

বেসিক LOGAL সঠিক rea সঠিক পার্থক্য করে যা

# BASIC LOGICAL CONCEPTS

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1.1 WHAT LOGIC IS

Logic is the study of the methods and principles used to distinguish correct reasoning from incorrect reasoning. There are objective criteria with which correct reasoning may be defined. If these criteria are not known, then they cannot be used. The aim of the study of logic is to discover and make available those criteria that can be used to test arguments, and to sort good arguments from bad ones.

The logician is concerned with reasoning on every subject: science and medicine, ethics and law, politics and commerce, sports and games, and even the simple affairs of everyday life. Very different kinds of arguments may be used, and all are of interest to the logician. In this book arguments of many varieties, on very many topics, will be analyzed. Our concern throughout will be not with the subject matter of those arguments, but with their *form* and *quality*. Our aim is to learn how to test arguments and evaluate them.

Our aim is to learn how to reason. In other words, our aim is to learn how to think logically. The thought processes called reasoning that are the logician's concern, but the outcome of these processes, the *conclusions* that are the products of reasoning, and that can be formulated in writing, are to be analyzed. Each argument confronted raises this question for the logician: Does the conclusion reached follow from the premisses used or assumed? Do the premisses provide good reasons for accepting the conclusion drawn? If the premisses do provide adequate grounds for accepting the conclusion—that is, if asserting the premisses to be true does warrant asserting the conclusion also to be true—then the reasoning is correct. Otherwise it is incorrect.

It would be a mistake to suppose that only the student of logic can reason well or correctly, just as it would be wrong to suppose that only the athlete who studies physiology can run well. Athletes <sup>ज्ञानवान्</sup> aware of the processes going on in their bodies often perform excellently, and some advanced students of physi-

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# Chapter 1 Basic Logical Concepts

ঝাঁঝিন ধৰণের উপর ধৰণের ক্ষেত্ৰে বৈজ্ঞানিক পদ্ধতিৰ মূলত কোৱা মিথ্যাজীবনীজ্যম কৰা হবে মুক্তিৰ মধ্যে ভুলেৰ মধ্যে তাৰায়ত কৰা শিল্প অস্থাস হৈ সঠিক কৰিব।

The study of logic is likely to improve the quality of one's reasoning for another reason: It gives one the opportunity to *practice* the analysis of arguments and the construction of arguments of one's own. Reasoning is something we *do* as well as understand; it therefore is an art as well as a science, with skills to be developed and techniques to be mastered. To this end this book provides an abundant supply of exercises through which those skills and techniques may be practised.

The appeal to emotion sometimes is more persuasive than logic, and in some contexts it may be more appropriate as well. But where judgments that must be relied upon are to be made, correct reasoning will in the long run prove to be their most solid foundation. With the methods and techniques of logic we can distinguish efficiently between correct and incorrect reasoning. These methods and techniques are the subject matter of this book.

## **1.2 PROPOSITIONS AND SENTENCES**

We begin by examining *propositions*, the building blocks of every argument. A **proposition is something that may be asserted or denied.** Propositions in this way are different from questions, commands, and exclamations. Neither questions, which can be asked, nor commands, which can be given, nor exclamations, which can be uttered, can possibly be asserted or denied. Only propositions assert that something is (or is not) the case, and therefore only they can be true or false. Truth and falsity do not apply to questions.

Moreover, every proposition is either true or false—although we may not know the truth or falsity of some given proposition. The proposition that there is life on some other planet in our galaxy is one whose truth or falsity we do not know; but either it is true that there is such extraterrestrial life, or it is not true. In short, an essential feature of propositions is that they can be true or false.

It is customary to distinguish between propositions and the sentence, the latter being the means by which they are asserted. Two sentences that consist of different words differently arranged may express the same content and have the same meaning and be used to assert the same proposition. For example

**Leslie** won the election.

The election was won by Leslie

## 1.2 Propositions and Sentences

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A sentence, moreover, is always a sentence in a particular language, the language in which it is used. But propositions are not peculiar to any language; a given proposition may be asserted in many languages. The four sentences

Está lloviendo.  
Il peut.

Il pleut. এটা regnet. অবশ্যই ফরাসি, এবং same দৃঢ়  
Es regnet.

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ভিন্ন. কাবণ তারা জার্মান।

ডিম ডিম

ভাষা: ইংরেজি স্প্যানিশ ডাক্টারিত ডিন

are certainly different, for they are in different languages: English, Spanish, French, and German. Yet they have a single meaning, and all may be uttered to assert the same proposition.

The same sentence can be used in different contexts, to make very different meanings.

The same sentence can be used, in different contexts, to make very different statements. For example, the sentence

The largest state in the United States was once an independent republic.

ମାର୍ଗବିଦୀ

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একদম

প্রজাতন্ত্র পরিবর্তন প্রস্তাবের অধৈক, বা "প্রস্তাব

would have been a true statement about Texas during the first half of the twentieth century, but it is now a false statement about Alaska. A change in the temporal context, plainly, may result in very different propositions or statements, being asserted by the very same words. (The terms "proposition" and "statement" are not exact synonyms, but in the context of logical investigation they are used in much the same sense. Some writers on logic prefer "statement" to "proposition", although the latter has been more common in the history of logic. In this book, both terms are used.)

The propositions illustrated thus far have been simple: "Leslie won the election"; "It is raining"; and so on. But propositions are often compound, containing other propositions within themselves, <sup>চলুন</sup> <sup>হব</sup> <sup>নিজের</sup> <sup>বিকল্প</sup> <sup>উত্তরণ</sup>. Consider the following passage from an account of the last days of Hitler's Third Reich in 1945:

আমেরিকানরা এবং গেট দখলক্ষ্যে প্লনিং করে

এলবে। দ্য

থেকে ব্রিটিশ ছিলেন

The Americans and Russians were driving swiftly to a junction on the Elbe. The British were at the gates of Hamburg and Bremen and threatening to cut off Germany from occupied Denmark. In Italy Bologna had fallen and Alessandria was besieged, plunging into the valley of the Po. The Russians, having captured Vienna on April 13, were heading up the Danube.

দুজনে বেশ কয়েকজন ছিলেন

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Several propositions contained in this paragraph are compound. "The British were at the gates of Hamburg and Bremen," for example, is the conjunction of two propositions: "The British were at the gates of Hamburg," and "The British were at the gates of Bremen." And that conjunctive proposition is itself one component of a larger conjunction, that "the British were at the gates of Hamburg and Bremen and [the British] were threatening to cut off Germany."

<sup>1</sup>William L. Shirer, *The Rise and Fall of the Third Reich* (New York: Simon and Schuster, 1960).

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চ্যাপ্টার লেসিক

লজিক্যাল কনেক্ষন ডেনমার্ক!

প্রতিটি উপাদান উপাদান উন্নয়ন প্রস্তাৱ এই দুই  
from occupied Denmark." Every proposition in this passage is asserted; that is,  
it is stated as true. Asserting the conjunction of two propositions is equivalent  
to asserting each of the component propositions themselves.

কিন্তু সত্ত্বেও হয়  
But there are other kinds of compound propositions which do not assert  
দ্য তাদের উপাদানের জন্মে উন্নয়ন প্রস্তাৱ কৰা হয়.  
the truth of their components. For example, in alternative (or disjunctive) propo-  
sitions, such as

জাদের দ্য না  
জাদের উপাদানের জন্মে উন্নয়ন প্রস্তাৱ কৰা হয়.  
Circuit Courts are useful, or they are not useful.<sup>2</sup>

যৌগিক প্রস্তাৱ হল প্রস্তাৱন "উন্নয়ন" সত্য কৰে  
neither of the two components is asserted; only the compound "either-or" dis-  
junction proposition is asserted. If this disjunctive proposition is true, either of  
তৃপ্তি হবে তখন তার উপাদান কোন উভয়ই  
its components could be false. And in compound propositions that are hypo-  
ত্যুম্ভুত হৈব এবং অন্তৰ্ভুক্ত হৈব  
thetical (or conditional), such as

যদি স্বত্ত্ব কৰিল না বিদ্যমান:  
If God did not exist, it would be necessary to invent him.<sup>3</sup>

আবার  
প্রয়োজন কৰিল না  
again neither of the components is asserted. The proposition that "God does  
ন্যুম্ভুত "বিদ্যমান" বিদ্যুত, এবং প্রয়োজন তার উপাদান কোন উভয়ই  
not exist" is not asserted here; nor is the proposition that "it is necessary to in-  
vent him." Only the "if-then" proposition is asserted by বিদ্যুত হৈল  
conditional statement, and that conditional statement might be true even  
though both of its components were false.

In the course of this উন্নয়ন, প্রতিক্রিয়া কৰিলৈ the internal structure of many  
kinds of propositions, both simple and compound.

### 1.3 ARGUMENTS, PREMISES, AND CONCLUSIONS

প্রস্তাৱন চৰুলতে বোৱায় যে এৰ সাথে আছে  
Propositions অনুমান দ্য প্রস্তাৱন কৰিলৈ কীভুলে কীভুলে কীভুলে  
inference refers to the process by which one proposition is arrived at and af-  
firmed on the basis of one or more other propositions accepted as the starting  
point of the process. To determine whether an inference is correct, the logician  
examines the propositions with which that process begins and the re-  
lations between them. This cluster of propositions constitutes an argument, and  
therefore there is an argument corresponding to every possible যাই শুধু কৰিলৈ  
যুক্তিবিদ্যা

It is with arguments that logic is chiefly concerned. As logicians use the  
word an argument is any group of propositions of which one is claimed to  
follow from the others, which are regarded as providing support for grounds  
for the truth of that one. The word "argument" is often used in other senses  
also, of course, এই প্রস্তাৱ যুক্তিবিদ্যা যাই শুধু কৰিলৈ  
also, of course, এই প্রস্তাৱ যুক্তিবিদ্যা যাই শুধু কৰিলৈ

In this strict sense, it is clear that an argument is not a mere collection of  
propositions; a passage may contain several related propositions and yet contain  
no argument at all. For an argument to be present, the cluster of propositions must  
have a structure. In describing this structure, the terms "premiss" and "conclu-  
sion" are commonly used. The conclusion of an argument is the proposition that

'ইব্রাহিম' লিঙ্কন, ইডিভে

<sup>2</sup> Abraham Lincoln, annual message to Congress, 3 December 1861.<sup>3</sup> Voltaire, Epitre à l'Auteur du Livre des Trois Imposteurs, 10 November 1770.

কংগ্ৰেস, ৩

ডিসেম্বৰ

1770।

## 1.3 Arguments, Premises, and Conclusions

অন্যান্য কারণে মিশ্চিত করা হয়েছে। অন্যান্য প্রস্তাবের ডিঃ, যা মিশ্চিত করেছে (বা উপসংহারীটি গ্রহণ করে), এটি থেকে যে ধরণের স্ফুর্তি অনুসরণ করা হয় তা  
**is affirmed on the basis of the other propositions of the argument, and these other propositions, which are affirmed (or assumed) as providing support or reasons for accepting the conclusion, are the *premisses* of that argument.**

The simplest kind of argument consists of one premiss and a conclusion that is claimed to follow from it or be implied by it. The premiss and the conclusion, in that order, may each be stated in a separate sentence, as in this argument that appears on a sticker affixed to biology textbooks in the State of Alabama:

জীবন মেইঝে  
জীবন প্রথম বিস্তার করা হয়  
চানু  
অতএব যে কোন বিবৃত  
No one was present when life first appeared on earth. Therefore any statement about  
life's origins should be considered as theory, not fact.

Or both the premiss and the conclusion may be stated in the same sentence, as in the following argument:

যেহেতু এটি cestors দিবামন্ত্রনা আউ যে সাম্প্রতিক হিসাবে শাসমানুষের বিবর্তনবাদে মৃগারূপে বিজ্ঞানী অবজ্ঞার পঙ্কজেরা হয়ে উঠেছে। এখনও অন্ধকার  
 Since it turns out that all humans are descended from a small number of African ancestors in our recent evolutionary past, believing in profound differences between the races is as ridiculous as believing in a flat earth.<sup>4</sup>

এমনকি পৃথক বিবৃতিতে নাশপাত্রিভিন্নভাবে বিবৃতিতে  
 Even in simple arguments, the statement of the conclusion may precede the  
 statement of the single premiss. When it does, the two propositions may ap-  
 pear in separate sentences or in the same sentence. An example of separate  
 statements in which the conclusion is stated first is this:

The Food and Drug Administration should stop all cigarette sales immediately. After all, cigarette smoking is the leading preventable cause of death.<sup>5</sup>

এবং একটি আইনের উদাহরণ  
And an example of a combined statement in which the conclusion comes first  
is this:

প্রতিটি অধিকাংশ অকৃত্য, আন্তর্জাতিক, এবং যেহেতু sition, আওমেটের সাথে সামুদ্রিকভাবে ইনফ্রাকশন এর চেয়ে জাটিল, বেশ কয়েক

জাচিলক্ষণারণ করা যুক্তি, একটি যুক্তি নিজেই গঠিত, যুক্তি হতে। এবং কিছু  
 Most arguments are much more complicated than these, and some উপস্থিতান  
 ments, containing compound propositions with several components, are ex-  
 ceedingly complicated, as we shall see. But every argument, whether simple or  
 complex, consists of a group of propositions, of which one is the conclusion  
 and the others are the premisses offered to support it.

Since an argument is made up of a group of propositions, no single proposition can, by itself, be an argument. But some compound propositions closely resemble arguments. Care must be taken not to confuse such propositions with arguments. Consider the following hypothetical proposition:

If life evolved on Mars during an early period in its history when it had an atmosphere similar to Earth's, then it is likely that life evolved on countless other planets that scientists now believe to exist in our galaxy.

<sup>4</sup>David Hayden, "Thy Neighbor Thy Self," *New York Times*, 9 May 2000.

<sup>5</sup>"Ban Cigarettes," *Orlando Sentinel*, 27 February 1992.

*"Jeremy Bentham, Principles of Legislation, 1802."*



indication that the argument is inductive. This is so because there are some strictly deductive arguments *about* probabilities themselves.\* Arguments of this kind, in which the probability of a certain combination of events is deduced from the probabilities of other events, are discussed in Chapter 14.

অধ্যায়

মুক্তির পথ

এই শৃঙ্খলে ধারণাগতি কঠোরভাবে ইঙ্গিত দ্বারণের, যা অনুমানমূলক মুক্তি থেকে সর্বাবাকে ত্রাস করে

এর মধ্যে

এর কাজ

## 1.9 VALIDITY AND TRUTH

সত্ত্বাবনার

নিজেদের।\* আলোচনা সমিতিরণ

অধ্যায়

ঘটনা

মুক্তি

As noted earlier, a successful deductive argument is *valid*. Validity refers to a relation between propositions—between the set of propositions that serve as the premisses of an argument and the proposition that serves as its conclusion. If the latter is logically necessary given the former, we say that the argument is valid. Since logical necessity is never achieved by inductive arguments, validity never applies to them. Nor can validity ever apply to any single proposition by itself, since the needed relation cannot possibly be found within any one proposition.

Truth and falsity, on the other hand, are attributes of individual propositions. A single statement that serves as a premiss in an argument may be true; the statement that serves as its conclusion may be false. That conclusion may have been validly inferred, but it makes no sense to say that any conclusion, or any single premiss, is itself valid or invalid.

**Truth is the attribute of a proposition that asserts what really is the case.** When I assert that Lake Superior is the largest of the five Great Lakes, I assert what really is the case, what is true. If I said that the largest of the Great Lakes is Lake Michigan, my assertion would not be in accord with the real world; therefore, it would be false. This contrast is important: **truth and falsity are attributes of individual propositions or statements; validity and invalidity are attributes of arguments.**

Just as the concept of validity does not apply to single propositions, the concept of truth does not apply to arguments. Of the several propositions in an argument, some (or all) may be true and some (or all) may be false. But the argument as a whole is neither “true” nor “false.” Propositions, which are statements about the world, may be true or false; deductive arguments, which consist of inferences from one set of propositions to other propositions, may be valid or invalid.

The relations between true (or false) propositions and valid (or invalid) arguments lie at the heart of deductive logic. Part II of this book is largely devoted to the examination of those complex relations. However, a preliminary discussion of the relation between validity and truth is in order at this point.

We begin by emphasizing that an argument may be valid even if one or more of its premisses is not true. Every argument makes a claim about the relation between the premisses and the conclusion drawn from them; that relation may hold even if the premisses turn out to be false or the truth of the premisses is in dispute. This point was made effectively by Abraham Lincoln in

\*If, for example, we learn that the probability of three successive heads in three tosses of a coin is  $\frac{1}{8}$ , we may infer deductively that the probability of getting at least one tail in three tosses of coin is  $\frac{7}{8}$ .

ডায়াফ্রেম মুদ্রা হয়, টেস্ট মার্কিন

অনুমান শিল্প

deductively

সত্ত্বাবনার

পরপর পেয়ে

অঙ্গত

তিনিটিতে

তিনিটি

তিনিটি

1858 in one of his debates with Stephen Douglas, Lincoln was attacking the *Dred Scott* decision, which obliged the return of slaves who had escaped into northern states to their owners in the South:

I think it follows, [from the *Dred Scott* decision] and submit to the consideration of men capable of arguing, whether as I state it in syllogistic form the argument has any fault in it:

Nothing in the Constitution or laws of any State can destroy a right distinctly and expressly affirmed in the Constitution.

The right of property in a slave is distinctly and expressly affirmed in the Constitution of the United States.

Therefore, nothing in the Constitution or laws of any State can destroy the right of property in a slave.

I believe that no fault can be pointed out in that argument; assuming the truth of the premisses, the conclusion so far as I have *recapitulated* at all to understand it, follows inevitably. There is a fault in it as I think, but the fault is not in the reasoning; but the falsehood in fact is a fault of the premisses. I believe that the right of property in a slave is not distinctly and expressly affirmed in the Constitution, and Judge Douglas thinks it is. I believe that the Supreme Court and the advocates of that decision [the *Dred Scott* decision] may search in vain for the place in the Constitution where the right of property in a slave is distinctly and expressly affirmed. I say, therefore, that I think one of the premisses is not true in fact.<sup>48</sup>

In the argument that he recapitulates and attacks, Lincoln finds the second premiss—that the right of property in a slave is affirmed in the U.S. Constitution—to be plainly false. The reasoning in the argument is not faulty; he points out, nevertheless, its conclusion has not been established. His logical point is correct: *An argument may be valid even when its conclusion and one or more of its premisses are false*. For the validity of an argument, we emphasize once again, depends only upon the *relation* of the premisses to the conclusion.

There are many possible combinations of true and false premisses and conclusions in both valid and invalid arguments. Consider the following illustrative arguments, each of which is prefaced by the statement of the combination it represents. With these illustrations before us, we will be in a position to formulate some important principles concerning the relations between truth and validity.

কিছু আর্ডমেন্ট, I. ইলাস্ট্রেশন গুরুত্বপূর্ণ নীতির আর্ডমেন্ট

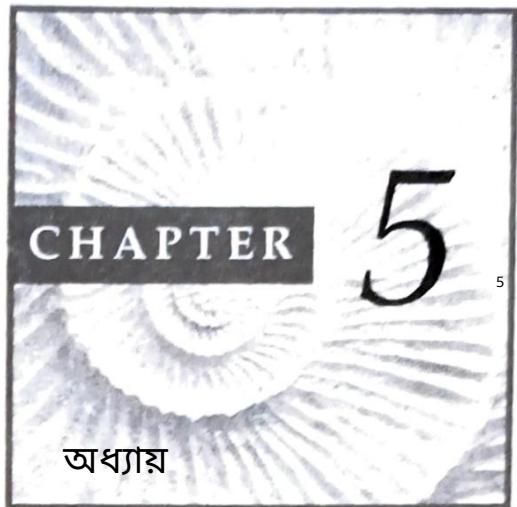
### I. Some valid arguments contain only true propositions—true premisses and a true conclusion:

All mammals have lungs.  
All whales are mammals.  
Therefore all whales have lungs.

### II. Some valid arguments contain only false propositions:

All four-legged creatures have wings.  
All spiders have four legs.  
Therefore all spiders have wings.

<sup>48</sup> Abraham Lincoln, in Roy R. Basler, ed., *The Collected Works of Abraham Lincoln*, vol. 3. (Rutgers University Press).



# CATEGORICAL PROPOSITIONS

## 5.1 THE THEORY OF DEDUCTION

দ্য  
Preceding chapters have dealt chiefly with language and its influence on argumentation. We turn now to argument itself, and first to the analysis of that special kind of argument called "deduction." A deductive argument is one whose premisses are claimed to provide conclusive grounds for the truth of its conclusion. If it does provide such conclusive grounds, the deductive argument is valid. Every deductive argument is either valid or invalid: valid if it is impossible for its premisses to be true without its conclusion being true also, and invalid otherwise.

The theory of deduction is intended to explain the relationship between premises and conclusion of a valid argument, and to provide techniques for the appraisal of deductive arguments, that is, for discriminating between valid and invalid deductions. To accomplish this, two great bodies of theory have been developed. The first of these is called "classical" or "Aristotelian" logic, after the ancient Greek philosopher who initiated this study. The second is called "modern" or "modern symbolic" logic. Classical logic will be the topic of this and the following two chapters (chapters 5, 6, and 7); modern logic will be the topic of chapters 8, 9, and 10.

## **5.2 CATEGORICAL PROPOSITIONS AND CLASSES**

সম্পর্কে সাইট নির্মাণ শুরু করা রাজ্য বন্ধু ক্লায়ারিস্টেলিয়ান বিভাগ কর্তৃত ফোরাম্স শ্রেণীগত বুঝাতে বিশ্লেষণ  
 The Aristotelian study of deduction focused on arguments containing propositions of a special kind, called "categorical propositions" because they are about categories or classes. To understand the classical theory of deduction, we must begin with a very careful analysis of these propositions, which are the building blocks of that theory. Consider the argument:

না কীভাবিক  
No athletes are vegetarians.  
সব ফুটবল খেলোয়াড়ই ফুটবল  
All football players are athletes.  
তাই এই  
Therefore no football players are vegetarians.

সায়ন তিনটি শ্রেণীগত শ্রেণী  
All three of the propositions in this argument, both premisses and the conclusion, are categorical propositions. Such propositions affirm, or deny, that some class  $S$  is included in some other class  $P$ , in whole or in part. In the example above, the three categorical propositions are about the class of all athletes, the class of all vegetarians and the class of all football players.

(Classes were mentioned briefly in our discussion of definition in Chapter 3, where a class was explained to be the collection of all objects that have some specified characteristic in common.) There are various ways in which two classes may be related to each other.

১. এক একটি ক্লাসের কিছু বিষয় অন্তর্ভুক্ত করা হয়।  
 If every member of one class is also a member of a second class, like the class of dogs and the class of mammals, then the first class is said to be included or contained in the second.

২. এক হয় প্রথম স  
 যদি কিছু অন্য, যেমন বলা যেতে পারে  
 If some but perhaps not all members of one class are also members of another, like the class of females and the class of athletes, then the first class may be said to be partially contained in the second class.

৩. এর বর্গ  
 ক্লাস কমন,  
 না দুই অন্য।  
 এর বর্গ  
 ক্লাস কমন,  
 না দুই অন্য।  
 If the two classes have no members in common, like the class of all triangles and the class of all circles, the two classes may be said to exclude one another.

These various relationships between classes are affirmed or denied by categorical propositions. The result is that there can be just four different standard forms of categorical propositions. They are illustrated by the four following propositions:

- |    |                                     |          |
|----|-------------------------------------|----------|
| 1. | সব                                  | হয়      |
| 2. | All politicians are liars.<br>না    | হয়      |
| 3. | No politicians are liars.<br>কিছু   | হয়      |
| 4. | Some politicians are liars.<br>কিছু | নিখ্যাবা |
| 4. | Some politicians are not liars.     |          |

Let us examine these four standard-form categorical propositions in greater detail.

The first example—All politicians are liars—is a universal affirmative proposition. It is about two classes, the class of all politicians and the class of all liars.

## 5.2 Categorical Propositions and Classes

saying that the first class is included or contained in the second. A universal affirmative proposition says that every member of the first class is also a member of the second class. In the present example, the subject term "politicians" designates the class of all politicians, and the predicate term "liars" designates the class of all liars. Any universal affirmative proposition may be written schematically as

All  $S$  is  $P$ .

যেখানে  $S$  and  $P$  represent the subject and predicate terms, respectively.

where the letters  $S$  and  $P$  represent the subject and predicate terms, respectively. The name "universal affirmative" is appropriate, because the proposition affirms that the relationship of class inclusion holds between the two classes and says that the inclusion is complete or universal: All members of  $S$  are said to be members of  $P$  also.

The second example—No politicians are liars—is a universal negative proposition. It denies of politicians universally that they are liars. Concerned with two classes, a universal negative proposition says that the first class is wholly excluded from the second, which is to say that there is no member of the first class that is also a member of the second. Any universal negative proposition may be written schematically as

No  $S$  is  $P$ .

কোথায়, আবার, সর্বজনীনাক্ষণিক প্রস্তাবনা হলো? নিম্নোক্ত উদাহরণগুলি প্রস্তাবনা হলো, but proposition has, minimal class হলো:

where, again, the letters  $S$  and  $P$  represent the subject and predicate terms. The name "universal negative" is appropriate because the proposition denies that the relation of class inclusion holds between the two classes—and denies it universally: No members at all of  $S$  are members of  $P$ .

The third example—Some politicians are liars—is a particular affirmative proposition. Clearly, what the present example affirms is that some members of the class of all politicians are (also) members of the class of all liars. But it does not affirm this of politicians universally: Not all politicians universally, but, rather, some particular politician or politicians, are said to be liars. This proposition neither affirms nor denies that all politicians are liars; it makes no pronouncement on the matter. It does not literally say that some politicians are not liars, although in some contexts it might be taken to suggest it. The literal, minimal interpretation of the present proposition is that the class of politicians and the class of liars have some member or members in common. For definiteness, we adopt that minimal interpretation here.

The word "some" is indefinite. Does it mean "at least one" or "at least two" or "at least a hundred"? Or how many? For the sake of definiteness, although this position may depart from ordinary usage in some cases, it is customary to regard the word "some" as meaning "at least one." Thus a particular affirmative proposition, written schematically as

কিছু এস প্রস্তাবনা

Some  $S$  is  $P$ .

অন্তত যে একটির শ্রেণী সদস্যের দ্বারা রাজনৈতিকভাবে জিঞ্চিরিত করে, এর says that at least one member of the class designated by the subject term  $S$  is also a member of the class designated by the predicate term  $P$ . The name "particular affirmative" is appropriate because the proposition affirms that the relationship of class inclusion holds, but does not affirm it of the first class universally but only partially, i.e., of some particular member or members of the first class.

দুই  
হয়

নেতৃত্বাচক  
সংশ্লিষ্টরা সম্পূর্ণ প্রস্তাবনা মে

বিশেষ রাজনৈতিক সদস্য

এই

রাজনৈতিক সদস্যের নিম্নোক্ত প্রস্তাবনার আক্ষরিক,

যদিও প্রথাগত নিশ্চিতকরণ

প্রতি

The fourth example—এই জাতীয়তা, সরকারীদের মন্ত্রণালয়ের রাজনৈতিক বিদেশের বিশেষ—is a particular negative proposition. This example, like the one preceding it, does not refer to politicians universally but only to some particular members of that class; it is particular. But unlike the third example it does not affirm that the particular members of the first class referred to are included in the second class; this is precisely what is denied. A particular negative proposition, schematically written as

কিছু S হল P শব্দটির সদস্য দ্বারা মনোনীত শ্রেণী। এইমাত্র বিবেচ

Some  $S$  is not  $P$ .

বিষয় মেয়াদিত্ব হল

says that at least one member of the class designated by the subject term S is excluded from the whole of the class designated by the predicate term P.

হয় হিসাবে সহজ

Not all standard-form categorical propositions are as simple and straightforward as the four examples just considered. The subject and predicate terms of a **স্টার্ড-ফর্ম ক্যাটেগরিক্যাল প্রপোজিশন**, এবং অধিকারী ও গুরুত্বপূর্ণ বিভাগ, উভয় অঙ্গই **বিভিন্ন অক্ষর এবং অক্ষরের জোড়া** সমূহ ক্ষেত্রে মনে রেখা হওয়া চাহিদে। যেমন, **“All candidates for the position are persons of honor and integrity”** has the phrase “**candidates for the position**” as its subject term and the phrase “**persons of honor and integrity**” as its predicate term.

চিল

It was traditionally held that all deductive arguments were analyzable in terms of classes, categories, and their relations. Thus the four standard-form categorical propositions just explained:

(याके बला हय A प्रष्टावना) (E प्रष्टावना बला हय) (I प्रष्ट

- universal affirmative propositions
- universal negative propositions
- particular affirmative propositions
- ~~particular negative propositions~~

(called A propositions)

ইতিবাচক প্রস্তাৱ বিশেষ কৰে মৌলিক প্রস্তাৱ সৰু ভালুক কৰা হ'ব।

(called I propositions)

(called O propositions)

were thought to be the building blocks of all deductive arguments. A great deal of logical theory—as we shall see—has been built up concerning these four kinds of propositions.

ଅନୁଶୀଳନ

## Exercises

সনাত্তকৰণ

এবং নিষ্পলিথিত প্রস্তাব্যত্বে predicate এর সমূহ ভিত্তিতে এবং

নাম দ.

ପ୍ରତିକି

**Identify the subject and predicate terms in, and name the form of, each of the following propositions.**

- \*১. Some historians are extremely gifted writers whose works read like first-rate novels.

২. No athletes who have ever accepted pay for participating in sports are amateurs.

৩. No dogs that are without pedigrees are candidates for blue ribbons in official dog shows sponsored by the American Kennel Club.

৪. All satellites that are currently in orbits less than ten thousand miles high are very delicate instruments that cost many thousands of dollars to manufacture.

৫. Some members of families that are rich and famous are not persons of either wealth or distinction.

6. Some paintings produced by artists who are universally recognized as masters are not works of genuine art that either are or deserve to be preserved in museums and made available to the public.

হয় না নিরাপদ হয়

7. All drivers of automobiles that are not safe are desperadoes who threaten the lives of their fellows.

সর্বাধিক

8. Some politicians who could not be elected to the most minor positions are appointed officials in our government today.

পর্সি আর্টস পরিচালনা করেন

9. Some drugs that are very effective when properly administered are not safe remedies that all medicine cabinets should contain.

সেই WHO

\*10. No people who have not themselves done creative work in the arts are responsible critics on whose judgment we can rely.

দৰ্শনাত্মক, মান-কৰ্ম নেতৃত্বকাৰী

## **5.3** **QUALITY, QUANTITY, AND DISTRIBUTION**

5.3

## QUANTITY, প্রস্তাব ইতিবাচক নেতিবাচক

ডিস্ট্রিবিউশন হয় গুণমানের, অন্তর্ভুক্তি হোক না কো

#### A. Quality

প্রতিটি ফার্মেটিভ সম্পূর্ণ তাদের এবং শব্দকে প্রত্যক্ষিকরে ন্যায় উদ্দেশ্যের প্রস্তাবাত হাতবাচক বলকেছে সহাজে ক্ষেত্রে, শুণ্মুক্তি  
 Every standard-form categorical proposition is said to have a quality, either affirmative or negative. If the proposition affirms some class inclusion, whether complete or partial, its quality is affirmative. Thus both universal affirmative propositions and particular affirmative propositions are affirmative in quality, and their letter names, A and I, respectively, are thought to come from the Latin word, "AffIrmo," meaning "I affirm." If the proposition denies class inclusion, whether complete or partial, its quality is negative. Thus both universal negative propositions and particular negative propositions are negative in quality, and their letter names, E and O, respectively, are thought to come from the Latin word "nEgO," meaning "I deny."

অন্তর্ভুক্তি থেকে ল্যাটিন, শ্রেণী নেগ সার্বজনীন

চিন্তা থেকে ল্যাটিন

### B. Quantity

Every standard-form categorical proposition is said to have a quantity also, universal or particular. If the proposition refers to all members of the class designated by its subject term, its quantity is universal. Thus the A and E propositions are universal in quantity. If the proposition refers only to some members of the class designated by its subject term, its quantity is particular. Thus the I and O propositions are particular in quantity.

Every standard-form categorical proposition begins with one of the words "all," "no" or "some." These words show the quantity of the proposition. "All" and "no" indicate that the proposition is universal; "some" indicates that the quantity is particular. The quantifier "no" serves additionally to indicate the negative quality of the E proposition.

যে নির্দেশ করে অতিরিক্তভাবে নেগা-

We observe that the names "universal affirmative," "universal negative," "particular affirmative," and "particular negative" uniquely describe each of the four standard forms by mentioning first its quantity and then its quality.

### C. General Schema of Standard-Form Categorical Propositions

মধ্যে "not" এবং predicate দেওয়া আছে কিভাবে হতে পারে

Between the subject and predicate terms of every standard-form categorical proposition occurs some form of the verb "to be" (accompanied by the দ্য এটিকে বলা হয় "কপুলা," বিভাগ, শুধুমাত্র এইক্ষণ্মৈ জন্তু "not" in the case of the O proposition). This verb serves to connect the subject এবং মুর্বৰ্তী হয়। পরিকল্পিত হয়, তবে নিষ্ঠালিখিত তিনটির অন্তর্ভুক্ত হচ্ছে। এবং পুর্বসূচিত হচ্ছে, কিছু আরও ঘোষণা করা হচ্ছে। সম্পূর্ণের আয়তক্ষেত্রে মাঝকার হবেন না। স্ট্যান্ডার্ড-ফর্ম হবে না তাহলে ক্ষিমা হচ্ছে। পারে

কিছু	রোারান	বিলে	রমন্টার্স
Some Roman emperors were monsters.			
All squares are rectangles.			
Some soldiers will not be heroes.			

ক্ষিমার শব্দটি "হয়"। এবং থাকা" পরবর্তী পরিবেশন কপুলাস প্রস্তাবিত হচ্ছে, তাহলে অংশ: চার "were," "are," এবং "will not be" serve শ্রেণীবদ্ধ বিষয় শব্দ, লিখিত কপুলা (অনুমানের প্রস্তাবিত হচ্ছে) অন্তর্ভুক্ত হচ্ছে। The general skeleton or schema of a standard-form categorical proposition consists of four parts: first the quantifier, then the subject term, next the copula, and finally the predicate term. This schema may be written as

উচ্চিকায়ার  
Quantifier (subject term) copula (predicate term).

বিতরণ একটি কোর্স।

### D. Distribution

চালু ক্লাস শ্রেণীবদ্ধ হচ্ছে উপায়, শুধুমাত্র থেকে

ব্যাখ্যাকারীর শর্তাবলী, বিষয় এবং বস্তুর শ্রেণী, এবং প্রস্তা

ব্রাজিল,

On the class interpretation, the subject and predicate terms of a standard-form categorical proposition designate classes of objects, and the proposition is regarded as being about these classes. Propositions may refer to classes in different ways, of course. কিছু proposition may refer to all members of a class, or it may refer to only some members of that class. Thus the proposition

সব সিনেটর হয় নাগরিক এর সকল সদস্য  
All senators are citizens.

প্রতিটি বোর্ডার অব্বের না করে

সিনেটররা কিন্তু শ্রেণীর প্রয়োগিক ক্ষেত্রের নাকল যে প্রতিটি এটি দাবি করে যে কোনও

refers to or is about all senators but does not refer to all citizens. It asserts that each and every member of the class of senators is a citizen, but it makes no assertion about all citizens. It does not affirm that each and every citizen is a senator, but it does not deny it either. Any A proposition, of this form,

All S is P.

এইভাবে কিন্তু করে en না করতে আল রেফার করুন সব টার্ম টেকনিকাল ক্যান টার্ম ইন টার্ম যদি একটি "রেফারেন্স" সম্ভব স্যাম্পলেক্স ক্ষেত্রে তাস্তু উচ্চিকায়ার প্রস্তা

অন্তর্ভুক্ত হচ্ছে। এটা নাগরিক অব্বের করে।

অকার্ডান্স

আঙ্গু পি.

The technical term "distribution" is introduced to characterize the ways in which terms can occur in categorical propositions. A proposition distributes a term if it refers to all members of the class designated by the term. Let us examine each of the standard-form categorical propositions, to see which terms are distributed or undistributed in them.

আমরা প্রস্তাৱ হিসাবে একটি নাগরিকের পদ বিবেচনা কৰুন

First, সমস্ত সিনেটরদের দ্বারা) যে(ৰা) হল। As we noted above, using the example "All senators are citizens," the subject term of an A proposition is distributed in (or by) that proposition. But the predicate term of an A proposition is undistributed in (or by) it.

প্ৰৱৰ্তী

বিবেচনা কৰিব

প্ৰস্তাৱ. একজন ই নিৱামিষাশী। যে তিনি ক্ৰীড়াবিদ বলা হৈয়

Next consider the E proposition. An E proposition such as

না ক্ৰীড়াবিদৰ এবং ক্ৰীড়াবিদদেৱ প্ৰত্যেকেৰ প্ৰতিটা দাবী হল nroposition-এৱে ক্লাস মেষারদেৱ শ্ৰেণী, যেটা জাহিৰ কৰাৰ সময়, নিৱামিষাশীদেৱ মধ্যে, এটা নিৱামিষ থেকে

বা তিনি কি ক্ষণটি বিষয় থেকে বীজপুৰুষ উন্নৰ্মাণ কৰিব আৰু ক্ৰীড়াবিদৰ পুনৰ্মাণ কৰিব

asserts of each and every athlete that he or she is not a vegetarian. The whole of the class of athletes is said to be excluded from the class of vegetarians. All members of the class designated by its subject term are referred to by an E proposition, which is therefore said to distribute its subject term. At the same time, in asserting that the whole class of athletes is excluded from the class of vegetarians, it is also asserted that the whole class of vegetarians is excluded from the class of athletes. The given proposition clearly asserts of each and every vegetarian that he or she is not an athlete. An E proposition, therefore, refers to all members of the class designated by its predicate term and is said to distribute its predicate term also. E propositions distribute both their subject and their predicate terms.

The situation is different with respect to I propositions. Thus,

কেউ কেউ এটাও কৰিবো। কাপুকুষ থেকে  
Some soldiers are cowards.

সম্মান

এইভাৱে, too তে সম্ভাৱ বা অবিৱত দাবি, যে এটি,

ঔনিক স্টালে, সম্পূৰ্ণৰেণে

সব সম্পর্কে এবং প্ৰতিটি সম্পূৰ্ণৰেণে পুনৰ্মাণ

প্ৰত্যেক বিশেষ কৰে

makes no assertion about all soldiers and makes no assertion about all cowards either. It says nothing about each and every soldier, nor about each and every coward. Neither class is said to be either wholly included or wholly excluded from the other. Both subject and predicate terms are undistributed in any particular affirmative proposition.

The particular negative or O proposition is similar in that it, too, does not distribute its subject term. Thus the proposition

কিছু হয় না  
Some horses are not thoroughbreds.

thoroughbreds কিন্তু এই শব্দেৱ সব অংশ সম্পর্কে ঘোড়া বোঝায়.

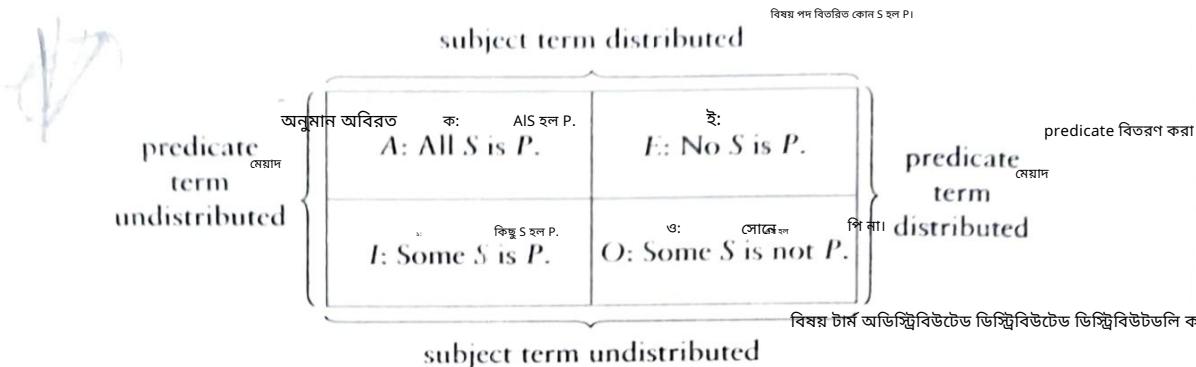
কিছু

শ্ৰেণী এৱে সদস্যৰা হল পৰ্যন্ত কোনোৰ সমষ্ট শ্ৰেণীৰ সমষ্ট শ্ৰেণী

says nothing about all horses but refers to some members of the class designated by the subject term. It says of this part of the class of all horses that it is not included from the class of all thoroughbreds, that is, from the whole of the latter class. Given the particular horses referred to, it says that each and every member of the class of thoroughbreds is not one of those particular horses. When something is said to be excluded from a class, the whole of the class is referred to, just as, when a person is excluded from a country, all parts of that country are forbidden to that person. The particular negative proposition does distribute its predicate term, but not its subject term.

We may summarize these remarks on distribution as follows: Universal propositions, both affirmative and negative, distribute their subject terms, whereas particular propositions, whether affirmative or negative, do not distribute their subject terms. Thus the quality of any standard-form categorical proposition determines whether its subject term is distributed or undistributed. Affirmative propositions, whether universal or particular, do not distribute their predicate terms, whereas negative propositions, both universal and particular, do distribute their predicate terms. Thus the quality of any standard-form categorical proposition determines whether its predicate term is distributed or undistributed.

The following diagram summarizes this information and may be useful in helping one to remember which propositions distribute which of their terms.



অনুশীলনের গুণমানের নাম এবং এবং তাদের বিষয় \*1।

## Exercises

ক্যাচ প্রদের পরিমাণে প্রার্থীদের নামসি অঙ্গাতার হজার অঙ্গ

Name the quality and quantity of each of the following propositions, and state whether their subject and predicate terms are distributed or undistributed.

কিছু রাষ্ট্রপতি যারা ২ তে মারা গেছে তারা সবাই নিষ্ঠুর এবং অযৌক্তিক সম্পত্তি কিছু সদস্য

- \*1. Some presidential candidates will be sadly disappointed people. দেরী জন্য ঘনত্ব উপাদান সার্কুলেক-শিল্প আদেশ ক
- 2. All those who died in Nazi concentration camps were victims of a cruel and irrational tyranny. না সম্পূর্ণ মৃদু
- 3. Some recently identified unstable elements were not entirely accidental discoveries. জটিলহৃদ্দয় প্রধান যে কোন
- 4. Some members of the military-industrial complex are mild-mannered people to whom violence is abhorrent. ব্যবসায়িক নির্বাচী ব্যর্থ শব্দ
- \*5. No leader of the feminist movement is a major business executive. এ খরচ হয়
- 6. All hard-line advocates of law and order at any cost are people who will be remembered, if at all, only for having failed to understand the major social pressures of the late twentieth century. স্বামুক্তি করা হয়ে আছে
- 7. Some recent rulings of the Supreme Court were politically motivated decisions that flouted the entire history of American legal practice. সুপ্রাপ্তি সময়সূচী করা হয়ে আছে যারা অবসর প্রাপ্তি করা হয়ে আছে এবং তাকিলদের জন্য ক্ষতিকর কী আচুম্বন করা। বিভিন্ন ক্ষেত্রে নির্বাচন করা হয়ে আছে
- 8. No harmful pesticides or chemical defoliants were genuine contributions to the long-range agricultural goals of the nation. বা ছিল
- 9. Some advocates of major political, social, and economic reforms are not responsible people who have a stake in maintaining the status quo. নির্ভাবহী আলোচনা
- \*10. All new labor-saving devices are major threats to the trade union movement. হয় দ্য বাণিজ্য

5.4 ন্য

প্রতিটি থেকে ঐতিহ্যগত অঙ্গ DURE অক্ষে

OPSION এবং উ

## 5.4 THE TRADITIONAL SQUARE OF OPPOSITION

শ্রেণীবদ্ধ প্রদত্ত

প্রস্তাব

স্ট্যান্ডার্ড-ফর্ম একই পরিমাণ দ্বারা প্রযোজিত প্রতিপাদিত বিপরীত

Standard-form categorical propositions having the same subject and predicate terms may differ from each other in quality or in quantity or in both. This kind of differing was given the technical name **opposition** by older logicians,

## 5.5 Further Immediate Inferences

193

ଅନୁଶୀଳନ

## Exercises

যাকা

ଅନୁମାନ ପ୍ରଥମ ଜ୍ଞାପନୀରେ ଯୋଗାଳୁକାମାତ୍ ସେଟ ମିଥ୍ୟା? ନିର୍ବାହୀ ନିର୍ବାହୀ ଶିଖିତଙ୍କ ମଧ୍ୟାତ୍ମକ ଯୋଗାଳୁ ରହିଛି କିମ୍ବା ଏହାରମାତ୍ରମୁକ୍ତ ବୁଦ୍ଧିମାନ ମାନୁଷ ମାନୁଷ

What can be inferred about the truth or falsehood of the remaining propositions in each of the following sets (1) if we assume the first to be true, and (2) if we assume the first to be false?

সব সফল

ହ୍ୟ ହ୍ୟ ହ୍ୟ

ବୁଦ୍ଧିମାନ ବୁଦ୍ଧିମାନ

- \*1. a. এসে কিছু সফল  
b. নো সুকি কিছু সফল  
c. ডেসে সফল কেবে কেবে  
d. সম্পূর্ণাত্মক সাথে নেই

2. a. সম্মে কিছু প্রাণী  
b. গ. ঘ. সম্মে কিছু  
c. জমন্ত প্রাণীর হউ রেনিয়াম  
d. আসে কিছু ইউরেনিয়াম

3. a. কিছু ইউরেনিয়াম  
b. গ. ঘ. দ্বারা উৎজোনিয়ান  
c. কালোভাবে  
d. কিছু

4. a. এসে কলেজ প্রফেসর  
b. গ. ঘ. কলেজ প্রফেসর  
c. কিছু  
d. সম্পূর্ণাত্মক

5.5

## FURTHER IMMEDIATE INFERENCES

## অনুমান, এই

ସୁର୍ଯ୍ୟ ତିନଟି

এখানে ছাল সঙ্গে

ଅନ୍ୟାନ୍ୟ ଅନ୍ୟାନ୍ୟ

## প্রথাগত প্রকারের আরও।

There are other kinds of immediate inference, in addition to those associated with the traditional Square of Opposition. In this section we shall present three of these other types.

A. বিষয়ের রূপান্তরকে বৈধকে পরিবর্তন করা বৈধভাবে স্পষ্টভাবে অনুমান করা হয়েছে

#### A. Conversion

ইন্দ্ৰিয় প্ৰথম ধৰনেৱ

The first kind of immediate inference, called **conversion**, proceeds by simply interchanging the subject and predicate terms of the proposition. Conversion is perfectly valid in the case of E and I propositions. Clearly, "No men are angels" can be uttered to make the same assertion as "No angels are men," and either can be validly inferred from the other by the immediate inference called **conversion**. Just as clearly, "Some writers are women" and "Some women are writers" are logically equivalent, so by conversion either can be validly inferred from the other. One standard-form categorical proposition is said to be the **converse** of another when it is formed by simply interchanging the subject and predicate terms of that other proposition. Thus "No idealists are politicians" is the converse of "No politicians are idealists," and each can readily be inferred from the other by conversion. The term **convertend** is used to refer to the premiss of an immediate inference by conversion, and the conclusion of that inference is called the **converse**.

Note that the converse of an A proposition does not in general follow validly from that A proposition. Thus, if our original proposition is "All dogs

## Chapter 5 Categorical Propositions

হয়

প্রাণী," এর মূল যুক্তি, কিছু দাবি সম্পর্কে স্ফুরারের ঐতিহ্যগত রূপান্তরজ্ঞাবস্থার ক্ষেত্রে স্থান প্রদান করা হলো অন্তর্ভুক্ত।  
যামি জন্ম বা  
কিছু  
are animals," its converse, "All animals are dogs," does not follow from the original proposition at all, the convertend being true while its converse is false. Traditional logic recognized this fact, of course, but asserted that something like conversion was valid for A propositions. From an A proposition (*All S is P*), its subaltern I proposition (*Some S is P*) can be validly inferred on the traditional Square of Opposition, as explained in Section 5.3. The A proposition says something about *all* members of S, but the I proposition makes a more limited claim, about only *some* members of S. We have just seen that conversion of an I proposition is perfectly valid.

So, given the A proposition (*All S is P*), its subaltern (*Some S is P*) can validly be inferred by subalternation, and from that subaltern, the proposition (*Some S is P*) can validly be inferred by conversion. Hence by a combination of subalternation and conversion, *Some P is S* can validly be inferred from *All S is P*. This pattern of inference, called **conversion by limitation** (or "*conversion per accidens*"), proceeds by interchanging subject and predicate terms and changing the quantity of the proposition from universal to particular. Thus it was traditionally claimed that from the premiss "All dogs are animals" the conclusion "Some animals are dogs" could validly be inferred, the inference being called "conversion by limitation." This type of conversion will be considered further in the next section.

Observe that the converse obtained as the outcome of conversion by limitation is *not equivalent* to the A proposition from which it is derived. The reason is that conversion by limitation requires a change in quantity, from universal to particular. The proposition that results from this conversion by limitation is therefore not an A but an I proposition; it cannot have the same meaning as its convertend, and hence cannot be logically equivalent to it. But the converse of an E proposition is an E proposition, and the converse of an I proposition is an I proposition; in these cases, the convertend and the converse do have the same quantity and are logically equivalent.

Finally, note that the conversion of an O proposition is not, in general, valid. The O proposition "Some animals are not dogs" is plainly true; its converse is the proposition "Some dogs are not animals," which is plainly false. An O proposition and its converse are not, in general, equivalent.

The converse of a given proposition always contains exactly the same terms as the given proposition (their order being reversed) and always has the same quality. The following table was traditionally held to give a complete picture of this immediate inference:

TABLE OF VALID CONVERSIONS		কথোপকথন	বৈধ	রূপান্তর / উচ্চারণ
CONVERTEND	CONVERSE	কথোপকথন		
ক:	আমি: ই	অক	বৈধ	রূপান্তর / উচ্চারণ
<b>A: All S is P.</b>	<b>I: Some P is S (by limitation)</b>	কথোপকথন	বৈধ	রূপান্তর / উচ্চারণ
<b>E: No S is P.</b>	<b>E: No P is S. P কিছু</b>	কথোপকথন	বৈধ	রূপান্তর / উচ্চারণ
<b>I: Some S is P.</b>	<b>I: Some P is S.</b>	কথোপকথন	বৈধ	রূপান্তর / উচ্চারণ
<b>O: Some S is not P.</b>	<b>O: Some P is not S. (conversion not valid)</b>	কথোপকথন	বৈধ	রূপান্তর / উচ্চারণ

সীমাবদ্ধতা) (রূপান্তর ত

ବିଭାଗୀ

## B. Obversion

Every class has associated with it a complementary class, or complement, which is the collection of all things that do not belong to the original class. Thus the complement of the class of all people is the class of all things that are not people. The class-defining characteristic of the complementary class is the (negative) attribute of *not being a person*. The complement of the class of all people contains no people but contains everything else: shoes and ships and sealing wax, and cabbages—but no kings, since kings are people. It is sometimes convenient to speak of the complement of the class of all persons as "the class of all nonpersons." The complement of the class designated by the term  $S_1$  is then designated by the term  $non-S_1$ ; and we may speak of the term  $non-S$  as being the complement of the term  $S$ .<sup>3</sup>

We are using the word "complement" in two senses: one being the sense of class complement, the other the sense of the complement of a term. The two senses, although different, are very closely connected. One term is the (term) complement of another just in case the first term designates the (class) complement of the class designated by the second term. It should be noted that just as a class is the (class) complement of its own complement, a term is the (term) complement of its own complement. A sort of "double negative" rule is involved here, so that we need not have strings of "non's" prefixed to a term. Thus we should write "নথ্য প্রতিকর্তা" instead of the term "voter" as "nonvoter," but we should write the complement of "nonyoter" simply as "voter" rather than "nonnonvoter." One must be careful not to mistake contrary terms for complementary terms, as in identifying "cowards" and "nonheroes." The terms "coward" and "hero" are contraries, in that no person can be both a coward and a hero, but not everyone—and certainly not everything—need be either one or the other. Thus the complement of the term "winner" is not "loser" but "nonwinner," for although not everything—or even everyone—is either a winner or a loser, absolutely everything is either a winner or a nonwinner.

<sup>৩</sup> Sometimes we reason using what is called the *relative complement* of a class, its complement within some other class. For example: within the class of "children of mine" there is a subclass, "daughters of mine," whose relative complement is another subclass, "children of mine who are not daughters" or "sons of mine." But observation and other immediate inferences normally rely upon the absolute complement of classes, as defined above.

Now that we understand what is meant by the complement of a term, the process of obversion is easy to describe. In **obversion**, the subject term remains unchanged, and so does the quantity of the proposition being obverted. To obvert a proposition, we change its quality and replace the predicate term by its complement. Thus the A proposition

সব বাসিন্দার  
All residents are voters.

বিস্ময়ে আছে এর  
has as its obverse the E proposition

না হয় অভোটার  
No residents are nonvoters.

এইগুলো দুই  
These two propositions, it is clear, are logically equivalent, and therefore either one can validly be inferred from the other. Obversion is a valid immediate inference when applied to any standard-form categorical proposition. Thus the E proposition

না আম্পাল্যার বিপরীতে  
No umpires are partisans.

বিস্ময়ে আছে এর দ্য যৌক্তিকভাবে নির্দলীয়। I এর বিপরীত কিছু ধাতু পরিষ্কার  
has as its obverse the logically equivalent A proposition

সব আম্পাল্য  
All umpires are nonpartisans.

একইভাবে, দ্য  
Similarly, the obverse of the I proposition

হয় দ্য ও প্রস্তাব ধাতু অবশেষে  
Some metals are conductors.

is the O proposition

কিছু হয় না  
Some metals are not nonconductors.

এবং ও  
And finally the O proposition

কিছু তার জাতিসমূহচিলৰীকা জাতিসমূহ  
Some nations were not belligerents.

বিস্ময়ে আছে দ্য  
has as its obverse the I proposition

কিছু ছিল  
Some nations were nonbelligerents.

ফর্ম বৈধ একটি ঘূর্ণচক্র  
The term **obvertend** is used to refer to the premiss of an immediate inference by obversion, and the conclusion is called the **obverse**. Every standard-form categorical proposition is logically equivalent to its obverse, so obversion is a valid form of immediate inference for any standard-form categorical proposition. To obtain the obverse of a proposition, we leave the quantity and the subject term unchanged, change the quality of the proposition, and replace the predicate term by its complement. The following table gives a complete picture of all valid obversions:

## 5.5 Further Immediate Inferences

টেবিল অফডার্সন ওভারস নং নন-পি।

TABLE OF OBVERSOS	
ওভারটেন্ড সব হল পি।	
OBVERTEND	OBVERSE
A: All S is P. কিছু এস P.	E: No S is non-P. S বিজ্ঞান হল অ-পি।
E: No S is P. কিছু এস P নয়।	A: All S is non-P.
I: Some S is P. বিজ্ঞান এস।	O: Some S is not non-P. বিজ্ঞান এস
O: Some S is not P. বিজ্ঞান অ-পি।	I: Some S is non-P.

কনট্রাপোজিশন প্রস্তাব,

## C. Contraposition

ciples, এটা tive এর জন্য তৃতীয় প্রকারের প্রিভিকেট টার্মিনল্যুন প্রস্তাৱ, যেতত্ত্ব অভিযোগকে প্রতিস্থানে ন্তার predicate হতে

আলেচিত দুটিপুরিচিহ্নকৰণীয় ক্ষতিপূর্ণভাবমাত্রা রাখিবৰ্তু

The third variety of immediate inference to be discussed introduces no new principles, for it can be reduced, in a sense, to the first two. To form the contrapositive of a given proposition, we replace its subject term by the complement of its predicate term and replace its predicate term by the complement of its subject term. Thus the contrapositive of the A proposition

সব

সদস্যীয় ভৌতিৱ।

All members are voters.

হয়

প্রস্তাব

is the A proposition

সব

All nonvoters are nonmembers.

যে এই এবং অনুমতি কৰখজ কোকেৱারেন

হয়ে

স্পষ্ট

বৈধ উপৰ

মুহূৰ্তের তাৎক্ষণিক রূপ নয়

That these two are logically equivalent will be evident upon a moment's reflection, and from this it is clear that contraposition is a valid form of immediate inference when applied to A propositions. Contraposition introduces nothing new, for we can get from any A proposition to its contrapositive by first obverting it, next applying conversion, and then applying obversion again. Thus, beginning with "All S is P," we obvert it to obtain "No S is non-P," which converts validly to "No non-P is S," whose obverse is "All non-P is non-S." Thus the contrapositive of any A proposition is the obverse of the converse of the obverse of that proposition. অবিলম্বে না

Contraposition is most useful in working with A propositions, but it is a valid form of immediate inference which can be applied to O propositions also. Thus the contrapositive of the O proposition

কিছু

হয়

আদর্শবাদী কষ্টকৰ হে deriving

Some students are not idealists.

দ্য

প্রথম প্রস্তাব. "কিছু হল" কিছু এস

is the somewhat cumbersome O proposition

কিছু যা দেখানো হৰেছো প্ৰয়োজনীয় না

Some nonidealists are not nonstudents.

অছাৰ আবাৰ contrapositive,

তাদেৱ

ন-পি অনুসৰণ কৰে যৌজিকা ক্ষেত্ৰে, ভেৱি-শিক্ষাতিক

which is logically equivalent to the first. Their logical equivalence can be shown by deriving the contrapositive a step at a time through obverting, converting, and then obverting again, as in the following schematic derivation: "Some S is not P" obverts to "Some S is non-P," which converts

আবাৰ

যা

ন-এস" এৰ বিপৰীত কিন্তু এটিও।

ক

এভাৱে

সমতুল্য গুৰুত্বাত্মক নৈতিক পৰিকল্পনা দ্বাৰা প্ৰৱৰ্তিত হয় ন-পি" এৰ ন

সময়সূচী

সমতুল্য গুৰুত্বাত্মক

তাদেৱ

ন-পি

ধৰ্মাত্মিক কৰে