

The Discipline Of Logic

An Investigation into Analytical Thinking

**Presented and Dedicated to those Students
of
Cameroon Baptist Theological Seminary
"who are thinking very hard about their faith and their world."**

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INTRODUCTION: LOGIC AND LIVING

The ability to solve problems is necessary for effective living. A problem is a condition that needs a solution that will end, or bring a change to the situation. The situation needs an end because it is not favorable to those involved. The end of something is often called its conclusion. This is not so with good circumstances. People genuinely desire success, good times and happiness to continue. This is natural and normal.

Yet, the question arises, "Is success always good?" Consider this little three-part argument: "Success is always good. I would be successful in life if I could eliminate all my enemies. Therefore, 'eliminating my enemies' is a good thing." Something is wrong with this argument. But what? Arguments like this one are common, but *these arguments themselves present the African context with big problems.*

An argument also has a conclusion. The conclusion is the truth to which the argument points. A strongly-held conclusion is sometimes called a conviction. A conviction enables us to take consistent action in the good and bad circumstances of life. A conviction should depend on the strength of the arguments, and one's faith in its conclusion. However, many actions are neither based on sound argument nor are they consistent. We call these actions *irrational*. A crowd comes to the conclusion that a woman is a witch. They stone the woman to death. But was their conclusion justified? How do we convince the crowd that their conclusion and/or their action is wrong?

In the above sense, all of life is a flow of argument. The "evidence" presented by circumstance, tradition, and people combine to "convince" us that certain actions are right or wrong. Overseeing this process for the Christian is the voice of the Holy Spirit as He speaks in and through the written Word of God. It is the power of "God's argument" about right and wrong, about the Lordship of Jesus Christ that makes the difference in the Christian life and worldview.

All this happens, or can happen, without the formal study of Logic. What value, then, is the study of logic? Putting an argument in a written form (all argument can be put in some kind of written form) makes clear what the argument is all about. Logic provides rules (or a framework) for reaching valid conclusions. And logic alerts the student to insufficient reasons for a conclusion, that might normally be thought sufficient for action. However, the profound difference between logical analysis and real life must be realized. Many problems do not lend themselves to the certainty of logical analysis. Our knowledge of the world is limited. We cannot know the future. Our propositions can be inadequate, or flawed. In real life logic and humility go hand in hand.

Perhaps more importantly, the assumption that a statement is either true or false, and that it cannot be both at the same time, underlies the discipline of logic. In Metaphysics Aristotle says that the most certain principle of all is “the same attribute cannot at the same time belong and not belong to the same subject and in the same respect.” Though logic is not primarily concerned with the truth or falsehood of statement within an argument, it continually confronts the student with the issue of truth, and its implications for solving life's problems and guarding its blessings. If one does not accept the above assumption, logic as a discipline will have little meaning for the student's practical thinking. Logic and relativism are antithetical.

Logic has traditionally been a part of philosophy. Philosophy textbooks usually have at least a chapter, or notes, on logic. Though a discussion of philosophy is beyond the scope of this text, something must be said about the relationship between philosophy and logic. Philosophy is both the process of reflection, and the results of that process. Philosophers ask questions. Philosophers relate ideas together. Philosophy is the discipline of critical thinking about the experiences, assumptions, problems, and ultimate questions of life. Logic provides rules for carrying out this critical process. Logic is essential to good philosophy. It is like the rules of a game, a very serious game. If the game is played according to the rules, the outcome is potentially fair; if not, the results are foul.

The results of the process of philosophy are many different philosophies. Influential philosophies like Idealism, Realism, Existentialism, Pragmatism, Humanism, and Skepticism seek to answer the important questions of their times in a systematic way. Some philosophies, like Analytical philosophy, have focused on limited, specific aspects of experience. And certainly, different philosophies present radically different perspectives on the universe and its issues.

Philosophical and existential issues become apparent as one studies logic. But they are not our basic concern. We are not primarily concerned with the relationship between logical truth and factual truth or even the meaningfulness of statements. One could say “The sky is grass.” The key issue in logic is how one uses that statement to come to a particular conclusion.

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The Discipline of Logic

Reflection is not unique to the western culture. All civilizations have ways of thinking or reasoning about the world and what happens in it, and ways of trying to solve its problems. Two approaches to reflection are Contextual and Mythical Thinking

Contextual Thinking

Contextual thinking is closely related to face-to-face relationships, and gives high priority to the significance and the effects of those relationships on one's life. The physical or moral consequence of argument, or the action, is not as significant as its consequences in the lives of those involved, and thus in the life of the thinker.

Thus, contextual logic does not ask the question, "Is the right thing to do?", It asks the question, "What is its effect on others?"

Contextual thinking is event oriented, and thus immediate and pragmatic. Anything that works is deemed to be "true". Thus the question, again, is not "Is the right thing to do?", but, "Does this thing bring results, or success?"

Mythical Thinking

A myth is a story formed primarily out of the desire to understand and communicate why or how things are. It is a way of understanding the world that develops in the imagination of the elder, the storyteller, or even the pastor.

Secondly, a myth is most often a story full of colorful pictures that feature humans or animals. Our emotions are stirred by the pictures, and we feel that the way things are now is connected to what happens in the story. But the connection is often unclear, and almost never subject to close examination. The important thing is the feeling, or the emotion involved in the supposed relationship.

Thirdly, a myth generally connects the physical and the spiritual worlds, telling us why things are as they are, and sometimes what will happen in the future. Because myths claim to "tell all" they do not leave much room for other explanations of the world.

Admittedly, mythology can be rich and in some ways satisfying. Both beauty and certain truths are often embedded in myths. These need to be appreciated. But often mythology leads away from biblical answers to life's problems and moves towards idolatry by creating pictures which replace the God of the Bible. It has a way of being fatalistic (things are as they are, and they cannot change). And lastly, for our purposes, it does not encourage critical thinking about the relationships of ideas, or cause and effect.

It was dissatisfaction with mythology that provoked the Greek philosophers to investigate the reality that is behind appearance, and to formulate the rules of thought for such investigation. Specific rules for analytical thinking were established. . Though those rules have been elaborated and refined over the course of two thousand years, they remain the basically the same as when Aristotle formulated them. As we study logic we will come to understand many of those rules and the principles involved in them. In a broader perspective, as we will see, logic is a tool that can help in solving problems, making decisions, and growing in ones spiritual maturity and understanding of God. Logic can assist in clear political thinking, in managing technology, and in virtually all of the disciplines encountered in the modern world.. But it is only a tool. One must ultimately choose whether and how one will use this tool in Bible study, personal reflection, church life, and cultural or technological development.

PART I: FORMAL LOGIC

Reasoning is a special kind of thinking in which inference takes place, or where "a conclusion is drawn from a premiss or primesses". Reasoning is the power of comprehending and inferring (or thinking) in orderly ways. To understand reasoning one must understand what inference is all about. Inference occurs when one associates one thought with another; it is "the act of passing from one thought (one called a proposition) that one considers to be true to another proposition (a conclusion) whose truth is believed to follow that of the initial one. An example of this kind of association might be between the thoughts "It is raining" (and therefore) "It is rainy season." One has used some process of reasoning when, on the basis of one or more thoughts, one reaches a conclusion one holds to be true.

Thus, logic is the study of argument. Every where around us we see arguments being formed and used to influence others. The course of history is in one sense a study in logic, good and bad, and its consequences. When Napoleon made up his mind to do battle at Waterloo, he had certain thoughts in mind, thoughts he considered to be true, and on the basis of those thoughts he decided he could win the battle. Clearly, he was wrong about the historical conclusion. But was he wrong in his thought processes? Were his initial thoughts(propositions, premisses) incorrect? Was he missing important pieces of information that would have caused him to make another decision? Or did he, in this instance, simply not draw the right conclusion (final thought) from the ideas with which he began?

Logic does not presume to answer all those questions about the battle of Waterloo, but it can study the process of reasoning behind that event. It examines how men reach the conclusions that they do. But more than that, it is "the study of the methods and principles used to distinguish good (or correct) reasoning from bad (incorrect) reasoning. Now, it is a fact of history that Napoleon was defeated at Waterloo. But the logician is not interested in that fact. He is concerned with the correctness of the completed process of reasoning, in this case the chain of thoughts that led up to the decision to do battle with Wellington. The question that the logician asks is "does the conclusion reached follow from the premisses used or assumed. If the premisses provide adequate grounds for accepting the conclusion, the reasoning is complete." In this way logic is sometimes said to be a "second-order" activity. It is not concerned with whether the premisses or the conclusions are correct. It is only concerned with the chain of reasoning which the argument presents.¹

The development of logic parallels rather closely the history of western philosophy. As has been mentioned, before the Greek philosophers the thought, or associative patterns, of man generally assumed a what's called a concrete, mythical pattern. Even though reasoning (in our technical sense) was practiced by man (and still is used by men everywhere), this type of thinking had not been examined and formalized into what we now call logic, or the discipline of inquiry. It was Aristotle, a Greek philosopher who lived from 384-322 BC., who studied how men think. He formulated the first principles that he believed to be the foundation for disciplined (and correct) reasoning.

ARISTOTLE AND THE BEGINNING OF FORMAL LOGIC

Aristotle (though he was not a Hebrew or a Christian) was unsatisfied with the mythical way of looking at the world. Though others preceded him, he is the man who is primarily associated with this change from mythical to logical thinking. However, he did it step by step. In his *De interpretatione* he developed what he called the "Logic of Noun Expressions". To do this he used simple Greek sentences called a "noun expressions" which he divided into three parts: a quantifier (certain kinds of adjectives), a noun (or name), and a predicate (verb and adjective). An example of this might be:

<u>Quantifier</u>	<u>Name (Subject)</u>	<u>Predicate</u>
All	men	are mortal.

¹ Peter Alexander, An Introduction to Logic, (London: George Allen and Unwin, 1969), 3.

This is a full noun expression, one that has a quantifier (All), a name or noun (men), and a predicate (are mortal). As such it is a premiss or categorical proposition, meaning "a proposition which asserts or denies that one class is included in another either in whole or in part." What this means in the example above is this: All men is one class (or group) that is included (are being the verb) in the group (or class) of mortal (beings).

A noun expression can be very useful. First, it causes us to think about the qualities that certain persons, places or things possess. We know that people die. We have seen it. In fact, experience tells us that everyone (actually every living thing--but that is a different proposition) dies at some time. "Common sense" says that all men are mortal. Secondly, by thinking about the qualities of one thing, some things, or all things we create groups, sets, or classes. In this case, the class is of all "men"(or human beings). But other groups are more limited, like "Some men are fons (kings)". Ultimately, predicates can be also properly be applied to one person, place or thing, like "Peter is a man, (and therefore) Peter is mortal.." And so forth. Thirdly, studying noun expressions enables one to better understand language and what a speaker is really saying. Not all premisses or categorical propositions are easily recognizable. Often a speaker will claim something to be true, but the listener never recognizes the significance of what has been said.

Having said all this, it must again be emphasized that logic does not judge the truth of a particular noun expression (or premiss) or the conclusion that follows from it. An argument can be perfectly logical, but the conclusion can be wrong. This fact frustrates many students, but think about it. Our talk is full of premisses. Each of these statements must be judged by experience, the collective knowledge of tradition, science, sociology (etc.), and most importantly the truth of Scripture. In the final analysis of an argument, one can say that it is perfectly logical, but that it reaches the wrong conclusion because certain of its premisses (noun expressions) are false because.....(and now we must present an argument for claiming that the premiss is false).

SENTENCES, STATEMENTS, AND ARGUMENTS

There is another way one can look at the beginning of logic. This approach helps one to recognize the parts of an argument. It involves what Aristotle did as he recognized the difference between a sentence and a statement, and how statements are used.

The first step was to understand what a sentence is: " A string of words (in a specific language) that conforms to rules of grammar and comprises a grammatical

unit." Recognizing a sentence simply requires understanding the grammar of any language. In English "Who is that?", "I feel good!", and "Go to class now" are sentences because they express complete thoughts." Depending upon the source one reads, a sentence can be grouped in the following ways:

Copi

1. Informational (I)
2. Expressive (E)
3. Directive (D)

As one can see, there is some overlap, and a bit of confusion between the categories in these two groups, but in general the two ways simply describe the nature of the complete, spoken thought as it might be interpreted on paper. An informational statement simply states a fact; a ceremonial statement is something spoken as a formality; an evaluative expression is a statement of "subjective fact" like "That book is a good book."; Feeling statements are intended to express emotions; Directive statements are commands; And questions seek answers. However, in real life any of these sentences can be expressed in one of four forms of speaking (the way the voice is sounded): Declarative (announcing), interrogative (questioning), imperative (commanding), or the exclamatory (primarily, emotional). An example of this occurs when one express an informational sentence with a questioning sound in ones voice:

Joseph is going? (Rather than "*Is Joseph going?*")

A sentence becomes a "statement" when it is used to claim something, the expressed claim being either **true** or **false**. A statement is usually an informational sentence expressed in a declarative manner which can be used as a premiss (the active part of an argument) or a conclusion of an argument. Understanding, or comprehending what are statements, and thus premisses or conclusions is often one of the more difficult tasks of logic. We need to learn to be fair to the speaking and writing of other people. We must learn to find arguments where they actually exist!!

At this point it would be helpful to define a number of terms, some of which have already been used, in order to help us discern and evaluate the kind of arguments we actually are hearing. These definitions will be more fully explained in this course.

Argument: A statement of belief (a conclusion) along with a statement of reasons or evidence to support it. An argument requires grounds (or reasons) for its conclusion.

Argument Signals: Words that suggest the occurrence of an argument. Some of these often indicate the presence of one or more premisses (reasons for the conclusion)..

...because, for, since, on the grounds that, for since...

And some words will likely indicate the presence of a conclusion.

...therefore, hence, consequently, it follows that, must, should, ought, necessarily, for from this fact, thus, so, then...

Assumption: Statements (of facts) that are taken for granted. Assumptions are **not** stated in the argument. Sometimes these are called presuppositions.

Categorical Syllogism: A deductive argument consisting of three categorical propositions that contain exactly three terms, each of which occurs in exactly two of the propositions.

Conclusion: The consequence of (generally) two or more propositions (or statements) taken as the premisses of the argument. (But see the next page.)

Conditional Sentence: A statement of a dependent relationship, relating something essential to the occurrence of something else or another thing.

Deduction: Deriving a conclusion that necessarily follows from a conclusion by the process of reasoning or inference.

Distribution: When all the members of a class (a group) are referred to, the class (s,m, or p) is said to be distributed.

Enthymeme: An argument that is stated incompletely, the unstated part of it being taken for granted. An enthymeme is of the 1st, 2nd, or 3rd order depending on whether the major, minor, or conclusion is suppressed.

Explicit: This word describes an argument, or part of an argument, that is fully expressed and free from vagueness, or uncertainty. It is clearly stated.

Fallacies: Incorrect, or invalid arguments. There are basically two types of fallacies. Formal and informal. Formal fallacies are errors in structure of the argument. Informal fallacies are defects in the content of the premisses. Arguments

are invalid when their structure is defective Arguments are **unsound** when the reasons given for a conclusion do not adequately support (or make certain) the conclusion.

Implicit: Capable of being understood, though unexpressed, from something else; suggested.

Induction: The process of reasoning from a part to a whole. "An inductive argument involves the claims, not that its premisses give conclusive (certain) grounds for the truth of its conclusions, but only that they provide some support for it.

Inference: A process by which one proposition is arrived at and affirmed on the basis on some other proposition or propositions.

Reasoning: The special kind of thinking in which inference takes place, or where "a conclusion is drawn from a premiss or premisses".

Examination of Deductive Arguments

Now taking all that has been said let's examine an example of a deductive argument in a classical form. In doing this we will work primarily with categorical syllogisms.

"Since all rational beings are responsible for their actions, and since all human beings are rational, it follows that all human beings are responsible for their actions."

In this argument the premisses are clearly signaled by the word "since":

...(since)"all rational beings are responsible for their actions"

...(since)"all humans are rational"

And the conclusion is signaled by the phrase "it follows that":

...(it follows that) "all human beings are responsible for their actions"

But not all arguments have two (or more) premisses. signal indicators. Here is an argument which has one premiss and a conclusion. The form of this argument is an enthymeme. Because of its abbreviated nature, the argument is not obvious to the casual reader.

"Smith ought to exercise more. It would be good for his health."

Premiss: "It would good for his health."

(Exercise would be good for Smith's health.)

Conclusion:(Therefore) "Smith ought to exercise more."

Exercise 1:

Each of the following paragraphs contain one or more statement. However, not all the groups of statements are arguments. Which sets of statements are arguments and which are not arguments. Why? Remember, you are looking for one or more premiss, and an accompanying conclusion. If known, the author of the quote is given.

1. The sincerest satisfaction in life comes in doing and not in dodging duty; in meeting and solving problems, in facing facts, in being a dependable person.

2. Women have great strengths, but they are strengths to help the man. A woman's primary purpose in life and marriage is to help her husband succeed, to help him be all God wants him to be.

3. We are sorry but we tried and tried, and we find that the stains on this garment cannot be removed without possible injury to the color or fabric. This has been called to your attention so that you will know it has not been overlooked.

4. Ngum ought to exercise more. It would be good for his condition

5. We must stop the homosexuals dead in their tracks-- before they get one step further towards warping the minds of our youth. The time for us to attack is now! The enemy is in our camp.

6. Jones does not attend church, for he is an atheist and atheists do not attend church.

7. Yes, and if oxen and horses or lions had hands, and could paint with their hands, and produce works of art as men do, horses would paint the forms of the gods like horses, and oxen like oxen, and make their bodies in the image of their several kinds.

Important:

8. Recognizing premisses and conclusions has great significance for Christian thinking. For example, Romans 3:22b-24 says "There is no difference, for all have sinned and fall short of the glory of God, and are justified freely by his grace through the redemption that came by Christ Jesus." Is there an argument in this passage? If so, what are the premisses? Are there premisses that are unwritten (implicit)? What is the conclusion? If there is an argument can it be personally applied and still retain its validity?

FURTHER CONSIDERATIONS IN EVALUATING DEDUCTIVE ARGUMENTS

It is not enough to simply know that an argument is being presented in a speech, conversation, or a book. The goal is to analyze the argument in such a way that we clearly understand what is being said, so that with whatever other tools we might have (Biblical knowledge, etc.), we might accurately evaluate the argument and its conclusion. **Logic is not an end in itself**, but it is a very crucial process in determining truth.

An example of a categorical syllogism:

All men are mortal.

Ngum is a man

Therefore, Ngum is mortal.

The process of recognizing deductive arguments has already been touched upon. Using the example of the above, these are the steps in recognizing and analyzing a this type of argument:

1. **Identify the argument's conclusion:** The conclusion of the argument is really its main point. It is what the premisses are focused towards. Sometimes signal indicators can help to do this in one or two ways. (See definitions on page 11.) Recognizing the argument's conclusion is the most important step of the analysis.

A. A conclusion indicator like **therefore**, or **consequently**, can flag (or make clear) the conclusion. (See the definitions on page 11.)

B. Premiss indicator, like **since**, **for**, **because**, *may* indicate the premisses (p. 4, a *noun expression*, a statement of category), and therefore isolate the conclusion.

Remember, these "word-indicators" are not necessarily present, or if they are present, they do not guarantee that an argument exists within the passage. They can introduce a simple explanation. In the above syllogism, the question is whether Ngum is, or is not, mortal. The whole point of the argument is to say that he is mortal. In this case the conclusion is indicated by "therefore".

2. Identify the major and minor premisses.

A. In the conclusion of the argument, identify the subject and predicate. In general, the subject term denotes a particular individual or class, and the predicate term designates some attribute that the individual, or class, is said to have. Another interpretation that one can give to this relationship involves the idea of sets, or groups of “things”, things here being persons, inanimate objects, ideas, etc., or any thing that can be put into a group. One “thing”, such as a person, forms a unique group and must be treated in a very special way. But nevertheless, Ngum here is a group composed of one. (We will use the convention “all persons identical to Ngum” to indicate Ngum as a group of one.) In this interpretation, Ngum (as a group of one) is found in the group of things that we call “mortal beings”. This type of analysis will later be examined in much more depth. For now, Ngum is the subject and the predicate is mortal or “mortality.”

<u>Quantifier</u>	<u>Subject Term:</u>	<u>Copula</u>	<u>Predicate Term:</u>
All	Ngum	(is)	mortal (beings)

B. This subject term, *Ngum*, is also called the minor term. The premiss in which it is found is called the minor premiss. Thus, "Ngum is a man" becomes the minor premiss in the main argument

C. The predicate term, mortal, is also called the major term. The premiss of the syllogism in which it is found becomes the major premiss because it contains that which one is trying to prove about the subject in concern. Thus, "All men are mortal" is the major premiss.

3. In some arguments the conclusion comes in the very beginning. Or the minor premiss may come before the major premiss. Arranged in its "final form" a syllogism looks like this:

Major premiss: Some objects of worship are fir trees.

Minor premiss: All fir trees are evergreens.

Conclusion: Some evergreens are objects of worship.

4. Some times what is being stated in a premiss is unclear. It is therefore necessary to identify exactly what is being said in these premisses by *translating* them into standard (or classical) form. The point of this is to understand them.

A. All premisses can be reduced to four classical forms. These forms are designated by the letters A,E,I, and O. And note, in there is a quantifier, subject, copula, and predicate in each proposition.

A- Universal affirmative	All s is p.
E- Universal negative	No s is p.
I- Particular affirmative	Some s is p.
O- Particular negative	Some s is not p.

Here are some premisses that are clearer when translated.

Premiss: Some are happy.

Translation: *Some persons are happy persons.*

Premiss: Only brave persons are war heroes.

Translation: *All war heroes are brave persons.*

(Note: Because of the use of only, this is an exception to the s-p rule.)

Premiss: Some are hungry.

Translation: *Some persons are hungry persons.*

Premiss: All marriages do not end in divorce

Translation: *Some marriages are not marriages that end in divorce.*

B. At this point, list the letters (A,E,I,O) for the standard form of the premisses and conclusion in that order: major premiss, minor premiss, conclusion. This abbreviation is called the "**mood**" of the **syllogism**. Every syllogism has a "mood"; the one here under consideration (the one about Ngum's health) is **IAI**. *Understanding an argument's mood means that one has understood precisely what each statement within the argument is saying.*

5. This "mood" only partially describes the formal structure of a syllogism. In order to fully understand it (or specify its form), we must discern what is called **the syllogism's "figure"**. This figure consists of letters (s,p,m) for the subject term, the predicate term, and the middle term (the class or set that connects the subject and predicate; see below) put into their actual relationship in the final form of the argument. There are only four possible "figures" that a syllogism can have.

Major Premiss:	m--p	p--m	m--p	p--m
Minor Premiss:	<u>s--m</u>	<u>s--m</u>	<u>m--s</u>	<u>m--s</u>
Conclusion:	s--p	s--p	s--p	s--p
Figure	First	Second	Third	Fourth
	Figure	Figure	Figure	Figure

Now the student is wondering how and where the “M” term comes about. Simply defining it as the term which joins the subject and predicate is not enough. To understand what is happening here, one must remember that all categorical syllogisms contain a subject and predicate. One can use categorical syllogisms without making an argument. To say “John is late for class” is simply a statement of fact. One has not created an argument. “John is the subject. “Late for class” is the predicate. The conclusion of an argument is always a simple categorical proposition. However, by *convention*, two reasons are given for a conclusion in a categorical syllogism.

The figure of the syllogism we have been studying is the Second Figure, or simply abbreviated it is F2. This further analysis is especially helpful when trying to understand more complex arguments, where it is difficult to keep track of what is being said. The rule here is that the subject and predicate in the conclusion must be connected through a "middle term" in one of the four ways listed above for the argument to be valid. In the case of Ngum's mortality, the syllogism is a first figure syllogism.

All men are mortal.	m--p
<u>Ngum is a man.</u>	<u>s---m</u>
(Therefore) Ngum is mortal.	s---p

"Mortal" is the predicate, or the point of the argument. And Ngum is the subject, or the one the argument is all about. *In analyzing an argument, the conclusion determines the subject and predicate of the argument. This is most important because the subject and predicate determine which premiss is the major and the minor premiss, and what is the middle term.* In this argument "men (or) man is the middle term, because it connects Ngum with mortality. Often the fault in an argument is in the absent, or defective middle term.

Logical analysis of syllogisms begins with the recognition that an argument exists. If an argument exists, by definition so must a conclusion. It is this conclusion that must be examined first. It must be translated into a standard form proposition (A,E,I,O), and its subject and predicate determined. These “terms”, as they are called, become the subject and the predicate of the syllogism.

Logic is the study of the principles and methods used to distinguish correct from incorrect reasoning.

Language is composed of sentences that have different functions.

Informational sentences contain statements that claim something, the expressed claim being either true or false.

All statements (whether used as premisses or conclusions) can be translated into one of four types of categorical statements or propositions:
A All s is p
E No s is p
I Some s is p
O Some s is not p

Statements, when used in arguments, become either premisses or conclusions.

An argument is a statement of belief (A conclusion) along with a statement of reasons (or evidence) for that conclusion.

A propositions are Universal Affirmatives.
E propositions are Universal Negatives.
I propositions are Particular Affirmatives
O propositions are Particular

All arguments have a conclusion:
The subject of the conclusion is labeled s and the predicate is p.

The predicate of the conclusion is found in the major premiss of the categorical syllogism.
The subject of the conclusion is found in the minor premiss.

The "Mood" of a syllogism is formed by listing (in this order) the forms of the Major premiss, minor premiss, and conclusion.

Major Premiss: All men are mortal (beings) A
(Subject) (predicate)
Minor Premiss: Socrates is a man. A
(subject) (predicate)
Conclusion: Socrates is (a) mortal (being) A

In addition to a "mood", the syllogism also has a "figure" that is based on the placement of the subject, predicate, and remaining term (the middle term) of the syllogism

In a standard three term syllogism, the third term (noun or noun phrase) becomes the middle term. The label "middle term" is a functional analysis. The middle term can be the subject or predicate of the major or minor premiss. There are only four possible arrangements in syllogism. These are called figures.

1 st Figure	2 nd Figure	3 rd Figure	4 th Figure
m-p	p-m	m-p	p-m
<u>s-m</u>	<u>s-m</u>	<u>m-s</u>	<u>m-s</u>
s-p	s-p	s-p	s-p

The mood and the figure of a syllogism uniquely determine its form.

Exercise 2:

Below are four syllogisms. Each can be put in symbolic form, using s, m, and p for the terms of the argument. However, not all the arguments are valid.

Put them in symbolic form using standard categorical statement forms, and comment on their validity.

1. Christians believe that Jesus is alive. Some Christians are doctors. Therefore, some doctors believe that Jesus is alive.
2. Whenever men put their trust in God they are safe. Those who are safe have nothing to fear. Therefore all who trust in God have nothing to fear.
3. Many young people try to live good lives. All God's children try to live good lives. It follows that all young people are God's children.
4. Whoever shall call upon the name of the Lord shall be saved. The jailer at Philippi called on the name of the Lord and was saved.

What does this all mean?

Life does not generally present one with obviously recognizable syllogisms. The rhetoric that surrounds us is often very complex, with imperfect syllogisms inside syllogisms, and at times untruth within untruth. **"The heart is deceitful above all things and beyond cure. Who can understand it?" (Jeremiah 17:9)**

But to say this does not mean that we should turn deaf ears towards the mouths and hearts around us. To listen is to honor those to whom we would share the love of Christ. To listen is to discern exactly what the person is saying, what they mean by their thoughts, and to at least seek to understand the heart from which the thoughts proceed. Logic can be thought of as one of the disciplines of "listening" and responding to the content of what we hear. Logic must never be separated from love. On the contrary, logic must be filled with love as we seek to speak the truth to the world about us.

Exercise 3:

Below is an article from the Cameroon Times (1990) entitled "Simple Truths". It contains a number of argument. Try to separate them, and follow the trail of thought the writer. What is the point (THE CONCLUSION) of the article? What would you say to the person who wrote this passage?

"Self-evident truths do not need evidence. They are already taken note of on the basis of available evidence. Sound evidence is a product of inquiry using our senses of sight, hearing, feeling, touch, and smell.

"Life around us can be seen, felt, touched, smelt and heard. A grain of corn planted into the earth, within a short time, metamorphoses into a green plant. It is a mystery that defies our understanding.

"The corn plant changes progressively: the flowers appear, followed by little swellings at portions of the stalk. These swellings soon transform into green corn curbs. The corn plant, with time loses its greenness, dries up, and with it the corn curb. We break the yellow corn curb from the stalk and find with it several rows of golden corn grains.

"Within limits provable by our senses, the corn grains come from the earth into which the grain of corn was planted. Further explanation of what happened is open to question and inquiry. The most we know is that the earth creates life. Consequently, with the earth must be a life-generating Essence.

"The earth has a dependable claim to the life it creates. Such a claim would not hurt the Sun whose nature it is to flood the entire universe with light and heat and energy."

PART II: INFORMAL LOGIC OR THE STUDY OF FALLACIES

In general, a fallacy is an argument, though perhaps psychologically persuasive, is nevertheless unsound. It is an argument that is "defective" because it contains an error in one of its parts, or its structure. If error is in the argument's structure, it is called a **Formal Fallacy**. These we have already examined. If the problem is in the content of the argument's premisses, the defect is an **Informal Fallacy**. The emphasis in this part of the course will be on the use of informal fallacy in argument.

A reason for this lies in the nature of language and thus, human interaction. Language has an expressive, or emotional function. And emotions are often used to direct others. Words can create feelings in others, feelings which will motivate actions or decisions that have little or no relationship to the facts of the situation. In each of the fallacies listed below, for one reason or another, a premiss simply does not support the conclusion of the argument. This is not to say, necessarily, that the premiss is false. but that in some fundamental way, **it fails to be relevant to the conclusion**. Two general classes of fallacies emerge as one studies all that goes wrong with an argument. First, there are the **Fallacies of Ambiguity**; secondly, there are the **Material Fallacies**.

For purposes of reference, these are the fallacies that we will study:

Fallacies of Ambiguity

Equivocation
Amphiboly
Accent
Composition
Division
Hypostatization

**Material Fallacies
(or) Fallacies of
Relevance**

**Argument against
Arguers:**

Abusive ad hominum
Abusive ad hominem
(Circumstantial)
Tu Quoque
Genetic Fallacy
Poisoning the Well

**Argument Based on
Emotion:**

Appeal to Fear
Appeal to Force
Appeal to Pity
Appeal to Authority
Mob Appeal
Appeal to Ignorance

**Arguments Based on
Presumption:**

(Arguments Involving
Assumption)
Begging the Question
Bifurcation
Complex Question

Arguments of Diversion:

False Analogy (Straw
Man)
Irrelevant Thesis (Red
Herring)
Irrelevant Conclusion
Ignoring the Issue
Befogging the Issue
Pettifogging

**Arguments of
Insufficient Evidence:**

Sweeping Generalization
Hasty Generalization
Accident
False Cause
Special Pleading

FALLACIES OF AMBIGUITY

Fallacies of Ambiguity are arguments which are unsound because they contain words that, either singly or in combination, can be understood in more than one sense, or because they contain some other element of confusion. Many words have more than one meaning, and when those words are used without clarification, the argument is always weakened. Of the many possible ambiguities, these will be considered: Amphiboly, Accent, Equivocation, Composition, Division, and Hypostatization.

Amphiboly: The structure of the sentence give rise to the possibility of two (or more) meanings, of which one is not intended by the author. Examples of Amphiboly might include:

"After two nights of looting and rioting, the mayor imposes a curfew."

Analysis: Who is doing the "rioting and looting"? Is the mayor or someone else doing it? Common sense tells us that it is probably not the mayor; but the sentence can be interpreted in both ways. A less ambiguous way of phrasing the statement might be: "The mayor imposes a curfew after there were two nights of looting and rioting (...in the city, perhaps.)"

"A gorilla is more like a man than a chimpanzee."

Analysis: What is the writer saying? "A gorilla is more like a man than a chimpanzee is like a man?" or "A gorilla is more like a man than it is like a chimpanzee?" A way of phrasing the first meaning might be: "A gorilla, more than a chimpanzee, resembles man."

More often than not the fallacy of amphiboly is unintended, and its often quite humorous in nature. In these cases its three main effects are:

- A. It detracts from what is being said, and results in poor communication.
- B. Respect for the argument and the one making the argument is diminished.
- C. Strictly speaking, it makes an argument **unsound**. Since the premiss in concern is unclear in its meaning, it cannot *be described as true or false*.

On occasion amphiboly can result from the "juxtaposition (putting close together) of two incongruous sentences", like "My husband took out an accident policy with your company, and in less than a month he was accidentally drowned. I consider it a good investment." (What as a good investment, the policy, or the drowning?)

Secondly, it must be added, although amphiboly is most often unintended, it can be also used to deceive, as in this famous, historical-literary example:

The "prophet" comes to Croesus (the king) and says, "If Croesus went to war with Cyrus, he would destroy a mighty kingdom." Croesus interprets that to mean that *he* will destroy the kingdom of Cyrus. In fact, it was Cyrus who destroyed a mighty kingdom, that which belonged to Croesus.

Amphiboly can result from these causes:

A. Improper punctuation:

"Pardon Impossible to be Executed."

B. Pronouns having ambiguous antecedents.

"If you don't go to other people's funerals, they won't come to yours."

C. Dangling Modifiers:

"Just received! Many shirts for men with 15 to 19 necks."

D. The use of two few words to establish the context.

"After two nights of looting and rioting, the mayor imposes a curfew."

Accent: The fallacy of accent occurs when the stress or tone used in a statement confuses the meaning of the statement, or else makes it inappropriate as a premiss in an argument. A rather outstanding example of this would be a statement used as a question, "John is going?" It would not be appropriate to base a conclusion like "Therefore, we should go too" on such a statement.

In practice, many examples of ambiguity due to accent can be difficult to recognize and assess, primarily because they are spoken, and secondarily because they are often very subtle in nature.

Equivocation: In equivocation ambiguity results from the fact that words have more than one correct sense and could have various meanings depending upon the way they are used (Their context)..

The end of a thing is its perfection; death is the end of life; death, therefore, is the perfection of life.

Analysis: The word "end" has several meanings. It could refer to the fulfillment, or goal of an event or process, (referred to in the above statement as "thing"). This is an "end" in the teleological sense. However, "end" can also refer to the cessation of something, to the fact that it is finished. In the argument above, the same word is used with two different meanings, thereby confusing the reader.

Hypostatization: In this ambiguity a word that properly refers only to an abstraction is used as if it could also refer to a concrete entity. A kind of hypostatization is personification, where ideas (and objects) are treated like persons.

Economic crisis is an enemy who is making total war on our country.

Analysis: An economic crisis is a combination of many events and factors. It is an abstraction, for it has no life of its own. The above statement treats "economic crisis" like it was a living thing, a person. Thus it creates an element of confusion about the real issues of the debate. Hypostatization is fine for political rhetoric, but is inadequate for logical argument. These two should not be confused.

Division: In division (as well as composition) the collective is confused with the distributive. This means that the qualities that the whole possesses are applied, or attributed to each part.

"The church is a strong church; therefore, each member is a strong Christian."

Analysis: What is true of the whole is not necessarily true of its parts. Because a church is strong as a whole does not give one the right to say that about each of its members.

"Since Cameroon is a prosperous country, all Cameroonians must be prosperous."

Analysis: In this case there are two sources of ambiguity. The prosperity of a nation is not exactly the same as the prosperity of an individual. That is the fallacy of equivocation. Secondly (if the two senses of prosperity were made equivalent), the not all people in a prosperous country are prosperous.

Composition: Composition is the reverse of division. One or more quality of the individual parts are attributed to the whole.

Since some students have money to pay their fees, all students have money.

Analysis: Obviously untrue, this argument takes a characteristic of a few students and attributes it to the whole student body. It has made the whole out of a *few of its parts*. But the whole, as the old saying has it, is more than the sum of its parts. An example of this truth might be applied to rainy season: Just because the rains are good for the crops does not mean that a large amount of rain is good.

Exercise 4:

Examples of Ambiguity: Explain why the following statements contain elements of amphiboly:

1. He likes his job more than his wife.
2. Save soap and waste paper.
3. Safe Driving is no accident.
4. Fallaci wrote her: "You are a bad journalist because you are a bad woman."
5. There must be lots of jobs available in physical education because the bulletin announced that the Dean will give a talk to graduating seniors about the employment opportunities in the college gymnasium tonight."

MATERIAL FALLACIES

Fallacies of ambiguity occur in premisses, and therefore arguments, where the content of the statement for one reason or another is unclear. One cannot make a valid argument from that which is unclear to begin with. **Material Fallacies**, on the other hand, are quite clear in their meaning, but are inappropriate in content (hence the term "material"), and therefore cannot be used in building a valid argument.

Fallacies of Relevance, or material fallacies, are arguments in which the premisses, despite appearance, do not bear upon the conclusion in the argument. These fallacies might well be called fallacies of irrelevance, for all of them

introduce some piece of irrelevance that tends to confuse and obscure the real issues by stirring up our emotions.

The study of material fallacies is the study of the unprincipled or unethical rhetoric that is often used by those who would bend others to their will. Fallacies of relevance derive their persuasive power from the fact that, when feelings run high, almost anything will pass as an argument.

Argument Against Arguers

The first category of Fallacies of Relevance is **The Argument Against Arguers, or the attempt to discredit the argument of the opposition by discrediting the opposition itself.** The way of thinking in this approach is that truth is determined by its source, not its content. The subtle (or not so subtle) variations of this approach include:

Abusive ad Hominem: (Against the man) Attacking the character of the opposing speaker rather than his or her thesis (idea). The approach here is to draw attention to the source of an idea, and attack the advocate of that idea with insult or abuse.

Bacon's philosophy is untrustworthy because he was removed from the chancellor ship for dishonesty.

Analysis: The way in which this irrelevant argument may sometimes persuade is through the psychological process of transference. When an attitude of disapproval towards a person can be evoked, it may be possible to convert that disapproval to disagreement with what the person says. **Note: The Human tendency is to discredit what a person says simply on the basis of their "reputation". But the discipline of logic does not work this way. It evaluates arguments on their own merits, whether they are valid, and ultimately whether they are sound.**

Other Examples:

The Pharisees: "Jesus's teaching were false because he did not obey their law."

We should pay attention to this pastor's teaching because: (he lost his temper, he is imperfect,...his ministry is struggling.)

This church member's opinion is not true because they aren't as committed as other members.

Argumentum ad Hominem (circumstantial): This fallacy attacks the opposing speaker by implying that the person has "vested interests" , or a "hidden agenda" through which they will personally profit if they win the debate. A common line in this approach is to say: "The only reason that you say that is....."; thus, one may avoid the issue of truth or falsehood and seek instead to prove that the opponent's thesis is being argued solely on the basis of "special circumstances" [it is true to them!!]

Don't pay any attention to what the pastor says about giving to the church; he's only saying it because it is to his advantage.

Analysis: Out of jealousy many African Christians argue against their pastor in this way. They try to discredit his statements because he will have some "advantage" if people accept his teaching (and it is not necessarily the advantage of money; it could be influence or power). Coping with this argument is not easy, but it can be done if one is truly convinced of the biblical basis for a teaching, and one is prepared to take the consequences in defending it.

First, in the above case, it is true that the pastor might be better supported if Christians tithed to God. But this is not necessarily so. The church would have to decide to pay the pastor some of the added income. To counter an Argumentum ad Hominem, one must first be honest about the circumstances of our argument.

Secondly, one vigorously refutes this fallacy because the words "only because" are meant to be exclusive, that is, ***the only reason for teaching tithing is for the pastor's advantage.*** Contrary to this line of thinking, the fundamental reason for teaching giving in the church is biblical. It is taught in the Bible, it is true, and we are to teach it in our ministries.

However, in real life the most convincing argument in a situation like this is the willingness to give up any advantage a biblical truth might bring to the one presenting the teaching, or "argument".

Tu Quoque: This is an argument which attempts to show that an opponent does not act in his own thesis or viewpoint, and "If the opponent has failed to follow his or her own advice, then their argument is worthless." This kind of attack presumes that the primary (or only) argument for the soundness of an argument is the conviction of its advocate. Furthermore, the person's argument is discredited

because of his or her actions. The people of Nazareth used this fallacy against Jesus.

Physician, heal thyself. Do here in your home town what we have heard that you did in Capernaum."

Analysis: This demand implies that, if he doesn't perform the actions requested, then the argument for his identity is invalid. **Tu Quoque can also be extended by insinuation and accusation into the future:**

"You would do the same thing if you got a chance."

Here there is no easy answer. Every fallacy contains some element of truth. People act on what they believe is true, so the accusation here is really, "You know that what you say is a lie." There are two approaches to this fallacy. One is to restate that truth stands by itself. The other emphasizes the fact that no person is perfectly consistent. We are sinners, **all of us.**

Genetic Fallacy: This fallacy attacks a thesis, institution, or idea by condemning its background or origin. "The genetic account of an issue may be true, and they may be helpful in understanding why the issue is in its present form, but they are fundamentally irrelevant to the merits of the argument."

Those from (such and such..) a tribe have nothing good to say about this matter.

It must be true. They taught it at CBTS.

Analysis: The fallacy is to value something by its source, rather than on its own merits. While this kind of prejudice is more often negative, it also happens when people accept without question the argument of a "big man" of a village. "It came from such and such, so it must be right." We must respect people, but at the same time testing the truth of everything.

Poisoning the Well: This is an attempt to preclude (end) a discussion by attacking the credibility of an opponent simply because they present a different position. The goal of the method is to place the opponent in a position from which he or she is unable to reply. A famous example is:

"Those who disagree with me when I say that mankind is corrupt prove that they are already corrupted."

(A quote from Frederick Nietzsche)

Those who teach against our traditional religion cannot be trusted.

Analysis: There is no simple way of coping with this fallacy, though in each case, it is necessary to disprove or discredit the argument in hand. Sometimes it is sufficient to point out the internal contradiction within the statement. In Nietzsche's statement, it would be effective to point out that, if "mankind is corrupt" the Nietzsche himself is corrupt. Why then should someone believe him when he says of those who disagree with him, "they are already corrupted". The second argument is more specifically phrased, and therefore much more difficult to evaluate. Perhaps one way of dealing with this "poisoning of the well" is to ask a series of questions which clarify the issues involved, and point towards the truth, like

"What do you mean by "teach against"?"

"Is traditional religion perfect?"

"What do you mean by "cannot be trusted"?"

Appeal to Emotion

A second major type of **Fallacy of Relevance** is the **Appeal to Emotion**. Sometimes the fallacy appeals to a simple emotion like fear or anxiety in its many forms; often it is to pity. Sometimes the emotion is compounded through direct intimidation or mob psychology. At times, the emotional appeal is hidden under an appeal to authority or ignorance. In all these cases the emotions involved can be quite strong. **However**, the evidence presented does not in itself justify the conclusion reached. Among the many kinds of appeal to emotion, these are common:

Appeal to Fear, or seeking to persuade through fear. This is the attempt to create an aura of anxiety, which in turn will motivate people to accept certain conclusions regardless of the evidence for or against..

If you believe in Christ, the spirits will be very unhappy.

Analysis: Here there is no explicit threat stated. But to accept the statement would mean a great deal of anxiety for anyone who believed in the spirit world to turn to Christ.

Appeal to Force. A variant of persuasion through fear, this is persuasion through intimidation. Often called "swinging the big stick" this approach is often taken when a person (or a nation) cannot, or is not interested in finding relevant evidence for a proposition.

If you attend church, I will not leave a coffee bush standing on your farm.

Analysis: Here the threat is explicit., an appeal to fear based on the use of specific force.

Appeal to Pity is to seek to persuade not by presenting evidence, but by arousing pity. Called the argumentum ad misericordiam, this is the "argument addressed to our sense of mercy."

You would see with me if you knew how much I suffered

Appeal to Authority is to seek to persuade not by giving evidence, but by arbitrarily citing an authority in the form of an:

1. Appeal to the one: *a central authority, the fon or the pastor.*
2. Appeal to the many: *members of ones tribe.*
3. Appeal to the select few: *village chiefs, or sub-chiefs; or church deacons.*
4. Appeal to tradition: *thanksgiving services; death celebrations.*

Called by John Locke the argumentum ad verecundiam, or an "argument addressed to our sense of modesty", this fallacy attempts to cite **those who have no special competence regarding the matter at hand. However, to cite someone competent in a matter (like a doctor in a medical problem) is not a fallacious argument because the doctor presumably has a sound argument for his conclusions. Of course, it may turn out that the doctor (or expert) is wrong.** Refuting an appeal to authority involves discerning the real issue in concern, and finding the best possible source for the truth.

Mob Appeal involves the use of emotion-laden words and phrases to cause people to come to a conclusion and act en masse . Also called appeal to the masses, this fallacious persuasion invites people's unthinking acceptance of ideas which are presented in a strong, theatrical manner.

(Pointing to someone in the market and yelling) "Thief, Thief!"

Appeal to Ignorance emphasizes the lack of evidence for a thesis, not the evidence supporting it. It is an argument that uses an opponent's inability to disprove a conclusion as proof of the conclusion's correctness. By shifting the burden of proof to the person hearing the argument, the argument itself becomes irrelevant." This is the "guilty until proven innocent" approach; the argument is correct unless you can think of ways to refute it. What's on trial here is really the knowledge of the hearer (not so often the reader), not the truth of the conclusion. The one hearing the argument is made to feel bad if he doesn't accept its "truth". Gossip is really a rather destructive appeal to ignorance.

Arguments Based on Presumption (or Assumption)

Fallacies of presumption are arguments that are unsound because of unfounded or unproved assumptions embedded in them. By smuggling such presumptions in under the guise of valid arguments patterns, these fallacies give the impression of being like the valid arguments that they resemble. However, since no conclusion can be more reliable than the assumptions on which they are based, the conclusions in such arguments cannot be trusted.

In fallacies of presumption, facts relevant to the argument have not been represented correctly in the premisses.

Begging the Question (*Petite Principe*): In the effort to find reasons for our conclusions, it is easy to reword the conclusion into a premiss and use that premiss as a reason for the conclusion. To reduce this fallacy to an example in its most basic form, one might say:

"It is good to go to church because going to church is good."

A more subtle, and perhaps more frequent form of this fallacy occurs when one attempts to proving a premiss by using it as a generalization about the past. For example:

Things will always be the same, because they have been the same (in the past).

(or)

"Respecting our ancestors brings success because success has always come from respecting (making offerings to, taking care of) our ancestors."

These two premisses are not exactly equal to each other. In the first, there is a simple *petitio principii*. In the second begging the question is combined with false cause (Did the spirits cause success?), but the effect is the same. How does one deal with "begging the question"? It is not easy, but perhaps the simplest solution is to ask the questions "*Why?*" and "*How?*". In the preceding examples one might simply ask "Why is it good to go to church?" Or "How have the spirits brought success?" Remember, the point of logic is not necessarily to prove the other person "wrong", but to clarify what is being said, and to seek conclusions that are based on sound arguments.

Bifurcation: Webster's dictionary defines "bifurcate" as "to divide into two branches or parts". The fallacy of bifurcation is the creation of two possibilities, or categories which are either exhaustive or exclusive, when in fact, other options exist. Often bifurcation creates confusion by using the words **either/or**. This fallacy presents contraries as though they were contradictory. Two statements are said to be contraries when it is impossible for both to be true, but possible for both to be false. Contradictories are statements which cannot both be true, or both be false at the same time.

Either you're for me or against me.

The person making this type of statement has personified the argument and has made agreement with the argument a test of the personal relationship. Using this strategy, this person (who is usually a leader, or an advocate of a plan of action) at a minimum makes other who disagree feel guilty, or more seriously makes them out to be traitors deserving some sort of punishment.

Complex Question: A complex question is an argument phrased in the form of a question which really is composed of two questions that should be asked separately. A famous example of a "complex question" is

Have you stopped beating your wife?

No one can answer this question "Yes" or "No" without making themselves look guilty, the reason being that the question is really two questions: "Have you beat your wife?" (To which one would answer "Yes" or "No") follow by (in the case of a "yes" answer) "Have you stopped beating your wife?"

A "complex question" does not have to take the form of a question at all. It may take the form of a proposition (or a motion at a business meeting) with two

parts. The fallacy here is that the part two does not necessarily follow part one of the statement.

We should postpone building the pastor's house for two years.

In the context of a business meeting someone might make this motion without the church first considering whether or not building the pastor's house should be postponed. Thus the motion may really be two motions wrapped up into one. The proper response to such a complex question is to separate it into two motions, and discuss the motions independently.

ARGUMENTS BASED ON DIVERSION:

(These types of arguments are often used in public debate.)

False Analogy (the "Straw Man"): Appearing to make a comparison to a parallel or similar example, the person is actually creating an analogy which has no bearing on the situation at hand, but which the arguer can very easily attack (Hence, the term "Straw Man").

Bareheaded women in church are like bareheaded women in the palace.

Irrelevant Thesis (the Red Herring) To draw attention from the real issue (or question) to something issue which people easily talk about. The term "Red Herring" came from the time in England when the quality of fish (Hence, red or smoked herring) sold in the market was a common topic of conversation.

The real problem in the church is the country's financial crisis.

Befogging the Issue: Just as fog in the rainy season can make it very difficult to see something important, there are individuals who raise all sorts or side issues in an attempt to draw attention from the main question. Consider the question, "Should we send a person to plant a church in a neighboring tribe?" Arguments befogging the issue might go like this:

Are these people related to us?

Do these people listen to anybody?

Others will be jealous if we try to help them.

Keeping to the issue is very difficult in a public meeting. It is possible for people to raise so many side, or related issues that the main point of the discussion is forgotten.

Pettifogging: (Petti, from the French, *petit*, or small) Quibbling (arguing) about very small points in an attempt to draw irrelevant conclusions is another way of distracting the discussion and/or putting down an idea. The difference between "befogging" and "pettifogging" Consider the question of whether we should paint parts of the church building. Befogging the issue might involve raising the issue that the shopkeeper who sells paint is involved in witchcraft. Pettifogging would focus on whether one small part of the building should be painted, the color of the paint, etc.

Of course, there can be legitimate differences in opinion as to how important a point in an issue is. But in general, pettifogging will draw significant conclusions based on insignificant points.

ARGUMENTS OF INSUFFICIENT EVIDENCE:

(Arguments in which we overlook, or evade significant facts.)

Sweeping Generalization (Accident): "Applying a fair generalization, one usually true, to an exceptional case by ignoring the peculiarities of the case."

"Since horseback riding is a healthful exercise, Nfor ought to do more of it because it will be good for his heart condition."

"Everyone has a right to own property. Therefore, even though Jones has been declared insane, you have no right to take away his weapon."

The fallacy of sweeping generalization de-emphasizes the fact that particular cases are irregular, and attempts to apply what are normally valid generalizations to situations in which they do not apply.

Hasty Generalization: The hasty generalization is exactly the reverse of the sweeping generalization. In this fallacy an isolated or exceptional case is used as the basis for a general conclusion that simply does not fit the majority of cases.

*My bad experience with my husband proves to me that all men are no good.
The bad pastor in my village proves that the church is really corrupt.*

Hasty generalization is the way that bitter and destructive prejudices develop. Someone from another tribe wrongs us, and all the members of that tribe become "no good". One pear on a tree is bad, and not only do we curse all the fruit on the tree, but we chop the tree down and use the wood for our cook fires.

Note: Care should be taken at this point to not confuse these fallacies with those of composition and division. In composition and division the argument is that of reasoning from a given attribute of a member of a whole *to the whole*, or a given attribute of the whole to *its parts*. Using the first example for hasty generalization, a fallacy of composition might read as follows:

Because my husband and I have had some bad experiences, our marriage is bad. (This goes from the part to the whole.)

Special Pleading: An argument based on unusual, unique, or special circumstances, usually put forth as the sole reason for the conclusion. In a court of law, where special pleading is allowed, the unusual situation is called "mitigating circumstances." In ancient Israel different punishments were given to acts of accidental violence than those given to intentional crimes of violence. Different, or exceptional, punishment was given on the basis of special circumstances.

But what may be appropriate in a court of law is not necessarily a valid logical argument. Consider the shopkeeper talk:

This is the only one of these I have every seen; you should buy it.

"Being the only one of its kind is not in itself a sufficient reason to buy the thing. Combined with the fact that you need the item, it might be a compelling reason to purchase it. Or, consider the following argument

This is a new teaching; we must listen to it and follow the fashion.

(or)

This is a special situation; the Bible does not apply to this.

This is a kind of special pleading that people with "itching ears" often use to defend new or novelty teaching, or deny the significance and relevancy of the Bible. In these cases the universal authority of Scripture must be affirmed.

False Cause:(*Non causa pro causa*) This fallacy is perhaps the most difficult of all fallacies to define and understand. Two events occur very closely in time. Does one "cause" the other. Lake Nyos erupted and many people died. Did that

eruption cause the deaths of so many. In this case, yes. The eruption of the lake was the cause of the Bum people's deaths.

But many other things occurred just before that tragic event. People failed to sacrifice to various gods. Villagers married and had babies. Almost certainly, people did wrong things. The witch doctors had probably put curses on some in these villages. Some might associate the tragedy at Nyos with one or more of these time-related events.

But in the scientific sense, that would be committing the fallacy of "false cause", of assuming that since two events occur closely in time the first *must* be the cause of the second. It *might* be the cause, but this should not be assumed.

A story might clarify this mistake: A man who had no family lived alone on a hill above a village. One night a terrible storm with much lightening came over the hill. People were terrified. In the morning a boy found the man on the floor of his hut; the man did not answer to his calls. Running to the village, he found that a doctor was visiting; he cried for everyone to come and see. Arriving at the man's hut they found him dead. Rumors that the man had been killed by the storm spread immediately. Some surmised that the storm god had been angered and had decided to take the man's life. On examining the man more closely, the doctor found a tiny snakebite on the man's ankle. It had been made by a very deadly snake. The villagers had been guilty of the fallacy of "false cause".

However, having said this, it must be admitted that the word "cause" is used in at least three different ways, and in each of those ways it has a different relationship to the event to which it is related. Cause and effect is a very complicated, important subject for study. It is a subject to which we turn in Part IV.

Exercise 5:

Please identify and explain the fallacy in each of the following statements.

1. Since it is impossible for an animal or plant to be indefinitely big or small, neither can its parts be, or the whole will be the same.
2. One sleeping pill is not bad for you; therefore, the whole bottle is not harmful to take.
3. Dogs are frequently encountered in the streets. Afghan hounds are dogs. Therefore, Afghan hounds are frequently encountered in the streets.

4. Seeing that eye and hand and foot and every one of our members has some obvious function, must not we believe that in like manner a human being has a function over and above these particular functions.
5. Traffic accidents are increasing. Collisions between Model T motors(antique cars) are traffic accidents. Therefore, collisions between Model T motors are increasing.
6. Mr. Nfor is a poor man because he loses whenever he plays drafts. He is, therefore, a poor loser.
7. The Army is notoriously inefficient, so we cannot expect Major Smith to do an efficient job.
8. All departures from the law should be punished. Whatever happens by chance is a departure from the law. Therefore, whatever happens by chance should be punished.
9. All phenomena in the universe are saturated with moral values. And, therefore, we can come to assert that the universe for the Chinese is a moral universe.
10. Every one said that the country soup had a distinctive taste, so they must all have found it very tasty.
11. American buffalo(animals similar to large cows) are practically extinct. This animal is an American buffalo, so it must be practically extinct.

PART III: CAUSE AND EFFECT

Cause and effect, or "causal connections" is the study of how events occur and the relationship between them. The concept of causal connections assumes that the universe is not random, that "events do not just happen, but occur only under certain conditions." But to say that something was a condition when an event occurred does not mean that it had a causal relationship to the event. For example, a student makes an A on a course during the rainy season. The two were related in time, but almost certainly the season of the year was not causally related to the grade.

An understanding of causal connections is essential to one who ministers in a society with animist or mythical traditions, where events are brought into relationship almost solely on the basis of time, similarity, or religious belief. Skill in discerning causal connections, and the ability to communicate those insights are crucial in guiding those who would easily be misled by those who would accidentally or intentionally deceive.

As one studies the relationship between an event and the thing or things (-the cause) that make it happen, one is first struck by the importance of the observer's perspective. The definition of cause is in part dependent on what type of event one is examining, and what one is seeking. There are two broad categories of events in life: the undesirable (or bad) and the desirable (or good).

An undesirable situation moves one to find out what was required for the event to occur. This is called the necessary condition *or* cause. A person is sick; the doctor looks for infection (bacteria) or something else that is making the person ill. That something could be poison, or even the conviction that someone has cursed them and that they're going to die. A motor won't run. The mechanic seeks to find the problem: something in the engine is missing, broken, or worn. This is the necessary cause (or condition) of the problem.

Of course, in a strict sense, everything that happens has one or more necessary conditions: fire requires oxygen; rain requires clouds; biological growth requires energy (or food), a fact which brings our discussion to a second general category of events: a good, or desirable event.

To occur, all events require more than one necessary condition. Good events (and now we broaden the term "event" to include conditions like good health, prosperity, success in school, having children, and so forth) require a number of necessary conditions. We call these the "set of necessary conditions," or a sufficient cause. For example, it is generally thought that good health requires (at least) proper nutrition, exercise, and rest. Taken together, these necessary causes generally (in the absence of disease) result in good health. In the absence of any one of the three, good health will suffer.

Consider, for example the "cause" of revival in the church. Certainly, prayer is a necessary condition for revival. Other necessary conditions could be thought to be repentance and obedience to God's word. (Some would debate whether these conditions are part of the cause of revival, or its effects.) The great certainty is that the work of the Holy Spirit is a necessary cause of revival. However one lists the factors that contribute to revival, taken together they are its sufficient cause for revival.

Exercise 6:

1. Explain "necessary cause" and "sufficient cause" in your own words to someone who has never heard the words before.
2. As has been stated, some events can be analyzed as having a "necessary cause". Others lend themselves to having a "sufficient cause" What is the necessary (or) sufficient cause of Sin? Of death in the world? Of redemption? Of the indwelling of the Holy Spirit? Of the mature Christian Life? Of the Second Coming of Christ?

PRACTICAL CAUSATION-PROXIMATE AND REMOTE

The concepts of necessary and sufficient causation are quite precise and their meaning and application in scientific studies. As we have seen, they also can be applied to our general understanding of the world about us. There is, however, a use of the word "cause", essentially practical in focus, which refers to the incident or action which makes the difference between an event happening or not happening.

Let's say that a house burns. We know that there are certain necessary conditions for fire to exist. It must have fuel, oxygen, and it must maintain its heat of combustion. All those things make up a sufficient condition for the fire. But all that does not tell us how the fire was started. For the fire to exist, it must have started, or been started, in some manner. One might say that there is a "necessary condition that stands out, or is most important. In the practical sense, that is its cause. And, for the purposes of clarity, we will call this its practical cause. Other examples of practical cause might include

A drunken driver causes an accident by going over into the path of an oncoming motor.

A bolt of lightening causes the power system to fail.

A nurse's carelessness causes a person's death.

A staff misunderstanding was the result of poor communication.

In thinking about causal relationships of this kind, two general types can be defined, that of proximate (or near) and that of remote causation. These words refer not to distance, but to time. It is assumed here that for every event of central interest (Let's label this event E) there is a chain of events that lead up to it, where event A causes event B, and event B causes event C, and event C causes event D, and finally D causes E.

The letters are of course an abstraction. The chain could be any length, and the events (or groups of events) of many different kinds could be linked together. The example of modern day Haiti demonstrates this: Deforestation causes climate change, which causes a change in agricultural production, which causes people to be poor, which results in great social unrest and crime.

Every part, or link, of this chain has some practical significance, but when the gendarmes seek to find out who committed a robbery (who caused the crime) they are not interested in deforestation or climate. These would be part of the remote cause of the problem. They are interested in the proximate cause, the person who stole the money.

Understanding remote causation can be important in understanding events and people, and in perhaps managing similar patterns of circumstances, and meeting needs in those people's lives. Discerning proximate causation enables us to deal with the here and now. In real life, as we have said, *this* is often called the necessary cause.

Exercise 7:

1. Think of three important events in your or your family's life. Now try to think of their proximate practical causes? Having listed those, now follow the causal chain behind each event as far as possible. Does this help you get perspective on the event in concern?
2. How do we answer someone who says that the god of Lake Nyos "caused" the deaths of many people?
3. Is God the remote cause, or the proximate cause of everything? Explain your answer biblically? Now to a very "illogical question": How do you feel about your answer?

TESTING THE LINK BETWEEN CAUSE AND EFFECT

Every culture and every person has some idea of cause and effect. It may not be called exactly that. But the link between events is essentially the same, when x happens then y will (or, or might, or must) occur. This is a conclusion drawn from some form of argument. The question is, "How do we come to this conclusion?"

For most peoples it is a conclusion based on the argument of simple experience. "I see (or observe) a relationship between two events, therefore those two events must be connected." The conclusion becomes more certain the more

instances we see of the two events, or circumstances, associated together. This conclusion is called an *inductive generalization*, that is, a general conclusion that one "takes in" or induces from a series of observations. The listing (we do this often without realizing that which we're doing) of the observations is called **simple enumeration**, which expressed formally, might appear as follows:

Example	Circumstance	Event
Year 1	I fertilized with chicken droppings.	Large tomato plants
Year 2	I fertilized with chicken droppings.	Large tomato plants
Year 3	I fertilized with chicken droppings.	Large tomato plants
Therefore	Are associated with tomato plants being fertilized by chicken droppings. (Are....)	Large tomato plants

Often this how one comes to a conclusion about the relationship of events and circumstance. The approach can result in significant and productive results. But the results are not at all dependable. Consider the following:

Mr. Ngum went to church	Mr. Ngum became ill during the week.
Mr. Nfor went to church.	Mr. Nfor broke his leg.
Mr. Ndi went to church	Mr. Ndi was robbed.
Therefore	Go to church and bad things will happen to you.

In situations like this there is often an unspoken assumption or prejudice at work, the inclination to assume something without adequate evidence. Sometimes the tendency is simply naive; at other times it is malicious. How do we go about making as certain as possible the relationship between two events or circumstances? Mill's Methods Of Inductive Inference are of great help.

John Stuart Mill (1806-1837) , building on the work of Sir Francis Bacon (1561-1626), formulated what five rules for guiding inductive method. (He called them "canons", from the Greek work for *reed*, hence ruler) The four that we will study are:

- I. The Method of Agreement
- II. The Method of Difference
- III. The Joint Method of Agreement and Difference

IV. The Method of Residues

We will examine the first two in some detail.

The first step in using Mill's methods is to carefully define the phenomenon, or effect, in focus. In the example of inadequate deduction on page 34 "being sick, breaking a leg, and being robbed were all put (lumped) together into one effect. It true that they were all bad events. But that is inadequate basis on which to group them together. Being sick is a very different experience from that of being robbed, though both may have some of the same consequence (being poor). In limiting the event, seek if possible to discover as many instances of the event as possible. Perhaps many people became sick, or several people broke bones, or a number of townspeople were robbed. Focus on the event itself, and not its consequences. This provides the stage for the second step.

The second step is to list as many circumstances that the similar events might have in common. Mill called these **Antecedent Circumstances**. Perhaps the people who became sick all went to a feast. We then list the things that the people ate at the banquet. It must be admitted that this involves a certain degree of trial and error. Not always are relationships clearly visible, and sometimes we make mistakes in associating things together. For example, those who became ill in the example above might have also been vaccinated by a missionary doctor that very day. That evening they attended the banquet given in the man's honor. Let's assume that some food caused the illness, but we might easily associate the illness with the medicine that the people received during the day. There is no perfect way to avoid mistakes in inductive thinking. Now we are ready for Mill's First Method, the method of agreement.

List each instance of the event, and the known antecedent circumstances. On paper the thought process would look like this:

Instance	Antecedent Circumstances			Event
1	A	B	D	E
2	A		C D	E
3		B	C D	E

Assume A, BC, and D represent the foods that the people at the banquet. What conclusion do we come to? D was possibly the cause of the sickness, here represented by E. But this is not absolutely certain. To further help establish a causal relationship, one must turn to Mill's second method, the **Method of Difference**.

Where the method of similarity emphasizes what different instances of an occurrence have in common (in this case, D), the method of difference uses instances **similar in every respect except one**. It would look like this on a continuation of the above chart.

4	A	B	C	D	E
5	A	B	C	-	-

In the above two instances (continuing on with people who ate at the banquet, we see that the fourth person ate everything and was sick. We know that the first three people studied ate D and were sick, but it is still not clear that D is the cause of the sickness. It becomes more clear that D is the probable cause when we find someone who ate everything *except* D and was not sick. This is the **Method of Difference**. One key aspect of this method is the firm control of the antecedent circumstances. We assume that A, B, C, and D are *all* the circumstances we have to consider. There is also a different emphasis here. In the method of agreement the emphasis is on all the cases where E occurred. Here one (or more) case where E occurred is compared with one (or more) where everything seemed the same, except for the fact that E did not happen. In real life this sometimes bears positive results. Consider this example. You and a friend have a difficult test the next day. Both of you go to the dormitory (or a house in your village) and you study under the same circumstances. You use mostly the same methods in studying. Both you and your friend have studied together, worked very hard, and you both have about the same intelligence. But your friend does much better on the examination. After you get your marks, you ask him the question, "What did you do different?"

The problem with the Method of Difference is that, outside the laboratory, we rarely have complete control of a situation. In the studying example notice the words "mostly" and "about". When comparing the difference between two events it is often difficult to isolate the presence of one antecedent which then can be labeled "the cause" of the event. But the method, even if used with *skepticism*, can bear genuine profit. The friend might tell you about a way he studied differently. *And that way just might help you make better marks on your next examination!!*

In the example concerning the illness we have touched on the third method, that of **The Joint Method of Agreement and Difference**. In this method we simply look for examples where there are similarities, or agreement, as in the first three instances. And then we examine two instances where everything seems the same except the presence and absence of the circumstance (another word here is

factor) that would seem to be "an indispensable part of the cause". In other words, we use both methods in solving the same problem

The **Method of Residues** is really the method of difference applied in a logical and systematic fashion. It works like this :

We observe that circumstances A, B, and C result in effects x, y, and z.

We know that B is the cause of y (and)

We know that C is the cause of z.

Therefore, A is inferred to be the cause of x.

Actually, what we are saying is that if BC cause yz, and ABC causes xyz, then subtracting B and C from the circumstances (here is the method of difference), and y and z from the results, then we come out with A the cause of x. This method is highly effective in situations where mathematical, or laboratory conditions prevail. But, nonetheless, it can perform a significant function in ordinary inductive thinking. Here's an example:

You have studied your children as they have grown. You know that certain circumstances cause them to behave in specific ways. If there is trouble at school, they are very angry at home. When they are sick they do not listen well. But now, X : the child has come home very angry. Y: They do not listen to what you tell them, and , Z: they are also very talkative. This is a new thing, something different. Has something happened to cause Z? That is a distinct possibility that merits real interest and investigation. The method of residues can help us isolate a new circumstance that is causing some new "effect".

Exercise 8:

1. There is an epidemic of measles among the children of your village. Rumors among the people have it that a certain sorcerer is causing the disease. What are some of the ways you convince them that is not true.
2. Think of the good and bad results you have had with your garden. What are some of the antecedent circumstances of each. Set up tables (like those above) and try to isolate the things that went right or wrong. Try to decide how likely it is that your results are accurate.
3. Can bad things cause good effects? Defend your answers with examples analyzing the circumstances involved.

PART IV: DEFINITIONS

Normally the subject of definitions is treated towards the beginning of any discussion of logic. There are substantial reasons for this. First, the proper use of definitions is essential to avoiding vagueness and ambiguity in any meaningful discussion. Thus, the nature of definition is often associated with the treatment of fallacy, particularly the fallacy of ambiguity.

Secondly, there is a close relationship between definitions and propositional statements. Not all definitions are propositions, but all premisses require terms that are defined precisely and accurately.

However, these very reasons can be used for treating definitions last. Definitions, particularly precisifying definitions, are strongly categorical in nature. And stipulative definitions are (by definition) propositions. Secondly, in a world of rhetoric and propaganda, definitions can contain all sorts of fallacies. Usually the premiss upon which the fallacy is based is not stated in the definition. But they're there.

The types of definitions include, but are not necessarily limited to:

1. **Persuasive Definitions:** This is a definition which is designed to influence attitudes and achieve a certain end or purpose. This does not mean that the definition is incorrect, or that the purpose of the definition is necessarily wrong. It does mean that the usefulness of the definition is limited, and that its purpose must be carefully examined for distortion or prejudice. Fallacies are common in this type of definition. An example which leads one to (lightly) dismiss someone who without thinking is committed to a point of view.

"Fanaticism consists of redoubling your efforts when you have forgotten your aim."
George Santayana

2. **Lexical Definitions:** This is the meaning of the word as listed in the dictionary. This type of definition simply reports the established usage of a word or term. But determining the established usage of a word may not be simple matter. Note that most dictionaries list two or more meanings for the same word because most words are used in more than one way. The most common standard usage is often listed

first, with less frequently used standard usages listed in the order of decreasing usage.

What do we mean by "standard usage"? It is **a** meaning (or **the** meaning) of the word that most people think of when the word is mentioned. However, "standard usage is strongly influenced by many considerations. People living in the jungle might have a very different picture of a mountain (or the French equivalent, mountain) than the people of the Northwest Province, even though the lexical definition of "mountain" is as follows:

The word "mountain" means a large mass of earth or rock rising to a considerable height above the surrounding country."

3. Precising Definition: These definitions are created to eliminate vagueness in the meaning of a word. Often these definitions are found in legal, or other specialized literature. Many precising definitions are used in biblical and theological studies.

"By intruder, we mean anyone who uninvited, and by force enters the domicile, or business establishment of another to their inconvenience.

Notice: There are three parts to this definition: 1. The conditions under which someone enters "uninvited and by force"; 2. The place of entry "the domicile (home), or business establishment of another"; and 3. the result of entry "to their inconvenience." By this definition, some who broke into a burning home to save a child would not be an intruder. Nor could one who has gone invited to another's home be considered to be an intruder. Though it may not cover all cases, the definition is very specific.

4. Stipulative Definition: The assignment of a new meaning to a word or words that already have conventional meanings. Like the precising definition, the stipulative definition is designed for a specific purpose. But unlike the precising definition which simply clarifies the already current usage of a word in a specific context, the stipulative definition creates a whole new meaning for a word(s) that have other meanings. Consider this definition:

The "Big Bang" is defined as the initial, instantaneous, nuclear reaction whose actual nature is unknown to modern physics, but which is thought to have created the beginning of the universe as we know it.

The words "big" and "bang" have conventional meanings. Used together, their conventional meaning would refer to "a loud sound, usually that of an explosion." In this type of definition, though there is generally some connection between the former and new use, the new meaning stands on its own.

5. Theoretical Definition: Definitions which are designed to formulate a theoretically adequate and scientifically useful description of the phenomenon to which the term applies are called *theoretical definitions*.

Energy equals mass times acceleration; or $E=mc^2$.

This was the definition developed by Albert Einstein in his analysis of the structure of the universe. It says that matter is completely composed of energy, and the relationship of the two involves the amount of matter (the *mass*) and a constant, or a number which does not change, the speed of light in centimeters *squared*.

Exercise 9:

1. Agree or disagree with the following quotations. Give your reasons for your position.

"It is certainly praiseworthy to try to make clear to oneself as far as possible the sense one associates with a word. But here we must not forget that not everything can be defined."
Gottlieb Frege

"Since all terms that are defined by means of other terms, it is clear that human knowledge must always be content to accept some terms as intelligible without definition, in order to have a starting-point for its definitions."

Bertrand Russell

2. What type is each of the following definitions? Is In each case, is the definition appropriate or adequate for the situation in Cameroon? Explain your reasoning.

A. Declination: The difference in direction between true north and magnetic north at any given point on the earth's surface.

B. Country Fashion: A way of life superior to that based on Christianity or any other religion.

C. Grace: The unmerited favor of God, most visibly demonstrated in Jesus Christ willingly sacrificing himself on a cross for the sins of the world.

D. Cubism: A method of painting, drawing, and sculpture in which objects are represented by cubes and other geometrical figures rather than realistic details.

E. By disciplinary status, we mean the suspension from classes and the penalties assigned to a student incurred when the student violates the school's code of conduct, or otherwise brings dishonor to Jesus Christ.

F. Population Density equals the total population of an region divided by its area in square kilometers.

CONCLUSION

The discipline of logic touches every part of living. Everyone, no matter who they are or where they are, must communicate to live. Much of that communication does not need to be placed under the magnifying glass of analysis. We share emotions, tell stories, make jokes, and give instruction to our family and others.

However, buried in the flow of talk are conclusions, both deductive and inductive, fallacies, and definitions that have significant effects on how we live. The conclusion that "Jesus is Lord!" has profound implications for what we think and do, just as the conclusion that "God is not good" has terrible consequences for the way one solves the problems of life.

Logic helps in focusing on these conclusions, good and bad. It identifies the reasons (if any) for those conclusions, and provides a means for evaluating the relationship between those reasons and their conclusion. Logic does not, cannot provide the standard for evaluating the truth of propositions. But in the case of fallacies, it does something highly significant. It often provides insight into the motives and strategy of those who would misuse argument for their own end.

Logic should never become a substitute for being well informed about life's important subjects. To do so could make it an excuse for ignorance, and a tool of contention and debate. Logic should be combined with knowledgeable insight about the issue in focus. The end result is that good information is used properly in making family, church and village (social) decisions.

Logic is not a substitute for the work of the Holy Spirit. People are not argued into the Kingdom. (John 16: 7-11)

But I tell you the truth: It is for your good that I am going away. Unless I go away, the Counselor will not come to you; but if I go, I will send him to you. When he comes, he will convict the world of guilt in regard to sin and righteousness and judgement: in regard to sin, because men do not believe in me; in regard to righteousness, because I am going to the Father, where you can see me no longer; and in regard to judgement, because the prince of this world now stands condemned.

However, while they do not come to God simply through logic, there is an inner logic in the convicting work of the Spirit. And there should be good logic in our witness to the world about us (1 Peter 3:15).

But in your hearts set apart Christ as Lord. Always be prepared to give an answer to everyone who asks you to give a reason for the hope that you have.

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FURTHER NOTES:

The Relationship between Formal, Causal, and Symbolic Logic

A. J. Ayer, when asked on a British telecast, to describe philosophy, he replied in concise fashion that it was the study of the proposition 'p supports q'. By this he meant that it is the clarification and analysis of what is meant (in many contexts) by "supports". Thus it is a study of reason...thought...proof...argument..., but it might also be the study of the existence of p and q, and thus the nature of p and q's classification. This book's stress has been on "reasoning" in either a formal or an empirical sense. However there are at least two other kinds of reasoning which might profitably be used in certain situations.

1. Empirical, or experiential, reasoning takes the form of a proposition such as "these are dog's tracks." This is an argument perceived *a posteriori*, or by virtue of experience.

2. There is also such a thing as a symbolic "logic" such as "the sum of the angles of triangle = 180° ." This is a formal, but not (necessarily) an experiential argument.

a. Consider the experience of most grade school geometry students who are asked to measure the angles of a triangle with a protractor. They try as hard as they can and still come up with a total of 179.3° .

b. Einstein has commented on this paradox in the statement "insofar as geometry is certain it has no relationship to the empirical world and insofar as observations of the world are empirical, they have no certainty."

3. Symbolic logic replaces words with symbols that are composed of two classes: Connectives and propositional variables. The relationships between propositional variables can be put into truth tables which show implication, equivalence, negation, conjunction, disjunction, condition, and bicondition. Symbolic logic allows for the analysis of complex relationships in a concise way.

4. But analysis of these relationships has also led to the concept of the "existential fallacy" which says that while two subcontraries cannot be false at the same time in the Aristotelian system, there are instances in which this is possible. Therefore, traditional logic is inadequate as a system of thought. Boole pioneered

this viewpoint, and his work has led to Boolean logic, which is the starting point of much modern logical theory. As the position is put in Copi, it contains a key weakness, that of its ambiguous use of the word “truth.”

5. However, as useful as it is in the creation of abstract logical systems, Boolean logic is not crucial to practical day to day logical inference.

Questions:

1. Give three examples of African experiential reasoning. How do these examples compare with the western idea of “cause and effect?”

2. Restate in your own words what symbolic logic is. Compare it to the idea of a theoretical definition. Are these worthy concepts? (Yes or No) Defend your answer.

3. What type (or blend of types) of reasoning best fits Africa? Why?

4. Do you agree with the Einstein quote in (b)? Why? Why not?

5. What is certainty? Why is it important to Christian living?

6. How does one reach certainty about the critical issues of life?

USES FOR LOGIC

Logic can serve the study of Scripture and the Gospel Presentation.

Scripture is rich in logical thought. In Isaiah 1: 18 The Lord says, "Come now, let us reason together,.... Though your sins are like scarlet, they shall be as white as snow; though they are red as crimson, they shall be like wool." The word translated reason here in its basic form could mean “to prove, decide, judge, rebuke, or correct.”

In the book of Acts we read of many instances in which Paul reasoned with those he was trying to win to Christ. A brief description of three examples is helpful:

Acts 17:2-4 As his custom was, Paul went into the synagogue, and on three Sabbath days he reasoned with them from the Scriptures, 3 explaining and proving that the Christ had to suffer and rise from the dead. "This Jesus I am proclaiming to you is the Christ," he said. Some of the Jews were persuaded and joined Paul and Silas, as did a large number of God-fearing Greeks and not a few prominent women.”

There is a progression in this passage: First, Paul reasons from the Scriptures. The Greek word translated “reasoned” is from the verb *διαλεγομαι*, which means to discuss. Paul is using argument in his witness. Secondly, Paul seeks to “prove”, to demonstrate, *παρατιθημι*, the truth of the Gospel. Thirdly, a large number were persuaded, from the verb, *πειθω*, meaning to convince. This last term carries the weight of both confidence and trust, as well as intellectual and emotional certainty.

Acts 17:17-18 So he reasoned in the synagogue with the Jews and the God-fearing Greeks, as well as in the marketplace day by day with those who happened to be there. 18 A group of Epicurean and Stoic philosophers began to dispute with him. Some of them asked, "What is this babbling trying to say?" Others remarked, "He seems to be advocating foreign gods." They said this because Paul was preaching the good news about Jesus and the resurrection.

Paul engaged people wherever he met them. Luke considers Paul’s argument (or “reasoning”) a form of preaching, or announcing the Good News.” He was not afraid to dialogue with the Greek philosophers of the time. His presentation on the Areopagus reveals a carefully connected chain of thoughts.

In Acts 18:19-21 they arrived at Ephesus, where Paul left Priscilla and Aquila. He himself went into the synagogue and reasoned with the Jews. (Verse 20) When they asked him to spend more time with them, he declined. 21 But as he left, he promised, "I will come back if it is God's will." Then he set sail from Ephesus.

Paul often presented the Gospel through argument, but he was never argumentative. He was both gracious and sensitive to the setting which he addressed. It seems that his strategy was to present truths that his hearers could accept, and then to lead them progressively to conclusions that would open their hearts’ door to an encounter with Jesus Christ. In Ephesus he left the Jews wanting more. Why he left is not certain; however the precedent is clear: Whenever we present a case for the Gospel, it is good to leave people wanting to hear more.

It must not be thought that Paul’s method of “reasoning” (dialectic), or the countless arguments of Scripture explicitly follow all the rules of logic as we know them today. But they are not illogical. The arguments of Scripture involve (at

least) inductive, deductive, causal, and analogical thinking. Often times these forms are mixed. But they are there, for God is the God of truth and the God of all sound reasoning. He does not contradict himself. His conclusions are sound. Logic can serve Systematic theology as one enlarges ones understanding of God

Logic can serve reflection or meditation. Reflection is simply the relating or connecting of one thought with other thoughts. Usually there are patterns in the way a person, or a culture reflects on any particular thought. There are many forms of reflection. A Christian reflects by calling to mind verses of Scripture which appear to relate to each other. For example, these verses *might* relate to the birth of a child.

Ecclesiastes 3: 1,2

"There is a time for everything,
and a season for every activity under
heaven:

a time to be born and a time to die,
a time to plant and a time to uproot,

Psalms 139: 14,14

"For you created my inmost being;
you knit me together in my
mother's womb.

"I praise you because I am fearfully and
wonderfully made;
your works are wonderful,
I know that full well."

The verses present the reader with many important statements of truth. Through the discipline of Hermeneutics we learn of the author's intent in writing the passages. The Holy Spirit speaks meaningfully through them. But what conclusions do we draw from these propositions? God's will is not always obvious, nor does God simply dictate to man the thoughts he should have. As we reflect, we must test our thoughts and conclusions. Regarding prophecies (or what *might* be considered statements of truth), Paul said "Test everything. Hold on to the good. Avoid every kind of evil." (1 Thessalonians 5:21, 22). It is the conviction of this author that being submissive to Scripture and the Holy Spirit, and testing our thoughts through Logic go hand in hand in the mature Christian life.

Logic and serve this testing process in a specific way. As has been stated, it examines the type of reflection called reasoning, and determines whether the conclusions of that process have adequate foundations.

Logic is essential in solving the great problems now facing Africa. Certainly African values and traditions will be utilized. But for the Christian, biblical premisses will be the primary foundation of genuine, long term solutions. Logic will be used to reach those valid conclusions.