dr. Zilboorg says that present day psychiatry does not possess any satisfactory definition of mental illness or neurosis. To illustrate, he told a story: A psychiatrist was recently asked for a definition of a "well-adjusted person" (not even slightly peculiar). The definition: "A person who feels in harmony with himself and who is not in conflict with his environment." It sounded fine, but up popped a heckler. "Would you then consider an anti-Nazi working in the underground against Hitler a maladjusted person?" "Well," the psychiatrist hemmed, "I withdraw the latter part of my definition." Dr. Zilboorg withdrew the first half for him. Many persons in perfect harmony with themselves, he pointed out, are in "distinctly pathological states." (*Time*, Nov. 24, 1946.)
 - b. Definition is of crucial importance in tariff problems. The Canadian tariff was higher on vegetables than on fruit. How should a shipment of rhubarb be taxed? The botanist defines a fruit as the matured seed-vessel of a flowering plant. Thus tomatoes are fruit, rather than vegetables. But most people would call a tomato a vegetable. The test adopted by the customs court was: Is it served with meat as a vegetable, or is it eaten as a dessert?
 - c. Slander is defined in law as defamation of reputation by speech; libel as defamation in permanent form, capable of wide circulation, such as writings or drawings. How should a court rule on the question as to whether defamatory remarks made by a radio commentator are slander or libel?

Section VII: The Construction of Definitions

We have been concerned with the analysis and criticism of definitions. We shall now discuss the problem of constructing adequate analytical definitions. This is sometimes a very difficult task, particularly when there is controversy over the "proper" meaning of a word.

Let us assume that we require a definition of "art." We should first stipulate that the word will denote certain referents: "Let the word 'art' stand for productions in the fields of paint-

ing, sculpture, architecture, literature, and music." This stipulation clarifies the extension of the term and eliminates certain ambiguous usages of the word "art" as in "Medicine is an art rather than a science" or in Plato's references to the arts of cobbling and the training of horses. Our next task is to analyze the nature of the referents for which the word stands. We must seek for the characteristics which are common and peculiar to paintings, poems, etc., so that our definition will have the virtue of equivalence. We shall leave to the reader and the art critic the task of finding the common and peculiar characteristics of works of art and also the more difficult problem of defining "greatness" in works of art.

Let us now examine a somewhat different type of problem, that of defining the word "propaganda." If the reader will examine the definitions of this term in several dictionaries and in a dozen books dealing with public affairs, it is a safe guess that he will find as many definitions as there are writers. This is, of course, a highly unsatisfactory situation, for when a speaker uses the word we cannot know what the speaker is referring to, and communication breaks down. The multiplicity of definitions of this word is such a scandal that a public-spirited citizen in New York is reported to have offered a prize of \$1,000 to anyone whose definition of the word would win general acceptance. It has also been seriously suggested that the use of the word be discontinued because of the extraordinary variety of its meanings.

When we examine the many definitions of "propaganda," however, we find that the word is used in two fundamentally different senses. In popular usage the word carries a derogatory connotation and refers to dishonest types of persuasion that seek to mislead the public. This meaning is rather widely accepted, for to call a speaker a "propagandist" is to tar him with the brush of opprobrium. On the other hand, we find a "neutral" definition of propaganda popular among some social scientists: "Propaganda is the expression of opinions or actions by individuals and groups deliberately designed to influence opinions or actions of other individuals or groups with reference to pre-determined ends." (From *Propaganda Analysis*, by Clyde R. Miller.) Those who accept a variant of this latter definition tend to speak of all speakers as propagandists. They also recommend that we draw a distinction between bad and good propaganda,

depending upon the aims of the propagandist. But neither of these definitions has won universal acceptance.

At this point the reader may ask, "Can we not arbitrarily stipulate *any* meaning for propaganda, and let the matter go at that?" As we have already noted, stipulation is not a merely arbitrary matter if we wish to define a word so that our definition will be "equivalent" to the referents denoted by it. Thus, some stipulations will be found satisfactory; others not. A stipulation that propaganda shall be understood to refer to "love poetry" will be wholly useless. When we think of "propaganda" we refer to certain kinds of activities that we apprehend only vaguely, and the search for a definition is the search for a description of these activities. Thus we reject some stipulations as inadequate and distinguish between definitions which describe our referents correctly and those which do not.

The attempt to construct an adequate definition of propaganda might proceed along the following lines: We begin with a stipulation that the word shall denote certain kinds of activities, such as wartime broadcasts by government agencies that seek to create a defeatist spirit in the enemy, to defame him, or to bolster the morale of one's own people. A poster designed to encourage the sale of war bonds during the last war is also a good example of the denotation of the term. This poster showed a picture of a marine lying on a foreign beachhead and asked the question, "Do you want our boys to die for the lack of guns?" followed by "Buy bonds!" The "Freedom Train," which sought to popularize knowledge of our civil liberties, in order to create affection for the democratic form of government, is another example.

If these examples are typical of the items properly included in the extension of the term "propaganda," then we must reject the two types of definitions noted above. Propaganda is not necessarily a dishonest type of persuasion which seeks to mislead the public. The "Freedom Train" did not mislead, and its purpose was a laudable one. The derogatory definition is thus too narrow. The neutral definition, on the other hand, is far too broad, for it covers *all* persuasive discourse, including the explanation of a formula in a class in mathematics, and even such expressions as "Please pass the salt" at the dinner table. It is worthy of note here that the Institute for Propaganda Analysis,

which adopted the neutral definition cited above, also developed the classification of the tricks and devices of propaganda noted in Chapter 4. But it is surely inconsistent to define propaganda as equivalent to all persuasive discourse and then to speak of the special tricks and devices of the propagandist. Unless propaganda is in some sense evil, why should we be warned against its diabolical devices?

Let us now seek to analyze the referents denoted by our term. We begin by seeking for an adequate genus. Let us suggest the following: "A form of directive language used by groups desiring the public's support and action for the group's objectives." (These objectives may be political, economic, religious, and so on.) Our genus states that the propagandist desires action from his hearers. In this respect he differs from the educator, who is interested in communicating knowledge or truth in order to enlighten his audience.

We must now attempt to find the proper differentia. Here, too, the distinction we have drawn between the educator and the propagandist is the crucial one. The educator will seek to teach the truth and will not conceal relevant portions of the truth in order to influence his hearers in a given direction, but will present all of the relevant facts and permit his hearers to make up their own minds. He assumes that his hearers are rational beings who can think intelligently and who will act wisely when they know the evidence. The propagandist, on the other hand, seeks action, not truth. He wishes to mold his hearers' minds in a certain direction, regardless of the evidence. If the truth will serve his purpose, then he will tell the truth, but he has no real devotion to truth rather than to falsehood. And since action may be hindered by an appeal to thought, the propagandist will seek to inflame his hearers' emotions as the most effective prelude to action.

These considerations lead to the following definition: "Propaganda is directive language which seeks to get action for a group's objectives by the means best calculated to achieve action, usually by appealing to the emotions rather than to the intelligence of its audience and which disregards the truth when it appears convenient to do so."

This definition should be examined critically to determine whether it adequately states the characteristics which are both

common and peculiar to propaganda. The reader should note that our definition appears to make all propaganda "bad," since it appears to be an intrinsically undesirable form of persuasion. This point must be clarified. A propagandist may of course have our good in mind, as was the case in the sale of war bonds during the war. The sale of these bonds was required in order to avoid inflationary tendencies which would have disrupted the economy and interfered with the effective prosecution of the war. But the government did not explain these facts to the people. The posters implied that the failure to buy bonds would mean that the soldiers would have no ammunition. The picture of a dead soldier was an emotional appeal which brought more action than would a reasoned argument against inflation. Since a rational appeal would presumably have brought no action, this propaganda may have been necessary, and few persons will object to its use. But when we give people propaganda instead of truth we treat them as children rather than as adults, unable to decide issues by a complete and truthful presentation of the relevant facts. Propaganda, then, is an intrinsically undesirable means of persuasion, but will be required so long as people lack the wisdom to choose wisely on the basis of rational considerations. In any case, those who have the wisdom to do so will always distinguish between the propagandist's appeals and his real purposes.

Before we leave the subject of definition, a warning is necessary. Stanley Baldwin, onetime Prime Minister of Great Britain, expressed an attitude of hostility toward the process of definition when he remarked, "Don't let us be too keen on definition . . . If we try to define the Constitution too much, we may split the Empire into fragments, and it will never come together again. Politically, if ever a saying was true, it is this: 'The letter killeth, and the spirit giveth life.' "

Susan Stebbing, in *Thinking to Some Purpose* (Penguin Books, p. 13), commented on this remark. She wrote,

He supposes that the logician must demand a definition, and that the definition must set forth precisely determinable characteristics. But whosoever demands such a definition of that which lacks precisely determinable characteristics is being illogical. The mistake consists in demanding that a sharp line be

drawn concerning characteristics which are not in fact sharply distinguishable.

Logicians, in other words, will not commit the error against which Miss Stebbing warns. We must, of course, use a word in a determinative sense, for otherwise we would be guilty of using "words without referents," but we must not be too rigid in applying a term whose boundaries are not precisely delimited. We must take a similar attitude toward our definition of propaganda.

Exercises

1. Criticize the definitions of propaganda found in the following: Joe and Jim are listening to a famous radio commentator who is pontificating in his usual pontifical style. Jim says, "Oh, turn that guy off; that's just propaganda." Joe retorts brilliantly, "Whaddayamean, propaganda?" Jim answers, "Just a pack of lies." Joe: "My dear fellow, you have a sadly antiquated notion as to what propaganda is. Propaganda means any speech or action which has the purpose of influencing the actions of others. It follows that every public speaker is a propagandist. The only possible distinction we can make is whether or not we like the particular type of propaganda which is being dished out. If you like it, it is good propaganda so far as you are concerned; if you don't like it, it is bad."
2. Criticize: The only difference between "propaganda" and "education" really is in the point of view. The advocacy of what we believe in is education. The advocacy of what we don't believe in is propaganda. (Edward L. Bernays, *Crystallizing Public Opinion*, Liveright, 1923, p. 210.)
3. Construct an adequate analytical definition of a "big" word, such as "religion," "democracy," "socialism," "communism," or "fascism."

Logic and Argument

Section I: Argument and Assertion

In Part Two we shall study the principles of valid reasoning, i.e., the principles which determine whether an argument is sound or unsound. Since the argument is the fundamental unit of reasoning, our first task is to understand the nature of argument.

The word "argument" is used in more than one sense. In popular speech "argument" often refers to a contest in reasoning, to a dispute, a wrangle, or a battle of ideas. Such arguments are contentious; each arguer tries to "win." In logic, however, the term argument refers to the basic unit of reasoning, and we define it as "a unit of discourse in which beliefs are supported by reasons."

An argument is a unit of discourse which seeks to prove that something is or is not the case. Here is an example: "You can't vote at the next election, for you aren't registered, and only those who are registered can vote." This argument undertakes to prove that you can't vote at the next election, and related reasons are presented in support of this point. Note that every argument contains two parts: (1) a point, or belief, or thesis, usually called the "conclusion" of the argument and (2) the supporting reasons, or evidence, usually called the "premises." The premises are the facts or assumptions on which the conclusion of the argument is based.

It is important to distinguish an argument from a "mere assertion." The French essayist Montaigne once said that "to philosophize is to learn how to die;" i.e., that a wise man will not fear death. This is a mere assertion as it stands. But Montaigne weaves this assertion into the conclusion of an argument when he gives his reasons for his belief. The argument goes as follows:

"A wise man will not fear the loss of life, for it is foolishness to fear the loss of something one can never regret having lost." The conclusion is stated before the comma; the rest is the supporting reason or premise. The argument is the whole. A statement becomes a premise or conclusion by virtue of the role it plays in the argument.

An argument is discourse containing inference, in which we say "This is so because of that," or "This is so; therefore that is so." The student should seek to acquire facility in distinguishing the conclusion from the premises of arguments. There are two questions he should ask himself whenever he encounters argumentative discourse: (1) What is the writer's point, i.e., exactly what is he trying to prove or "put across"? (2) What reasons does he present to support his point? These questions concern only the structure of the argument and not its adequacy or inadequacy. Questions concerning the soundness of arguments will be discussed later.

An argument, then, has two parts; premises (or evidence) and conclusion. Note that the order of these parts is immaterial. The conclusion may be stated first, last, or it may be sandwiched between the evidence. The three possibilities follow:

1. Evidence stated first . . . *therefore* . . . conclusion.
2. Conclusion stated first . . . *because* . . . evidence.
3. Part of evidence . . . *therefore* conclusion . . . *because* remainder of evidence.

The following arguments are respective examples:

1. All men are mortal, and Socrates is a man; *therefore* Socrates is mortal.
2. Socrates is mortal *because* all men are mortal, and Socrates is a man.
3. All men are mortal; *therefore*, Socrates is mortal *because* he is a man.

These forms state exactly the same argument, despite the difference in the arrangement of its parts. Most arguments contain *logical indicators*, i.e., words which signal that a part of the

argument is premise or conclusion. "Because" and "therefore" are such indicators. These words have many synonyms. Synonyms for "therefore" are words like "so," "hence," "consequently," "thus," which always introduce the conclusion of the argument. This function may also be performed by phrases such as "which indicates that," "which shows that," "we may conclude that," "must be," and so on. Synonyms for "because" are words like "for," "since," or phrases like "in view of," or "for the reason that," etc. Remember that "because" and its synonyms always introduce a premise.

Some arguments contain no logical indicators, as in "We are headed for socialism. Congress just voted big subsidies for farmers." The speaker obviously intends the second sentence to be evidence for the first. The logical indicators may also indicate subsidiary elements rather than the main conclusion in an argument. But the student who is alert to the presence of the indicators will have little difficulty in distinguishing the premises and conclusion of an argument.

Exercises

Read the units of discourse stated below, and distinguish collections of mere assertions from arguments. Are beliefs alone stated, or are reasons given for the beliefs? Identify "logical indicators" where present. If the unit is an argument, analyze it into two parts, evidence and conclusion, and restate it with the conclusion first (Form 2 above).

1. All men are mortal and fallible, so some mortal beings are fallible.
2. Since only citizens can vote, John must be able to vote, for he is a citizen.
3. If a man is able to vote, then I know that he must be a citizen. John must be a citizen, for I know that he can vote.
4. Good sense is of all things the most equally distributed among men; for everybody thinks himself so abundantly provided with it that even those most difficult to please in all other matters do not commonly desire more of it than they already possess. (Descartes)
5. There are thousands of persons on the federal payroll who don't

earn their pay but who are kept on until they can retire. The commission studying this matter may recommend that these workers be let off with adequate severance pay.

6. All men are mortal and fallible. All men are sinners.
7. The following excerpts are from a speech delivered by General George Marshall, former Secretary of State and author of the Marshall Plan, in Chicago, Illinois, on November 18, 1947:
 - (a) It seems evident that as regards European recovery, the enlightened self-interest of the United States coincides with the best interests of Europe itself and of all those who desire to see conflicts of whatever nature resolved, so that the world can devote its full attention and energy to the progressive improvement of the well-being of mankind. The place to begin that process is in Europe.
 - (b) We recognize that our people will be called upon to share their goods still in short supply and will have to forego filling a portion of their own requirements until the greater needs of Europe have been met. This is a direct contradiction of the allegation that we are seeking to dump surplus foods in Europe in order to avoid the depressing effects of oversupply.
8. There is no race in the whole world that consists of families of uniform character. Every race embraces many diverse family lines. It is incorrect to assume that all the members of a racial group possess uniform characteristics because they are similar in some respects. All people who are blond and who have blue eyes have not the same characteristics and there is no reason to give inordinate weight to this single feature. (From "remarks" by Franz Boas in a pamphlet, 1934.)
9. The first condition of free government is government not by the arbitrary determination of the ruler, but by fixed rules of law, to which the ruler himself is subject. We draw the important inference that there is no essential antithesis between liberty and law. On the contrary, law is essential to liberty. (L. T. Hobhouse, *Liberalism*, Henry Holt.)
10. Human beings do not live "by bread alone"; they also need to dream, to have great hopes and aspirations. This is especially true of today's teenagers, who are so accustomed to modern luxuries that they no longer thrill to material possessions.

Modern parents no longer have dreams. They now possess what they used to dream about. They have split-level ranch homes, picture windows, finny automobiles, and automatic dishwashers.

This is the reason why today's parents have so little influence over their teenagers.

Section II: The Law of Rationality and Evasions Thereof

We have distinguished arguments from mere assertions. An argument is discourse containing inference, in which we say, "This is so because of that." But the inference may be sound or unsound. In Part Two we will be concerned with the principles of sound reasoning. Before proceeding to the principles, however, let us consider the aim of logical thinking and the manner in which this aim may be frustrated.

Every person who is interested in logical thinking accepts what we shall call the "law of rationality," which may be stated as follows: We ought to justify our conclusions by adequate evidence. The meaning of adequacy will be explained in detail as we proceed. Let it suffice here to say that by "adequate evidence" we mean evidence which is good and sufficient in terms of the kind of proof which is required. There are occasions when we require conclusive proof, as in mathematics, and there are occasions when it is sufficient to establish the probability of a given conclusion, as in weather prediction. But in all cases the evidence must be adequate to its purpose.

Adequate evidence is evidence which is relevant to the conclusion to which it is directed. We need not define "evidence" or "relevant," since we may assume that these words will be generally understood by most persons. Unless the meaning of these words were understood by the reader of a book on logic prior to his reading the book, he would not be able to follow the author's reasoning. The reader must be warned, however, that "relevance" is not always easily determined. When we say that one fact is relevant to another, we mean that there is a connection of some kind between them. This connection is not always apparent. For example, a historian investigating the causes of the decline and fall of the Roman Empire must consider only matters relevant to his study. Should he study the history of the building of the Great Wall in China, and the practice of human sacrifice among the Aztecs? Both facts may appear irrelevant, but we find to our surprise that the first fact is relevant. For the Great Wall was built to keep the Huns out of China, and they

turned west instead. In their travels for pillage and loot they finally came to the Roman Empire and had an important role in its destruction. But all of us understand what relevance means. When one fact is irrelevant with respect to another, then that fact, like "the flowers that bloom in the Spring," has "nothing to do with the case."

Though few, if any, will have the temerity or the foolishness to challenge the law of rationality, it is often evaded. Evasion usually occurs through carelessness, but it may also occur through design. In this section we shall note some of the typical ways in which the obligation to support beliefs by adequate evidence is evaded.

In every argument we find the assertion of a belief, which we shall call "P," (for "probandum," or proposition to be proved). Someone says that P is true. When we ask the speaker, "Why," or "What reasons do you have for believing that P is true?" we ask for evidence. We then expect adequate evidence to support his belief. This adequate evidence should be relevant to the question at issue, and it should be good and sufficient evidence. In the rest of this chapter we shall be concerned with the evasion of the requirement that evidence be furnished. The proverb says that we asked for bread and were given stones. Paraphrased, we shall find that we asked for evidence and received the Argumentum ad Misericordiam, or the Argumentum ad Hominem, or the Argumentum ad Verecundiam. We turn now to the evasions, seven of which will be considered:

1. The Appeal to Authority *copy p. 48, 80*

This evasion has the following structure: Jones says that P is true. When asked, Why? he answers, "Because X says so." Now, P (the *probandum*) should be proved by adequate evidence, but the fact that X says it is true is not evidence for its truth. The citing of authority in this bald manner is an evasion of the law of rationality.

Now, to say that "the appeal to authority" is an evasion of the law of rationality is not to say that we are guilty of this evasion whenever we cite an authority for our beliefs. There is no doubt that sensible people must rely on authorities for many, if not most, of their important decisions and for the beliefs on which these decisions are based.

When a physician tells us that we need an operation we rely on his authority. We accept the authority of the weatherman that rain is probable. We have neither the time nor sufficient knowledge to investigate the evidence for all of our beliefs. The point, however, is this: No belief is true merely because someone says so. It is true because of the evidence in its behalf. When we trust an authority, we merely place credence in the fact that he has evidence. And if we wish to *know*, rather than merely to believe, we should inquire into the evidence on which his conclusions are based. For example, the reader believes that the earth is in motion. On what evidence?

In general, three questions should be kept in mind when considering the statements of an authority: Is the cited authority an authority in the specific field in which he has made his pronouncements? Does the authority have evidence to prove his statements? Do all qualified investigators agree on the general soundness of the type of proof offered? A great physicist may be an authority in the field of nuclear physics, but that does not qualify him to be dogmatic in the field of religion. A man may be very critical in one field and very uncritical in another. A theologian may be an authority in the field of theology, but he is not necessarily an authority on the question of the existence of God, since not all qualified investigators are agreed on the soundness of his methods of proof. On the other hand, we accept the statements of astronomers that the mean distance of the sun from the earth is close to 93 million miles, because they are authorities with respect to such matters, their evidence is available to all, and all qualified investigators agree on the soundness of their methods. We accept our physician's statement that we should take medicine for our ailments for similar reasons (or at least we believe these reasons to hold). But even the acceptance of competent authority is never a substitute for proof.

When the authorities are in conflict, i.e., when "the doctors disagree," two courses of action are open to us. If the problem is a purely theoretical one, and we are not required to take immediate action, we should suspend judgment. If action is required, we should accept the authority who appears to be most competent and trustworthy.

The appeal to authority is often called the "Argumentum

ad Verecundiam," a learned-sounding Latin phrase which means the "appeal to reverence." A revered authority or tradition is often regarded as infallible, so that anyone who disagrees is in some sense disloyal to that which ought to be revered. This type of appeal is sometimes employed with respect to the theory of evolution. We may be told that evolution cannot be true because it is contrary to the story in the Book of Genesis. But this question must be decided by those who have examined the available evidence, and the writers of that ancient book did not possess our present knowledge. Reverence is not a substitute for evidential proof. Reverence was also exhibited by the mediaeval professor who looked through Galileo's telescope, but who continued to teach the ancient astronomical ideas because he preferred to distrust the evidence of his senses rather than doubt the authority of Aristotle.

The fact that "everybody knows that this is so" is no proof. The masses of men have frequently been mistaken. They once thought that the earth was flat. They still believe that the speed of a falling object depends on its weight. The voice of the people is not necessarily the voice of God on all questions.

2. The Appeal to Emotion *cap 1.79*

The structure of this evasion: "The proposition 'P' is true." Why?—"Because I (or you) have strong feelings concerning it." But strong feelings do not constitute evidence for the truth of a proposition. The fact that people have emotional attachments to religious and political doctrines does not make the doctrines true.

The appeal to emotion takes two forms, one subjective or personal, and the other objective or social. In its *personal* form the appeal is to one's own emotions. A person is convinced of the truth of a proposition because he "cannot bear to think it untrue." If I feel so strongly about it, his argument goes, then it surely must be true. But wishes are fathers to thoughts, and this is an evasion of the law of rationality. The argument is usually not stated in this bald manner, but it is often found in a concealed form.

In the *objective* form the appeal is to the emotions of other persons, as when a speaker substitutes emotional appeals for evidence. In traditional logic this is called the "Argumentum ad

Populum," the appeal to the people, or, in less flattering terms, to the mob. The masses of men are often moved by emotion rather than by reason. Speakers inflame crowds of people with emotionally loaded language, rabble-rousing and prejudiced appeals, by spell-binding, "pulling the heart strings," and appeals to popular sentiment. But the truth is not always one with our emotions. Mark Antony's speech, part of which was quoted in Chapter 4, is an excellent example of the use of this evasion. It is Mark Antony's task to convince the mob that Caesar was not a dictator. His argument, reduced to its structural elements, goes as follows: If Caesar's wounds are pitiful to behold, then Caesar could not have aspired to be a dictator. If Caesar remembered you in his will, then he did not aspire, etc. Emotion overcomes reason, but again, no evidence.

Mark Antony's speech is also a good example of a special variety of the appeal to emotion called the "Argumentum ad Misericordiam," or the "appeal to pity." This appeal is used by attorneys for the defense who tell the jury that the prisoner at the bar has a wife and four small children. It was this type of argument which Socrates disdained to use in his speech defending himself to the Athenian jury, as reported in Plato's *Apology*. Finally, we note the "appeal to laughter." This means that we meet an opponent's arguments, not by evidence, but by a joke, to arouse laughter at his expense and to divert the attention of the hearers from the issue. But laughter, like loud talking, is never a substitute for evidence.

A warning is called for before we leave this evasion. We have not said that all emotional appeals are inappropriate. When the facts are not in question and action is desired, an emotional appeal is appropriate, even indispensable. In the critical days of 1940 when England was threatened with invasion Prime Minister Winston Churchill's emotional eloquence inspired his people and spurred them to heroic efforts. What must be condemned is the substitution of emotion for proof when proof is required.

3. The Argumentum ad Hominem *Copi 74*

The Latin title means "an argument directed to the man," to the man (speaker, writer), that is, instead of to the point at issue. For example, let us suppose that we disagree with what a

speaker says. We may try to disprove what he says by presenting contrary evidence. But sometimes we don't bother to present the evidence. Instead, we try to disprove what the speaker says by attacking *him*, (verbally, of course).

This evasion is a form of *disproof*, rather than *proof*. It seeks to show that a certain proposition is false but substitutes an attack against the speaker for an attack against the proposition itself. Its structure: "P is false." "Why is P false?" "Because he who asserts P is a certain kind of person."

It may be instructive to contrast the "ad hominem" with the "appeal to authority." There is a sense in which these are opposites, for in the latter we say "P" must be true because X says it is. In the "ad hominem" we say "P" must be false because X is a certain kind of person. The ad hominem argument, in other words, has a negative purpose: to discredit a proposition by discrediting the speaker. It is an evasion of the law of rationality because it fails to provide relevant evidence against the proposition it seeks to disprove.*

To illustrate. A woman reads Schopenhauer's *Essay on Women*, aptly described by G. K. Chesterton as "that hideous essay." Schopenhauer writes:

It is only the man whose intellect is clouded by his sexual impulses that could give the name of the fair sex to that undersized, narrow-shouldered, broad-hipped, and short-legged race: for the whole beauty of the sex is bound up with this impulse. Instead of calling them beautiful, there would be more warrant for describing women as the unaesthetic sex. Neither for music, nor for poetry, nor for fine art, have they really and truly any sense or susceptibility; it is a mere mockery if they make a pretense of it in order to assist their endeavor to please. Hence, as a result of this, they are incapable of taking a purely objective interest in anything.

And more of the same. He says that women are interested only in acquiring husbands, in dress, jewelry, and cosmetics. Now, practically all women and most men would disagree with

* Note that "ad hominem" is sometimes used in a different sense—for an argument based on an appeal to a person's private prejudices: "You, as a property owner, will surely oppose building a new high school, for this will mean higher taxes."

Schopenhauer. But how does the "typical" woman reader meet Schopenhauer's argument? By pointing out that his statements are untrue, or highly misleading in their selectivity? No. She attacks Schopenhauer himself, stating that he must have been a disappointed lover or that he must have had a very unhappy childhood to write such tripe. But this attack does not meet his argument. "Attacking the man" is an evasion of the law of rationality and it is not a proper substitute for presenting evidence to refute his argument.

In general, the "ad hominem" takes the form of directing one's attack toward the speaker rather than to what he has said. The implied assumption is that his being a certain kind of person, or having a certain personal history, tends to make his statements false. Thus we answer an opponent by noting that he is a millionaire or a poor man, as the case may be, young or old, an employer or a member of a labor union. The popularity of the "psychoanalytic" method in recent years has made this method of approach a common one. Instead of meeting an opponent's arguments with evidence we seek to psychoanalyze him. If he says that a strong government is desirable, then we find that he is seeking a substitute for a "father-image." If he thinks a weak government is desirable, then he is in revolt against his father-image.

Note how this approach seems to discredit whatever view it seeks to "explain." In general, we employ this psychological approach only for views with which we disagree, for it seldom occurs to us to seek a psychological explanation, or any explanation at all, for what seems obvious to us. One who takes the psychological approach thus usually assumes the falsity of the view he seeks to explain. It is as if the speaker were to say, "Your ideas are so patently false that it is difficult to see how an intelligent man could assert such things. So there must be a psychological explanation." But if we believe that ideas are false, then we are duty-bound to present the evidence. A pejorative psychological analysis of the supposed psychological causes of a belief is no substitute for logical analysis. Indulging in "personalities" is irrelevant with respect to the logical force of ideas. Euclid's geometry stands or falls on its own merits, whether or not Euclid was a kind husband and father.

We should not confuse the ad hominem with an attack

PE JS-RA TWE
 tendency to make
 - wrong

XXX
against a man's character. If we say that Roe is a liar, or dishonest, or a spy, we have made allegations which may be false and slanderous, but the ad hominem does not occur unless we contend that Roe's statements must be false because Roe is a certain kind of person. This distinction should be borne in mind when considering a special variety of the ad hominem called "Poisoning the Wells." This figure of speech refers to the demand that we should suspect or ignore whatever some people may say on the ground that the truth cannot be in them. "Do not drink water from that well," it is said, "for the well is poisoned." In practice, this takes the form of an attack which seeks to discredit a witness, by alleging that he is a dishonest witness. This is sometimes a legitimate procedure, provided that we do not confuse this kind of an attack with a disproof of what the speaker says. This important distinction requires careful analysis.

XXX
We do not commit the ad hominem evasion when we attack a person's character, as when we say that he is a liar and should not be trusted. Thus in a law court a witness for the prosecution testifies that he observed the defendant in the act of committing the crime. The attorney for the defense then presents "character witnesses" who testify that the witness is a notorious liar who has been previously convicted of perjury. This evidence proves that the witness is untrustworthy, and that his testimony is of little worth with respect to its credibility. A jury will be reluctant to accept his statements at face value and will probably disregard his evidence. But liars sometimes tell the truth, and we should not confuse proof that a witness is untrustworthy, with proof that what the witness is now saying is false. We also discredit a speaker when we find that he has been paid to give his testimony, that he is an apologist for special interests or groups, that he is notoriously biased or prejudiced, or that he is insincere, and so on. If we know that a person is a communist, and as such would never find any fault with Russia, his statement that Russia is right in a particular international dispute would carry little weight. In the same manner we discount a Republican's attacks against a Democratic administration, and vice versa, because we feel that such criticisms are apt to be prejudiced. But in none of these examples have we proved that the speaker's statements are false.

We also seek to discredit a speaker when we accuse him of

being inconsistent, but this is not to prove his last statement false. For example, ex-Governor Arnall of Georgia once stated that he thought it inadvisable to outlaw the Communist Party. An opponent retorted, "But Governor, a year ago you favored outlawing this party." The Governor answered that he had reconsidered, and now believed it would be a mistake to suppress ideas with which he disagreed. The fact that the Governor was inconsistent did not prove that he was now wrong (or right). But when we find a person consistently inconsistent, then we lose respect for his mental quality and integrity, and in such cases he becomes a discredited witness. Though we may admire people who have sufficiently flexible minds to change their opinions with new evidence, we do not admire those whose opinions change, like weather vanes, with every shift in the winds of doctrine. But though an attack against a man's authority may be legitimate, we must never confuse this with an attack against the ideas he has expressed.

A similar distinction must be made when we read a history of ideas. When a historian gives us a sociological or a socio-political-economic interpretation of ideas, he "explains" how a particular thinker came to develop his system of thought. For example, Thomas Hobbes (1588-1679) advocated the principles of absolute monarchy in his *Leviathan*. It is highly enlightening to know that Hobbes was personally a rather timid man. Perhaps he desired the security which a strong king would give him. We may also learn that he wrote in a time of troubles, when the social situation was disorganized and chaotic and when men longed to escape the horrors of civil war. The historian may explain how the principle of absolute monarchy reflected the social needs of the time. But insofar as Hobbes presented a reasoned defense of his principle for *any* society, then his argument must be met with logical criticism as well as sociological interpretation.

The same considerations apply to John Locke's (1632-1704) defense of constitutional monarchy. Locke was an apologist for the reign of William and Mary, the constitutional monarchs who ascended the throne in 1689 at the invitation of the English Parliament. But Locke's argument for the advantages of representative government can also stand on its own feet. Edmund Burke (1729-1797) was a liberal in his early career.

The French Revolution aroused a horror of revolution in him and he became an extreme conservative, arguing that social reform was certain to cause more harm than good. But once again, our knowledge of the conditions which led him to this position do not in themselves invalidate the argument. It may be that Burke's psychological experiences gave him an insight which he had not previously had.

The value of the historical explanation of ideas is that it may call into question our unthinking acceptance of assumptions which appear to be eternally valid. The critical mind welcomes a questioning of first principles. "Truth" is a very complex matter in the field of political philosophy, and history reveals that most political ideas play a very practical role in organizing society under certain historical conditions. Nevertheless, political programs are also general techniques for achieving certain universal goals, and as such their validity transcends their immediate historical setting.

Before we leave this topic we shall note a popular type of defense against the ad hominem attack. We may defend ourselves against an ad hominem by our own ad hominem, directed against its proponent. This type of defense is called the "tu quoque," which means "You're another." An illustration: X, a forty-year-old professor argued in favor of the military draft in 1949. He stated that it was necessary for the defense of the nation. A student interposed, "You favor the draft because you are in the higher age bracket and are not in danger of being drafted." The professor responded with his own ad hominem in the form of the tu quoque, "By the same token, you are against the draft merely because you are afraid that you will be drafted." The question at issue in this discussion was: Is the draft necessary for the welfare of the country? The tu quoque settles nothing, but is a useful rhetorical device to expose the evasion called the ad hominem. Similarly, if we are told that we believe in the truth of P merely because we have been "conditioned" in a certain way, the proper retort is that our opponent considers P false merely because *he* has been conditioned in a different way. We shall usually find that those who use the ad hominem seldom realize that it may be applied to themselves. Thus, a Marxian sees the doctrines of classical economics as false, "since they are merely products of a special historical situation," but

the Marxian economics is regarded as infallibly true and not as the mere product of a historical situation. But the critic may be hoisted with his own petard.

4. Argumentum ad Ignorantiam *Cop. p. 77*

This means the "appeal to ignorance." It has the structure: "P is true." Why? "Because you can't disprove it." This type of evasion often occurs in discussions which involve religious faith. Thus a man may argue that the Book of Genesis gives a literal account of the creation of the world. A skeptic may state that this account appears improbable to him, though he may also admit that he cannot disprove it. The religious protagonist then asserts, "You must now admit that it is true, for you cannot disprove it." This is the appeal to ignorance or inability to disprove. But inability to disprove is not equivalent to proof. Only evidence gives us proof. If we accepted this kind of substitute for evidence we should be required to believe that the Angel Gabriel visited the prophet Mohammed to inform him that God had decided that the Moslem religion was to supersede the Jewish and Christian religions. For how would you go about disproving this claim? We are not required to accept the improbable merely because we do not know how to disprove it. As cautious thinkers, we will withhold belief until we have positive evidence in favor of a proposition.

5. Begging the Question *Cop. p. 83*

This evasion, known in traditional logic as "Petitio Principii" consists in our pretending to prove something when actually we *assume* in the "proof" that which we are supposed to prove. "Why do I believe that Zilch is guilty? Because he is guilty." The evasion has the following logical structure: "P is true." Why? "Because P is true." The "evidence" here merely restates the conclusion. There is thus no independent relevant evidence whatsoever; we have merely assumed the truth of that which we are supposed to prove. The conclusion is used to establish itself.

This evasion is seldom stated in this bald form. The fact that we use the conclusion to establish itself is usually concealed in various ways. X argues that it is wrong for women to sit at bars. When asked, Why? he answers, "Because I know that it

isn't right." The expression "wrong" and "not right" are equivalent to each other. "Arguing by definition" usually involves begging the question. Thus, X asserts that all Christians are virtuous men. Y then points to the example of Thwackum, who is a Christian, but no exemplar of virtue. "Ah," answers X, "Thwackum may attend his church regularly, but he is no Christian, since, if he were, then he would be a model of virtue." This is begging the question by definition, since X has *defined* a Christian as a virtuous man. Thus his statement "All Christians are virtuous men" was a mere statement of the tautologous remark that "All virtuous men are virtuous men." This is certainly true, but it is no proof that "Christians," in the sense of "being a member of a Christian church," are all virtuous men. The original proposition appeared to be a significant statement only because the implied tautology was concealed.

Question-begging may also occur independently of arguments. Statements may assume matters that ought to be proved, as in the use of "question-begging epithets" such as "stupid conservatism," or "wild-eyed radicalism," or in referring to a person on trial as "that criminal." Complex questions (Have you stopped beating your wife?) also "beg the question" by assuming that which ought to be proved.

Though we should not assume what needs to be proved, some assumptions are indispensable in any discussion. The careful thinker is one who tries to be aware of his assumptions. Few of us, however, are capable of exercising the care shown by a cautious man who was famous for never saying anything he was not sure of. While driving through the country with a friend they passed some sheep. "Those sheep seem to have been sheared recently," said his friend. "Yes," answered the cautious man, "at least on one side." Charles Lamb, the English essayist, was also a careful man. He is reported to have refused to admit that 2 plus 2 is 4 until he knew what use would be made of his admission.

"Reasoning in a circle" is a "drawn-out" form of begging the question. It contains intermediate steps. The conclusion is used to establish itself, but it is smuggled into a chain of reasons rather than into only one. A fairly complicated example: The founder of a new religion tells us that he is inspired, so that we may believe whatever he tells us (P). When challenged

for proof he presents us with a book which states that he speaks in God's name (Q). "Why should we believe this book?" we ask. "Because it comes from God (R), he answers. "But how can we know this?" we persist. "Because you can take my word for it (S)." "And why should we take your word?" "Because I am inspired (P)." If we should now ask, "How can we know that you are?" the circle will start all over again.

The structure of this argument may be shown in schematic form:

Assertion that P is true. Proof: Because Q is true. (Question: How do we know Q is true?)

Proof that Q is true. Because R is true. (Question: How do we know R is true?)

Proof that R is true. Because S is true. (Question: How do we know that S is true?)

Proof that S is true. Because P is true. (But this is what we started out to prove!)

6. Diverting the Issue

The law of rationality requires that we furnish evidence for or against the proposition in issue and not for some other proposition. The evasion we call "diverting the issue" takes the following structure: P is true (or false) because I can prove R (where the truth of R is irrelevant to the truth of P). This evasion is seldom found in this obvious form, for usually R bears some superficial resemblance to P, and it may appear that we have proved P when we have proved R.

An example: In 1940, the "isolationist" chancellor of a leading American University argued against the proposal that the United States should send military aid to England during the early stage in the World War. He sought to prove his point by the rhetorical questions, "Do you think that a victory for the British Empire will result in the disappearance of all of the ills which afflict us here at home?" and "Are we to help the British Empire every time it goes to war?" His argument boils down to the following: We should not help England (P) because I can prove that such action will not result in a Utopia (R), or We should not help England (P) because I can disprove the thesis

that we should help England whenever England goes to war (R). But what the chancellor should have proved was that it was not in the interest of the United States to help England in 1910. His evidence should have shown (if such evidence were available) that we would have been better off by not helping England at that time. The wise man will always choose the better when he cannot get the best.

Another example: A group of law students were discussing the abilities of the various members of the freshman class. One of them insisted that Littleton, a student whose class recitations contained frequent references to Schopenhauer, Nietzsche, and other philosophers, was a true genius. His friends turned upon him with withering scorn and the challenge, "A genius! What possible basis is there for calling him a genius?" "Well," came the immediate response, "he's no ~~fool~~ fool!"

In debates this type of diversion is of frequent occurrence. One of the debaters may seek to divert the issue to one which his opponent will find more difficult to prove or to one which he can more easily prove. X asserts that "all corporation executives are opposed to labor unions," and then adduces evidence to prove that it would be absurd to believe that "all corporation executives are friendly to labor unions." But the proof of the falsity of the second proposition does not prove the truth of the first. Certainly it is not the case that *all* executives are friendly, for some are and some are not. But this is quite different from saying that none of them ^{are} are friendly.

Similarly, if X asserts that "some executives are friendly," Y may then seek to prove that it is false to assert that "all are friendly." But Y is not disproving the falsity of X's statement; he is disproving a different one. This type of diversion is called an "extension," since it extends the opponent's statement beyond what was actually asserted.

7. Special Pleading

We ought to furnish adequate evidence for our beliefs, and this means that we ought to state the evidence as fairly and completely as it is possible to do so. To deliberately select evidence which is favorable to our thesis and to conceal unfavorable evidence is to violate this law. Few human beings are capable of perfection in this matter. Charles Darwin was an

outstanding example of a thinker who conscientiously sought to find all the possible evidence which might upset his theory and who candidly admitted the gaps in his account of the evolution of life. At the opposite pole we find the fabled geologist who worked out a highly original theory concerning the rock formations in a certain valley. The examined evidence confirmed his theory, and he was in a state of exultation over the sensation which his paper would make in scientific circles. He walked up a hill to enjoy "his" valley, when his eye fell on a large boulder, a type of rock which should not have been there if his theory were true. He thereupon put his shoulder to the boulder and pushed it down the other side of the hill!

"Special pleading" is the evasion committed by speakers or writers who carelessly or deliberately overlook "negative" facts. The following is an example: "The New Deal of the early thirties was a disaster. It unbalanced the budget, increased the national debt, passed unconstitutional legislation, etc., etc." This argument tells us that the New Deal was a disaster "because of the following list of facts . . ." But this listing of evidence, whether true or not, is very one-sided. No mention is made of facts on the other side. Its structure: "P is true." Why? "Because of the following list of facts: Q, R, and S." But facts A, B, and C, which might tend to disprove P, are ignored, either carelessly or deliberately.

The term "special pleader," however, should not be used for those who merely fail to state the evidence completely, for complete evidence is often an unattainable ideal. Outstanding examples of this evasion are found in political debates where each side claims all the credit and finds nothing but ill in its opponent's records. Lawyers are also notorious special pleaders, since their chief purpose is to win the case rather than to find the truth. Witnesses in a law court who swear under oath are required to testify to the truth, the whole truth, and nothing but the truth. This is obviously a precaution against special pleading. Each part of the affirmation is necessary. Otherwise the witness might tell the truth part of the time and lie the rest of the time. He could then say that he had told "the truth," but not "nothing but." Or he might tell only the truth but leave out a substantial part of it. Thus the requirement that he tell the "whole truth."

Exercises

A. The following group contains examples of each of the evasions of the law of rationality. The correct answers are found at the end of this set, but the student should attempt to identify each example before looking up the answers. The seven evasions are the following:

- (1) The appeal to authority (Argumentum ad Verecundiam).
- (2) The appeal to emotion.
 - (a) The appeal to one's own emotions.
 - (b) The appeal to the emotions of others (Argumentum ad Populum, ad Misericordiam, Appeal to Laughter).
- (3) The Argumentum ad Hominem (Poisoning the Wells).
- (4) Argumentum ad Ignorantiam.
- (5) Begging the Question (Reasoning in a Circle).
- (6) Diverting the Issue (Diversion, Extension).
- (7) Special Pleading.

In each case find the proposition (P) in issue. Show the structure of the evasion in the following way: "P is true (or false) because . . ." Then state the nature of the evasion.

1. Your argument that the Taft-Hartley Law has contributed to labor unrest is without merit, since you are an International Representative of the CIO and would therefore be against the act no matter how good it was.
2. A wholesaler sued a retailer for \$200, claiming that he had shipped that amount in goods to the defendant and had not been paid. The retailer claimed that he had paid the bill. The wholesaler-plaintiff stated that he had no record of the payment. The retailer-defendant then said that the court should dismiss the case, since the plaintiff could not disprove his claim that he had paid the bill.
3. Every slip of the tongue is significant in that it reveals some unconscious and suppressed desire. There can be no question about the truth of this statement, since it was put forward by Sigmund Freud, the founder of psychoanalysis.
4. Henry, a determinist, believes that human beings have no free will. He argues that in all choices between two courses of action, the strongest impulse will prevail, i.e., that the strength of the impulse decides the issue, not the "will."

ad Hominem

#4

#1

How do we know that the strongest impulse always prevails? # 5
By the very fact that it prevailed.

5. I feel that if we don't prevent the establishment of life tenure for the Chief Executive, the republic eventually will be undermined and destroyed. The New Deal is the height of totalitarian nationalism. Our Republican tradition is based upon uncompromising independence and the interests of the republic. (Alfred M. Landon, 1941.) # 2
6. Jones says that he is in favor of an army draft at the present time. Smith: "But why? We are not at war." Jones: "This is a period of crisis." Smith: "Well, so far as I am concerned, I favor the time-honored constitutional way of doing things." Jones: "But in time of national crisis we must disregard the constitution." # 6
7. Under the capitalistic system there are many poor people, there is waste of men and materials, cut-throat competition, the glorification of the acquisitive instinct, depressions on the one hand and inflation on the other. This proves that the system is thoroughly bad and should be discarded. # 7

The above arguments may be analyzed as follows:

1. "The proposition: 'The Taft-Hartley Law has contributed to labor unrest (P)' is a false proposition because you are a certain kind of person." Ad hominem.
2. "I paid the \$200.00 (P). This is true, since you cannot disprove it." Ad ignorantiam.
3. "Every slip of the tongue is significant because Freud says so." Freud was a great psychologist, but scientific psychologists still debate the truth of many of his theories. In any case, what is the evidence for this probandum? Ad Verecundiam or appeal to authority.
4. P: "The strongest impulse always prevails (hence no free-will)." How do we know that it does? "Because it does." This is begging the question.
5. These are highly "loaded" remarks. President Roosevelt had just been re-elected to his third term, but "life tenure" is a figment of the imagination. "The height of totalitarian nationalism" is an inflammatory rather than an informative description of the New Deal. Mr. Landon had a point, but he submerged it in emotive language. His probandum is not clear, but it seems to be "You ought to vote Republican." Appeal to emotion.

6. This is an example of a diversion. The question is whether it is right that "we should have an army draft at the present time (P)." Smith diverts the issue to "the constitutional way of doing things," and Jones falls into the trap. (The draft is constitutional.)
7. Highly selected and one-sided facts to prove that "capitalism is bad (P)." Special pleading.

B. Analyze this group as before. Each type is represented by one example.

1. The attorney for the defense handed his brief to the barrister with the written notation, "We have a very poor case. Abuse the plaintiff's lawyer." Which evasion was he recommending?
2. "Educated people do not believe in the devil."
"But I know some college graduates who do."
"I said *educated* people; the college graduates you refer to aren't really educated, because if they were, then they wouldn't believe in the devil."
3. How do we know that this man is guilty of having committed this well-planned crime? I have encountered many examples of crime in my experience, but never one so well-planned as this one. Consider the circumstances of this crime carefully, and I am sure that you will agree with me that it was unusually well-planned.
4. Since it is impossible to prove that immortality is false, there being absolutely no positive evidence against it, we may rest assured in the confident belief that our souls are immortal.
5. Religion brought intolerance into the world, denied freedom of thought, retarded scientific progress, and was a divisive influence in that it separated group from group, each creed believing that it alone was good and all others bad. Therefore religion has done more harm than good.
6. Why do I think the Demlican party is the best? Because that is the way my father voted.
7. I know that there will never be an atomic war because I just couldn't bear to think about what will happen to the human race if there is such a war.

C. Identify the evasions in the following and explain your answers. State the probandum in each case.

1. But, Doctor, surely your advice that I should cut down on my smoking for health reasons cannot be sound, since I see that you yourself are a chain smoker.
2. Vivisection is wrong because it is wrong to dissect living animals for experimental purposes.
3. Free enterprise is not as good a system as socialism. I need only point out to you that free enterprise does not work perfectly. There are losses as well as profits, depressions as well as booms. Letting everyone decide things for himself will not result in a perfect state.
4. *Open the door, Richard* must be the greatest song ever written. No other song ever became so popular in so short a time, and since music is written for the public, what the public approves of must be the best.
5. Modern art is greater than traditional art because all the best critics say so. Who are the best critics? You can identify them by the fact that they prefer modern art to traditional art.
6. Our senator is about the worst we ever had. I just can't stand his sanctimonious manner and his preaching to other countries in a holier-than-thou manner. And I feel like screaming whenever I hear that he is making another junket to Europe.
7. Russia has real freedom, and capitalism allows no freedom. What proof do I have? Because, by definition, capitalism enslaves the workers.
8. What does this child psychologist know about raising children! He doesn't even have any children of his own.
9. ELMER: I oppose all forms of imperialism, both the Russian type and the type represented by the Marshall Plan.
PHIL: But the Marshall Plan is not imperialism in the usual sense of that term.
ELMER: Oh, so you think that the Marshall Plan represents a policy of pure benevolence on the part of the United States?
10. Every human being believes in God whether he admits it or not, for this belief is universal in the human race.
11. The universe must have had a beginning. There have been many philosophers and scientists during the last 2,000 years who have tried to prove that the universe had no beginning. It is generally agreed that not one of these "proofs" will stand up.
12. PARENT: If you expect to graduate from college you will have to put more time in your studies.
SON: In other words you want me to give up all my social

and athletic activities and do nothing but study from morning until night!

13. Dromedary cigarettes are without question easiest on the throat and most healthful. Our private statistical researches prove beyond doubt that more doctors smoke Dromedary than any other brand.
14. "Crime is a disease." "Well, but how about J. P., the headwaiter, who went to jail for income tax evasion? He seemed like a normal man to me." "Oh, he was sick, very sick." "But how do you know that?" "By the very fact that he committed a crime, for crime is a disease."
15. This witness is not telling the truth for he was convicted of perjury some years ago.
16. I would not hire X as a professor at this University. I have reason to believe that he is a communist.
17. Segregation must prevail, for it can be proved scientifically that human beings differ in all sorts of ways.
18. We'll give this here boss thief a fair trial, but send to town for a good strong rope.
19. A Chicago newspaper commented as follows on ex-President Truman's statement that "we won that war for freedom": "Whose? The Poles? The Lithuanians? The Hungarians? The Yugoslavs? They were all freer before the war for freedom. They are all, and many others besides, enslaved now."
20. Will the farmer benefit by the increased wages which labor will receive if we raise our tariffs? There is no question that he will, since labor will buy more of the products of the farm.
21. Since I have tried every conceivable way I can think of to solve this puzzle, and have gotten absolutely nowhere, I can only conclude that there is no solution for it.
22. We should not prepare for war, for from so wicked a thing as war there can come only doom immeasurable.
23. You say that the United States has the highest living standards of any nation in the world? I can disprove that statement by pointing to the sharecroppers in the South. Is that what you mean by a high living standard?
24. The Constitution of the United States embodies a truly good form of government, for its founders were unquestioned experts in political theory.
25. Commerce students should not be required to take courses in liberal arts such as literature and philosophy. Why not? Because such courses are not worth taking.

26. I would not hire X as a professor at this university. I believe that he is prejudiced against Jews, Catholics, and Negroes.
27. I shall prove that the corrupt Demlican Party does not deserve your support and that the reliable Republicrat Party does.
28. If every person over sixty were given a pension of \$200 per month, then they would buy more goods; this would increase the need for workers, whose wages would rise, and they in turn would raise their standard of living. Business would be kept at a high level, and everyone would benefit.
29. I pay no attention to writers who criticize communism for they are all prejudiced. The fact that they criticize communism is in itself proof that they are prejudiced.
30. Karl Marx and F. Engels, in the *Communist Manifesto*: "But don't wrangle with us so long as you apply, to our intended abolition of bourgeois property, the standard of your bourgeois notions of freedom, culture, law, etc. Your very ideas are but the outgrowth of your bourgeois production and bourgeois property, just as your jurisprudence is but the will of your class made into a law for all, a will whose essential character and direction are determined by the economic conditions of existence of your class."
31. Bishop Wilberforce scored a telling hit in his famous debate with Thomas Huxley on the subject of evolution. He simply inquired casually whether Huxley was descended from the monkeys on his mother's side or his father's side of the family. (Clarke).
32. Salesman to undecided customer: "Shall I wrap it up, or do you wish to have it delivered?"
33. A pacifist argued that all wars are morally evil. When a friend asked if he meant that we should not fight even if an enemy attacked us, he answered, "But no one will attack us."
34. A railroad spokesman said, "The Union's spokesman accuses us of speaking the language of the railroads. We wouldn't dream of suggesting that he speaks the language of the unions."
35. Aristotle stated that "the good" meant that which the good man approves. (*Nichomachean Ethics*.)
36. How long, oh America, will you tolerate the misrule of the party in power? They have squandered public funds and denied the people the services they are entitled to; they have raised taxes and unbalanced the budget; they have inflated

- the currency and raised interest rates; they have allowed foreign goods to be sold in this country and they have antagonized our friends abroad; it's time for a change!
37. Nietzsche: "Those who disagree with me when I say that mankind is corrupt prove that they are already corrupted."
 38. The ideas of "progress", and "individualism" are products of eighteenth century philosophers, and they reflect the special conditions of that age. So these ideas are out of date today and not valid for our society with its different social and economic conditions.
 39. Psychological hedonism is the theory that every human action is always motivated by the individual's desire to benefit himself alone in what he does. If the opponent of this theory presents the case of a marine who threw himself on a grenade, giving up his own life in order to save his buddies from certain death, the psychological hedonist is not impressed. He argues that it must have been done for selfish reasons, as proved by the very fact that it was done.
 40. A well-known editorial writer wrote isolationist editorials for the *New York Daily News* and interventionist articles for *Collier's* in 1940. Would this information have been relevant to the truth of what he said in either publication?
 41. The House of David sect in Benton Harbor, Michigan, was reported to believe that every member of the sect was immortal. When it was pointed out that the members showed the same mortality rates as other groups, the answer was that those who died were not true believers, since if they were they would not have died.
 42. In 1941, in a radio debate, Frederick J. Libby argued that it was against the best interests of the United States to help England or otherwise meddle in the "European" war. Thomas Y. Elliot remarked that Mr. Libby's objections were without merit, since he was head of a "Christian Pacifist" organization, which was opposed to all wars, whether they were aggressive or defensive and for whatever reason they might be fought. Mr. Libby accused Mr. Elliot of the argumentum ad hominem. Was his objection justified?
 43. "In what grave and important discussion," a Van Buren editor asked, "are the Whig journals engaged? How are they enlightening the public mind and supplying material for that deep and solemn reflection which befits a great people about to choose a ruler? We speak of the divorce of the bank and the state; and the Whigs reply with a dissertation on

the merits of hard cider. We defend the policy of the administration; and the Whig answers, 'log cabin,' 'big canoes,' 'Go it, Tip, come it, Ty.' We urge the re-election of Van Buren because of his honesty, sagacity, statesmanship, and show the weakness and unfitness of his opponent; and the Whigs answer that Harrison is a poor man and lives in a log cabin. We show that he is not a poor man, that he does not drink hard cider except from choice, that his home is not a log cabin but a fine house; . . . the Whigs reply, 'No matter, the prairies are on fire.' " (*J. B. McMaster, A History of the People of the United States: Vol. 6, p. 565, D. Appleton-Century Company, 1906.*)

44. "Treason can never prosper. What's the reason?
That when it prospers none will call it treason."

Syllogisms, Propositions, and Terms

Section I: Introduction to the Syllogism

In the previous chapter we noted the significance of the law of rationality, which requires that the evidence or reasons should be sufficient to prove our beliefs or conclusions. We also noted the distinction between arguments containing conclusive proof and arguments in which evidence is merely sufficient to establish probabilities. The remainder of Part Two will be devoted to the principles of conclusive proof, or validity.

The argument is the fundamental unit of reasoning. We shall study various types of arguments, but our chief emphasis will be devoted to the syllogism, one of the basic forms of deductive reasoning. The syllogism will be defined, in a very broad sense, as an argument in which two premises lead to a conclusion. The importance of this form of reasoning has been recognized by logicians since the time of Aristotle (384–322 B.C.), though Aristotle, it may be noted here, treated it in a limited manner, and analyzed only one of its types. Much misunderstanding, however, is still prevalent concerning the nature of the syllogism. It has been called “artificial” and “outmoded.” We shall endeavor to show that such criticisms rest on misunderstandings, and to justify, at least in part, the following statement by the American philosopher, W. P. Montague.

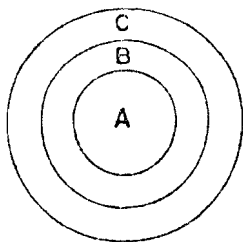
Far from being artificial or outmoded, the Aristotelian syllogisms are the blood and flesh, or at least the connective tissue of all human discourse; and indifference to the logical laws which they exemplify is intellectual triviality, for it means indifference to the laws of any possible universe that the intellect can comprehend. (*The Ways of Things*, Prentice-Hall, 1940, p. 35.)

We shall begin our discussion of the syllogism with the simplest kinds of examples, and develop the complexity of the subject by gradual stages. In order to facilitate our understanding of the logical form of such arguments we shall state them in the schematic form shown below. This form of presentation, which misleads many persons into thinking that syllogisms are "artificial," is adopted because it clearly indicates the structure of the argument. Thus:

nicht *= menschen* *= mensch*
 All men are mortal.
 Socrates is a man.
 Therefore, Socrates is mortal.

The form of this syllogism is "artificial" in the sense that people do not argue in this schematic form. In ordinary discourse, as Montague has put it, the same argument might go like this: "Socrates, yes, even the divine Socrates, must be mortal, because we know that he is a man, and, alas we have to remember that whoever is man is also mortal." We shall deal with arguments in ordinary language in due course, but we will use the schematic form whenever we wish to clarify the logical structure of a syllogism.

Let us now consider the essential nature of syllogistic reasoning. Consider the following set of circles:



There are three circles, marked A, B, and C. B is inside C, and A is inside B. We shall now construct a syllogistic argument concerning these circles: If a circle B is inside a circle C, and A is inside circle B, then A must be inside C.

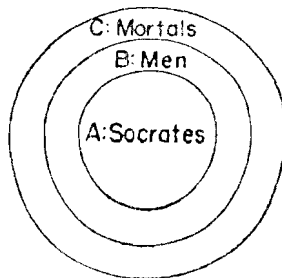
Stated schematically, we find:

B is inside C.
 A is inside B.
 Therefore, A is inside C.

If the premises of this syllogism are granted, then we must accept the conclusion. In this simple example we find the essential meaning of "validity": An argument is valid when the premises necessitate the conclusion. If it is impossible, granted the truth of the premises, that the conclusion should be false, then the argument is valid. If the reader grasps this simple example of valid reasoning, then he will be able to understand the more complicated examples, for all rest on principles of the same order.

In a valid argument, the truth of the premises guarantees the truth of the conclusion. Why is this so? We shall not attempt to answer this question, if indeed an answer is possible, but we will assume that we live in the kind of world in which such things are so and that the "light" of reason guides us correctly in such matters. If we know that a letter is inside an envelope and that the envelope is locked in a trunk, then it follows that the letter is inside the trunk. In any event, we shall assume that such reasoning is logically correct.

If we now return to the Socrates syllogism, we shall find that its validity rests upon the same principles. Its form or structure is exactly the same as the circles illustration. As logicians interested in validity, we are concerned with form or structure, rather than with content. The form is the framework or mold; the material or content is that which is poured into the mold. The use of symbols will help us to exhibit forms, and we shall therefore use symbols frequently. Let us then substitute the letters A for Socrates, B for men, and C for mortal. If we now draw circles for each of these letters, we will have exactly the same circles illustration we used above:



Note that the order of the *premises* of an argument is immaterial. We might have stated our argument as follows:

Socrates is a man.		A is inside B.
All men are mortal.	or	B is inside C.
Therefore, Socrates is mortal.		Therefore, A is inside C.

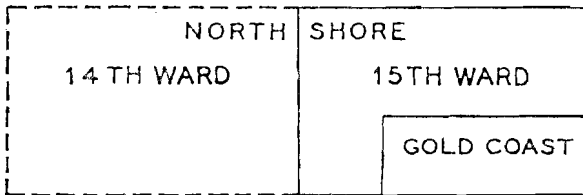
Diagrams enable us to "see" the structure of arguments with the eye of the senses as well as with the eye of the mind, and we shall resort frequently to diagrammatic illustrations. The use of these diagrams in logic is similar to their use in geometry. They are not indispensable, but they are very helpful aids in reasoning. We shall usually use circles, but other types of diagrams might also be used, such as maps. For example, examine the following syllogism:

The residents of the 15th ward are residents of the North Shore.

The residents of the Gold Coast are residents of the 15th ward.

Therefore, The residents of the Gold Coast are residents of the North Shore.

This syllogism might be illustrated by the following map:



This map shows that the syllogism is valid, just as the circles do. The circles, however, are easier to draw, and are generally preferred.

An introductory word concerning the relationship of "validity" to "truth" may be considered at this point. * A valid argument is one in which the premises "necessitate" the conclusion. This means that if the premises are true, then the conclusion must be true, or, stated in a different way, that it is impossible for the premises to be true and for the conclusion to be false.

* A more thorough discussion will be found in Chapter 14, Section II, page 329.

The actual truth or falsity of the premises is irrelevant. We ask: "If we *assume* that the premises are true, would the conclusion have to be true?" In Part Two we shall be concerned with structure, not with content; with the *form* of the argument rather than with the *truth* of what is stated. Thus (1) an invalid argument may be composed of true statements, and (2) a valid argument may be composed of false statements. Examples of each of these possibilities are as follows:

Premises True, but invalid (1) All Muscovites are human beings.
All Russians are human beings.
Therefore, All Muscovites are Russians.

Valid, but Prem. Not True (2) All Holy Rollers are chain-smokers.
All Moslems are Holy Rollers.
Therefore, All Moslems are chain-smokers.

The first of these syllogisms is invalid, even though each statement is true. It is invalid because the premises do not logically justify the conclusion. (The reasons for its invalidity will be discussed later.) The second syllogism is valid, even though each of its constituent statements is false. Its form is exactly the same as our circles illustration, as you will find if you substitute *A* for Moslems, *B* for Holy Rollers, and *C* for chain-smokers. A valid argument is one in which the premises necessitate the conclusion. If these premises were true, then this conclusion would have to be true. A wholly satisfactory argument, of course, is one in which the premises are true, and the reasoning valid; but our only concern at present is with the meaning of validity.

Section II: The Categorical Proposition and Its Parts

In the last section we became acquainted with some simple examples of syllogistic reasoning. We saw how the validity of an argument could be exhibited through the use of circles or other types of diagrams. In the course of our study we shall find that not all syllogisms are so simple as those we have examined, and we shall also learn that syllogisms are not all of the same type. We have begun with examples of the "categorical syllogism," and shall deal with such syllogisms exclusively in the first few chapters of Part Two. We shall then go on to study hypothetical and alternative syllogisms. Syllogisms are classified on the

basis of the types of propositions which enter into their construction. We shall, accordingly, study different types of propositions.* The same thought, moreover, may be expressed by different types of propositions. As examples of different types of propositions which may express the same thought, consider the following: (1) "Good readers are persons who find logic an easy subject," and (2) "If a person is a good reader then he finds logic an easy subject." The first of these is categorical, which means "unconditional"; the second is hypothetical, or "conditional." The first simply states a fact without conditions. The second, that something will be the case on the condition that something else will hold. But for the time being, we shall confine our attention to categorical propositions.

Categorical
Hypothetical

Our first task is to analyze categorical propositions which contain subjects and predicates. These terms are defined as follows:

Subject. The thing or entity of which we assert something.

Predicate. That which is asserted of the subject.

Examples: The desk is brown. "Desk" is the subject; that of which we make an assertion. "Brown" is that which we assert of the subject. Or: Dogs are animals. "Dogs" is the subject, and "animals" the predicate. When we speak of "subject" in logic, we always mean the complete subject. In "The desk which was bought five years ago and which was moved out of this room yesterday by two men wearing blue jeans is an antique" all the words preceding the verb "is" constitute the subject.

XXX

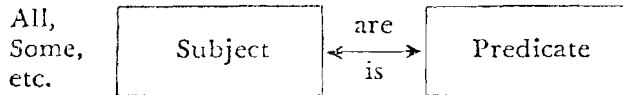
A categorical proposition (of the subject-predicate type) is made up of various elements: (1) The subject and predicate are called terms. Thus there are two terms; a subject term, and a predicate term. (2) There is the copula (a word meaning "that which joins"), which joins the subject term to the predicate term. The copula will always take a form of the verb "to be." ("Men are mortal." "This section is hard to understand." "I am a student of logic.") Note, however, that "is" and "are" are copulas only when they link the subject to the predicate. In

* A proposition, as we learned earlier, is a sentence which is either true or false. Not all sentences are either true or false; for example, directive sentences or interrogative sentences. A proposition, in other words, states that something is or is not the case. We need not know whether a sentence is true or false in order to call it a proposition, as in "There is oil beneath this building." We do not know whether this statement is true or false, but it is surely one or the other.

XXX

"Students who are conscientious are bound to succeed" only the second "are" is the copula. The first is simply part of the subject term. And finally, (3) there are the "quantifiers," words such as "all," "some," "no," or "none," which indicate the extent to which we refer to the members of the subject term, as in "All men are mortal" or "Some women are fickle." When no quantifier is stated, "All" is generally understood. Individual subjects like "This desk" and "Socrates" have no quantifiers.

In graphic form, the proposition consists of the following elements:



Exercises

Identify the subject term, predicate term, copula, and quantifiers (if any):

1. Some movie stars are happily married.
2. All birds are members of a class of vertebrata called "aves." all
3. Socrates is mortal.
4. Dogs are friendly animals.
5. Birds which are in the hand are things equivalent to two in the bush.
6. The ships which sailed last night are sloops which are very fast.

Section III: The Class-Analysis of Subject-Predicate Propositions

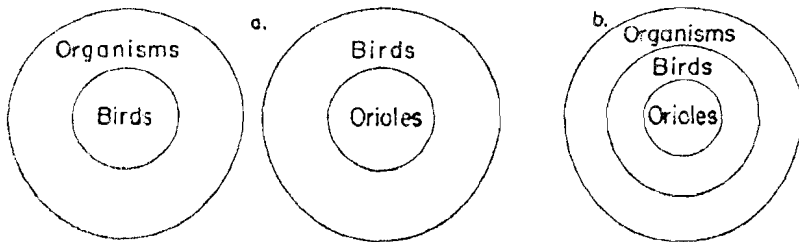
We shall interpret all subject-predicate propositions as asserting that two classes have certain relations to each other. This means that we shall think of the subject term as referring to a class of individuals or things, and similarly with the predicate. Let us carefully define the meaning of "class." A class means a group of things, or a collection of things having some characteristic in common. This characteristic may be a "natural" one, as in the group of things called "mammals." The common characteristic may also result from an arbitrary act of selection, as in

"The people you saw on the street today." These people constitute a group having in common the fact that they were seen by you today. The class may consist of individuals who do not take more than two lumps of sugar in their coffee. Thus there are no limitations on grouping any entities into a class. We may even find a common characteristic between "a very heavy elephant" and "the thought of the square root of minus one in an angel's mind." They belong to the class of things which were used as illustrations in this paragraph.

Every entity may be said to belong to an infinite number of classes. Thus "tiger" belongs to the following classes and to an infinite number of others: existing things, physical things, living things, things found in jungles, in zoos, things which inspired the poems of William Blake, and so on.

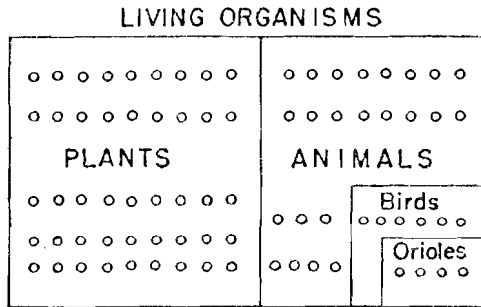
A class, then, is any collection of things having some common characteristic. The members of a class need not be actually existing things. We may speak of "sprinters who can run one hundred yards in less than nine seconds" or "human beings who are without sin," though neither class has any members. A class having no members is called a "null" class.

The importance of thinking of subjects and predicates as classes of things will soon become evident when we begin to test the validity of syllogisms by the use of diagrams. When we think of "Orioles are birds" as representing two classes of things, the manner in which the circles should be drawn is immediately apparent. Similarly with "Birds are living organisms." These propositions may be diagrammed separately or they be combined, as in the following:



These relationships may also be exhibited by a "map" that emphasizes the fact that the classes are always collections of

individuals. In the following "map" diagram each small circle stands for an individual member of the class to which it belongs:



An important qualification of the above remarks must now be noted. Some sentences have single individuals as their subjects, as in "Ferdinand is a non-belligerent bull" or "This book is a logic text." In such cases the subject term is stated to be a member of the predicate class, and is not included within it. In other words, class-inclusion refers to the relationships of two classes to each other; class-membership to the relationship when the subject term is an individual. But though we shall have occasion to note situations in which this distinction is an important one, we shall nevertheless usually treat an individual subject in the same way as we treat a class. We shall use a circle to diagram the individual subject. We shall treat the individual, for most purposes, as a class having only one member and include it within another class.

The form in which many sentences are stated may not clearly indicate that the subject and predicate terms refer to classes of things. When we encounter such sentences we must translate them into the proper form so that the relations of two circles to each other will be clearly indicated. A fuller discussion of this subject must be reserved for a later chapter, but we shall now note a very simple form of completion which some sentences require. Thus, "The desk is brown" is an incomplete sentence for class-analysis, since "brown" is not the name for a collection of individual things. A class is made up of individual things, each of which could be pointed to, and it would be impossible to point to a "brown." When either subject or predicate

is stated as an *adjective*, we must always add the "completing complement," or noun, in order to refer to a collection of individual things. Completed, the above sentence would read, "The desk is a brown thing." The sentence "All men are mortal" requires the addition of "beings," or we could simply add an "s" to "mortal," for "mortals" is a noun that refers to a class.

We shall now introduce the symbol $<$, using it to mean "class-inclusion" (or class membership). When this symbol stands between two classes, for example, $A < B$, we shall interpret it as meaning "A is (are) included in the class of B." The symbol is actually a substitute for the copula, and it emphasizes the relationship of the inclusion of one class in another. The grammatical copula *are* represents the more traditional type of usage; the symbol of inclusion " $<$," the more modern usage. We shall use both. Frequently, however, we shall find that the symbol expresses our meaning more accurately, especially when the subject is an individual. Thus, "Franco is a dictator" really means "Franco $<$ dictators," i.e., "Franco is in the class of dictators." The symbol emphasizes the fact that the predicate class is a plural noun. Note carefully the exact words for which the symbol $<$ stands: It means "are included in the class of" or "is a member of the class of."

Exercises

Restate the following sentences, substituting the symbol of class-inclusion ($<$) for the copula, and supply the missing quantifier and the completing complement where necessary. The predicate should be stated in the plural form in all cases. Read each proposition orally, using the words for which $<$ stands.

For example: Suppose the sentence is, "Judges are trustworthy." We supply the missing quantifier "all" and add the completing complement "persons." The sentence now reads: "All judges are trustworthy persons." Using the symbol of class-inclusion we get: All judges $<$ trustworthy persons. This is read as "All judges are included in the class of trustworthy persons."

1. Some movie stars are happily married. *people*
2. All Americans are peace-loving. *persons*
3. All philosophers are reflective. *persons*

4. Ferdinand is ^agentle. *Beil*
 5. Liberals are idealistic. *personality p. 162*
 6. Liberals are idealists. *following page*
 7. Her eyes are ^{eyes that are}blue.
 8. This book is a logic text. *you can do this page*

Section IV: Affirmative and Negative Propositions

Propositions are classified according to their *quantity* and *quality*. The difference between "all" and "some" or between "none are" and "some are not" is a difference in *quantity*; the difference between affirmative and negative is one of "*quality*."

The propositions we have thus far examined have all been affirmative in quality. Each sentence asserted that a certain predicate may be affirmed of a subject. All have been of the form "S is P," using "S" for the subject of a categorical proposition and "P" for its predicate. But a categorical proposition may also assert that a certain predicate *cannot* be affirmed of a subject, i.e., that the predicate is *excluded* in whole or in part from the subject class. The presence of words like "no" or "not" usually indicate that a proposition is negative, as in "No S is P," or "Some S's are not P's," or "S is not P." Examples of such negative propositions in words are: "No men are angels," "Some men are not egoists," "Jayne Glamour is not an actress."

Note carefully the following sentences: "Nurses are non-combatants," "Nurses are not combatants." These sentences have the same meaning, but the first is stated affirmatively; the second, negatively. The difference between them centers in the copula. Does the copula indicate that the subject is something-or-other, or that it is *not*? There are many adjectives and nouns which are prefixed by "non," but the use of such terms does not make the propositions negative. The question is whether the negation belongs to the copula. "S is P" and "S is non-P" are both affirmative, but "S is not P" is negative. Note carefully that the form "No men are angels," (No S is P) asserts that angelic qualities cannot be affirmed of men. It means "Men *are not* angels," or "S is *not* P"; hence it is negative.

The symbol "<," we noted above, stands for class inclusion. It is an affirmative symbol. The corresponding negative symbol is "<" which stands for class-exclusion. When we say "S is not P" we mean that the class S is excluded from the class P (in

whole or part, depending upon the quantifier). " ∇ " stands for the words "are excluded from the class of." This symbol will be explained in greater detail in Section VI.

Exercises

Distinguish the copulas as affirmative or negative.

1. He is unwise. *affm*
2. He is not unwise. *neg*
3. No S is P. *neg.*
4. No metals are non-conductors. *—*
5. Some women are not intuitive. *—*
6. Some nonfanatics are enthusiasts. *+*
7. S is not non-P. *—*
8. All non-S are non-P. *+*
9. No non-fools are persons who do such things. *—*
10. Teetotalers are persons who do not drink hard liquor. *+*

Section V: Universal and Particular Propositions

In the last section we distinguished between affirmative and negative categorical propositions. We shall now classify propositions as "universal" or "particular." This distinction is based upon the extent to which we make reference to the members of the class of things named by the subject term. When we refer to all of the members of the subject class, as in "All nations are preparing for war," the proposition is universal. When reference is made only to some of the members of the subject class, as in "Some nations are preparing for war," the proposition is called particular. The distinction between universal and particular propositions is one of "quantity." When the quantifier is "all" the sentence is universal; when it is "some" the sentence is particular.

Similarly with negative propositions. The sentence "No men are angels" is universal, for it refers to all men, rather than merely to some. The quantifier "no" indicates a universal proposition. "Some students are not athletes" with the quantifier "some" is obviously particular. The term "particular," by the

way, comes from an older usage in which it meant "referring to a part only," i.e., part of a class, not all of it.

Propositions which have an individual person or thing as subject are also classified as universal. Thus, "H. G. Wells was a second-rate novelist" or "This pen has a ballpoint" or "Carlyle was not a great man" are universals, though their subjects consist of single persons or things. The justification for this usage is that when the subject is an individual we refer to all of the subject, not to part of it.

There are thus two types of universal propositions, those which use the quantifier "all" and those which have an individual as subject. The former are called "general" and the latter "singular." But both are universals.

It is easy to distinguish any universal proposition from a particular proposition if we remember that a particular proposition always uses the quantifier "some" or other word (such as "many," "few") indicating that only part of the subject class is being referred to.

When the subject class has no quantifier, as in "Women are fickle," we may be uncertain as to whether the writer is referring to all women or only to some. As previously indicated, we shall adopt the convention of interpreting such indefinite statements as referring to all, unless the context makes it clear that "some" is intended. When the context does not indicate which quantifier is intended, assume that the proposition is universal.

To sum up, there are two types of universal propositions, general and singular. A universal-general proposition refers to all of the members of the subject class; a universal-singular has as its subject a *single* individual person or thing. A particular proposition is one which speaks of *some* of the members of the subject class. In tabular form:

Universal:

General—*All* men are mortal. *No* men are angels.

(Look for the quantifiers "all" or "no.")

Singular—*This* table is brown. *John* is not a dancer.

(A single thing or individual is the subject.)

Particular:

The quantifier is *Some*, or any word which designates less than the whole of a class.

Exercises

Classify the following propositions as universal-general, universal-singular or particular:

1. All fish live in water. *UG*
2. Some dogs are homeless. *P*
3. No textbooks are thrillers. *UG*
4. That theory is discredited. *US*
5. You are wrong. *US*
6. Lazy students are failures. *UG*
7. T. S. Eliot is a British subject. *US*
8. Those apples look edible. *US*
9. Some apples are not tangy.
10. That group of men should be watched. *US*
11. Human beings are never satisfied. *UG*

Section VI: The Four Types of Categorical Propositions

We have classified propositions in terms of quantity and quality: as universal or particular, and as affirmative or negative. Combining the four elements in the two classifications, we derive four different combinations, which we shall label as A, E, I, and O in accordance with the custom of logicians:

Universal-Affirmative	A form
Universal-Negative	E form
Particular-Affirmative	I form
Particular-Negative	O form

Henceforth, we shall use the letters A, E, I, and O to signify the combinations for which they stand. These letters were originally used by mediaeval logicians, who derived them from the first two vowels in the two Latin words, *affirmo* (I affirm) and *nego* (I deny). Thus the affirmative forms are A and I; the negative forms are E and O. We shall now study these forms in detail and we shall diagram them in four different combinations of circles, a method of diagramming invented by the Swiss mathematician and physicist Euler (1707–1783).

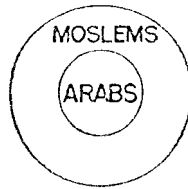
1. The A-form

Examples: "All Arabs are Moslems" and "Ali-Baba is a Moslem."

The A-form (universal-affirmative) has the two types shown in the examples, the general and the singular. Using the symbols "S" for subject and "P" for predicate, "All S is P" represents the general form and "S is a P" represents the singular. We are already acquainted with the universal and affirmative nature of these types.

In class terminology, we write "All S < P" or "S (an individual) < P."

The same type of circle diagram will be used for both:



2. The E-form

Examples: "No Arabs are Hindus" and "Ali-Baba is not a Hindu."

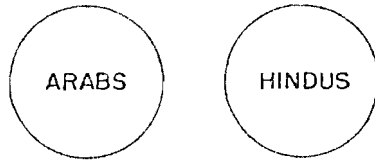
The E-form (universal-negative) also has two types, general and singular. With respect to the *general* type, we recall that a universal proposition refers to *all* of the subject. The assertion that "No Arabs are Hindus" refers to *all* Arabs, for it states that each and every one of them is excluded from the class of Hindus. Similarly in "No logic texts are easy to read," we assert that all logic texts are outside the class of books which are easy to read. The E-form is thus universal, for it refers to *all* of the subject-class.

The E-form is negative for it denies that a certain predicate can be affirmed of the subject. It asserts that the subject does not belong to the predicate class; the relation of inclusion is denied *in toto*. This is the same as to say that the subject class is *completely excluded* from the predicate class.

The *singular* E-form, "Ali-Baba is not a Hindu," should be analyzed in the same manner. Here we say that the predicate cannot be affirmed of an individual, or that this individual is *excluded* from the predicate class. Individual subjects, as we saw earlier, are treated as universals.

In circles, we use the same form for the general and singular

universal-negative. "No S is P," and "S (an individual) is not a P," are exhibited by two circles which have no point of contact, viz.:

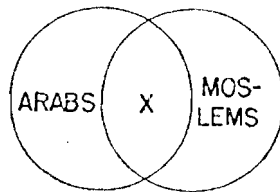


The symbol of class-exclusion, as we have noted, is " ∇ ," standing for the words "are excluded from the class of." The E-form in class terminology will take the following forms: "All Arabs ∇ Hindus," "Ali-Baba ∇ Hindus." These are read, "All Arabs are excluded from the class of Hindus," etc. Note carefully the sharp difference between the traditional statement of the E-form and its class statement: "No S is P" and "All S ∇ P." "No S is P" means that *all* of S is completely excluded from (outside of) the class of P.

3. The I-form

Example: "Some Arabs are Moslems."

The I-form (particular-affirmative) asserts that part of the subject class is included within the predicate class. "Some S is P." In diagrammatic form, we find that the S and P circles intersect:



The area marked X indicates that there are individuals who are members of both classes.

In class symbolism: Some S \subset P.

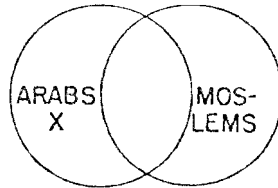
4. The O-form

Example: "Some Arabs are not Moslems."

The O-form (particular-negative) asserts that some of the members of the subject class are excluded from, or are "outside

of," the predicate class. This form is particular, since the quantifier is "some," and negative since it asserts that part of the subject is *not* in the predicate class. In the traditional manner we say, "Some S is not P." In class symbolism we use the symbol of exclusion once more and write, "Some $S \not\leftarrow P$," which should be read, "Some S is excluded from the class of P."

In circles:



Note the position of the "X" in this diagram. It is in the subject circle outside of the predicate circle, and indicates that there are members of the subject class who are outside the predicate class. In the I-form, the position of the X indicated that there were some entities which were members of both classes.

The four types of categorical propositions reveal all of the possibilities in the relations of one class to another. There are four possibilities, covered by the forms we have designated under the letters, A, E, I, and O. One class is wholly or partially included within another, or it is wholly or partially excluded from another. These forms alone can be diagrammed in circles; a proposition which can be diagrammed in circles must be in one of these four forms. Some further refinements in the relations of these circles will be discussed in the next chapter.

The four forms may be presented schematically, as in the following table:

TYPES OF PROPOSITIONS		TRADITIONAL FORM	CLASS-TERMINOLOGY
A	Universal-Affirmative (S ⊆ P)	General All S is P	All $S \leftarrow P$
		Singular X (an individual) is P	$X \leftarrow P$
E	Universal-Negative (S ⊈ P)	General No S is P	All $S \not\leftarrow P$
		Singular X (an individual) is not P	$X \not\leftarrow P$
I	Particular-Affirmative (S ∩ P)	Some S is P	Some $S \leftarrow P$
O	Particular-Negative (S ∩ P)	Some S is not P	Some $S \not\leftarrow P$

The reader should carefully note the two forms of expression in which each type of proposition may be stated. The "traditional" form of expression states each type in ordinary language, and the "class-terminology" form expresses the same type in the symbols of class inclusion and exclusion. These different forms of expression are exactly equivalent to each other, and the reader should familiarize himself with these equivalences. Note in particular the two different ways in which the E-form is expressed.

Exercises

Classify the following propositions as, A, E, I, or O, and define each in terms of quantity and quality, (universal-affirmative, universal-negative, particular-affirmative and particular-negative).

1. No saints are sinners. *E*
2. All politicians are interested in votes. *A*
3. Some statesmen are politicians. *I*
4. Some politicians are not statesmen. *O*
5. Lewis is not a timid man. *E*
6. Shakespeare is a great poet. *A*
7. Some explanations are non-luminous. *I*
8. Some types of non-compliance are worthy of chastisement. *I*
9. All saints are excluded from the class of sinners. *E*
10. Some citizens are excluded from the class of voters. *O*
11. Those exercises are quite difficult. *A*

Section VII: The Distribution of Terms

A new technical term, "distribution," must now be added to our logical vocabulary, and we will have completed our analysis of categorical propositions. This term is used in a precise and technical sense by logicians, and its customary meaning should be ignored. The understanding of this term is of great importance, since distribution is the fundamental idea in the analysis of the syllogism.

We shall speak of the "distribution" of terms. To say that a term is distributed means that we have referred to all of the members of the class designated by that term. Thus, when we say "All dogs are animals," the term "dogs" is distributed be-

cause we have referred to *all*. We have referred to each and every member of the class "dogs." In "Some books are texts" we have referred to only part of the class of "books," and the term "books" is undistributed.

We shall now examine the manner in which the A-E-I-O forms distribute their terms. Since it is quite easy to understand the notion of distribution when applied to the subjects of propositions, we shall dispose of this aspect of the problem very briefly, and then give a more extended discussion to the distribution of the predicate terms in each of the four forms.

The two universal propositions distribute their subject terms. The A-form (All dogs are mammals) distributes its subject "dogs" and the E-form (No crows are green birds) distributes its subject "crows." "No crows" refers to *all* crows, i.e., all crows are excluded from the predicate class.

The two particular propositions I (Some Americans are liberals) and O (Some Arabs are not Moslems) obviously refer to some Americans and some Moslems rather than to all, and so these subject terms are undistributed.

We turn now to the distribution of the *predicate terms* in each of the four forms.

I. The A-form: "All dogs are mammals."

This proposition does not say anything about *all* mammals. "Dogs" constitute only part of the class of mammals, so this sentence refers only to *some* mammals. "Mammals" is an undistributed term in this sentence. We may now generalize our analysis of this proposition: The predicate term is undistributed in every A-form proposition. Similarly we may generalize each of the analyses of the other forms.

In the typical A-form proposition, as in the one above, the predicate class is larger than the subject class. But the two classes may be co-extensive, as in "All triangles are 3-sided figures." In this case we know (from our knowledge of mathematics) that the subject class and the predicate class have the same members. But *as such*, an A-form proposition of the form "All S is P" tells us that its subject is distributed but it does *not* tell us that the predicate is. We shall therefore follow the rule that an A-form leaves its predicate undistributed. If we follow this rule we will never go beyond the information actually given to us.

We shall use the symbols ("d" and "u") for distributed and undistributed. We may thus write our A-form as follows: All dogs (d) are mammals (u). Using S and P once more, and using the symbol of class inclusion, we have $S(d) < P(u)$. Note that the quantifier "all" is unnecessary in this symbolic form, since "d" means "all." Note also that the singular A-forms are treated in the same manner as the general.

2. The E-form: "No crows are green birds."

The predicate term "green birds" is distributed here. The proposition states that "All crows are excluded from the class of green birds." This obviously means that all green birds are outside the class of crows, so an E-form distributes both its subject and predicate. We are given information concerning each and every member of both classes.

Using the symbols of distribution, our proposition may be written as "No crows (d) are green birds (d)." The student should become adept at translating all E-forms into class terminology, viz.: "All crows (d) are excluded from the class of green birds (d)," or "All crows (d) \nless green birds (d)." In completely symbolic form, this would read: $S(d) \nless P(d)$. The singular E-form is treated in the same manner.

3. The I-form: "Some Americans are liberals."

The predicate term is undistributed. We are informed that the two classes, Americans and liberals, overlap, i.e., that some Americans are liberals and, conversely, that some liberals are Americans. We have received no information concerning all liberals. We have not been told that all liberals are Americans, but only that some are. Thus the predicate "liberals" is undistributed. In class-symbols: $S(u) < P(u)$.

4. The O-form: "Some Arabs are not Moslems."

The predicate of an O-form is distributed. The proposition asserts that all Moslems are completely outside the group designated by the subject term. This will become clear if we remember that many of the Arabs of Lebanon are Christians. These Arabs are "some" Arabs, and none of them are Moslems, so all

Moslems are completely "outside of" these Arabs of Lebanon.

Another example may be helpful. If I say that "Some students are not Republicans," I refer to the entire class of Republicans. Look through the entire class of Republicans, I am saying, and you will not find any of these particular students. They are outside of the entire class. Any negative proposition, in other words, in saying "not" *excludes* its subject term from the entire class designated by the predicate term, and its predicate is distributed. The O-form in symbols: $S(u) \not\leftarrow P(d)$.

Our discussion of the distribution of terms in the A-E-I-O forms may be summed up in the following table:

		Subject	Pred- icate	Traditional form	Class ter- minology	
Universals	{ Aff.	A	d	u	All Sd is Pu	Sd < Pu
	{ Neg.	E	d	d	No Sd is Pd	Sd $\not\leftarrow$ Pd
Particulars	{ Aff.	I	u	u	Some Su is Pu	Su < Pu
	{ Neg.	O	u	d	Some Su is not Pd	Su $\not\leftarrow$ Pd

As an aid to memory, two simple summary principles will be helpful:

- ~~(1) Affirmative propositions (A and I) never distribute the predicate term.~~
~~(2) Negative propositions (E and O) always distribute the predicate term.~~

The distribution of the subject term is indicated by the quantifier and should be quite easy to figure out.

Exercises

Classify the following propositions (a) as affirmative-negative, (b) as universal-particular, (c) as general-singular (where relevant), (d) as A, E, I, or O, and (e) indicate the distribution of the subjects and predicates of each:

The Analysis of Categorical Syllogisms

Section I: The Definition of the Syllogism

A syllogism, in the broad sense of the word, is an argument made up of two premises and a conclusion. There are, as we noted in the previous chapter, different types of syllogisms, but we are at present concerned only with the categorical type, sometimes called the "Aristotelian" syllogism, since it was the only type recognized by Aristotle. A categorical syllogism is an argument made up of three categorical propositions, which contain between them three and only three terms.

Later on, we shall study non-categorical types of syllogisms. The fundamental distinction between the categorical and the non-categorical types lies in the types of the propositions of which the syllogism is composed. Categorical syllogisms are composed of categorical propositions, which are made up of terms. Such propositions are called "simple," as distinguished from propositions whose constituent elements are sub-propositions. The latter are called "compound." The following is an example of one type of compound proposition: "If all men are rational beings, then all men are entitled to justice." This proposition has two sub-propositions as its constituent elements: "All men are rational beings" and "All men are entitled to justice." Non-categorical syllogisms are based upon compound propositions. But we shall come to these later. For the time being we shall be concerned exclusively with categorical propositions and categorical syllogisms.

A categorical syllogism may be more precisely defined as an argument composed of two categorical premises and a categorical conclusion, containing three and only three terms, in which the three terms are combined in such a way that a term in one

premise will be the same as the term in another premise, and the other two terms will be the same as the terms which appear in the conclusion. The reader need not bother to memorize this definition, since its meaning will become quite clear in a moment. The definition indicates that a relation between two classes of things is established by virtue of their relation to a third class. For example, let us suppose that we are concerned with the question as to whether hay fever is in the class of infectious diseases. The solution of this problem requires that we relate these two classes to a third class. We must seek for a third term which will connect the two terms with which we begin. We may connect them by the class of "allergy diseases." Since we know that "all allergy diseases are non-infectious" and that "hay fever is an allergy disease," we draw the conclusion that "hay fever is not infectious." This is an example of a categorical syllogism. * xx

In this chapter we shall be concerned with the analysis of categorical syllogisms, with the primary aim of learning the rules of validity in such arguments. We shall also learn how to check the rules of validity by drawing diagrams. For clarity in presentation we shall begin by stating all syllogisms in a schematic or "artificial" form and deal with syllogisms as they appear in living discourse in a later chapter. The difficulties encountered in analyzing complicated syllogisms, as we shall see, are chiefly problems of language and not of form.

Section II: Basic Words in the Analysis of Categorical Syllogisms

The categorical syllogism is an argument containing two premises and a conclusion.

All actors are egoists.
All movie stars are actors. } *Premises*

Therefore, All movie stars are egoists. } *Conclusion*

There are three propositions, each with a subject and predicate term. There are three different terms in the syllogism, each of which is used twice. The three terms (or classes of things) in our example are "actors," "egoists," and "movie stars." Each term is used twice, making three pairs of terms. Henceforth, when we speak of a "term" we must remember that it is used twice.

The terms are called "middle term," "major term," and "minor term." These words are defined as follows:

Middle term: The term which appears in *both premises*. Since each term is used twice, and twice only, the middle term does not appear in the conclusion. "Actors" is the middle term.

Major term: The predicate of the conclusion is called the "major" term. "Egoists," the predicate of the conclusion, is the major term. The major term also appears in the first premise, "All actors are egoists."

Minor term: The subject of the conclusion is called the "minor" term: "Movie stars." It also appears in the premise, "All movie stars are actors."

In analyzing syllogisms we shall use symbols for our three terms. The choice of symbols is an arbitrary matter. Traditionally, logicians have used M for the middle term, S for the minor term, and P for the major term, and we shall adopt this practice for the most part. Since S stands for the subject of the *conclusion* (minor term), and P for the predicate of the conclusion (major term), we must mark the minor and major terms in the conclusion before we can mark them in the premises.

Using these symbols, we use "S" for "movie stars," "P" for egoists, and "M" for "actors." Symbolized, our syllogism reads as follows:

All M are P.

All S are M.

Therefore, All S are P.

Another convenient way of symbolizing is to use the first letter of each term. This would give us A for actors, M for movie stars, and E for egoists, and we would have:

All A are E.

All M are A.

Therefore, All M are E.

The major premise is the premise which contains the major term (and the middle term), and the minor premise is the premise which contains the minor term (and the middle term). We must examine the conclusion of the syllogism to determine the minor and major terms; these are, by definition, the subject and predicate terms of the conclusion.

Exercises

Identify the middle term, major term, and minor term in the syllogisms below. Note that each type of term appears twice. Also identify the premises as major or minor.

1. All men are mortal.
Socrates is a man.
∴ Socrates is mortal.
2. All politicians are opportunists.
No statesmen are opportunists.
∴ No politicians are statesmen.
3. All A are B.
No C are B.
∴ No C are A.
4. Some K are M.
No N are M.
∴ Some K are not N.

Handwritten notes:
 1. M: mortal, P: men, S: Socrates
 2. M: opportunists, P: politicians, S: statesmen
 3. M: B, P: A, S: C
 4. M: M, P: N, S: K

Section III: Preliminary Analysis of Categorical Syllogisms

The analysis of a syllogism requires the application of certain techniques. We shall illustrate these techniques by applying them to the syllogism in Section I. (Since we have not yet examined the rules of validity, our analysis at this stage must be of a preliminary nature.)

Step 1. Write out the syllogism, symbolizing the terms with the letters S, P, and M, viz.:

$$\begin{array}{c} \text{All actors are egoists.} \\ \hline \text{M} \qquad \qquad \text{P} \\ \text{All movie stars are actors.} \\ \hline \text{S} \qquad \qquad \text{M} \\ \hline \therefore \text{All movie stars are egoists.} \\ \hline \text{S} \qquad \qquad \text{P} \end{array}$$

Step 2. Identify each proposition as an A, E, I, or O form. We find that each of these propositions is in A-form. We then place the symbols for "distributed" (d) and "undistributed" (u) to the right of the symbols M, S, and P in each proposition. The chart on page 174 can be used as a guide for reference as to the

distribution of subjects and predicates in the four forms. Our syllogism will now look like this:

A-form All actors are egoists.
 $\frac{M d}{P u}$

A-form All movie stars are actors.
 $\frac{S d}{M u}$

A-form \therefore All movie stars are egoists.
 $\frac{S d}{P u}$

Step 3. As a final step at this stage, "gather" the symbols, stating them in the class analysis form:

$$\begin{aligned} M d &< P u \\ S d &< M u \\ \therefore S d &< P u \end{aligned}$$

Note that the quantifiers need not be stated when we use the symbols, since the signs of distribution indicate whether the propositions are A-E-I-O forms.

We are now ready to study the rules which determine whether a syllogism is valid or invalid.

Section IV: The Rules of the Categorical Syllogism

There are five rules which determine the validity of a categorical syllogism. A syllogism which complies with each of these rules, i.e., which violates none of them, is valid. A syllogism which violates any one of these rules is invalid.

The rules of the syllogism resemble the axioms of mathematics in that they are assumptions or principles which are not proved but accepted as true. But though we shall not attempt to prove the rules, diagrams and other forms of illustrations may help us to "see" that these rules must hold. As we noted earlier, if all of B is in C, and A is in B, then A must be in C. The principle involved in this reasoning may be generalized: If one class is wholly included within another, then any part of the first class is part of the second. Why is this so? Some thinkers hold that this is simply a characteristic of the language which we speak, others that logical relations are grounded in the nature of things, so that we simply "see" that these principles characterize the world in which we live. The latter view would appear to be nearer the truth. In any case, however, we must recognize that not all

logical principles can be proved, since every proof requires the use of principles which are themselves not proved.

The five rules or axioms of the syllogism may be divided into two groups, as follows:

A. Rules concerning the proper distribution of terms (rules of quantity):

Rule 1. The middle term must be distributed at least once.

Rule 2. A term which is undistributed in a premise must also be undistributed in the conclusion.*

B. Rules concerning negative propositions (rules of quality):

Rule 3. No conclusion is necessitated by two negative premises.

Rule 4. If either premise is negative, then the conclusion must be negative.

Rule 5. A negative conclusion cannot be drawn from two affirmative premises.

We shall now study these rules in detail. But before we analyze a syllogistic argument in terms of the rules, we should inspect it in order to determine whether it meets the definition of a categorical syllogism. It must have three and only three terms, each of which is used twice, with a middle term appearing in each of the premisses.

Rule 1. The middle term must be distributed at least once.

Consider the following argument:

All brain surgeons are highly trained men.

All jet pilots are highly trained men.

Therefore, All jet pilots are brain surgeons.

This foolish argument illustrates the following principle: the fact that two classes of things have one or more characteristics in common does not justify us in concluding that the two classes are identical, or even that one is included within the other. Brain surgeons and jet pilots share the characteristic of

*Note that this rule does not require that a term which is distributed in a premise must also be distributed in the conclusion. It means only that if a term is undistributed in a premise it must not be distributed in the conclusion. In other words, we must never go from "u" in a premise to "d" in the conclusion.

being highly trained men, but we can draw no conclusions about their relationships to each other from this information.

As logicians, however, we must exhibit the fallacy in terms of the technical rules of the syllogism. We begin by setting up the syllogism in accordance with our method of analysis:

A-form All brain surgeons are highly trained men.
 P d M u

A-form All jet pilots are highly trained men.
 S d M u

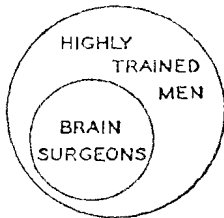
A-form. ∴ All jet pilots are brain surgeons.
 S d P u

Rule 1 tells us that the middle term must be distributed at least once. We note that the middle term is "highly trained men" symbolized by "M." We note that "M" is undistributed ("u") in both premises. Rule 1 has been violated. This argument contains the fallacy of "the undistributed middle term."

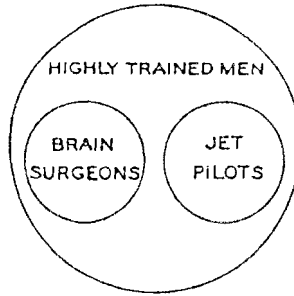
Let us pause for a moment to examine the rationale of Rule 1. But first, let us be clear as to what "validity" means. A valid argument is one in which the conclusion necessarily follows from the premises. This means that if we grant the truth of the premises we must grant the truth of the conclusion. An invalid argument is one in which the conclusion is not thus necessitated.

The meaning of validity in this connection will become clearer if we illustrate by the circle diagrams. We ask the question: Is it possible to draw the circles in such a way that the premises will be shown to be true, without showing that the conclusion must be true? If we can do this then we have shown that the premises do not necessitate the conclusion.

The major premise tells us that "all brain surgeons are highly trained men." In circles:

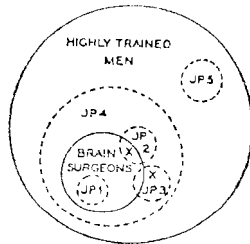


The minor premise tells us that "jet pilots are highly trained men." Now, this question: Can you put a circle for "jet pilots" inside the "highly trained men" circle without showing that jet pilots are brain surgeons? If you can, then you have shown that the conclusion drawn by the syllogism is not necessitated, and the argument is invalid. Thus:



Note that it is of no importance that you are able to draw a diagram showing that the conclusion *might* be true. The only question is: Is it possible to draw a diagram in which the conclusion is *not* true? This is the only thing we need to show in order to demonstrate that the syllogism is invalid.*

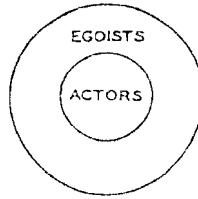
* The premises require us to draw jet pilots *wholly within* the class of *highly trained men*. Thus there are five different ways in which the minor premise may be drawn in conjunction with the major premise:



JP 1 shows jet pilots as wholly included within brain surgeons, JP 2 shows them as partially within, and JP 3 as partially outside; JP 4 shows *brain surgeons* as wholly within the class of jet pilots, and JP 5 shows jet pilots as wholly outside the class of brain surgeons. The conclusion asserted that JP 1 was necessitated by the premises; the diagram shows that this location of jet pilots is not necessitated. It is sufficient for our purposes to exhibit *one* possibility *other than* the conclusion asserted by the argument. In our illustration we drew "jet pilots" at JP 5 to show the invalidity of the argument.

“All actors are egoists”:

In a valid argument, on the other hand, it is impossible to draw circles which show the premises to be true without at the same time showing the conclusion to be true. Let us illustrate with the “actors” argument, a valid syllogism. We begin our diagramming by drawing circles for the major premise,



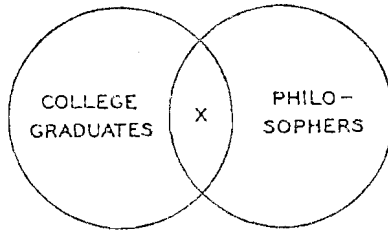
The minor premise tells us that “all movie stars are actors.” Now the question: Can you draw the minor premise as required without showing that “All movie stars are egoists”? A glance will tell you that this is impossible, so the argument is valid.*

Here is another type of syllogism that involves the fallacy of the undistributed middle term: “Some college graduates are philosophers, and some philosophers are wealthy men; hence, some college graduates must be wealthy men.” We set up this syllogism as follows:

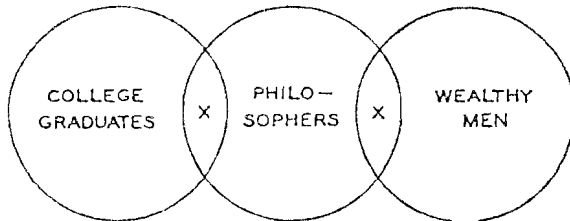
- I-form Some $\frac{\text{college graduates}}{S \text{ u}}$ are $\frac{\text{philosophers}}{M \text{ u}}$.
- I-form Some $\frac{\text{philosophers}}{M \text{ u}}$ are $\frac{\text{wealthy men}}{P \text{ u}}$.
- I-form Some $\frac{\text{college graduates}}{S \text{ u}}$ are $\frac{\text{wealthy men}}{P \text{ u}}$.

The middle term “philosophers” (M) is not distributed at least once. The diagram will exhibit the invalidity of this argument if we can draw circles which exhibit the truth of the premises without showing the truth of the conclusion. We proceed as follows: “Some college graduates are philosophers” gives us:

* Further refinements and special problems in diagramming syllogisms will be discussed in Sections VI and VII.



Now, can we draw a circle for "Some philosophers are wealthy men" without showing the conclusion drawn by the argument? We can:



It is very important to note that the fact that the conclusion happens to be true is irrelevant with respect to the validity of a syllogism. The only question is: Do the premises necessitate the conclusion? From the premises given to us in this argument it does not necessarily follow that "some college graduates are wealthy men," so the argument is invalid.

Rule 2. A term which is undistributed in a premise must also be undistributed in the conclusion.

The following syllogism contains a violation of this rule:

A-form All Hindus are vegetarians.

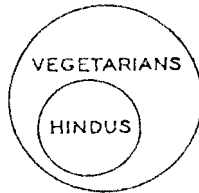
E-form No Sikhs are Hindus. S E K

E-form No Sikhs are vegetarians.

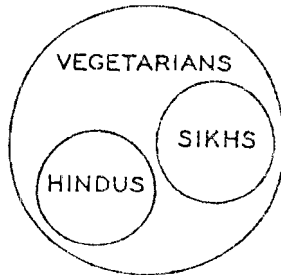
Note that "vegetarians" is undistributed (u) in the premise and distributed in the conclusion. The rule states that a term which is undistributed in a premise must not be distributed in the conclusion. The violation of this rule is called "illicit distri-

buti^on" or "illicit process." We may also refer to the term involved in the fallacy and speak of ("illicit major" (as in the syllogism above) or of "illicit minor" when the fallacy involves the minor term. The point of the rule is that when a term is undistributed in the premise this gives us information concerning *some*, or part, of the class designated by the term. If we distribute this term in the conclusion, we say something about *all* of this class, and this is to "out-talk" our information. It is not fallacious, on the other hand, to go from "d" in the premise to "u" in the conclusion, for if the premise gives us information about "all" we can then draw conclusions about "some."

Let us now diagram the argument. We draw the major premise:



We now ask our key question: Can we draw a circle for the minor premise, i.e., showing the Sikhs class outside the Hindus class, without showing that "no Sikhs are vegetarians," the conclusion drawn by the syllogism? We can, viz.:



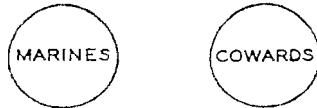
Rule 3. No conclusion is necessitated by two negative premises.

Here are two negative premises:

No marines are cowards.
No cowards are aviators.

The rule tells us that no possible conclusion can be necessitated by two negative premises. Why not? Well, consider the possible conclusions we might draw: (1) All marines are aviators, (2) No marines are aviators, (3) Some marines are aviators, and (4) Some marines are not aviators. (We could also reverse these subjects and predicates.)

We begin by diagramming "No marines are cowards":



We must now draw "no cowards are aviators." The "aviators" circle must be outside the "cowards" circle, but no directions other than this are given. Aviators might be inside the marines circle wholly or partially, or outside wholly or partially. Which-ever conclusion we draw (1-4) cannot be necessitated since there will be three other possibilities.

Rule 4. If either premise is negative, then the conclusion must be negative.

Rule 5. A negative conclusion cannot be drawn from two affirmative premises.

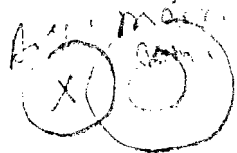
The last two rules are of lesser importance, since violations are rarely encountered, but they are necessary in order to complete the "system" of the rules of validity. An argument may violate none of the first three rules and yet violate one of these, so we must check by all five rules in order to guarantee validity.

Violation of Rule 4:

All communists are Marxists.

Some Brazilians are not Marxists.

∴ Some Brazilians are communists.



Violation of Rule 5:

All men are rational animals.

All rational animals are moral agents.

∴ Some moral agents are not men.

The student will have little difficulty in showing that the conclusion in Rule 4 is not necessitated. The fact that some Brazil-

ians exist outside the Marxist circle does not prove that they exist within the communist circle. Drawing a proper diagram for Rule 5 presents difficulties which will be discussed in Section VI.

We may now note that the last three rules concerning negative propositions may be summed up in one formula: If negative propositions are used in a syllogism, then one and only one premise must be negative and the conclusion must be negative. Rule 3 emphasizes "one and only one negative premise"; Rule 4 that the conclusion must be negative when a premise is negative; and Rule 5 that a premise must be negative when the conclusion is negative. But the separate rules clarify each aspect and show the three ways in which the formula may be violated.

Exercises

Analyze the ten syllogisms on pages 189-190 in accordance with the methods used in this chapter. Check for violations of the rules: if none of the five rules are violated then the syllogism is valid. Draw the circle diagrams to "illustrate" your answers in the first five syllogisms. Remember that in order to illustrate invalidity the diagrams need exhibit only one situation in which the premises are true and the conclusions false.

To illustrate the way in which these syllogisms should be analyzed, the first one is worked out for you:

Step 1. Copy the syllogism on your note-paper, adding the following notations:

- (a) Symbolize middle, minor, and major terms by M, S, and P, using each symbol twice.
- (b) Identify each of the three propositions (two premises and conclusion) as A, E, I, or O forms.
- (c) Place the signs for distributed (d) or undistributed (u) to the right of the symbols M, S, and P. (The distribution signs follow automatically after you have identified the A-E-I-O forms.)

Syllogism No. 1 will now look like this:

A-form	All Republicans are free-enterprisers.
	<u> </u> <u> </u>
	M d P u

E-form No Democrats are Republicans.
 $\frac{S d}{\quad} \quad \frac{M d}{\quad}$

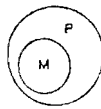
E-form \therefore No Democrats are free-enterprisers.
 $\frac{S d}{\quad} \quad \frac{P d}{\quad}$

For convenience in analysis we shall now "gather" the symbols of our syllogism, as follows:

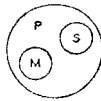
M d	<	P u
S d	✗	M d
S d	✗	P d

Step 2. We check now for violations of the rules. Rule I tells us that the middle term must be distributed at least once. We note that M is distributed twice. No violation here. We then check for a possible violation of Rule 2, that a term undistributed in a premise must also be undistributed in the conclusion. We find that P was "u" in the major premise and "d" in the conclusion. Violation of Rule 2. The syllogism is invalid. It is unnecessary to check the remaining rules if you find that one rule has been violated.

Step 3. Draw a diagram to show that the premises of this argument may be true and the conclusion false. We shall designate the terms by the symbols instead of words. Begin by drawing the major premise:



Now, can we draw "No S is M" without showing that "No S is P"?
 Yes, as follows:



The drawing illustrates the invalidity of the syllogism.

syllogisms for
 analysis.

1. All Republicans are free-enterprisers.
 No Democrats are Republicans.
 \therefore No Democrats are free-enterprisers.
2. All bankers are golfers.
 All middle-aged men are golfers.
 \therefore All bankers are middle-aged men.

Handwritten notes:
 1. All Republicans are free-enterprisers.
 2. All bankers are golfers.

3. Some Hindus are vegetarians.
All Brahmins are Hindus. # 1
∴ Some Brahmins are vegetarians.
4. All Republicans are free-enterprisers. ~~VALID~~
No Socialists are free-enterprisers.
∴ No Socialists are Republicans.
5. All ministers of the gospel are shepherds of men. #
Some teachers of philosophy are not ministers of the gospel.
∴ Some teachers of philosophy are not shepherds of men.
6. Some believers in democracy are advocates of a planned society.
Some advocates of civil rights are not advocates of a planned society.
∴ Some believers in democracy are advocates of civil rights.
7. No Democrats are Republicans.
Some Republicans are not isolationists.
∴ Some Democrats are not isolationists.
8. Some Russians are not communists. V
All communists are fanatics.
∴ Some fanatics are not Russians.
9. All Republicans are protectionists. *Rec. of Jan. Wright Co. of*
All conservatives are Republicans.
∴ Some protectionists are not conservatives.
10. All beginning students in logic are students whose knowledge of the rules is superficial.
No beginning students in logic are persons without rational capacity.
∴ Some students whose knowledge of the rules is superficial are not persons without rational capacity.

Section V: The Diagramming of Syllogisms or *A problem in Logic*

The diagramming of syllogisms in circles is an art which requires a thorough understanding of its principles, and, in some cases, a more refined analysis of the logical forms than we have as yet presented. This section will be devoted to this problem.

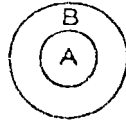
Let us restate our aims in diagramming arguments. We have learned the rules to which a valid syllogism must conform. We have learned the meaning of validity, viz.: a valid argument is one in which it is impossible for the conclusion to be false when the premises are true. We have also learned that if it is possible to draw the circles in such a way that the conclusion

might be false though the premises are true, then the argument is invalid. And one further point before we proceed: Though the diagrams are not essential for proving validity, since the rules are sufficient for this purpose, the diagrams give us visible or "geographical" pictures of the relations of the members of classes to each other, so that we can see just why the argument is valid or invalid.

The chief difficulty in diagramming is that some ingenuity is often required to find a diagram which conforms to the premises and yet reveals that the conclusion need not follow. And worse, the Euler circles, while accurate as far as they go, do not adequately cover the full meaning of the A-E-I-O forms and do not furnish us with a sufficiently good instrument for diagramming all possible syllogisms. We shall therefore now present a supplementary interpretation of the diagrams for the A-E-I-O forms and we shall then have an adequate tool for all syllogisms which use these forms.*

1. The A-form

"All A is B" is diagrammed by Euler as:



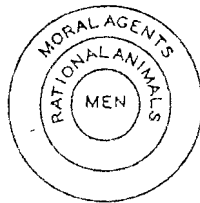
This diagram indicates that all of A is included within B, but it also shows some of B is outside of A. Now, this is normally the case in A-forms, as in "all dogs (A) are animals (B)." "Dogs" is the smaller class, and there are animals other than dogs. But this is not necessarily true in all A-forms. In "all triangles (A) are three sided figures (B)," A and B are coextensive, and there is no B outside of A.

In other words, the Euler diagram for A is correct insofar as it shows that A is *at least* as large as, or coextensive with B (never smaller), but it is misleading in that it indicates that B is always larger than A. Since the A-form does not necessarily imply the latter and since the Euler diagrams may indicate valid-

* An alternative method of diagramming will be found in the appendix.

ity if the second possibility is ignored, these circles are inadequate to handle all the possibilities in arguments containing A-forms.

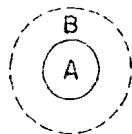
To illustrate: The syllogism illustrating the violation of Rule 5 on page 187 (Men are rational animals and rational animals are moral agents, so some moral agents are not men) is invalid, but its invalidity cannot be shown by the ordinary Euler diagrams. It would be quite pointless to diagram this argument as shown below:



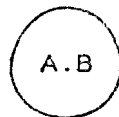
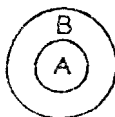
The point of diagramming an invalid argument is to show graphically that the premises may be true and the conclusion false, but this diagram indicates that the conclusion is true.

It appears from these circles that some moral agents are outside the class of men. This indicates that we need an improved method of diagramming to exhibit the invalidity of this argument.

We shall now draw an A-form as follows:



The B-circle is shown by a broken line to indicate that B may or may not be larger than A. Thus an A-form has two possibilities: (1) in which B is a larger class than A, and (2) in which B is coextensive with A. These possibilities are shown below. (The dot between A and B stands for "both"):



Let us now rediagram the last syllogism considering the possibility that the A-form may be represented by possibility 2. If the subjects and predicates are coextensive, the diagram will look like this:



The class of men, in other words, may be coextensive with the class of rational animals (it actually is!), and the class of rational animals may be coextensive with that of moral agents! Our drawing now shows that the premises of this syllogism may be true but that the conclusion that "some moral agents are not men" does not necessarily follow from the premises.

In a valid argument the conclusion will be necessitated whichever interpretation we give to the A-form diagrams.

2. The E-form

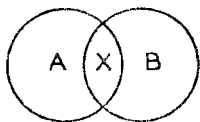
"No A is B" is diagrammed by Euler as:



These circles are fully adequate for all possibilities arising under this form.

3. The I-form

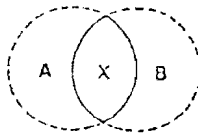
"Some A is B," diagrammed by Euler as:



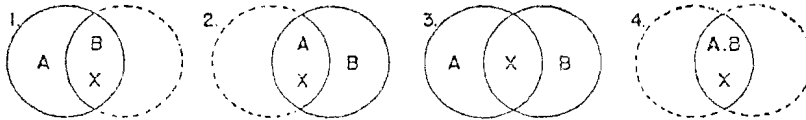
suggests that there may be some A that is outside of B (and some B outside of A). But these conclusions do not necessarily follow

XXX from "Some A are B" if we give it what logicians call a "strict interpretation." The nature of "strict interpretation" may be made clear by an example: A careful thinker who likes to travel visits the Melanesian Islands, and he observes natives eating betel. All the natives he has observed eat betel, but he cannot say that all Melanesians do (though they possibly may), nor can he say that some do not, and so he reports that "some Melanesians eat betel." A logician, reading this statement will interpret it as follows: He says some do; he has not said that some do not; so he means that at least some do and possibly all eat betel. This is the strict interpretation of an I-form: At least some A are B and possibly all A are B.

In ordinary speech "some A are B" usually means "not all are," but this is not the strict interpretation used in logic. In other words, from "some A are B" we cannot conclude "some A are not B." "Some A is B" should be represented by the following diagram:



The solid lines indicate what we definitely know, or are sure of, namely, that at least some A are B. But the following possibilities may also hold in fact:

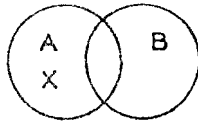


Note that the original solid lines and the "x" are present under each interpretation. Diagram 1 means that all B are A *; Diagram 2 that all A are B; the third that some A are B, but also that some A is outside of B and some B outside of A; and the fourth that A and B are identical classes. (The broken lines may be eliminated from each interpretation.)

* "Some A is B" is convertible with "Some B is A." The latter leaves open the possibility that all B is A.

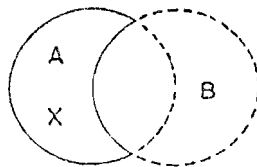
4. The O-form

“Some A is not B” is diagrammed by Euler as:

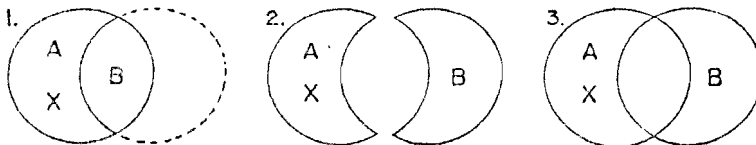


This suggests that some A may also be inside B. “Some A is not B” does not imply that some A is B to the careful thinker. Let us illustrate with our globetrotter once again. He is now among the Eskimos. He has heard tales about the blubber diet of Eskimos and he makes inquiries. Those interviewed tell him that they do not eat blubber. He now reports that “some Eskimos do not eat blubber.” In ordinary language this would suggest that some of them do, but not to a logician. Strictly interpreted the statement means “At least some Eskimos do not eat blubber, and possibly none do.” It is also possible that some do, but a valid argument must satisfy *all* of these interpretations of “Some do not,” not merely one.

We shall represent the O-form by the following diagram:



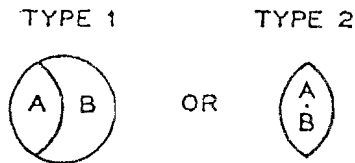
The solid lines indicate what we are sure of, marked by the “x.” This new diagram may refer to the following factual situations:



Here again the original solid portion marked “x” is present under each interpretation, i.e., each shows that “some A is not B.”

But the first interpretation indicates that some A is not B and that all B is A. This would be the case in "Some animals (A) are not dogs (B)" for all dogs are animals. The second diagram is equivalent to the ordinary E diagram. It indicates that, strictly interpreted, "Some A is not B" does *not* mean that "Some A is B." The third interpretation indicates that some A is not B, that some A is B and that some B is not A. An illustration of the last situation is found in "Some men are not poets"; for some men *are* poets, and some poets are not men.

When the A-E-I-O forms are interpreted with the new diagrams, the broken lines may be discarded for each interpretation. Note also that where the diagram requires it, the two possibilities in the meaning of "All A is B" may be represented by either



74.7
When we diagram arguments, we should use the simpler Euler circles where these are adequate. The special diagrams should be resorted to only when necessary. Remember that we need find only one interpretation under which the premises are true and the conclusion might be false, to prove an argument invalid. Try the possible interpretations until you can find an appropriate diagram (when you know from the rules that the argument is invalid).

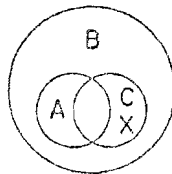
We shall now present another illustration of the use and value of the new method. Assume that we have the following syllogism:

Some C is not A.
 All A are B.

 ∴ Some B are not C.

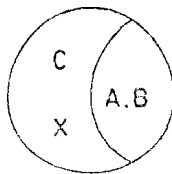
This syllogism commits the fallacy of illicit major term. If we draw a diagram for one of these premises and try to fill in with the other in order to show that the premises may be true and the conclusion false, we will find that the ordinary Euler circles

will not do the job. The following diagram, for example, is obviously not helpful:



This diagram does *not* exhibit the invalidity of the syllogism, since it does not show that the premises might be true and the conclusion false. Rather, it appears to indicate that the conclusion is true, for some of the B circle is outside the C circle. We need a diagram which will show that these premises do not necessarily result in the conclusion presented.

The invalidity of this argument can be shown very clearly by the use of our new method of diagramming. We shall use Type I under the O-form above to diagram the major premise. This will show that Some C is not A and also that All A is C. If we now interpret the minor premise All A are B as involving the possibility that A and B are identical classes, we have the following:



The new diagram reveals graphically that if some C is outside of A and all A is B, it does not necessarily follow that some B is outside of C. (Everything in the circle is part of C.) The same results would follow if the A class were smaller than the B class.

Exercises

Draw circle diagrams for syllogisms 6-10 on page 190. Use the ordinary Euler diagrams or the revised diagrams, whichever will suit your purposes. The problem in each case, to repeat, is to find a

diagram that will indicate, by a geographical picture, that the premises of an argument may be true and the conclusion false. Make your diagram as simple as possible.

Section VI: The Corollaries, Figures, and Moods

In this section we shall briefly discuss two matters of theoretical interest pertaining to the theory of the syllogism: the corollaries of the rules, and the figures and moods of the syllogism. These matters are of interest in showing how the principles of the syllogism may be organized into a deductive system.

I. The corollaries.

additional inference.

The five rules of validity are sufficient for the testing of the validity of all syllogisms. No other rules are necessary. These rules play a role in the theory of the syllogism somewhat comparable to that of the axioms in Euclidean geometry. The axioms of geometry are undemonstrated, or "primitive" propositions which are used to prove theorems. In a similar manner we may use the five rules to demonstrate derived rules or corollaries (theorems) and we may then use such derived rules in the testing of syllogisms. But the corollaries are not indispensable, since they contain no new principles. Our discussion of the manner in which they are derived, however, will furnish an interesting logical exercise in working out the implications of a deductive system.

Corollary I. No valid conclusion may be drawn from two simple particular premises.

This corollary states that no conclusion can be validly derived from the combinations of two I-forms, two O-forms, or an I and an O. We already know that two O-forms are an impossible combination, since no conclusion follows when both premises are negative (Rule 3). Let us consider the other two possibilities.

Suppose that both premises are in the I-form. Then no terms will be distributed. The middle term will then be undistributed, and Rule 1 will be violated. Let us now suppose that we have an I and an O in the premises. Only one term will now be distributed (the predicate of the O). The distributed term must be the middle term to satisfy Rule 1. But the conclusion

of the syllogism must be negative (Rule 4). If the conclusion is negative, then its predicate must be distributed. But both the major and minor terms were undistributed, so the major term cannot be distributed without violating Rule 2. We have thus proved that the corollary must hold on the basis of the rules.

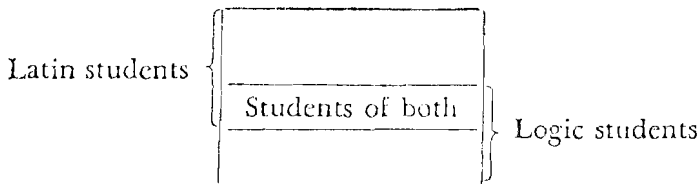
There is, however, an important exception to the corollary we have just proved. Note that we proved the rule for "simple" particular propositions. This qualification must be explained. A particular proposition refers to *some* of the subject, i.e., less than all. But there are many different ways in which we may refer to less than all of the members of a class. We may say "a few," "one-half," or "most" S's are P's. All of these are interpreted as meaning "some," i.e., less than all. But a particular proposition beginning with "most," which means "more than one-half," is a "special" as distinguished from a "simple" type of particular, for which Corollary 1 will not hold. For consider an argument such as the following:

Most of the students in this college are students of Latin.

Most of the students in this college are students of logic.

Therefore, Some of the students of Latin are students of logic.

If more than half of the students study Latin and more than half study logic, then some students must study both subjects, since "most" means "more than half." A map diagram will illustrate the situation:



This syllogism is valid despite the fact that it appears to violate Rule 1 and Corollary 1. It is a special type of case, whose validity is based upon mathematical relations. The corollary will therefore hold for all combinations of particular premises except when both have the quantifier "most."

Corollary 2. *If one premise is particular, then the conclusion must be particular.*

If one premise is particular, then the other must be universal (Corollary 1). Both premises cannot be negative (Rule 3). This leaves the following possible combinations of premises: AI, IA; AO, OA; EI, IE. We must prove that each of these six combinations cannot yield a valid conclusion which is universal.

Let us consider AI, or IA. Can the conclusion be a universal? It cannot be E, for a negative conclusion would violate Rule 5. Nor can it be an A. For AI or IA contains only one distributed term, which must be the middle term (Rule 1). If the conclusion were an A, the minor term would be distributed, violating Rule 2.

Combinations AO and OA. The conclusion cannot be an A (Rule 4). Nor can it be an E, for the premises contain two distributed terms, one of which must be the middle term (Rule 1). An E-form distributes both subject and predicate, and at least one of these terms must have been undistributed in the premises. The same reasoning applies to the combinations EI or IE.

So much for illustrations of the manner in which corollaries are demonstrated. The reader may try his hand at proving the following: Corollary 3: The premises must contain at least one more distributed term than the conclusion, and Corollary 4: No conclusion can be validly inferred from a particular major premise and a negative minor.

2. The figures and moods of the syllogism

Syllogisms may be classified with respect to the position of the middle term in the premises and with respect to the quantity and quality of the premises and the conclusion. The position of the middle term determines the figure the mood is determined by the quantity and quality of the propositions. There are four possible figures, since the middle term may take four possible positions, viz.:

<i>Figure 1</i>	<i>Figure 2</i>	<i>Figure 3</i>	<i>Figure 4</i>
M P	P M	M P	P M
S M	S M	M S	M S
<hr/> S P	<hr/> S P	<hr/> S P	<hr/> S P

The moods are determined by the various combinations of A-E-I-O forms. When both of the premises and the conclusion are A-forms, the mood is called "AAA." The first letter stands for the major premise, the second for the minor, and the third for the conclusion. If the major premise is an A, the minor an E, and the conclusion an E, the mood is AEE.

Let us now compute the number of different syllogistic forms which are possible, taking account of the different combinations of moods and figures. Since there are four types of propositions and three propositions in a syllogism, there are four times four times four or sixty-four possible combinations of moods. These combinations may be arranged in four types of figures, so that we have four times sixty-four or 256 possible syllogistic forms. Most of these forms are invalid. We can easily eliminate the invalid forms by applying the rules and corollaries to each possible combination of premises. Thus, both premises cannot be negative (Rule 3). This eliminates all syllogisms whose premises are in the moods FE, EO, OE, and OO. Both cannot be particular (Corollary 1), and IE is ruled out by Corollary 4. This leaves us with only eight possible combinations of premises which can yield valid conclusions in some or all of the figures: AA, AE, AI, AO, EA, EI, IA, and OA. ~~XXV~~

The next problem is to determine which combinations of premises are valid in each of the figures. For example, premises AA or AI cannot be valid in Figure 2, for the middle term is the predicate in each premise in that figure, and if the premises are affirmative, the middle term will be undistributed. We shall now state some special corollaries which determine the rules of validity for each figure, but we shall not prove these corollaries. Their proof will follow the general procedure we used in proving the general corollaries concerning validity.

Figure 1:

- Corollary 1. The minor premise must be affirmative.
- Corollary 2. The major premise must be universal.

Figure 2:

- Corollary 1. The premises must differ in quality.
- Corollary 2. The major premise must be universal.

Figure 3:

- Corollary 1. The minor premise must be affirmative.
 Corollary 2. The conclusion must be particular.

Figure 4:

- Corollary 1. If the major premise is affirmative, the minor must be universal.
 Corollary 2. If either premise is negative, then the major must be universal.
 Corollary 3. If the minor is affirmative, the conclusion must be particular.

The mediaeval logicians worked out a set of mnemonic lines to aid the student in memorizing the valid moods of each figure, viz.:

Barbara, Celarent, Davi, Ferioque prioris;
Cesare, Camestres, Festino, Baroko secundae;
Darapti, Disamis, Datisi, Felapton, Bokardo, Ferison habet;
 Quarta insuper addit . . .
Bramantip, Camenes, Dimaris, Fesapo, Fresison.

The names in all these lines were invented, the instructions being in Latin. The first line gives us the valid moods in the first figure; the second, the valid moods in the second figure; and so on. The italicized letters in each name indicate the mood. Thus a syllogism in Barbara is one having A-forms in premises and conclusion. The interested reader may wish to determine which moods are valid in each figure, with these suggestions as his guide. These classifications are of course unnecessary if our sole interest lies in the testing of syllogisms for validity, the five rules being sufficient for that purpose. The systematic organization of the rules and corollaries, however, has great theoretical interest, as indicating the nature of a deductive system, the subject of the concluding section of this chapter.

Section VII: A Note on Deductive Systems

We are now familiar with the meaning of deduction. Granted certain premises we can deduce conclusions which necessarily follow from these premises. A deductive system refers to a collection or body of propositions which are so organized that some serve as the premises and the others as conclusions.

which necessarily follow from the premises. An example of such a deductive system is found in Euclidean geometry, a model for all such systems since 300 B.C. Euclid's premises, or "assumptions," include the following elements: (1) Undefined terms, such as "length" and "breadth," (2) definitions, such as the definition of a "line" as a "breadthless length," (3) axioms, or "common notions," [e.g., "Things equal to the same thing are equal to each other." "The whole is greater than any of its parts."] (4) postulates,* such as "All right angles are equal," and (5) rules of procedure, such as "It is possible to draw a straight line from any point to any other point."

From these assumptions Euclid deduces theorems, which follow from the assumptions as the conclusion follows from the premises of a valid argument. A famous example is the Pythagorean theorem: "The square formed on the hypotenuse of a right triangle is equal to the sum of the squares formed on the other two sides."

The relation of the rules of the syllogism to the corollaries resembles that of the assumptions to the theorems in the Euclidean system, the rules serving as assumptions (axioms or postulates) and the corollaries as theorems. This collection of propositions is thus a simple example of a deductive system.* *

Some further comments on the nature of a deductive system may be helpful. (1) The postulates of an ideal deductive system should possess three characteristics: independence, consistency, and sufficiency. "Independence" means that the postulates should not be reducible to each other, for, if they are, then the reducible postulates would be theorems. "Consistency" refers to the fact that the postulates should not result in inconsistent theorems, and "sufficiency" means that they must be adequate to yield all the known truths concerning the set of

* Euclid's postulates differ from his axioms in that the latter are "common notions" which are "generally accepted" outside of geometry, whereas the postulates are introduced by geometry itself. Strictly, the axioms are assumptions which are taken from outside the field of a given science, postulates those which are introduced by the given science; but we shall treat both as assumptions of the deductive system.

* * For a more thorough discussion of these matters the interested reader should see M. R. Cohen and E. Nagel, *An Introduction to Logic and Scientific Method*, Harcourt, Brace and Company, 1934, Chapters 4 and 7; and J. N. Keynes, *Formal Logic*, 4th ed., The Macmillan Company, 1906, pp. 287 ff.

propositions to which they are applied, i.e., all of the propositions in this set must be deducible from the postulates. (2) The postulates of a given system are not proved within that system. If they could be proved then they would be theorems rather than postulates. Whether they can be proved in some other fashion is simply irrelevant in the given system, the sole interest lying in the deducibility of the theorems from the assumptions. Thus, though Euclid's axioms and postulates seem "self-evident," this is not proof that they are true. It follows that *any* set of postulates may serve as the basis of a deductive system, but in practice the important systems are those in which the axioms are in "agreement" with the real world in some sense. A valuable system, moreover, is one which will yield significant theorems. (3) Finally, we should not think of the axioms as being first in the order of *discovery*. They are first, or fundamental, only in a logical sense and are discovered *after* there already exists a collection of propositions forming the body of a science. The formal scientist, such as Euclid or Aristotle, then seeks for a small number of assumptions from which the known truths concerning the subject matter may be deduced as theorems.

As we proceed in our introduction to logic we shall discuss other types of syllogisms. These, as we shall see, may be translated into the "Aristotelian" forms we studied in this chapter. But we shall also encounter other formal truths concerning deduction which cannot be reduced to the syllogistic form. This suggests that the entire field of logic cannot be organized into a completely systematic formal science, and indeed this was the prevailing view during the two thousand or more years following Aristotle's work. Beginning in the nineteenth century, however, with the work of George Boole and other logicians, in particular the great work of Whitehead and Russell in their *Principia Mathematica* (1910-1913), an important advance occurred in logical theory. Modern "symbolic" or "mathematical" logic has sought to demonstrate that all of the principles of logic may be proved on the basis of a small number of assumptions in an abstract deductive system. The exposition of this aspect of the new logic, however, belongs to a more advanced work than the present one.

Semantics and the Syllogism

Section I: The Need for Semantical Analysis

We have studied the rules of the syllogism and have learned how to distinguish a valid from an invalid argument. But though we now know the rules, **our ability to analyze syllogisms is still very limited**. This is true for two reasons: (1) Our analyses have been limited to examples presented in the schematic or artificial form suitable for the clearest possible exhibition of the structure of the argument analyzed, and (2) our analyses have been confined to arguments in which the propositions clearly indicated the relationships of the three terms to each other. **It is easy to apply the rules when syllogisms are presented in such ready-made form, but in living discourse syllogisms are not presented in schematic form, nor are the terms always easily identifiable**. In order to remedy these limitations and to acquire the ability to analyze arguments as they occur in everyday discourse, we shall investigate a number of semantical problems.

We shall learn how to translate everyday language into its correct logical form, and we shall also study the principles of "equivalences" in propositions. Propositions stated in different forms may express the same meanings, and transformations from one form into another may be required for syllogistic analysis.

The need for further analysis of meanings will become apparent when we examine the following syllogism:

All healthy people are non-alcoholics.

No unhealthy people are strong.

∴ No strong people are alcoholics.

This syllogism appears to contain five terms ("unhealthy people," "strong people," "healthy people," "non-alcoholics," and "alcoholics"), and thus it appears to violate the requirement that a syllogism must have three and only three terms. But, as we

all ~~alcoholics~~ & ~~unhealthy~~ people
 all ~~alcoholics~~ < ~~unhealthy~~ people

shall presently learn, the first premise may be translated into "all alcoholics are unhealthy people," since this proposition has identically the same meaning as the first premise. We now have only three terms, and a valid syllogism.

Section II: Sentences in Irregular Forms

A categorical proposition must be stated in one of the A-E-I-O forms. Such forms indicate the manner in which two classes are related to each other in inclusion or exclusion. In everyday discourse, however, propositions may not clearly indicate the relations of two classes to each other, and in such cases we must translate the sentences into the correct form.

The necessity for this translation may be clarified by a somewhat farfetched analogy. The rules of the syllogism give us a kind of logical machine for testing arguments. This logical machine may be compared with a stamping machine that impresses stampings on pieces of metal. The pieces are inserted into the machine, a lever is pressed, and out comes the stamped piece. But the machine will not accept any piece of metal. The metal must be of the proper size and shape for insertion into the machine. Now, our logical "machine" is one into which we insert arguments. After the argument is "inserted," we press the lever (the rules), and out comes the argument stamped "valid" or "invalid." But the logical machine also requires that the pieces (the propositions) must be in the proper form for insertion, and "proper form" here means that the class relationships must be clearly indicated. Thus every proposition must be stated in strict A-E-I-O form, with all of the constituent elements, such as the quantifier, the copulas, the signs of inclusion or exclusion, and the names of the two classes, in their proper places. The chart below demonstrates for us the framework for each A-E-I-O form, with blank spaces which are to be filled in by the names of the subject and predicate classes.

206

XXX

XXX

	<i>Traditional forms</i>	<i>Class terminology</i>
A-form	General: All _____ are _____	All _____ < _____
	Singular: X _____ is a _____	X _____ < _____
E-form	General: No _____ are _____	All _____ \nless _____
	Singular: X _____ is not a _____	X _____ \nless _____
I-form	: Some _____ are _____	Some _____ < _____
O-form	: Some _____ are not _____	Some _____ \nless _____

Every proposition must be stated in one of the forms shown above, for no others can be used in the analysis of categorical syllogisms. We turn now to the analysis of sentences as they are stated in ordinary language. Such sentences may not be in the forms shown above, and we must learn how to make the proper revisions in order to shape the propositions for insertion into the logical machine.

1. Grammatical revisions

Before we analyse a sentence into its class relations, **we must clearly identify the subject and predicate.** In "Little has been accomplished by fanatics" the subject is "fanatics." "Fanatics," we are saying, "are persons who have accomplished very little." In "All take great risks who put their eggs in one basket" the "who" modifies "all," and the sentence should read, "All persons who put their eggs in one basket are persons who take great risks." The copula ("are") now separates the subject from the predicate.

2. The missing quantifier

We noted earlier that **every logical proposition must have a quantifier**, and must therefore begin with "all," "no," "some," or, in the case of singular propositions, with the name of or reference to an individual thing or person. When no quantifier is stated, assume that the proposition is universal, unless it is quite clear from the context that "some" is intended. Where there is any doubt, assume that "all" is meant. Thus, in "College students are idealists" the speaker must be understood to mean "all." We are not certain that he meant "some." But in "Human beings live until the age of one hundred" it is obvious that "some" is intended.

3. The missing complement

We noted earlier that *the completing complement must be added to adjectives and other phrases in order to indicate classes.* Thus, in "All lions are mild" the predicate term does not clearly indicate a class. "Mild" is not the name of a class. If it were, we would be able to point to its members, but we cannot point to a "mild." However, when we add the completing complement "creatures" or "animals," our sentence will clearly refer to two classes of things. **The proposition must clearly indicate**

that the circle representing the subject can be drawn inside another circle representing the predicate, and each circle must be named by a noun which designates a class of things.

In a sentence such as "Militarists are losing ground," "losing ground" is not a noun which names a collection of things. We must add the complement "persons who are," and we then have the class: "persons who are losing ground." But do not add complements when classes are clearly designated, since the simplest adequate statement is the most desirable. Note, too, that the subject term may also require its complement, as in "The foolhardy are losers." Add "persons" to "foolhardy" and add the quantifier "all," and we get "All foolhardy persons are losers."

Exercises

Restate the following sentences so that the subjects and predicates will clearly refer to classes of things, i.e., groups or collections of persons or things. Do not add complements to nouns. Where necessary, add expressions such as "things which are _____" or "persons who are _____," but where such simple words as "persons" or "things" are sufficient, you will simplify your statement by limiting yourself to a one-word complement. Also add the quantifier where it is missing.

1. Movies are entertaining. *movies are things which are*
2. She is a blonde.
3. ^{all}The members of the orchestra are ^{person who are}tuning their instruments.
4. ^{all}The reflective ^{persons}are philosophers.
5. ^{all}The narrow-minded are prudes.
6. Short skirts are ^{short skirts are}on the way out.
7. Bobby-soxers are disappearing.
8. Those who are loyal to their country are patriots.
9. Blessed are the meek.
10. Happy are they who enjoy their work.

4. The missing copula

Many sentences omit the copula. We must supply it in such cases. Thus, in "Some fish fly" the copula is missing, and we must also add the complement to the predicate. The sentence

will then read, "Some fish are flying creatures." Note that the operation of supplying the copula is always a two-fold one, since the completing complement will always be required for the predicate term and perhaps for the subject as well.

Another example: "Some ancient Oriental peoples worshipped the sun." We must supply the copula and add the complement so that the predicate will clearly indicate a class. Restated it reads, "Some ancient Oriental peoples are persons who worshipped the sun."

The following suggestion may be helpful to the student: Always identify the subject first, i.e., the complete subject. The copula should be stated immediately after the subject term. If you have difficulty in recognizing the subject in some cases, look for the main verb, and the subject will immediately precede it.

Exercises

Restate the following sentences by supplying the copula, complements, and quantifier when necessary. Express the copula in the forms of "are" and "included in the class of" (<). Be sure that the predicate is stated in the plural form.

1. Kangaroos jump. *all kangaroos are animals which jump*
2. Beginners make mistakes. *all beginners are persons who make*
3. Children like to play games.
4. All atoms contain electrons.
5. Grass grows. *all grass is included in the class of things -*
6. Evolution accounts for design.
7. He ridicules others who has never accomplished anything worthwhile.
8. All agree with me who are not ignorant of the facts.
9. They jest at scars who never felt a wound.
10. The people scurried to shelter when they heard the approach of the bombers.

5. Exclusive Propositions

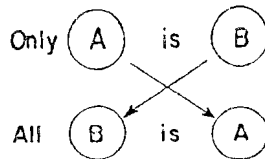
a. The rule of transposition.

An exclusive proposition is one beginning with the words "only" or "none but." "Only men are priests." "None but adults

are admitted." Such sentences do not clearly state the relationship of two classes to each other. "Only _____ are _____" is not a permissible form, and it will not be found in the chart on page 206. The subjects and predicates are not clear, and until they are it would be impossible to draw circles to represent these propositions or to fit them into our schedule of appropriate forms and yet retain the same meaning as the original statements.

Take the sentence "Only men are priests." How shall we draw the circles? Obviously we cannot draw a small circle representing men inside a large circle representing priests, for the sentence does not state that *all* men are priests. We therefore require a different type of translation. We require a restatement, which can be diagrammed and which will have a meaning equivalent to that of the original sentence. The sentence can be translated into "All priests are men." This carries the meaning of the original sentence and is in proper class form. This simple example gives us our rule of translation: Whenever a sentence is in the form "Only (or none but) S is P" (where S stands for the subject and P for the predicate), we shall change the "only" to "all" and reverse the order of the subject and predicate. The exclusive sentence carries the meaning that all of the members of the class denoted by the (original) predicate are included in the class represented by the (original) subject.

A diagrammed statement of this type of translation may be helpful:



or

From the statement: "Only fools are misers."

We derive:

"All misers are fools."

Exercises

Translate the following exclusive propositions into propositions revealing class relationships, by eliminating expressions such as "only" and "none but." The expression "none but" has exactly the same meaning as "only."

1. None but S is P.
2. Only sissies are cry-babies.
3. None but Democrats are New Dealers.
4. Only declarative sentences are propositions.
5. Only persons who suffer from inferiority complexes are persons who wish to dominate others.

b. Procedure for complex cases.

More difficult types of translation are found in sentences in which the completing complement may be missing in one or both terms. The basic procedure to be followed in such translations is as follows:

1. Before we attempt to change the exclusive sentence into an A-form categorical proposition, we should check to determine (a) that each term has its completing complement and (b) that the exclusive sentence has a copula. Be sure that the complements and the copula are present before you proceed.
2. Transpose by reversing the order of the subject and predicate terms around the copula, and add the quantifier "all."

Let us examine some examples, in an increasing order of difficulty:

- (i) "Only the narrow-minded are censors." "Narrow-minded" requires the complement "persons" and Step 1 is now satisfied. By Step 2 we have "All censors are narrow-minded persons."
- (ii) "Only citizens can vote" requires the copula as well as a complement for the predicate term to satisfy Step 1. It is advisable to add the copula first, immediately after the subject term, viz.: "Only citizens *are*. . . ." Are what? Obviously "persons who can vote." This completes Step 1. By Step 2: All persons who can vote are citizens.
- (iii) "Only the brave deserve the fair" is the most difficult type, for this requires complementing both subject and

predicate as well as adding a copula. Follow this procedure to complete Step 1: (1) Add a complement to the subject, then (2) supply the copula, and finally (3) complement the predicate. A problem arises with respect to the predicate noun. It is not "fair persons" for this would fail to account for the words "deserve the." The correct predicate is "persons who deserve the fair," and Step 1 completed gives us: "Only brave persons are persons who deserve the fair." By Step 2: "All persons who deserve the fair are brave persons."

Exercises

Translate the following exclusive sentences into A-form propositions, following the procedures given to you under (b) above.

A. The following examples require complementing the subject, the predicate, or both. Do not add complements to nouns.

1. None but the unhappy are geniuses.
2. None but the imaginative are poets.
3. Only the curious are wise.
4. None but good citizens are desirous of the general welfare.
5. Only those who put others at ease are really polite.
6. None but gentlemen are deserving of the fair.
7. Only those who suffer from inferiority complexes are aggressive.

B. The following require adding the copula **as** well as completing complements:

8. Only religious persons pray.
9. Only women bear children.
10. Only vulgar persons talk like that.
11. None but cowards die more than once.
12. Only the curious get burned.
13. Only the musical appreciate modern music.
14. Only the brave deserve the fair.
15. Only those who can, do.

6. Negative sentences

Like other sentences in ordinary language, negative sentences may lack complements and copula, and these must then be supplied in order to fit such sentences into the "logical ma-

chine." Such sentences should be restated as standard E- or O-forms. Negative sentences also present special types of linguistic problems.

The quantifiers "none" or "nothing" indicate E-forms. "None of the greedy are happy" has a copula, so we need only change "none of" to "no," add complements to subject and predicate, and we get "No greedy persons are happy persons." "Nothing human frightens me" requires a copula as well as complements for subject and predicate, viz.: "No human things are things which frighten me."

The exact meaning of an E-form becomes clearer when we translate "No S are P" into "All S $\nless P$." In class-analysis form our two E-forms will read: "All greedy persons \nless happy persons" and "All human things \nless things which frighten me."

We shall now examine a type of sentence which is ambiguous in its construction, i.e., amphibolous. Take, as example, "All Polynesians are not easygoing." Note carefully that this sentence is not in strict E- or O-form. Its structural skeleton is "All ___ are not ___." No such skeletal form will be found in the chart on page 206. This means that the sentence does not assert a precise relationship between two classes, since there are only four ways in which this can be done. Because only sentences in the four structural forms will fit into our "logical machine," we must therefore find, if possible, an E- or O-form equivalent.

We shall adopt the convention that sentences which present the "All ___ are not ___" formation will be rephrased as O-forms, unless an E-form is obviously intended. Simply change the "All" to "Some." Our example rephrased: "Some Polynesians are not easygoing persons." This rule is in accordance with customary usage. "All Russians are not communists" means "Some Russians are not communists" not "No Russians are communists." "All _____ are not _____" usually means "Not all _____ are _____," i.e., "Some _____ are not _____." But occasionally an E-form is intended, as in "All men are not sinless." This should be rephrased as "No men are sinless."

In the absence of a quantifier a negative sentence usually indicates an E-form as in "Misdemeanors are not crimes." This obviously means "No misdemeanors are crimes."

Exercises

Restate the following negative sentences in strict E- or O-forms. Add complements and the copula where necessary. Restate each E-form proposition in the two forms "No S is P" and "All S & P."

1. No sparrows sing. *All sparrows are excluded from the class*
2. No Englishmen make good coffee. *All E.M. are excluded from*
3. Men are not sinless.
4. All labor leaders are not idealists.
5. All the students in this class will not get A's.
6. None of those who violate the rules will receive special consideration.
7. None of the faint-hearted were present at our great victory.
8. Nothing which makes sense is beyond my comprehension.
9. All who proclaim devotion to ideals are not sincere.
10. All that glitters is not gold.
11. The selfish individual is not a lover of his fellow-men.
12. Shostakovich's Fifth is not as great as Beethoven's Fifth.
13. No prejudiced person is included in the class of Christians.
14. What is not considered proper is not always wrong.
15. Plays cannot be judged by merely reading them.

7. Exceptive sentences

Translating an "exceptive" sentence into standard form requires more complex procedures than we required in our other translations.

A sentence of the form "All *except* A are B" (or "All *but* A are B") means that only A's are not B's.* "All but lazy students will graduate," means "Only lazy students will not graduate." If we translate this into an A-form we get "All students who will not graduate are lazy."

But this translation does not convey the entire meaning of "All but lazy students will graduate." If we combine this sentence with "John is a lazy student" as a minor premise we could not logically draw the conclusion that John will not graduate, for the two premises contain an undistributed middle term. Now, though the meaning of an exceptive sentence is somewhat

* This form of translation was suggested to me by Professor Donald Cliver of the University of Missouri.

See I-27 p. 185

ambiguous in this respect, the usual interpretation would be that our exceptive sentence contains "No lazy students will graduate" as part of its meaning. Since this meaning is not contained in "All students who will not graduate are lazy," we must add the second meaning to the first in the form of a conjunctive sentence (one which joins two propositions by the conjunct "and") as follows: "All students who will not graduate are lazy *and* no lazy students will graduate."

The following procedure is used in translating exceptive sentences:

- (1) Translate "All but A is B" into an exclusive sentence, and negate the predicate term, viz.: "Only A's are not-B's." In categorical form we have "All not-B's are A's."
- (2) Translate "All but A is B" into an E-form, with the original subject and predicate, viz.: "No A's are B's."
- (3) Now combine the two translations into a single conjunctive proposition: "All not-B's are A's, and no A's are B's."

As we shall learn in the next section, "No A is B" is the equivalent of "All A is not-B" (or "non-B"), and so we can restate our conjunctive proposition as:

"All non-B's are A's, and All A's are non-B's."

Exercises

Translate the following exceptive sentences by following the procedure outlined above.

1. All but science majors take General Science.
2. All but military personnel were evacuated.
3. All except those who repent will be damned.
4. In 1947 the Ford Motor Company, for the first time in its history, permitted smoking by employees during working hours. The announcement read: "All employees except women office employees may smoke."

Section III: Equivalent Propositions

Different sentences may express exactly the same thoughts and meanings. They will then express equivalent propositions. Thus the sentence "Hitler is dead" has the same meaning as

"Hitler is not alive"; "No men are angels" has the same meaning as "No angels are men"; and "All just men are unprejudiced" means the same as "All prejudiced men are unjust." The three pairs of propositions we have just noted are examples of the logical processes called "obversion," "conversion," and "contraposition," the subject matter of this section. Though our immediate concern with these processes lies in the equivalences of language, we shall also note that these are also processes of reasoning, usually called "immediate inference." "Immediate" here means that we draw inferences from a single proposition, as distinguished from sylogistic, or "mediate" inference, in which we draw a conclusion concerning two classes because of their relation to a third class that "mediates" the inference.

The study of equivalent propositions has many values, not least of which is the realization that there is more than one way of stating the truth. In the search for truth it is not the language that is important but the ideas expressed. A difference in verbal formulation does not mean that there is a difference in meaning. We often find that apparent differences of opinion disappear when we learn that the difference is merely one of verbal formulation. This study will make us more keenly aware of equivalences in meanings, an awareness of which will be found indispensable in the analysis of many arguments.

I. Obversion

Obversion is a process whereby we change a proposition into its equivalent by *changing its quality*. (but not its quantity), and by negating its predicate.

Example: A-form All men are fallible.
 E-form No men are infallible.

The A-form obverts into the E-form. The E is thus the obverse of the A.

These two propositions have exactly equivalent meanings. Note that the obverse contains two negations. We changed the proposition from affirmative A to negative E, and we negated the predicate from "fallible" to "infallible." The basic principle underlying this process is that two negations result in a positive statement, similar to the "double-negative" rule in grammar.

The child who says "I ain't got none" is, strictly speaking, saying that he does have some, though we will not usually mistake his meaning. "He did not fail to attend" means that he did attend. In algebra, too, we learned that the multiplication of negative numbers results in a positive number. The same principle also applies with respect to terms. The negation of "infallible" is "fallible"; the negation of non-combatant is "combatant."

We shall now introduce a new symbol " \sim " called the "tilde," or sign of negation. Its verbal equivalent is "non," "in-," "un-," "im-," etc. If "B" stands for "fallible persons" then " $\sim B$ " stands for "non-fallible persons." We may thus express obversion symbolically as follows:

All A are B

obverts into: No A are $\sim B$.

! Note the two steps: (1) Change the universal affirmative A-form into the universal-negative E-form (change quality, never quantity), and (2) negate the predicate term. (Do not tamper with the subject term!)

Note that "All C are $\sim D$ " obverts into "No C are D." The negation of $\sim D$ is $\sim\sim D$, and the latter is the same as D.

The table on page 218 shows the manner in which all four types of propositions are obverted. Note (1) that there is no change in the quantity of the proposition. Universal propositions remain universal; particulars remain particular. (2) The quality of the proposition changes from affirmative to negative and vice-versa. (3) The predicate term is negated. (4) The subject term remains unchanged.

Two further points should be noted. (5) Examine carefully the obversion of I- and O-forms. The change in quality that takes place by changing "are" in the I-form to "are not" in the O-form, and vice-versa, is an operation entirely distinct from that of negating the predicate term. (6) Note the simplicity of the operations of obversion as stated in the "class-analysis" symbols. Only two operations are required. (1) We change $<$ to $\not<$ (or vice-versa) and negate the predicate symbol. (Due allowance must of course be made for changes in the signs of distribution in the predicate term when we go from affirmative to negative and from negative to affirmative.)

Original A	Ad < Bu	All A are B.	All men are mortal.
Obverse E	Ad < ~Bd	No A are ~B.	No men are non-mortal.
Original E	Ad < Bd	No A are B.	No liberals are appeasers.
Obverse A	Ad < ~Bu	All A are ~B.	All liberals are non-appeasers.
Original I	Au < Bu	Some A are B.	Some bankers are golfers.
Obverse O	Au < ~Bd	Some A are not ~B.	Some bankers are not non-golfers.
Original O	Au < Bd	Some A are not B.	Some Communists are not Russians.
Obverse I	Au < ~Bu	Some A are ~B.	Some Communists are non-Russians.

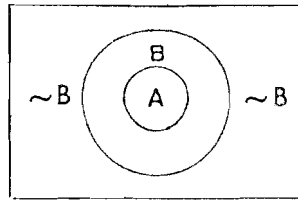
When we obvert sentences in ordinary speech, difficulties may arise concerning the proper negation of the predicate term. It is, in general, preferable to negate by the prefix "non-," which expresses simple negation, rather than by prefixes such as "un-" and "in-" which often express antitheses, or words of contrary meaning. Consider "He is trustworthy" and "He is not untrustworthy." "Not untrustworthy," or the "not-un-" formation in general, appears to express a lack of certainty, though many people, especially the British, use this type of expression to express obversion. When the British send communiqués from war fronts announcing that they "were not unsuccessful," they mean that they were successful. To be safe, use the prefix "non-," though other prefixes may sometimes correctly express simple negation. Note also that the simple negation of "large" is "non-large," (not "small"); the negation of "rich" is "non-rich," (not "poor"). People may be "non-rich," though far from poor.

Exercises

1. Obvert the following:

- | | |
|-----------------------------------|---|
| a. Some X is Z. | h. No planets are stars. |
| b. No L is M. | i. Some books are not texts. |
| c. Some R is not S. | j. Some chess players are non-athletes. |
| d. All ~A is ~B. | k. All nonappeasers are wise men. |
| e. Some R is not ~S. | l. No nonreaders are nonflunkers. |
| f. All puns are crimes. | m. Only A is B. |
| g. Some Chicagoans are gangsters. | n. Only the brave deserve the fair. |

2. Obvert: Germany invaded Russia on June 22, 1941. (Restate in logical form before you obvert. Remember too that a singular subject has no quantifier.)
3. Additional examples, if desired, will be found on page 171.
4. Are the following inferences justified? If not, which rule of obversion was violated?
 - a. All volunteers are patriots. Hence, all non-volunteers are unpatriotic.
 - b. All anonymous donors are wholly unselfish, so donors who sign their names are not wholly unselfish.
 - c. All letter writers who refuse to sign their names are cowards. Therefore, no writers who sign their names are cowards.
5. It is a useful exercise to draw circles in order to see why the obverse has the same meaning as the original proposition. Thus, if "All A is B," then the area outside the B circle is " $\sim B$," and since no A is outside the B circle, it follows that "No A is $\sim B$." In the diagram:



Draw and explain similar diagrams for the E-, I-, and O-forms.

2. Conversion

"No men are angels" has exactly the same meaning as "No angels are men." For obviously, if all men are excluded from the entire class of angels, then all angels must be excluded from the entire class of men. The two propositions are equivalent in meaning, though the order of their subjects and predicates is reversed. The subject of the first proposition has become the predicate of the second. The process whereby we pass from one proposition to another by reversing the order of the subject and predicate is called "conversion." This process is a legitimate one when the second proposition has the same quantity and quality as the first and when there is no "illicit distribution" of terms in the second proposition. When we apply this process to the A-E-I-O forms, however, we shall see that the E-forms and I-forms convert simply; A- and O-forms do not. A special kind

of conversion may be applied to A-forms, however, as we shall note. Let us look at each form separately.

The E-form. An E-form may be converted, as in the example above, into a new proposition exactly equivalent in meaning to the original proposition. If all of A is excluded from B, then all of B must be excluded from A.

The I-form. "Some Americans are Communists" also means that "Some Communists are Americans." The original sentence states that there are some individuals who are both Americans and Communists. Obviously, then, there are some individuals who are both Communists and Americans. This gives us the rule that an I-form can be converted into a converse that is exactly equivalent to the original sentence. If some A are B, then some B must be A. If circle A overlaps B, then circle B overlaps A.

The A-form. Can we convert "All dogs are animals" into "All animals are dogs"? Obviously not. "All A is B" cannot be converted into "All B is A." But we can perform an operation on A-forms which is called "conversion by limitation." "All dogs are animals" can be converted into "Some animals are dogs." "All A is B" can be converted into "Some B is A." * Thus the "conversion by limitation" of an A-form yields a partial converse. It is important to note, however, that conversion by limitation gives us a new proposition that is *not equivalent in meaning* to the original one.

The process of distribution will explain why A-forms cannot be converted simply, like E- and I-forms. An E-form distributes both terms, and so does its converse. In the I-form, both terms are undistributed; similarly in the converse. But in the A-form, the predicate is undistributed, and if we convert it simply (i.e., without limitation), the original undistributed predicate would be distributed in the converse, as in going from "Ad < Bu" to "Bd < Au." The general rule of conversion with respect to distribution is that the converse must not distribute a term that was undistributed in the original proposition (cf. Rule 2 of the syllogism). The fact that we have informa-

* The conversion of an A-form requires certain assumptions concerning the existential import of propositions. This problem will be discussed in Chapter II, Section IV.

tion concerning *some* members of a class does not warrant an assertion concerning *all* of its members.

One further point. In formal logic we are interested in valid inferences. We have stated the rule that "All A is B" cannot be converted into "All B is A." But suppose we have an A-form such as "All triangles are three-sided figures." We know that B is A in this case, i.e., that all three-sided figures are triangles. We may use this information as we please, but we did not derive this information by a formal logical process from "All triangles are three-sided figures." A formal logical process is concerned with form, not with content (or outside knowledge), and it is formally illegitimate to derive "All B is A," from "All A is B." To say this is illegitimate simply means that the latter might be true, and the former false. This is what is meant by "invalid argument."

The O-form. Can we convert "Some women are not mothers" into "Some mothers are not women"? Obviously not. The rule: An O-form cannot be validly converted. To do so would result in an illicit distribution of the original subject term, for we would go from " $Au \not\prec Bd$ " to " $Bu \not\prec Ad$." The subject A would be undistributed in the original and distributed in the converse.

Once again we note that outside information may tell us that the converse of an O-form *happens* to be true. Take the example: "Some students are not women." We also know that "Some women are not students." But the point is that if we are given "Some A is not B," we cannot necessarily conclude that "Some B is not A."

The following table summarizes the possibilities in conversion. Remember that only E- and I-forms convert into equivalent propositions, that A-forms convert by limitation only, so that the converse is not equivalent to the original proposition, and that the O-forms do not convert at all. Note also that the singular A- and E-forms are not usually convertible.

	<i>E-form</i>	<i>I-form</i>	<i>A-form</i>
<i>Original</i>	No A is B ($Ad \not\prec Bd$)	Some A is B ($Au < Bu$)	All A is B ($Ad < Bu$)
<i>Converse</i>	No B is A ($Bd \not\prec Ad$)	Some B is A ($Bu < Au$)	Some B is A ($Bu < Au$)

Exercises

1. Convert the propositions in Exercise 1 in the preceding exercises.
2. Are the converses of the following propositions justified?
 - a. All communists praise Russia, so those who praise Russia must be communists.
 - b. Since some Germans were not Nazis, it follows that some Nazis were not Germans.
 - c. Some Indians are non-Hindus, so some non-Hindus are Indians.
 - d. No New Dealers are conservatives. Then no conservatives are New Dealers.
 - e. All movies are masterpieces, so some masterpieces must be movies.
3. Are the following examples of conversion formally justified? Are the converses true in fact? Explain your answers.
 - a. All men are rational beings. Therefore, all rational beings are men.
 - b. Some baseball players are not golfers, so some golfers are not baseball players.
 - c. Some coins are not pennies, so some pennies are not coins.
 - d. Some human beings are not professors, so some professors are not human beings.
4. Convert: Americans enjoy a higher standard of living than Europeans.
5. Of which error in conversion is Alice guilty, according to her logical friends in Wonderland?

The Hatter asked, "Why is a raven like a writing desk?"
 Alice replied, "I believe I can guess that."
 "Do you mean that you think you can find out the answer to it?" said the March Hare.
 "Exactly so," said Alice.
 "Then you should say what you mean," the March Hare went on.
 "I do," Alice hastily replied; "at least—at least I mean what I say—that's the same thing, you know."
 "Not the same thing a bit!" said the Hatter. "Why, you might just as well say that 'I see what I eat' is the same thing as 'I eat what I see!'"
 "You might just as well say," added the March Hare, "that 'I like what I get' is the same thing as 'I get what I like!'"

"You might just as well say," added the Dormouse, which seemed to be talking in its sleep, "that 'I breathe when I sleep' is the same thing as 'I sleep when I breathe'!"

(HINT: "I mean what I say" means "The things which I say are the things which I mean.")

3. Contraposition

The contrapositive of a proposition is the obverse of its converted obverse. To obtain the contrapositive we must perform three steps: ⁽¹⁾obvert, then ⁽²⁾convert, then ⁽³⁾obvert once again. Let us illustrate this three-step procedure by an example of contraposition:

Original:	All metals	are conductors.	All M are C.
1. Obvert:	No metals	are non-conductors.	No M are \sim C.
2. Convert:	No non-conductors	are metals.	No \sim C are M.
3. Obvert:	All non-conductors	are non-metals.	All \sim C are \sim M.

This process may be applied to all A-form propositions, without exception. Note the symbols with which we begin and end: "All M are C" becomes "All \sim C are \sim M." The contrapositive of an A-form is thus another A-form, with the original subject and the original predicate reversed in order and both negated. The contrapositive of "All S is P" is "All \sim P is \sim S." The contrapositive of "All wizards are magicians" is "All non-magicians are non-wizards." The student should learn how to perform this process in both the one step and in the three step procedure.

The contrapositive of an A-form is always equivalent in meaning to the original proposition. This must be the case, since the obverse of an A-form (1), the converse of an E-form (2), and the obverse of an E-form (3) are equivalent to the propositions which are obverted and converted. The contrapositive of an O-form also results in an equivalent proposition. Thus, "Some A is not B" is equivalent to "Some \sim B is not \sim A." The E-form yields a partial contrapositive, and the I-form has no contrapositive. But we shall find little occasion to use contraposition except in the A-forms and will therefore not discuss this operation further.

Exercises

1. Exercises on contraposition: State the contrapositives of the following A-forms before you work out the three steps, and then prove your answer through the three steps:
 - a. All Brahmins are Hindus.
 - b. All communists are subverters.
 - c. All men are mortal.
 - d. All persons who fail in logic are non-studious.
 - e. Only members are admitted.
2. On equivalence: Which of the following pairs are equivalent to each other? (The test of equivalence is whether or not you can translate back into the original proposition):
 - a. All A are B and All $\sim B$ are $\sim A$.
 - b. All A are B and All $\sim A$ are $\sim B$.
 - c. All A are B and No $\sim B$ are A.
 - d. Some A are not B and Some B are not A.
 - e. Some A are not B and Some $\sim B$ are not $\sim A$.
3. On equivalence: Match the numbered proverbs with the lettered proverbs below. Do you regard the matched proverbs as having equivalent meanings?
 - (1) It never rains but it pours.
 - (2) Kind hearts are more than coronets.
 - (3) Just as the twig is bent the tree's inclined.
 - (4) Know thyself.
 - (5) Carrying timber into a wood.
 - (6) First come, first served.
 - (7) Faint heart ne'er won fair lady.
 - (8) A tempest in a teapot.
 - (9) Don't put off until tomorrow what you can do today.
 - (10) He who fights and runs away may live to fight another day.
 - (11) Make hay while the sun shines.
 - (12) Every man to his own taste.
 - (a) Discretion is the better part of valor.
 - (b) Troubles never come singly.
 - (c) A mountain out of a molehill.
 - (d) None but the brave deserve the fair.
 - (e) There's nothing so kingly as kindness.
 - (f) Strike while the iron is hot.
 - (g) Like father like son.
 - (h) One man's meat is another man's poison.

- (i) Carrying coals to Newcastle.
- (j) The proper study of mankind is man.
- (k) The early bird gets the worm.
- (l) No time like the present.

(From George W. Crane's "Test Your Horse-Sense" Quiz in *The Chicago Daily Tribune*.)

Handwritten notes:
 1. All men are mortal things.
 2. Some men are non-mortal things.
 3. Some non-mortal things are men.
 4. All non-mortal things are men.

Handwritten notes:
 All men are mortal things.
 - some men are non-mortal things
 - some non-mortal things are men.
 all non-mortal things are men.

Handwritten notes:
 All cars are such
 - some are non-such
 - some non-such are cars
 all non-such are non-cars.

The Syllogism and Everyday Discourse

Section I: Syllogisms and Ordinary Discourse

We are now ready to analyze syllogisms as they are stated in ordinary discourse. We have learned how to make the linguistic transformations that are required when the essential relations of subject and predicate are obscured by "irregular" forms of expression. We should now be able to restate the syllogisms of ordinary discourse in the schematic form requisite for clear analysis.

We often reason syllogistically in ordinary discourse, but such syllogisms do not usually follow the pattern of the schematic form. They are more likely to occur in such forms as the following: "Certainly, we ought to have military training for our youth. These are critical times, aren't they? And shouldn't we have military training in critical times?"

We shall analyze syllogisms such as this one. We shall put the propositions into strict A-E-I-O forms, eliminating all unnecessary verbiage, rhetorical questions, etc., and then arrange the propositions in the schematic form we used earlier, with the premises first and the conclusion last. The syllogism above would then take the following form:

All critical times are times when we ought to have military training for our youth.

The present time is a critical time.

∴ The present time is a time when we ought to have military training for our youth.

The structure of this argument is now obvious, as is its validity. In everyday discourse it is also customary to state an argu-

ment incompletely, because it seems unnecessary to state all the details. Someone tells us confidentially, "You know, all drunkards are short-lived. Well, poor John won't live very long." This argument is a syllogism in the form of an "enthymeme" (from two Greek roots meaning "in the mind"), i.e., part of the argument is unstated but understood. We supply the unstated but obvious premise that "John is a drunkard," and we have a complete syllogism.

In this chapter we shall analyze syllogisms as they might occur in ordinary discourse and will make frequent use of the devices for linguistic translations that we studied in the last chapter. As we noted earlier, the rules of the syllogism are easy to apply once we have properly analyzed the linguistic elements. But before we turn to the analysis of syllogisms, we must examine some special linguistic difficulties that arise in connection with the requirement that a syllogism must have three terms.

Section II: A Syllogism Has Three and Only Three Terms

The syllogism has been defined as an argument that has three and only three terms, but as yet we have not discussed the manner in which this requirement may be violated. Blatant violations do not usually occur in ordinary discourse. Thus, no one would be likely to argue in the following manner:

All Englishmen eat roast beef with Yorkshire pudding.

Zoroastrianism is a Persian religion.

Therefore,———?

Since these two propositions contain four terms, they could not serve as the premises of a syllogism. There would be no middle term. An argument having the appearance of a syllogism, but containing four terms, is usually said to involve the "four-term fallacy." In the strict sense, such arguments are not syllogisms, but it will be convenient to refer to them as syllogisms involving "the four-term fallacy."

Though the four-term fallacy seldom occurs in the crude form of the illustration, it often occurs in a more subtle way. The ambiguity of terms may conceal the fact that a supposed middle term is really no middle term at all, but a word with two quite different meanings. The middle term, in other words, may be used equivocally. Let us look again at an example that

we used earlier, on pages 56-7: "Science has discovered many 'laws of nature.' This is proof that there is a God, for a law implies the existence of a lawgiver, and God is the great Lawgiver of the Universe."

In more schematic form we have the following:

All laws₁ are rules which imply the existence of a lawgiver.

The 'laws of nature' are laws₂.

∴ The 'laws of nature' are rules which imply the existence of a Lawgiver (God).

The middle term "laws" is used equivocally, so this syllogism has four terms. "Laws₁" is used in the sense of "legal laws," i.e., rules established by a governing body; "Laws₂" means descriptions of the uniformities among natural events. When we eliminate the equivocal uses of the middle term "laws" and substitute the proper definitions, we find the following argument:

All *rules established by a governing body* are rules which imply the existence of a lawgiver.

The 'laws of nature' are *descriptions of the uniformities of natural events*.

∴ The 'laws of nature' are rules which imply the existence of a Lawgiver (God).

Stated in this way, the four terms are glaringly obvious. But the four terms were not so obvious in the original argument, which had the appearance of a three-term syllogism because of the ambiguity of the word "law."

The student should examine every argument for possible violations of the three-term requirement! Note, however, that mere differences in terminology do not necessarily prove that four terms are used, as when synonymous expressions are used for the middle term, viz.:

Those who believe that the state should be subordinate to the individual are opposed to the dictatorship of the proletariat.

All anarchists are libertarians.

∴ All anarchists are opposed to the dictatorship of the proletariat.

In this argument the middle term is referred to by two different expressions: "libertarians" and "persons who believe that the state should be subordinate to the individual." Since both refer to the same referents, there are in reality only three terms. The term "libertarians" may be regarded as the subject of the major premise.

A merely apparent four-term fallacy may also occur when words of opposite meaning are used in an argument, as in

All front-line fighters are combatants.

All nurses are non-combatants.

∴ No nurses are front-line fighters.

In this syllogism we have apparent violations of both the three-term requirement and Rule 5, that a negative conclusion cannot be drawn from affirmative premises. But here we note a fundamental "rule of courtesy" which should be shown to all syllogisms: Do not assume that a four-term fallacy has occurred unless you have given the writer or speaker the benefit of every doubt. The reader should restate every syllogism as a three-term argument if this can be done without changing its meaning! When we give the last syllogism such courtesy, we find that the minor premise may be obverted into "No nurses are combatants," that there are thus only three terms, and that the syllogism is valid.

A different type of semantical violation of the three-term requirement is illustrated by the following example:

All morally good men are concerned with human welfare.

All virtuous men are morally good men.

∴ All virtuous men are concerned with human welfare.

Though this "syllogism" apparently has three terms, it really has only two since "morally good men" and "virtuous men" are synonymous terms. There is actually no reasoning from premises to a conclusion since the conclusion merely repeats the first premise in different language. Though such arguments are strictly speaking not syllogisms, we may refer to them as syllogisms involving the "two-term fallacy."

The four-term and two-term errors are semantical, rather than formal, in nature. The errors may be overlooked by care-

lessness in symbolization, as when we use the same symbol for different terms, or different symbols for the same term. We should therefore carefully check the language of every syllogism for possible violation of the requirement that a syllogism must have three and only three terms.

Section III: The Analysis of Syllogisms in Everyday Discourse

We shall now analyze syllogisms as they may occur in everyday discourse. The following procedure will be helpful to you in analyzing the syllogisms of the exercises:

Step 1. Your first task is to state the syllogism in schematic form, with the premises stated first and the conclusion last. To correctly identify premises and conclusion look for the "logical indicators," words like "because," "for," "since," which always precede a premise, and words like "hence," "so," "therefore," which introduce the conclusion. (Re-reading Section I of Chapter 6 may be helpful.)

Step 2. Be sure that each proposition in your syllogism is stated in strict logical form. (The possible structures of the standard forms are shown in the table on page 206.) Semantical revisions will be required when the argument uses rhetorical language or rhetorical questions. These irregularities should be eliminated. Make the proper grammatical revisions; add quantifiers, copula, and complements as necessary; translate exclusive and exceptive sentences; and revise negative sentences as required.

Step 3. The first two steps may adequately prepare the syllogism for the application of the rules. But other difficulties may need to be surmounted. You may have difficulty in correctly identifying the terms. When this occurs, carefully examine the conclusion, note its subject and predicate, and then try to find the common term in the premises. Further grammatical revisions may be required. Also recheck to see whether you have done everything required by Step 2.

It will sometimes be necessary to try out various hypotheses concerning the terms until we find the correct ones.

Step 4. Remember the "rule of courtesy" when the syllogism seems to have more than three terms. Use the rules of equivalence to obvert, convert, or contrapose in order to eliminate

extra terms. Assume that the speaker had only three terms in mind until you have exhausted these precautions.

Step 5. Your syllogism is now stated in the proper schematic form. Symbolize the terms, show signs of distribution, gather the symbols together in class-analysis form for a symbolic statement of the structure of the syllogism, and analyze for validity.

Exercises

Restate the following syllogisms according to the instructions found in the five steps, and analyze for validity.

1. Since only citizens can vote, John must be able to vote, for he is a citizen.
2. Only the productive can be free, for only the productive are strong, and only strong people are free.
3. Since only the lucky make strikes, I must conclude that I am a very unlucky bowler, for I have not made a strike all winter.
4. Whatever is perceived by the senses is undoubtedly a fact. Then the existence of the soul cannot be a fact, since no one has ever perceived the soul by the senses.
5. Many great men have done very poorly in their studies while they were at college. I got low grades last semester. Can it be that I am a great man?
6. Decent newspapers cannot attain a wide circulation, for they decline to emphasize sensational material such as illicit love affairs and murders. We all know that papers which adopt such sensational methods invariably attain a wide circulation.
7. From Samuel Johnson's *Life of Cowley*: "Because the father of poetry was right in denominating poetry . . . an imitative art, these (metaphysical poets) will, without great wrong, lose their right to the name of poets . . . for they copied neither nature nor life."
8. The medical profession informs us that some stimulants are harmful to the human body. Everybody knows that all types of alcoholic liquor are stimulants; it follows, therefore, that some types of alcoholic liquor are harmful to the human body.

9. Nothing that makes sense ever puzzles me, and some of these exercises are quite puzzling. These exercises simply do not make sense.
10. The attorney for the defense argued; "It is a rule of the company by which my client was employed as a signal operator that express trains alone do not stop at his station. Now, the train in question stopped at his station, so he was undoubtedly correct in assuming that it was not an express train."
11. Every scientist will agree that true theories are theories which are confirmed by experiments. Now, we know that carefully formulated scientific experiments have confirmed Einstein's theory of relativity. Therefore it must be a true theory.
12. No unambitious people are successful, so no successful people are hedonists, for all ambitious people are non-hedonists.
13. No aggressive people are conscientious objectors, and all unaggressive people are friendly, so all unfriendly people are non-conscientious-objectors.
14. All Eskimos live in snow houses, and all people who like to live in snow houses would dislike our modern conveniences, so all Eskimos would dislike our modern conveniences.
15. All human beings are mortal, and all members of the genus homo sapiens are human beings, so all members of homo sapiens are mortal. (Does this example have three terms?)
16. The Dean says that all except the students with less than a "C" average will graduate. If you know that John has less than a "C" average, can you draw the conclusion that John won't graduate?
17. The *Digest* publishes what it considers the most interesting material that people want to read. Now, we know that an article doesn't have to be true in order to be interesting, and, since this magazine tries to publish interesting stories, we may conclude that its articles and stories are not entirely true.
18. If an argument is valid, and the conclusion is false, then a premise must be false. If we assume this principle then I can prove the falsity of A. E. Housman's theory that good poetry can be recognized by "the thrill down our spine." (*The Name and Nature of Poetry*). For though his own poetry is certainly good poetry, it does not send a thrill down my spine.

19. A Republican senator said that he disagreed with his party's chairman on key questions on domestic and foreign policy. If so, the chairman replied, then the senator is not a Republican, for the policies with which the senator disagrees are those for which the Republican party stands in the nation.
20. All who were present at the college senate meeting were members of the faculty, so I am justified in saying that no one present was not a member of the senate, since only faculty members belong to the senate.
21. If there is no reason to suppose that all his actions were praiseworthy and every reason to admit that no act is virtuous if it is not praiseworthy, then you can't argue that his actions were all virtuous.
22. The Eskimos are the only people who eat nothing but meat, and it is found that all Eskimos have good teeth. So we may conclude that no people who eat only meat have bad teeth.
23. A man is ennobled by the experience of finding himself faced by the choice between life and death. War provides the supreme situation in which men have to make this choice, so that if universal and perpetual peace could be attained, it would be at the price of robbing men of all ennobling experiences. (Thouless.)
24. Find a valid conclusion which would follow from the following premises: All of the incoming women freshmen at Indiana University disapprove of young men who neglect their studies in order to ride around in their flashy convertibles, and none of the incoming women freshmen at Indiana University seek to marry husbands who take the policies of either of the two major parties very seriously. Therefore?
25. It is a well-known fact that there are many pacifists in the U.S. today, and only people who are in favor of appeasing Russia are members of this peculiar sect. The pacifists feel that it is better to appease Russia than to go to war, even though appeasement may mean that communism will control the entire globe that we inhabit. Now, there is absolutely no question but that some persons who favor the appeasement of Russia are anything but loyal American citizens. The appeasers to whom I refer are in reality pro-communist, and they want Russia to take us over. Their talk about their desire for peace is nothing but a pretense. What these people really want is for us to disarm and thereby give Russia an easy path to conquest. It is thus apparent that at

least some, even if not all, pacifists can hardly be considered to be good American citizens.

Section IV: The Enthymeme

"Roosevelt made mistakes, for he was only human." This sentence states a syllogism in the form of an enthymeme, which we define as an incompletely stated syllogism. Only part of the complete argument is explicitly stated, the remainder being "within the mind." Completed, the argument would look like this:

All human beings make mistakes.
 Roosevelt was a human being.
 ∴ Roosevelt made mistakes.

In everyday discourse we will find that syllogistic arguments are frequently stated in the form of enthymemes. In the example above it was unnecessary to state the major premise, "All human beings make mistakes," since it was obviously implied, and most speakers try to avoid "belaboring the obvious." Many arguments will be found to contain such unstated assumptions. Frequently, however, such assumptions are false or unjustified, and it is therefore important that we make our assumptions explicit, so that we may critically examine what is being assumed. This can be done only by completing the enthymeme.

Enthymemes may be classified into "Orders," to indicate the part or parts which are missing. There are four such Orders, as follows:

1. Major premise omitted

The illustration above omitted the major premise. Another example: "This cough syrup should help me, for it helped a man in St. Louis. I read his testimonial." The major premise, "Whatever helped a man in St. Louis will help me," is assumed.

2. Minor omitted

"Roosevelt will make mistakes, because all men make mistakes." The minor premise is missing here: Roosevelt is a man.

3. Conclusion omitted

"All men make mistakes, and the President is a man." The conclusion is obvious, but unstated. Another example, as told by Thackeray: "An old abbé, talking among a party of intimate friends, happened to say, 'A priest has strange experiences; why, ladies, my first penitent was a murderer.' Upon this, the principal nobleman of the neighborhood enters the room. 'Ah, Abbé,' here you are; do you know, ladies, I was the Abbé's first penitent, and I may promise you my confession astonished him.'"

4. The minor premise and the conclusion are omitted

This type is rarer than the others. It requires the *context* of a situation which indicates that an argument is intended. For example, assume that you are talking to a person whose boasting annoys you. You say, "Only an insecure person boasts about his achievements." Your hearer will supply the minor premise and the conclusion. The complete syllogism will read as follows:

All persons who boast about their achievements are insecure persons.

You are boasting about your achievements.

∴ You are an insecure person.

The problem of validity in the enthymeme must now be considered. In all of the examples considered, we completed the enthymeme into a valid syllogism. But consider the following: "Why do I say that X is a communist? He opposes loyalty oaths for teachers, doesn't he?" This is an enthymeme of the First Order, since the major premise is omitted. But what is the major? There are two possibilities: (1) All communists are opposed to loyalty oaths for teachers, or (2) All persons opposed to the loyalty oaths for teachers are communists. It is likely that the first interpretation was intended, in which case the argument would be invalid, since the middle term would be undistributed. If the second interpretation were intended, then the argument would be valid, but the falsity of this premise would be quite apparent. When one is in doubt as to which interpretation is intended, the argument should be analyzed in terms of both possibilities. Note also that questions concerning the truth of a premise are problems of material, not of formal logic.

Invalid enthymemes in other Orders will be quite obvious. The following is in the Second Order: "All Republicans believe in free enterprise, so you do not believe in free enterprise." This example contains an illicit major. A Third Order example: "All guilty individuals fail to pass the lie-detector test, and he failed to pass it." This argument contains an undistributed middle term.

Exercises

A. Complete the following enthymemes in strict categorical form. Each should be stated as a valid syllogism, unless it is obvious that an invalid argument was intended. State whether each is valid or invalid, and note the Order of the enthymeme. Linguistic irregularities should be handled as before. Note particularly, however, that the complete argument should have three terms, not four, five, or even six terms. It will be found helpful, in complying with the three-term requirement, to symbolize the subject and predicate of the conclusion by "S" and "P." Then find "M." Be sure that each term is stated in identically the same manner each time it is used.

1. This must be a good book—it was chosen by the Book-of-the-Month Club.
2. Liberals believe in freedom of speech, so he is not a liberal.
3. Remark made to an aggressive person: "When anyone acts aggressively it usually means that he is suffering from an inferiority complex."
4. All Republicans are against the "police state" so you must be a Republican.
5. Naturally, I consider him an intelligent man. He's a Democrat, isn't he?
6. Generals are notoriously poor chess players. I also play the game badly.
7. Don't take logic. You will have to work out a lot of exercises.
8. I don't see why I should be required to study Latin. Aren't all the worthwhile books translated into English?
9. We should have "socialized medicine" in the United States. Hasn't it worked well in England?
10. Robespierre's enemies accused him of having identified the "enemies of the state" with his personal enemies. "I deny the

accusation," he answered, "and the proof is that you still live."

B. State any set of two premises which will validly lead to the following conclusions (find a middle term):

1. No logical exercises are too easy.
2. Some payments for services rendered are not contemptible.
3. On rainy days, I dine alone.
4. Omar wished to remould this sorry scheme of things nearer to the heart's desire.

Section V: The Sorites

The sorites (rhymes with "nighties") is a series of syllogisms telescoped into one argument, as in the following:

All young men are idealists.	All Y are I.
All idealists are sensitive creatures.	All I are S.
All sensitive creatures are dissatisfied.	All S are D.
All dissatisfied creatures are unhappy.	All D are U.
∴ All young men are unhappy.	∴ All Y are U.

In this argument the first two premises lead to an unstated conclusion; namely, that "All young men are sensitive creatures." This unstated conclusion is then combined with the third premise, to yield the unstated conclusion that "All young men are dissatisfied," and so on. In other words, the conclusion of one syllogism is the premise of another, and all conclusions except the final one are unexpressed. The premises are so arranged that any two successive ones will contain a common term.

This form of the sorites is called the Aristotelian type. A second type, called the Goclenian sorites, proceeds in this way:

All living things are mortal.	All L are M.
All animals are living things.	All A are L.
All cats are animals.	All C are A.
∴ All cats are mortal.	∴ All C are M.

In the Aristotelian type, the first premise contains the subject of the conclusion, and the common terms of the premises appear first as a predicate and then as a subject. In the Goclenian type, the first premise contains the predicate of the conclusion, and the common term appears first as subject and then as predicate. Special rules for these sorites are as follows:

1. If negative premises are used, no more than one premise can be negative. In the Aristotelian sorites, it must be the last premise; in the Goelenian, the first.
2. No more than one premise may be particular or singular. If such premises are used, they must come first in the Aristotelian form, and last in the Goelenian.

Every sorites, however, may be stated in either form. The Goelenian sorites may be translated into the Aristotelian type by proceeding backwards from the last premise.

Exercises

1. Construct a valid Goelenian sorites having four propositions and containing a negative premise and a singular premise. Then restate in the Aristotelian form.
2. Classify the following sorites with respect to its form. Is it valid?

The human soul is a thing whose activity is thinking. A thing whose activity is thinking is one whose activity is immediately apprehended and without any representation of parts therein. A thing whose activity is immediately apprehended without any representation of parts therein is a thing whose activity does not contain parts. A thing whose activity does not contain parts is one whose activity is not motion. A thing whose activity is not motion is not a body. What is not a body is not in space. What is not in space is insusceptible of motion. What is insusceptible of motion is indissoluble (for dissolution is a movement of parts). What is indissoluble is incorruptible. What is incorruptible is immortal. Therefore, the human soul is immortal. (Leibniz, *Confessio Naturae Contra Atheistas*, translated by H. W. B. Joseph, *An Introduction to Logic*, The Clarendon Press, pp. 355-6.)

3. The following examples of sorites are taken from Lewis Carroll's *Symbolic Logic*. Rearrange the premises in the Aristotelian order, making semantical changes as required:
 - a. All babies are illogical.
No one is despised who can manage a crocodile.
Illogical persons are despised.
∴ No babies can manage crocodiles.
(HINT: Symbolize each proposition by appropriate letters

- ("B" for babies, etc.) and then join premises having common terms.)
- b. No terriers wander among the signs of the zodiac; Nothing that does not wander among the signs of the zodiac is a comet; Nothing but a terrier has a curly tail. ∴ All creatures with curly tails are non-comets.
 - c. Which conclusion may validly be derived from the following premises? All writers who understand human nature are clever; no one is a true poet unless he can stir the hearts of men; Shakespeare wrote Hamlet; no writer who does not understand human nature can stir the hearts of men; none but a true poet could have written Hamlet.
4. The following case may explain the reluctance of automobile dealers to sell cars to minors (legal infants):

On 21 April, 1928, the plaintiff, being a minor, entered into a contract with the defendant, by the terms of which he traded a Chevrolet truck, valued at \$250, for a Dodge sport roadster, valued at \$659.50. On 21 May, 1928, the plaintiff made a payment of \$40.95 on his note. Thereafter the Dodge sport roadster was destroyed in a wreck; whereupon the plaintiff elected to disaffirm his contract, and now sues to recover \$290.95, the sum of the value placed upon the Chevrolet truck at the time of the trade, to wit, \$250 and the payment of \$40.95 subsequently made on the note.

Stacy, Chief Justice: When an infant elects to disaffirm a contract, relative to the sale or purchase of personal property, other than one authorized by statute, or for necessities, what are the rights of the parties?

- (1) An infant may avoid such a contract, either during his minority or upon arrival at full age . . .
- (2) Upon such avoidance, the infant may recover the consideration paid by him . . . with the limitation that he must restore whatever part of that which came to him under the contract he still has . . .
- (3) Where the infant parts with personal property, he may, upon disaffirmance, recover the value of such property, as of the date of the contract.

In the instant case the plaintiff is entitled to recover the \$40.95 which he paid on his note, together with the fair market value of the Chevrolet truck at the time of the trade. (*Collins v. Norfleet-Baggs, Inc.*, Supreme Court of North Carolina, 1929.)

(HINT: Sum up the decision and the law in this case as stated by the Chief Justice in the form of an Aristotelian sorites. Begin with the singular premise: The plaintiff $<$ infants, etc.).

Section VI: The Relations between Terms Generalized

We have now completed our discussion of categorical syllogisms involving the relationship of class inclusion. These syllogisms used propositions containing subjects and predicates interpreted in terms of classes included within or excluded from each other. In later chapters we shall study the compound types of propositions composed of subpropositions rather than of terms. But before we leave the categorical type of syllogism we must note a special type which relates terms in relations other than that of class inclusion. Such syllogisms and the nature of "relations in general" will be our concern in this section.

Consider the valid syllogism:

$$\begin{array}{l} A \text{ is older than } B. \\ B \text{ is older than } C. \\ \therefore A \text{ is older than } C. \end{array}$$

This syllogism cannot be analyzed by the methods we have hitherto employed. If we put each proposition into "class" form, we shall find four terms: "A," "things older than B," "B," and "things older than C." But the argument is valid, and we must now inquire into the rationale of arguments such as these.

Subject-predicate categorical propositions relate terms to each other, but in a very special way, by class inclusion. Hitherto we have translated all possible relations between terms into the relation of class inclusion. But this procedure, though satisfactory in a great many cases, is not adequate for arguments such as the one above, and it thus becomes necessary to find a more flexible tool for handling other types of relations. In order to do this we must generalize the notion of "relations" and find a wider principle which will cover both the relation of class inclusion and other types of relations.

When we assert " $A < B$ " we are saying that A is related to B in terms of class inclusion. We shall now use the symbol "(R)" for "related to," and we shall revise the previous symbolization to " $A (R <) B$." We may now assert new types of relations in the same manner. If we wish to say that A is older than B, we need

not use the relation of class inclusion. We may use "o" for the relation of "older than" and symbolize the relationship as "A (R_o) B." This means that A is related to B in the relation of "older than." Similarly with other types of relations. The syllogism above may thus be symbolized as follows:

$$\begin{array}{l} A (R_o) B. \\ B (R_o) C. \\ \therefore A (R_o) C. \end{array}$$

This type of argument may also be diagrammed, but not by circles. We may use a straight line to represent the different points on a line representing ages, from zero (0) to infinity (n), and we may then indicate the position of each term on the line, thus:

0 C B A n

The diagram shows us that if A is older than B, and if B is older than C, then A must be older than C. This is not startlingly new knowledge, but it serves as a simple illustration of the manner in which we may picture relations other than class inclusion, in order to test the validity of arguments in which they are used.

It should be obvious that some relations will permit valid argument and that others will not. Thus, if we know that A is the lover of B, and that B is the lover of C, we can conclude nothing with respect to the relations between A and C, nor indeed can we conclude that B is the lover of A. The relation of "lover of" does not permit such inferences. This makes it necessary to classify all relations, so that we may know which types of relations will yield valid inferences, and which will not. The relation of class inclusion, as we well know, is a type of relation which permits valid inferences. We shall now examine the special characteristics possessed by a relation which make such inferences permissible.

We shall classify relations under two general heads, *symmetry* and *transitivity*, each of which has three subdivisions.

1. Symmetry.

The three subdivisions are *symmetrical*, *asymmetrical* and *non-symmetrical*.

a. Symmetrical relations:

This type of relation is defined as a relation such that if A has it to B, then B *must* have it to A. Examples: equal to, unequal to, different from, cousin of, playing cards with, etc. In each case if A has the relation to B, then B has it to A.

b. Asymmetrical relations:

Here, if A has the relation to B, then B *cannot* have it to A. Examples: father of, older than, greater than, son of, at left of, etc. In each case if A has the relation to B, then B cannot have it to A.

c. Non-symmetrical relations:

Here, if A has the relation to B, then B *may* or may not have it to A. Examples: Lover of, helper of. If A is the lover of B, B may or may not be the lover of A.

2. Transitivity:

The subdivisions are similar: *transitive, atransitive, non-transitive*.

a. Transitive relations:

This relation is defined as a relation such that if A has it to B and B has it to C, then A *must* have it to C. The relation of "being older than" is such a relation, as are: equal to, ancestor of, class inclusion, etc.

b. Atransitive relations:

Here, if A has the relation to B and B has it to C, then A *cannot* have it to C. Examples are: father of, greater by half, etc.

c. Non-transitive relations:

Here, if A has it to B and B has it to C, then A *may* or may not have it to C. Examples are: lover of, unequal to.

These relations may also be combined as follows:

1. Transitive-symmetrical: equal to, contemporary of
2. Transitive-asymmetrical: greater than
3. Transitive-non-symmetrical: included in the class of
4. Atransitive-symmetrical: spouse of
5. Atransitive-asymmetrical: father of
6. Atransitive-non-symmetrical: nearest blood relative of
7. Non-transitive-symmetrical: cousin of
8. Non-transitive-asymmetrical: unrequited lover of
9. Non-transitive-non-symmetrical: lover of

We shall now consider the importance of these relations with respect to some inferences. " $A < B$, and $B < C$; therefore, $A < C$ " is a valid inference because class-inclusion is a transitive relation.* "Older than" is also a transitive relation, and permits us to draw a similar type of inference. In other words, it is our knowledge that relations such as "class-inclusion" and "older than" are transitive relations which justifies us in drawing certain inferences.

We may now generalize the reasoning involved in the sorites. The Aristotelian sorites is a series of terms related by the transitive relation of class-inclusion. Thus if $A < B$, $B < C$, $C < D$, $D < E$, then $A < E$. For purposes of further simplification, this series of propositions may be stated as $A < B < C < D < E$. Such a series is called a "chain of relations," and indicates that any term at the left will be included within any term at its right, since " $<$ " is a transitive relation. In interpreting such a chain, however, we should remember that it is a simplification of a sorites, with the connecting links omitted. In *reading* it, we must supply the missing links, viz.: "A is in B, and B is in C, and C is in D, and D is in E."

We may also generalize our previous analysis of the relation of conversion. We found that the E- and I-forms were convertible. In our new language, we may say that the relations of "being wholly excluded from" and "being partially included within" are symmetrical relations, so that if A has one of these relations to B, then B must have it to A. But the A-form relation of "being wholly included within" is a non-symmetrical relation, and from this it follows that the A-form is not convertible simply. The generalization of relations also permits conversions which would not be permissible under class relations. Thus "married to" is a symmetrical relation, and symmetrical relations are always convertible. If "A is married to B," we may thus convert into "B is married to A." If we interpreted the original statement in class terms, its meaning would be substantially altered and its conversion preposterous. We may also

* Note, however, that this inference will hold only for general universals and not for singular propositions, since *class-membership*, as distinguished from *class-inclusion*, is an *atransitive* relation. Where singular propositions are used in a syllogism, as in the familiar, "All men are mortal, Socrates is a man, etc.," the inference rests on the principles that if every member of class A is a member of class B, then any specified member of the first class must be a member of the second class.

now employ a new form of conversion, called "conversion by converse relation," when the relation is asymmetrical. Thus, "B is greater than A" converts by converse relations into "A is smaller than B." Similarly with "A is west of B" and "B is east of A."

We shall note further applications of these relations as we proceed. In particular, the importance of the transitive relation of "implication" will be emphasized. This relation, the most important relation in inference, will be discussed in the next chapter.

Exercises

- A. Classify each of the following relations with respect to symmetry and transitivity:
1. A is beating B.
 2. A is taller than B.
 3. A is a sister of B.
 4. A is the best friend of B.
 5. A is outside of B.
 6. A is "breathing down the neck of" B.
- B. Which of the following inferences are valid? Explain why, in terms of the relations involved.
1. A is the employer of B, and B is the employer of C. So A is the employer of C.
 2. A is heavier than B, so B is lighter than A.
 3. A is the twin of B, so B is the twin of A.
 4. A is a member of the Chicago Chamber of Commerce, and the Chicago Chamber of Commerce is a member of the United States Chamber of Commerce, so A is a member of the United States Chamber of Commerce.

8. P: All Eskimos live in snow houses.
 Q: Some Eskimos do not live in snow houses.
9. P: An atomic war will destroy mankind.
 Q: Human beings ought to abolish atomic warfare.
10. P: Swing music is first rate music.
 Q: Swing music is fourth rate music.
11. P: Some politicians are statesmen.
 Q: All politicians are statesmen.
12. P: Some of these exercises are easy.
 Q: Some of these exercises are not easy.
13. P: X is an artichoke.
 Q: X is a vegetable.
14. P: This book is not written in Chinese.
 Q: This book is not written in Japanese.
15. P: All Indians have blue eyes.
 Q: No Indians have green eyes.

Section III: The Square of Opposition

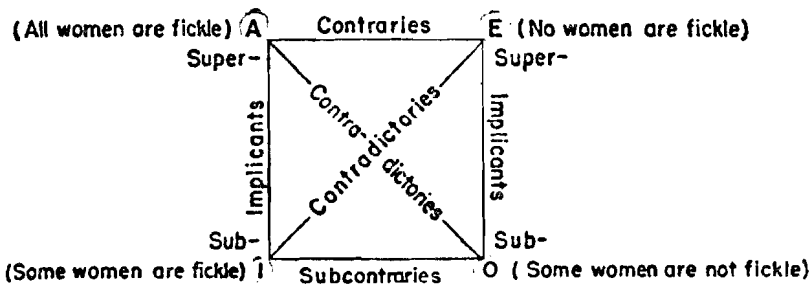
The term "opposition," as used in traditional logic, refers to the relations of propositions having the same subjects and predicates but differing in quality or quantity or both. The A-E-I-O forms may thus be "opposed" to each other when they embody the same subjects and predicates. We shall use the following group for illustrative purposes:

- A: All women are fickle.
 E: No women are fickle.
 I: Some women are fickle.
 O: Some women are not fickle.

No two of these propositions are independent of each other, since the truth or falsity of any one will involve truth values in the others. Nor are any two equivalent. But we shall find the other five relations exhibited among them. Thus, the A- and O-forms are contradictories, since their relation to each other fulfills the definition of contradiction which we stated earlier, namely, that if the truth of one of a pair of propositions involves the falsity of the other, and the falsity of one involves the truth of the other, then the relation is that of contradiction. E and I are also contradictories. A and E are contraries, since both cannot be true, though both can be false. I and O are subcontraries, since both could be true, but both could not be false. A is the

superimplicant of I, and E of O. I and O are the subimplicants of A and E respectively.

The traditional logicians worked out an ingenious diagram called the "Square of Opposition," which embodies these oppositions, viz.:



This diagram requires a word of explanation. The letters A-E-I-O at the corners stand for the propositions in the brackets, all of which have the same subjects and predicates. The diagonal lines connecting A and O, and E and I, marked "contradictories" mean that A-O and E-I are pairs of contradictories. The top line connecting A and E indicates that these are contraries, and the line between I and O that these are subcontraries. The vertical lines are marked "implicants," and the notations "super" and "sub" indicate that A is the superimplicant of I (E of O) and that I is the subimplicant of A (and O of E).

This diagram gives us an automatic device for detecting the relations of propositions when they have the same subjects and predicates. This limitation is very important for, as we already know, we may determine the relations between propositions which do *not* have the same subjects and predicates, as in relating "John is six feet tall" to "John is six feet, one inch tall." The relations of such pairs of propositions cannot be determined by the Square, for their predicates differ. But we know that they are contraries since they fulfill the definition of contrariety. The Square, then, does not define, but merely illustrates a limited application of the five relations.

The Square also has certain internal limitations. The universal propositions must be general, not singular, for singular

Section V: The Traditional "Laws of Thought"

Traditionally, the so-called "Aristotelian Laws of Thought" have been regarded as basic in all reasoning. These laws have been formulated in two different ways, for things (or classes), or for propositions, as follows:

1. **The Law of Identity:** For things, the law asserts that "A is A," or "anything is itself." For propositions: "If a proposition is true, then it is true."
2. **The Law of Excluded Middle:** For things: "Anything is either A or not-A." For propositions: "A proposition, such as P, is either true or false."
3. **The Law of Contradiction:** For things: "Nothing can be both A and not-A." For propositions: "A proposition, P, cannot be both true and false."

These laws, though not the only principles used in reasoning, are certainly basic in the sense that all reasoning presupposes them. These laws, of course, are really axioms, not psychological laws which purport to tell us how we actually think. They are not scientific laws of nature, for they are not descriptions of observed uniformities of behavior. These laws can also be violated as when people contradict themselves, or are inconsistent. When we think rationally, however, we always assume these axioms. We shall discuss their meaning and significance in connection with certain popular criticisms and misunderstandings.

1. The Law of Identity

For things, The law "for things" is used in widely different ways: As a logical relation identity is illustrated by equations such as $x = x$, or $x + 2x = 3x$, or statements such as "Mark Twain is Sam Clemens." The "is" here means that each name denotes the same individual.

When we say "Tables are tables" and "Cows are cows," we use the law as a principle of semantics. Unless terms retain identical meanings throughout a given unit of discourse and have fixed referents in their various occurrences, communication would be impossible.

In metaphysics the principle of identity is often interpreted

to mean that permanence as well as change is a pervasive feature of reality. We shall expand on these usages in answering some criticisms of the law.

Some writers, in particular the late Count Alfred Korzybski and the General Semanticists, have attacked the law as false. Korzybski criticized the use of the "is" of identity, claiming that it results in such expressions as "Grass *is* green" or "Smith *is* a man" which are taken to mean that grass is identical with green or that the *name* Smith is identical with a man! The word, he tells us, is not the thing. This is all very true and instructive. It is an error, for example, to take the word "freedom" as a guarantee of a free society, but this is not a criticism of the law of identity but of foolish misapplication of the law. In any case it may be doubted whether the error he notes is actually responsible, as he claims, for his catalogue of the ills to which the spirit and flesh of modern man are heir, ills such as:

. . . unrest, unhappiness, nervous strain, irritability, lack of wisdom, and absence of balance, the instability of our institutions, the wars and revolutions, the increase of "mental" ills, prostitution, criminality, commercialism as a creed, the inadequate standards of education, the low professional standards of lawyers, priests, politicians, physicians, teachers, parents, and even scientists . . .

Because of his belief that the Law of Identity is responsible for these evils, Korzybski believed that the crucial need of the twentieth century is the formulation of a new non-Aristotelian logic which will reject the Law of Identity.

Korzybski's basic criticism of the Law of Identity is that it is not true for a world that is in constant change. Things are in constant flux, he argues, so that nothing is ever the same from moment to moment. When we say that "a table is a table," we ignore the fact that the table *now* is different from what it was a moment ago. Hayakawa, in his *Language in Action*, as we noted in our earlier discussion of extension and intension, follows Korzybski's lead here. He asserts that "no word can ever have the same meaning twice" on the ground that the thing referred to has changed in the meanwhile and that our attitude toward it has also changed. Two answers may be given to this criticism:

(1) "The table *now* is different from what it was a moment ago." True, but unless words consistently referred to the same referent throughout a given unit of discourse, communication would break down. When one speaks of a table, he means a table, and is understood to mean a table, for anything is itself and not some other thing.

(2) The critics also confuse logical and physical identity. The problem here becomes a metaphysical one, involving the basic concepts of permanence and change. In the ancient world, the Greek philosophers first formulated this problem. Heraclitus, the philosopher of change, asserted that it was impossible for anyone to step into the same river twice, since the river was constantly changing. But Plato and Aristotle effectively criticized this doctrine of universal "flux" by noting that the statement "X has changed" requires that X retain its identity throughout the series of changes, for otherwise it would be impossible to say that X had changed. There is constant physical change in our universe, but also permanence or identity. The reader is undoubtedly a somewhat different person now from what he was before he began to read this discussion, but he must also be the same reader who began to read, for otherwise how could we say that *he* had changed? There can be no change except in relation to something that is constant.

XXX ¶ *For propositions.* In the propositional formulation of the law of identity, we say that if a proposition is true, then it is true. This again is not so obvious as it appears, as we shall see when we consider some of the implications of this formulation. Does the reader believe that a proposition can be "true for one man and false for another," or that "what is true in one age of history is false in another age"? If so, he rejects the law of identity for the law means that if a proposition is true, it is true for all persons, in all times, and in all places. But, the reader may urge, was not the statement "The earth is flat" true in the middle ages and is it not false today? The answer to the first part of this question is No. The earth was not flat in the middle ages, and to have called it such was to utter a false statement. People *believed* that the earth was flat, but believing a thing is so does not make it so. Their belief was false.

Another typical criticism of the law proceeds as follows: May not the time element, or the space element, make a prop-

osition true for one time and place and false for another? For example, "It is cool today" may be true where we are, but false in the tropics, or false for us in July. But "It is cool today" is an unprecise statement of the speaker's meaning. To make it precise we must not only date it and locate it, but we must say something like the following: "The temperature is 41° F. at 1:15 p.m. in the shade at the meteorological station in Chicago, Illinois on March 31, 1960." If this statement is true, then it must be true for all time and places.

It is undoubtedly the case that men's beliefs differ, so that what *seems* true to one man will *seem* false to another. Confidence in one's beliefs is not always justified, nor is certainty always a guarantee of truth. We should remember that we may be mistaken in what we believe to be true. Truth is an ideal difficult to achieve, and in practice we may find it safer to say that a given belief appears to be probable in the light of the available evidence, rather than to say, "It is true." But if we know the truth, then we know the truth.

2. The Law of Excluded Middle

For things Anything is either A or not-A, or anything is either A or its contradictory. We may assert that anything in the universe is either a piece of chalk or not a piece of chalk. A color is either red or not-red. Contradictories always exhaust the universe of discourse to which we refer.

Some critics urge that this is vicious "either-or" thinking, representing a "two-valued orientation" toward the world, whereas the world requires a "multi-valued orientation." There are, it is urged, infinite differences in things, so that it is false to say "Either A or not-A." For example, we should not divide men into two classes, the good and the evil, for there is some evil in the best of us, and some good in the most evil. The cartoonist Mauldin once illustrated the vice to which the critics refer. He pictured one man carrying a sign with the words, "Russia is never wrong." Another carried the sign, "Russia is always wrong." The critics of the law ask: Does not another alternative exist? Must Russia be either always right or always wrong?

These critics call our attention to a prevalent fault in thinking. A great deal of confused thinking falls into an "either-or"

pattern. We often assume that there are only two possibilities in a situation or only two choices when there are more than two. We say "Either you are for us or against us" (you may be neutral); we say "Either we must establish a world government or an atomic war is inevitable" (the "cold war" may continue indefinitely). We shall call this "the error of insufficient options."

But this type of thinking should not be confused with the law of the excluded middle. The criticism of the law noted above is based upon a confusion between contrariety and contradiction: The law of the excluded middle says that anything is A or its contradictory. Thus, a man is necessarily either rich or not rich, for "rich" and "not rich" are contradictories. But we cannot say that a man must be either rich or poor for these terms are contraries. The law does not require us to say that Russia is always right or always wrong, but only that Russia is either always right or not always right. In any pair of contradictory propositions one must be true and the other false.

Another type of criticism is based upon the alleged inadequacy of the law of the excluded middle in dealing with matters of *degree*. When a physician measures temperature, for example, he does not make his report in terms of hot or cold or even of fever or no-fever, but he states the degree of temperature. Granted, but the law is not a technique of scientific procedure. It is merely an axiom of reason. "Either the body temperature is 98.6° F. or it is not" is an instance of the law. (It is also significant to state whether or not the patient has a fever.)

Another example of the "degree" criticism is found in B. B. Bogoslovsky's *Technique of Controversy* in which he cites the example of a beard in order to expose this alleged weakness of the law. The point is this: suppose we say "Either Smith has a beard or he does not," and Smith is neither beardless nor does he have a full beard. Consider the difficulties. If we agree that 1,000 hairs make a beard and that 100 do not, we will also agree that 999 make a beard and that 101 do not. But is there some point, say 549 hairs, where we can say: This is not a beard but the addition of one hair will make it one? This seems absurd and the critics say that this proves the law inapplicable to things involving degrees. But the absurdity is based on the fact that it has never been important to define a beard precisely. The law of

the excluded middle presupposes that our terms have been precisely defined.

Mastery of a college course is also a matter of degree, and so it also seems unrealistic to say "Either John has mastered the course or he has not." But in this case the administration of a grading system requires a precise definition of mastery, given in the minimum passing grade of 60. Fair or unfair, the student whose grade is 60 has "mastered" the course, one with a grade of 59 has not.

For propositions, A proposition is either true or false. "The street has been sprinkled" is either true or false. There is no middle ground between truth and falsity. Now, suppose that only part of the street has been sprinkled. Would it then be *both* true and false to say that the street has been sprinkled since it has been in part and has not been in part? Here again we find the necessity for precision in our statements. When we say "The street has been sprinkled" we usually mean that certain parts of it have been sprinkled. With respect to *these parts* our statement is either true or false. If the statement were interpreted to mean "All parts have been sprinkled" then this proposition too is either true or false.

Vagueness in the meaning of our terms is also responsible for the belief that some propositions are neither true nor false. "I am happy" and "We are enjoying prosperity" are examples of propositions which may be regarded as neither completely true nor completely false. But when the words are defined precisely, then, in some determinate respects the propositions will be either true or false. If we cannot define "happiness" or "prosperity," then we are not stating completely meaningful propositions, and truth or falsity apply only to meaningful propositions.

3. The Law of Contradiction

For things, nothing can both have and not have a given characteristic in precisely the same respect. This law asserts that nothing can be both A and the contradictory of A. A man cannot be both rich and not-rich at the same time and in the same respect. For propositions, we say that no proposition can be both true and false, in the same respects. The law of relativity tells us that an object may be moving for one frame of

reference and at rest in another, but for any given frame of reference the object is not both moving and not-moving. It is perhaps needless to note that we are not always able to determine which of two contradictory propositions is true. But one must be true, and one false.

Exercises

- A. Analyze and discuss the following items in terms of the preceding discussion:
1. Every seven years the cells in a human body change completely. How then can a man's debts be held against him for more than seven years, since he is no longer the same man?
 2. Do the following items illustrate the law of identity?
 - a. Those were the days when men were men.
 - b. Let us call a spade a spade.
 3. What happens when an irresistible force meets an immovable object?
 4. According to the principle of contradiction, "animal" cannot be both vertebrate and invertebrate. But are not some animals vertebrate and others not?
 5. Are the following statements both true and false?
 - a. Heavy objects fall at the same speed as light objects.
 - b. Water boils at 212° F.
 - c. Hamlet was a man.
 6. Does Aristotle use the principle of the excluded middle in the following quotation from his *Physics*? "As every occurrence must be ascribed either to coincidence or to purpose, if the frequency of heat in the summer cannot be ascribed to coincidence or chance, it must then be ascribed to purpose."
 7. Is the law of the excluded middle applicable to statements such as "John loves Mary"?
 8. Is it necessarily the case that a nation will either win a war or lose it?
- B. Study the following quotations and consider their points of agreement or disagreement with the text. Also answer the questions following each.
1. There is a venerable law of logic called the "law of excluded middle" which states that A is either B or not B. Thus a piece of paper is either white or not white. This is obviously true, and I shall not deny its soundness as a law of pure

Compound Propositions and Syllogisms

Section I: Compound Propositions

Up to this point we have been concerned with categorical propositions. Such propositions have terms, i.e., classes, as their constituent elements. We now turn our attention to compound propositions which have propositions as their constituent elements.

Thus, "All men are rational beings" has the terms "men" and "rational beings" as its constituent elements. The compound proposition "If men are rational, then a world community is a possibility" has two propositions as its elements, namely, "Men are rational" and "A world community is a possibility." By analogy with chemical analysis we may think of categorical propositions as being composed of atoms (terms), and compound propositions of molecules (propositions).

There are three major types of compound propositions,¹ each having a distinctive set of connective words, and each being made up of subpropositions, which we shall customarily symbolize by the letters p , q , r , etc., which stand for propositions. Following is a list of the different types, with examples of each:

- Hypothetical:** *If prices continue to rise, then the unions will ask for wage increases.*
- Alternative:¹*** *Either the nations will co-operate, or all will perish.*
- Conjunctive:²** *Americans believe in freedom of speech and Americans speak English.*

Each type will now be considered in detail.

* Many writers use the term "disjunctive" for what we call "alternative" propositions.

Section II: Hypothetical Propositions and Syllogisms

A hypothetical proposition is made up of two subpropositions connected by the words "if" and "then." The hypothetical proposition "If prices continue to rise *then* the unions will ask for wage increases" has two subpropositions. The first of these is called the "antecedent," the second the "consequent." We shall symbolize these by p and q . The structural form of the hypothetical proposition may thus be exhibited as follows:

If	<u>p (antecedent)</u>	then	<u>q (consequent)</u>
	(Prices continue to rise)		(The unions will ask for wage increases)

"If p then q " means "If p is true then q is true" or "If what p asserts is the case, then what q asserts will be the case."

Let us now examine the precise meaning of the proposition: "If prices rise, then the unions will ask for wage increases." No assertion is made that either of the subpropositions taken alone is true. We have not said that prices will rise nor have we said that the unions will ask for wage increases. The only assertion we have made is that the consequent will follow if the antecedent occurs. *If* prices rise, we have said, then the unions will surely ask for wage increases.

Another meaning of this proposition is that if we find that the unions do *not* ask for wage increases, then we may conclude that prices have *not risen*, for if they had risen then the unions would have asked for increases.

This proposition, however, tells us nothing about what may happen if prices do not rise. There may be other reasons why unions ask for wage increases. Similarly, if we learn that the unions have asked for wage increases we cannot conclude that prices have risen, because of the aforesaid other reasons.

To sum up this expansion of the meaning of "If p then q ," we have found that it involves four aspects:

1. If p is true, then q must be true.
2. If p is false, i.e., if p does not occur, then we can draw no conclusion concerning the truth or falsity of q .
3. If q is true (q occurred) then we can draw no conclusions concerning the truth or falsity of p .

4. If q is false (q did not occur) then we know p is false (did not occur).

It may be noted that the relation of p to q is that of implication. The relation of superimplication holds between p and q and that of subimplication holds between q and p . "If p then q " may thus be expressed in the form " p implies q ."

2. Hypothetical syllogisms.

The rules of validity of the hypothetical syllogism are based upon the meaning of the hypothetical proposition.* The following hypothetical syllogism is an example of the so-called "mixed" type, i.e., it is made up of a hypothetical major premise, a categorical minor premise, and a conclusion:

<u>If a battleship is gray, then it has been painted.</u>	(If p then q .)
p	q
The <u>battleship Missouri is gray.</u>	(p)
p	
∴ The <u>battleship Missouri has been painted.</u>	(∴ q)
q	

We shall refer to the hypothetical premise as the "major premise," and to the second premise as the "minor." Note the latter carefully. It introduces a "special case," the battleship "Missouri." The minor premise asserts that our special case has the characteristic stated in the antecedent of the major premise; hence, we say that the minor premise "affirms" the antecedent, and we symbolize the minor premise by " p ," i.e., p is true. But the minor premise might have informed us that the antecedent did not apply to the Missouri, i.e., that the Missouri was *not* gray. This is to deny the antecedent, i.e., to say p is false, or "not- p ," symbolized by " $\sim p$." There are two other possibilities. The minor might have informed us that our special case has the characteristics of the *consequent* of the major premise (symbolized by " q ") or that it does not have it (symbolized by " $\sim q$," i.e., q is false). These four possibilities give us four "figures" of the hypothetical syllogisms, which take their names from what the minor premise asserts. They are as follows:

* The concepts of distribution and class analysis are now irrelevant since we are no longer dealing with terms.

— Figure 1. Affirming the antecedent: *valid*

If a battleship is gray, then it has been painted. If p then q .
 The Missouri is gray (affirms antecedent). p
 \therefore It has been painted (affirms consequent). $\therefore q$

The hypothetical major premise asserts that the consequent will be true if the antecedent is the case. The minor premise asserts that the antecedent is the case (affirmed) so we may properly affirm the consequent. This valid argument form is often referred to as *modus ponens*. *Mod*

XX
 — Figure 2. Denying the antecedent: *invalid*

If a battleship is gray, then it has been painted. If p then q .
 The Missouri is not gray (denies antecedent). $\sim p$
 \therefore It has not been painted (denies consequent). $\therefore \sim q$

Here the minor premise tells us that the Missouri is not gray. We cannot properly conclude that it has not been painted. It may be painted in a different color, such as white. The major premise asserts that a ship has been painted if it is gray; but it does *not* assert that it has been painted *only* if it is gray. "Denying the antecedent" is an invalid argument form.

— Figure 3. Affirming the consequent: *invalid*

If a battleship is gray, then it has been painted. If p then q .
 The Missouri has been painted (affirms consequent). q
 \therefore The Missouri is gray (affirms antecedent). $\therefore p$

The minor asserts that the Missouri has been painted. For the same reasons as above, this does not permit us to conclude that it is gray. This form is also invalid.

— Figure 4. Denying the consequent: *valid*

If a battleship is gray, then it has been painted. If p then q .
 The Missouri has not been painted (denies consequent). $\sim q$
 \therefore The Missouri is not gray (denies antecedent). $\therefore \sim p$

XX
This form is valid. If the Missouri is not painted, then it certainly cannot be gray, since only painted battleships are gray.

When we deny the consequent of the major premise, then the antecedent must be false. Consider: If the antecedent is the case, then the consequent must be true. But if the consequent is not the case, then the antecedent cannot have occurred for if it had, then the consequent would have occurred. This valid form is called the *modus tollens*.

Exercises

A. State the figures of the following syllogisms, and note whether they are valid or invalid:

1. If p then q 2. If p then q 3. If p then q 4. If p then q
 and $\sim q$ and q and $\sim p$ and p
 $\therefore \sim p$ $\therefore p$ $\therefore \sim q$ $\therefore q$

B. Analyze the following syllogisms for validity. Write out each with the hypothetical major premise stated first, the minor premise second, and the conclusion last. Underline the subpropositions of the major premise as p and q .

Two hints may be helpful in working out the last four exercises. Exercises 5 and 6 contain negative expressions. These may be symbolized by $\sim p$ or $\sim q$ as the case may be. Now, if the minor premise asserts $\sim p$ this would affirm, and p in the minor would deny $\sim p$, and similarly with $\sim q$ and q .

In exercises 7 and 8 note that a mixed hypothetical syllogism is always invalid when the minor premise denies the antecedent or affirms the consequent. But when the antecedent is affirmed or the consequent denied (Figures 1 and 4) then we must check the conclusion to determine whether it properly affirms the consequent, as in Figure 1, or denies the antecedent, as in Figure 4.

1. If a man can vote, then he is a citizen. John is not allowed to vote, so we may conclude that he is not a citizen.
2. If a man can vote, then he is a citizen. John can vote, for he is a citizen.
3. If a sailor desires submarine duty, then he must be a brave man. But Bill cannot be a brave man, for he did not desire submarine duty.
4. If this world is the work of a wise and beneficent Intelligence, it will exhibit evidence of wisdom and foresight. The most hardened skeptic is not able to deny that the world does, as a matter of fact, exhibit evidence of wisdom and

Exercises

1. State the contradictories of the following:
 - a. A and B, $\sim(\sim A \text{ and } B)$, $\sim(\sim A \text{ and } \sim B)$.
 - b. There will be no world government and there will be no third world war.
 - c. It is impossible that a statesman should both protect his country's interest and sacrifice his country's interest.
2. Express the meaning of the following in symbols, assuming that the relations are to be understood in the exclusive sense.
 - a. p or q ; $\sim(r \text{ and } s)$; A or $\sim A$
 - b. There cannot both be an irresistible force and an immovable object. (Use the symbols F and O).
3. Analyze for validity:
 - a. You cannot have socialism and retain economic freedom. But we shall not get socialism, so we shall retain economic freedom.
 - b. Not both can anyone indulge in racial and religious discrimination and believe in the fatherhood of God. You believe in the fatherhood of God, so you don't discriminate.
4. State the equivalent categoricals and negated conjuncts for the following:
 - a. All students of literature are well-read persons.
 - b. All situations in which prices go up are situations in which the unions will ask for wage increases.
 - c. Not both can we work hard and not succeed.

Section VI: The Dilemma

1. The meaning of dilemma

A young man was considering the pros and cons of marriage. Being of a somewhat sombre and pessimistic turn of mind, his reflections took the following form: "If I get married, then I shall undertake grave responsibilities and worries. That's not so good. On the other hand, if I remain single, then I shall often be lonely without the companionship of some lovely woman. And that's not so good. What to do?"

This young man found himself confronted with a dilemma. A dictionary defines a dilemma as "a situation in which we are forced to make a choice between equally undesirable alterna-

tives; in other words, a perplexing predicament." This is the way the term is popularly understood. This usage may even cover some "perplexing predicaments" in which the choices are between equally desirable alternatives as in the case of the child in Proust's *Remembrance of Things Past* who could not make up his mind when given the choice of two tempting kinds of dessert. For his alternatives were also undesirable: whichever one he chose, he would lose the other.

In debating, or argument generally, the dilemma is an effective rhetorical device for putting one's opponent "in a hole." Most dilemmas involve perplexing predicaments. But in logic, "dilemma" means a certain kind of logical structure, and its conclusions may be either pleasant or unpleasant. As a logical form the dilemma, as we shall see, combines some of the forms we have studied in this chapter and involves no new principles of proof.

2. The analysis of dilemmas

We shall now analyze a dilemma. The President, Senators, and Congressmen are confronted with dilemmas whenever they act on controversial legislation. Whichever way they act they will lose votes. The dilemma arises when the alternatives are of equal (or nearly equal) importance. Thus, when controversial labor legislation comes to the president's desk, the president may say to himself: "If I sign this bill, I will lose many labor votes. If I veto it, I will lose many conservative votes. But I must either sign or veto. Thus in either case I shall lose votes." This dilemma has the following structure:

If I sign this bill, then I will lose many labor votes, and

$$\frac{p}{r}$$
 If I veto this bill, then I will lose many conservative votes.

$$\frac{q}{s}$$
 But either I sign this bill, or I veto this bill.

$$\frac{p}{q} \quad \frac{r}{s}$$
 Therefore, either I lose labor votes or I lose conservative votes.

$$\frac{p}{q} \quad \frac{r}{s}$$

4-10-21
25/11

Note the structure of the argument. It is made up of two syllogisms in hypothetical form:

If p then q	and	If r then s
p	or	r
$\therefore q$	or	s

These elements are combined in the following manner. The major premise is a complex conjunctive proposition, made up of two hypothetical propositions. The minor premise is an alternative proposition in which the two antecedents of the hypotheticals in the major premise are affirmed. The conclusion, another alternative proposition, then goes on to affirm the consequents. This type of dilemma is called "constructive."

The dilemma should of course be stated in valid form. This requires that the antecedents of the major premise be affirmed, or its consequents denied. A dilemma in which the consequents are denied (the "destructive dilemma") is illustrated by:

If you were a loyal member of the party, then you would wish to support our leader when he is right; and if you were intelligent you would see that he is right. But either you don't wish to support him when he is right or you don't understand that he is in the right. Therefore, either you are not loyal, or you are not intelligent.

Stated symbolically, we have:

	If p then q and if r then s
But either	$\sim q$ or $\sim s$
\therefore either	$\sim p$ or $\sim r$

The types of dilemma we have analyzed above are called "complex," since the consequents and antecedents are different propositions. In "simple" dilemmas, either the antecedents are the same or the consequents are the same. Thus:

If p then q and if p then r	If p then q and if r then q
But either $\sim q$ or $\sim r$	But either p or r
Therefore $\sim p$ or $\sim p$ (i.e., $\sim p$)	Therefore q or q (i.e., q)

3. The criticism of a dilemma

A dilemma may of course be formally invalid, but typically the criticism of a dilemma is based upon material rather than formal considerations. Let us suppose that you are in a debate. Your opponent charges that you are enmeshed in a dilemma from which you cannot escape and that this dilemma places you in an embarrassing predicament. Assuming that your opponent's

argument is formally valid, there are nevertheless three possible modes of escape from the "embarrassing predicament" in which he claims that he has placed you. You may be able to "escape through the horns," or "take the dilemma by the horns," or "rebut." These defenses are based upon factual rather than formal considerations. If the facts are not with you, then you may find the dilemma "impregnable."

a. Escaping through the horns

The horns of the dilemma are the two alternants stated in the minor premise: "Either p or r ." This implies that there are only two possibilities. But are these actually the only alternatives? If they are not, then we may "escape" through these horns by showing that there are other alternatives, such as t , etc. We then assert that p and r are not exhaustive of the possibilities, that we may escape the devil and the frying pan and not find ourselves in either the deep blue sea or the fire.

This form of attack cannot always be used. The young man contemplating marriage could not use this attack, since he must either remain single or get married. The alternatives exhaust the possibilities. But consider the following dilemma concerning the Caliph Omar, who ordered the destruction of the famous library at Alexandria, Egypt. He is reported to have reasoned as follows: "If these books contain the same doctrines as those of the Koran, then they are unnecessary. If they contradict the doctrines of the Koran, then they are pernicious. Destroy them!"

But there are other possibilities. Mathematical treatises, for example, do not contain the doctrines of the Koran nor do they contradict these doctrines.

Our analysis may be generalized. It is impossible to slip through the horns of a dilemma when the alternatives are genuine contradictories, since one or the other must hold, but it is possible to slip through the horns when the alternatives are contraries. In the last example the alternatives were contraries.

One final comment: Alternatives may not be contradictories, but circumstances may rule out a third possibility. Thus "sign the bill" and "veto the bill" are not formal contradictories, since one might do nothing. But our Constitution makes "doing nothing" equivalent to a veto under certain circum-

stances and equivalent to signing under others, so that there was no third alternative open to the President. No escape between the horns was possible.

b. Taking the dilemma by the horns

To "take the dilemma by the horns" means to deny the consequences alleged to flow from p or to deny the consequences alleged to flow from r . To do either one of these things (or both) is to deny the major premise of the dilemma. We deny that q follows from p or that s follows from r . A dilemma based on a false premise is a specious one.

The "not loyal or not intelligent" conclusion might be avoided by attacking the horn of the dilemma which says "If you were intelligent then you would understand that he is in the right." Possibly an intelligent person might find that the leader was wrong. Whether this is so or not, however, depends on the facts, or material truth, and not on formal considerations.

c. Rebuttal, or the "counter-dilemma"

This form of escape is sometimes effective where the others fail. Let us assume that the premises of the dilemma are true and the alternatives exhaustive. Escape from the embarrassing predicament may yet be possible. "A cloud may have a silver lining" just as "every rose has a thorn." Choices involve sacrifices, but sacrifices often bring compensating gains. The counter-dilemma emphasizes the silver lining. But, as we well know, it is not true without exception that every cloud has a silver lining, so this form of escape is not always possible. The facts of the situation must be considered in each specific case.

Thus our pessimistic young man might be told to look at the situation from a different point of view. "If you get married," we tell him, "you will not be lonely, and if you remain single then you will avoid the cares and responsibilities of marriage." Both alternatives now appear favorable, and his embarrassing predicament has been eliminated. What we have done here is to emphasize different aspects of the same factual situation. The same facts may appear desirable or undesirable, depending upon the point of view, as in the case of the child and his dessert.

Let us set the formal structures of the dilemma and counter-dilemma side by side:

<i>Dilemma</i>	<i>Counter-dilemma</i>
If p then q , and if r then s	If p then $\sim s$ and if r then $\sim q$
But either p or r	But either p or r
\therefore Either q or s	\therefore Either $\sim s$ or $\sim q$

The major premise of the counter-dilemma contradicts the original consequents and reverses their order. Note, however, that the conclusion of the counter-dilemma is *not* the contradictory of the conclusion of the original dilemma. "Either I will have responsibilities or I will be lonely" is quite consistent with "Either I won't be lonely or I won't have responsibilities." The contradictory of the original conclusion would be: I won't be lonely and I won't have responsibilities. The counter-dilemma does not deny the facts stated in the original dilemma; it merely looks at them in a different way.

But not all counter-dilemmas are effective, nor indeed do all of them "make sense." Whether any one of the three attacks we have noted is effective will always depend upon the facts of the particular situation. An attack against a dilemma may be strong, or it may be weak. There are no rules which determine the persuasiveness of an attack; your own common sense must be the judge.

Exercises

Restate the following dilemmas in proper form. Note whether the dilemma is in valid form. Then determine whether the dilemma can be effectively attacked by one or more of the three methods of criticism.

1. If you don't believe in the capitalistic system, then why don't you go to Russia to live? If you do believe in it, then you should not criticize the manner in which it is operated. But either . . . , etc.
2. Either the conclusion of a syllogism is contained in something already stated in the premises, or it is not. If the conclusion merely states something already given in the premises, then it adds nothing to our knowledge, and is useless.

If asked to prove that "All animals are mortal," we might deduce this from the premises that "all living things are mortal," and "all animals are living things," and so on. But obviously, such proof lives on borrowed premises, and we never rid ourselves of the qualification "provided the above premises are true," and these premises themselves need proof. But we demand that this deductive chain be broken, and that our deductions be based on a premise of which we can say, "This proposition is true—period." In the end our deductions must have a stop if we are not, in despair, to give up the search for truth. We require a non-deductive basis for our chains of reasoning. How shall we find it? We find it in our experiences. We believe that living things will die because they have died in the past. Is this conclusive proof that all living things will die in the future? No. We may be warranted in our certainty that some living things have died, but it can be only probable that what happened in the past will also happen in the future. Nevertheless, whether we say that our premise is true or probable, we seem to have found a means whereby we may break the deductive chain in the proof of a premise. Deduction is never absent in proof, but something new has been added, namely, the appeal to experience.

Section III: The Meaning of Truth

— see p. 264

We have seen that the truth of the conclusion of a valid argument can have no greater certainty than the truth of its premises and that the validity of an argument is wholly independent of the truth or falsity of its premises. We also defined truth as "correspondence with the facts." We shall now examine some of the implications of this definition.

If a true proposition is one which corresponds to the facts, then a true proposition must be true for all men at all times and all places. This, indeed, was the conclusion we reached in our discussion of the "Laws of Thought." If a proposition correctly describes the facts, then it cannot be said to be a correct description for one man and not for another. Correctness is determined by objective considerations, upon the facts and the evidence. Truth is thus an objective, or public affair, and does not depend upon anyone's feelings.

The position stated above is opposed by "relativists," who

hold that the truth of a proposition is relative to time, and place, and circumstance. Differences of opinion exist on all matters, says the relativist, and this is because each individual's ideas are based upon his own past experiences in a given environment. Since no two individuals have exactly the same experiences, truth will be different for each. We have already examined this position in some detail. Little need be said here, except to note a retort which may be made to the relativist: "If all ideas are the result of past experience, or 'conditioning,' we may say to him, 'then your relativistic theory is itself the product of your past experiences, and therefore not 'true' for any but those who have had your experiences.'" Thus this view appears to end in self-stultification.

Nevertheless, though the relativistic view must be rejected if our definition of truth is accepted, it does call attention to an important consideration, namely, that differences of opinion are often quite legitimate. The candid observer will be deeply impressed by the actual variety of opinions which men hold on all matters of real importance. Consider the differences of opinion on matters political, both at home and in the international sphere. Consider the differences with respect to religious truth, and consider the different interpretations of the events which lead to the breaking up of a friendship! But these differences of opinion do not mean that truth is relative. They mean only that no one may really *know* which of two interpretations is the correct one. We should say "This proposition is *true*" only when we *know*. In practice, however, our emotions, biases, and prejudices affect our judgments; and wishful thinking leads us into error. Self-righteous people will always think that they are right about everything, but truth depends upon the correspondence of a proposition with the actual facts.

We must therefore distinguish between the *truth* of a proposition and the *belief* we may have in its truth. The statement, "The earth is shaped like a flat disk and floats on water," is a false proposition because it incorrectly describes the facts, but it was once believed true. People were once ignorant of things we know today, and we are also beset by ignorance in many matters. But if we really know that a given proposition is true, then its truth will never change, provided that we state it with

will help the reader in following the discussion. (The numbers in the example refer to the steps.)

The Eight Steps

- (1) The situation which generates the problem.
- (2) The formulation of the problem.
- (3) Observation of facts relevant to the problem.
- (4) The use of previous knowledge.
- (5) The formulation of the hypothesis.
- (6) Deduction of the implications of the hypothesis.
- (7) Testing of the hypothesis.
- (8) Conclusion: The hypothesis is confirmed or disconfirmed.

1. The situation which generates the problem

Every scientific problem has a "background." There is some disturbing situation which must be set right, whether the disturbance be of a practical or theoretical nature. In our example Andrew notes certain peculiarities in Emrys' behavior. Emrys, hitherto a well-adjusted individual, is acting very strangely.

2. The formulation of the problem

Why, Andrew asks himself, does Emrys act in this manner? What is the cause of the observed peculiarities in his behavior? This is the problem generated by the disturbing situation. The formulation of a problem initiates the scientific inquiry. Note that the problem should be formulated in a precise manner. It should be "localized" and admit of a definite answer. "What's wrong with the world?" is not a scientific question, as Will Rogers well knew when he quipped that both he and Bernard Shaw knew that the world was all wrong, but that neither of them knew what was the matter with it.

We shall fumble aimlessly if we seek to solve a vaguely defined problem. The precise "definition" of the problem may require further analysis by breaking a large problem into smaller parts, or additional observations. Only those with knowledge of the field of investigation, moreover, are able to formulate problems precisely.