A. The Structure of Categorical Propositions

To "categorize" a person, place, time, thing, or situation is to characterize it as a member of a class of similar things. One does not consider the thing in question from its purely individual point of view, that is, in terms of the qualities it has without relationship to any other things. Upon being categorized, an individual thing is known by properties that it has by virtue of its being a member of the class of things referred to by that category. All propositions expressed in the Aristotelian system of logic are called categorical propositions because they are constructed using two categories of things: the subject category (or class) and the predicate category (or class). The copula, or connector between the subject and predicate, of a categorical proposition indicates how its subject category is related to its predicate category. The copula specifies whether members of the subject category are also members of the predicate category or whether members of the subject category are not members of the predicate category. Illustration:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Copula</th>
<th>Predicate</th>
<th>Quality of Copula</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Strawberries</td>
<td>are</td>
<td>red.</td>
<td>Affirmative</td>
</tr>
<tr>
<td>(2) Strawberries</td>
<td>are not</td>
<td>red.</td>
<td>Negative</td>
</tr>
</tbody>
</table>

However, this is not enough. (1) declares that members of the class of strawberries are also members of the class of red things, but (1) is ambiguous because it does not specify the quantity of the subject class that is included in the predicate class. Thus, Ms. A might take (1) to mean “all strawberries are red,” while Mr. B might take (1) to mean “some strawberries are red.” Ms. A and Mr. B would then be in disagreement over the truth or falsity of (1). Ms. A declares (1) false because she believes that “all strawberries are red”
is false, while Mr. B declares (1) true because he believes the statement, “some strawberries are red” is true. Statement (2) is equally ambiguous. Ms. A might consider (2) true because she believes that “some strawberries are not red” is true, while Mr. B might consider (2) to be false because he believes that “no strawberries are red” is false.

Many arguments develop because two parties interpret an ambiguous statement in different ways. Such arguments are really pseudo-disagreements, because the disputing parties are not taking opposite sides to the same claim. By filling in missing information in different ways, as in (1) and (2) above, one party may argue that the statement in question is true, while the other party argues that the statement in question is false. To avoid such pseudo-disagreements and pseudo-agreements, any statement expressed as a categorical proposition must specify the following elements in the order indicated:

QUANTITY….SUBJECT….COPULA….PREDICATE

The quantity specifies how much of the subject is being included in or not included in the predicate class. Either all or some of the subject is included in the predicate. Thus, for (1) above, the two possibilities become:

A: All strawberries are red.
I: Some strawberries are red.

And the two possibilities for (2) above become

E: All strawberries are not red.
O: Some strawberries are not red.

Presented in this way, the A, E, I, and O propositions exhibit an informative symmetry. The A and E propositions say something about every strawberry in the universe, and so are called Universal propositions. The I and O propositions refer only to part of the entire
class of strawberries, and so are called Particular propositions. The copula of the A and I propositions affirms the inclusion of members of the subject class in the predicate class, while the copula of the E and O propositions denies inclusion of members of the subject class in the predicate class. We describe this by saying that the quality of the copula in the A and I propositions is Affirmative while the quality of the copula in the E and O propositions is Negative. It is now possible to describe any categorical proposition in terms of the quantity of its subject and the quality of its copula:

- **A**: All S are P  
  Universal Affirmative
- **E**: All S are not P  
  Universal Negative
- **I**: Some S are P  
  Particular Affirmative
- **O**: Some S are not P  
  Particular Negative

We began by specifying the structure of propositions in terms of subject, copula, and predicate, and we saw that propositions expressed in this manner were ambiguous. In order to eliminate ambiguities that might lead to needless conflict, specification of the quantity is required. Nonetheless, we still have not eliminated a remaining structural feature leading to ambiguity. This problem arises from the way in which the E proposition is expressed. To illustrate, consider the following E proposition:

(3) All strawberries are not red.

Two individuals might disagree over the truth and falsity of (3) because they each take it to mean something different. Mr. A may take (3) to be true because he knows from experience that “some strawberries are not red” is true. On the other hand, Mr. B may take (3) to be false because he knows from experience that to say of all strawberries that they are not red (i.e., that no strawberries in the universe are red) is to say something that is false. Thus, Mr. A could insist that “all strawberries are not red” is true while Mr. B could insist that “all strawberries are not red” is false. Here again, we have a pseudo-disagreement because (3) is ambiguous and one party takes it to mean one thing while the other party takes it to mean a different thing.
Any statement of the form “All S are not P” is ambiguous. In some context it could mean “Some S are not P,” while in other contexts it could mean that “No S are P”:

\[ E: \text{All S are not P} \]

is ambiguous between

\[ E_1: \text{No S are P} \]

\[ E_2: \text{Some S are not P} \]

Since this ambiguity is possible whenever we use the form “All S are not P,” that form is banished. Any speaker using it must specify whether it means \( E_1 \) or \( E_2 \). And, since \( E_2 \) is the same as the \( O \) proposition, any speaker who intends to assert a universal negative proposition must use the \( E_1 \) form. Thus, the legitimate categorical propositional forms are:

<table>
<thead>
<tr>
<th>Proposition</th>
<th>Formulation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>All S are P</td>
<td>Universal Affirmative</td>
</tr>
<tr>
<td>E</td>
<td>No S are P</td>
<td>Universal Negative</td>
</tr>
<tr>
<td>I</td>
<td>Some S are P</td>
<td>Particular Affirmative</td>
</tr>
<tr>
<td>O</td>
<td>Some S are not P</td>
<td>Particular Negative</td>
</tr>
</tbody>
</table>

While “No S are P” may look as if it has an affirmative form, as the \( A \) and \( I \) propositions do, this is merely an accidental similarity. Essentially, the copula of the \( E \) proposition is like that of the \( O \) proposition. In linguistic terms, the \( E \) and \( O \) propositions have similar deep structures because they both have negative copulas, but different surface structures. In biology, this would be similar to the case of individuals who have the same genotype, or species, but different phenotypes, the sum total of qualities.
2.A.1. **Exercises on Form, Quantity, and Quality:**

Give the form (A, E, I, O), Quantity (Universal, Particular), and Quality (Affirmative, Negative) of the following propositions and underline the copula.

<table>
<thead>
<tr>
<th></th>
<th>FORM</th>
<th>QUANTITY</th>
<th>QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Every student who is registered in college is very highly motivated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Some of the propositions which are presented in this course are not meant to make good sense.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. None of the people who are elected to public office are honest.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Some musicians are people who are not satisfied with present conditions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Nothing I do is intended to hurt you.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Some things that are not grown on a farm are available in today's supermarkets.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. Some people who are in college for an education are not worried about what other people think of them.

8. All you ever do is complain about what other people are not doing to help you.

9. Some people who are not intimidated by rhetoric or threats are able to achieve something worthwhile in life.

10. All drivers of automobiles which are not safe are desperadoes who threaten the lives of their fellow men.

11. Some politicians who could not be elected to the most minor positions are appointed officials in our government today.
12. No men who have not themselves
done creative work in the arts
are responsible critics on whose
judgments we can rely.  

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

B. Definitions

The use of the system of Aristotelian logic requires that one construct phrases which
clearly designate the class of things referred to by the subject and the class of things
referred to by the predicate. In order to accomplish this, the subject term and the
predicate term must be as unambiguous and precise as possible. Some of the most
common fallacies in reasoning arise from terms used in an argument which are either
ambiguous or vague. Consider, for instance, the following argument:

All poor students are students who will not be admitted to law school.

Smith is a poor student.  

Smith is a student who will not be admitted to law school.

The conclusion that Smith is a student who will not be admitted to law school appears to
follow only because the term “poor student” is taken to refer to the same class of students
in both premises. If, however, it is used in the first premise to refer to the class of students who make less than average grades, while it is used in the second premise to refer to the class of students who have inadequate financial resources, then the conclusion obviously does not follow.

In constructing and evaluating arguments, it is critical that the terms used in the arguments be clarified so that ambiguities and vague references are eliminated. Otherwise, we risk misleading, and being misled by such terms to draw conclusions that do not really follow. We clarify the meaning of a subject or predicate term by giving either its denotative meaning or its connotative meaning or both.

The **denotative meaning** of a term is given by referring directly to an actual individual in the class to which the term applies. Thus, we might indicate what a dog is by pointing to one. The complete set of all individuals to which the term applies is called the **extension** of the term. Thus, the extension of the term "dog" is all of the things to which the term can appropriately be applied. Likewise, the extension of the term "airport" is all of the places to which the term can appropriately be applied, and includes Kennedy Airport in New York, NY, National Airport in Washington, DC, O’Hare Airport in Chicago, IL, and Charles DeGaulle Airport in Paris, France. Likewise, the extension of the term “alcoholic beverage” is all beverages to which that term is correctly applied, and includes all specific instances of beverages containing gin, beer, wine, vodka, bourbon, etc.

The **connotative meaning** of a term refers to the set of qualities, properties, or characteristics shared by all the objects to which the term correctly applies. This set of attributes is called the **intension** of the term. Thus, the connotative meaning of the term “dog” is “domesticated canine mammals and their progeny”. And the connotative meaning of the term "airport" is a “tract of land or water which is maintained for the landing and takeoff of airplanes and for receiving and discharging passengers and cargo, and usually has facilities for the shelter, supply, and repair of airplanes.” Likewise, the connotative meaning of “alcoholic beverage” is “any beverage containing a colorless, volatile, flammable liquid with chemical composition C₂H₅OH and intoxicating
properties.” The property of being suitable for the landing and takeoff of airplanes is a property shared by all airports, and is thus an essential part of the connotative meaning of the term “airport.” The property of containing a liquid with the chemical composition C₂H₅OH is a property shared by all alcoholic beverages, and is, thus, an essential part of the connotative meaning of the term “alcoholic beverage.”

Methods of Definition

The term to be defined is called the definiendum and the definition offered to clarify that term is called the definiens. From the two kinds of meaning introduced, denotative and connotative, we derive two kinds of definition.

I. Denotative Definition

Producing or pointing to an actual example of a term we are using is one of the most elementary ways of clarifying the meaning of a term. It is the way that most of us initially learn our native language. Pointing to an example of a term is called an ostensive definition of that term. However, such forms of definition are limited by considerations such as the following:

1. In many cases it is impossible to point to each member of the extension of a term. Yet, we are expected to apply the term to new cases where appropriate.

2. A given thing may be an example of many different terms, and pointing or referring to that example does not distinguish between the meanings of the different terms. Thus, we may refer to Martin Luther King Jr. as an example of a civil rights leader, as an example of a minister, as an example of an African-American, and as an example of a husband. Yet, the terms “civil rights leader,”
“minister,” “African-American,” and “husband” certainly do not all mean the same thing.

3. Finally, some terms do not have sensible objects as members of its extension. It is impossible, for instance, to point to an actual example of heaven or zero. Yet, this does not mean that the terms “heaven” and “zero” are meaningless. For the meaning of a term can be given not only by denotation, but also by connotation.

II. Connotative Definition

The connotative definition of a term presents the properties that identify it and distinguish it from other terms. The properties which define a term are classified as either part of its genus or part of its difference. The genus is that characteristic or set of characteristics that describes the general class to which a term belongs. The term being defined is always a subclass of the more general class given by the genus, and the property or set of properties that distinguishes it from other subclasses of the same genus is called the difference. The class whose membership is divided into subclasses is called the genus class, and the subclasses under it are called its species.

Let us take the examples we have used earlier to illustrate the notions of genus and difference. "Airport" has as its genus "a tract of water or land." But to say that "airport" means "a tract of water or land" is, while correct, grossly inadequate and incomplete. For that property does not differentiate “airport” from “seaport” or “parking lot.” What distinguishes an airport from a seaport or a parking lot is the property of being maintained for the landing and takeoff of airplanes, the discharge of passengers and cargo from airplanes, and the supply, storage, and repair of airplanes on land. It is these latter properties that establish the specific difference between "airports" and other terms which have the same genus.

Likewise, while it is correct to say that an alcoholic beverage is a liquid, that is again an incomplete explication of its meaning. The term "alcoholic beverage" belongs to the
genus "liquids," but that does not distinguish a martini from a milkshake or water or a myriad of other substances, all of which fall under the genus "liquid." The property that marks the specific difference between alcoholic beverage and other liquids is the property of having an intoxicating, drinkable component with the chemical composition of $C_2H_5OH$.

Let us now define the term "college freshman" by the method of genus and difference. The genus class to which the term belongs is "undergraduate college student." But to say that a college freshman is an undergraduate college student does not differentiate it from a college sophomore, junior, or senior. To complete the definition we need to give the properties of the species "college freshman" that distinguishes it from other species of undergraduate college student (i.e., sophomore, junior, senior). In this case, the specific difference is the property of "having less than 30 semester hours of class credits". Following is a list of the terms we have defined:

<table>
<thead>
<tr>
<th>Definiendum</th>
<th>Definiens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>a tract of land or water (genus) that is maintained for the landing and takeoff of airplanes, the receiving and discharging of passengers and cargo from airplanes, usually having facilities for the shelter, and supply and repair of airplanes (difference).</td>
</tr>
<tr>
<td>Alcoholic beverage</td>
<td>a liquid (genus) which is drinkable and contains an intoxicating component with the chemical composition $C_2H_5OH$ (difference).</td>
</tr>
<tr>
<td>College freshman</td>
<td>an undergraduate college student (genus) who has less than 30 semester hours of class credits (difference).</td>
</tr>
</tbody>
</table>
As the examples given indicate, relative clauses are generally used to express the specific difference. The following kinds of connotative definitions are characterized by the nature of their specific differences:

**Functional definitions** are definitions where the specific difference is a particular use or function that the genus is put to. For example, a sextant is an instrument (genus) used for measuring distances using angles (difference).

**Operational definitions** are definitions where the specific difference is a public and repeatable procedure with specific outcomes. Thus, an alkaline liquid is a liquid (genus) which is such that if a piece of litmus paper is immersed in it then the litmus paper will turn blue.

**Stipulative definitions** introduce new terms as the definiendum, and stipulate the genus and difference that constitute their meaning. Thus, let "Gbal" be defined as a ball (genus) which is green (difference).

**Theoretical definitions** give the meaning of a term using the concepts peculiar to a particular scientific theory. Thus, “table salt” is defined as “sodium chloride.”

**Lexical definitions** report the definitions given a term in standard dictionaries. For example, the term "blitzkrieg" is defined by Webster's dictionary to mean “warfare which is sudden, swift, large scale, offensive, and intended to win a quick victory.”

**Synonymous definitions** give the meaning of a term by introducing another term with the same meaning. Thus, "krieg" means "war" in German and "noir" means "black" in French.
2.B.1. **Exercise on Definitions:** Give the definitions of the terms under "Definiendum" (numbered 1 through 19) by identifying under "Definiens" their appropriate *genus* (numbered 1 through 13) and *difference* (numbered 1 through 19).

<table>
<thead>
<tr>
<th>Definiendum</th>
<th>Genus</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. submarine</td>
<td>1. male</td>
<td>1. parent</td>
</tr>
<tr>
<td>2. bison</td>
<td>2. inflammation</td>
<td>2. writing</td>
</tr>
<tr>
<td>3. pen</td>
<td>3. animal</td>
<td>3. higher learning</td>
</tr>
<tr>
<td>4. hepatitis</td>
<td>4. institution</td>
<td>4. large</td>
</tr>
<tr>
<td>5. arthritis</td>
<td>5. man</td>
<td>5. heavenly bodies</td>
</tr>
<tr>
<td>7. czar</td>
<td>7. instrument</td>
<td>7. living things</td>
</tr>
<tr>
<td>8. astronomy</td>
<td>8. study</td>
<td>8. religion</td>
</tr>
<tr>
<td>10. theology</td>
<td>10. deer</td>
<td>10. society</td>
</tr>
<tr>
<td>11. sociology</td>
<td>11. woman</td>
<td>11. female</td>
</tr>
<tr>
<td>12. anthropology</td>
<td>12. buffalo</td>
<td>12. young</td>
</tr>
<tr>
<td>13. college</td>
<td>13. plant</td>
<td>13. married</td>
</tr>
<tr>
<td>14. seedling</td>
<td>14. operate under water</td>
<td></td>
</tr>
<tr>
<td>15. wife</td>
<td>15. Russian</td>
<td></td>
</tr>
<tr>
<td>16. stag</td>
<td>16. unmarried</td>
<td></td>
</tr>
<tr>
<td>17. doe</td>
<td>17. joint</td>
<td></td>
</tr>
<tr>
<td>18. father</td>
<td>18. liver</td>
<td></td>
</tr>
<tr>
<td>19. husband</td>
<td>19. male</td>
<td></td>
</tr>
</tbody>
</table>
2.B.2. **Exercises on Definitions:**
Identify the following definitions as synonymous, denotative or connotative:

1. A physician is a doctor.

2. The OPEC countries include Saudi Arabia, Kuwait, and Algeria.

3. Amphibians are any class of vertebrates that are born with gills but develop lungs as mature adults.

4. Amphibians are frogs, toads, newts and salamanders.

5. A toreador is a bullfighter.

6. Photosynthesis is the production in green plants of bio-chemical substances in the presence of light.

7. Dogs, wolves, jackals and foxes are canines.

8. Ursa Major means Great Bear.

9. Dialectical Materialism is the logical basis of Marxism.

10. Phlegmatic means sluggish, dull, apathetic.

11. A cannibal is a person who eats human flesh.

12. Alcoholic beverages are beer, wine, hard liquors and liqueurs.
13. A bassoon is a double-reed bass woodwind instrument having a long curved stem attached to the mouthpiece.

14. Boyle's Law is a law in physics that states that for a body of ideal gas at constant temperature the volume is inversely proportional to the pressure.

15. An amulet is something worn on the body because of its supposed magic power to protect against injury and evil.

16. An amulet is a charm.

17. Cannelloni are tubular casings of dough filled with ground meat, baked and served in tomato sauce.

18. Metempsychosis means transmigration of the soul.

19. A PT boat is a small, fast, and armed boat used for coastal patrol and convoy.

20. Myopia means nearsightedness.

21. Sclerosis is a hardening of a tissue.

22. Agronomy is the theory and practice of field-crop production and soil management.

23. Acrophobia is the fear of being at a great height.

24. Paranoia is a chronic mental disorder characterized by systematized delusions of persecution and of one's own greatness.

25. Clairvoyance means discernment.
26. Clairvoyance is the ability to perceive objects not present to the senses but which have objective existence.

27. Marsupials are kangaroos, wombats, bandicoots, opossums, etc.

28. Marsupials are mammals that carry their young in a pouch.

29. A scimitar is a saber having a curved blade with the edge on the convex side and used chiefly by Muslims.

30. ESP means extra sensory perception.

31. A pentagon is a polygon with five sides.

32. *Gamba* means leg in Italian.

33. A snack is a small meal.

34. Tetanus is an infectious disease caused by the tetanus bacillus.
C. Rules for Definition by Genus and Difference

To construct correct definitions by genus and difference or to evaluate ones that are proposed, certain rules should be used as guides.

Rule 1. A definition should state the most essential properties of the term being defined.

A good connotative definition should be based on basic identifying properties of the members of a class being defined. If one were to define “man” as an animal that has been to the moon, it would be a violation of the rule since having gone to the moon is not essential to knowing what it means to be a man. Socrates was a man long before man had been to the moon.

Rule 2. The definition must not be too broad or too narrow.

An adequate definition should include all cases covered by the definiendum and only these cases. A definition is too broad if it includes cases or objects to which the term does not apply, and it is too narrow if it excludes cases or objects to which the term applies. Thus, the definition of "shoes" as a "covering for the feet" is too broad for it would include socks which are not shoes. And the definition of a "car" as a "Toyota" would clearly be too narrow for it excludes other examples of a car.

Rule 3. A definition should not be circular.

This rule states that a definition should not contain the term to be defined or its synonym. The reason is that a term that needs clarification cannot be its own means of clarification. For example, to define a philosopher as a person who philosophizes is a circular definition.
Rule 4. A definition should be expressed in clear and neutral language.

The purpose of a definition is to eliminate ambiguity and vagueness in a term. Therefore, we should use words that are plainer and more familiar to the listener than the term being defined. We should try to use literal language in definitions rather than figurative or metaphorical ones, for the latter are susceptible to varied interpretations. An example of figurative language in a definition is the definition of bread as "the staff of life." This may be good poetic language but is an unclear definition. Of course, the obscurity of a definition is a relative thing. It depends on the level of knowledge of the listener. For example, to define “holoblastic” as the “undergoing of complete cleavage into blastomeres” may be an obscure definition to non-specialists but perfectly intelligible to embryologists. We must also avoid the use of language with a slant or bias that is sarcastic, cynical or facetious. An objective definition tries to convey information rather than the emotions and prejudices of the speaker. Examples of biased or slanted definitions are: Marriage is a state of slavery. Welfare is a racket in which freeloaders take advantage of public charity.

Rule 5. A definition should, if possible, be expressed affirmatively rather than negatively.

Definitions are supposed to explain what a term means, not what the term does not mean. Hence, definitions must be expressed affirmatively whenever possible. Thus, to define the term "plutocracy" as a form of government that is not a democracy nor a monarchy is to fail to explain what the term means. Likewise, to define a woman as a person who is not a man tells us what a woman is not, but does not tell us what a woman is. Sometimes there are terms which are basically negative in meaning and, therefore, are best defined negatively. For example, a bachelor is an unmarried man; blindness is a state of being without sight; baldness is the state of not having hair on one's head, and so on. But even in these examples, there is an affirmative mention of the genus, though the difference is expressed negatively.
2.C.1. Exercises on Connotative Definitions:

Determine whether the following break any of the rules for a good connotative definition:

1. A comet is a heavenly body.
2. A weather vane is a meteorological instrument.
3. An abnormal person is one who acts abnormally.
4. A Republican is a person who favors big business.
5. Democracy is a form of government found in democratic countries.
6. A square is a plane figure with four equal sides and four right angles.
7. Beauty is the flower of virtue.
8. Beauty is the harmony of form.
9. Health is the absence of disease.
10. Abortion is the murder of innocent human beings.
11. Virtue is the opposite of vice.
12. Murder is the premeditated killing of an innocent person.
13. A policeman is a racist pig.
14. A male chauvinist is a man who thinks the opposite sex inferior.
15. Suicide is the killing of oneself.
16. Gold is a mineral that is neither silver nor iron.
17. Psychiatry is a pseudo-science that produces uncertain cures.
18. Woman is synonymous with folly.
19. Woman is the temptress of man.
20. Religion is an obsessional neurosis of mankind.
21. Religion is the opium of the people.
22. Christians are the salt of the earth.
23. Herpetology is a branch of zoology having to do with the study of reptiles and amphibians.
24. An altruist is a person foolishly sacrificing his interest for the sake of others.
25. An atheist is an immoral person who does not believe in God.
26. Man is an animal who laughs.
27. Man is a tool-making and tool-using animal.
28. A philanthropist is a person who practices philanthropy.
29. Darkness is the absence of light.
30. A jury is a group of people at a criminal trial.
31. Premarital sex is sexual intercourse between unmarried persons.
32. A hat is covering for the head.
33. Faith means reason blindly accepting propositions that cannot be proved.
34. An agnostic person is someone who is neither a theist nor an atheist.
35. A carpenter's square is a square used by a carpenter.
36. A violin is a stringed musical instrument played with a bow.
37. Feminism is a movement formed by a group of militant women who hate the admirable career of motherhood and being a housewife.
38. A chicken is a domesticated bird.
39. War is the dehumanizing use of armed violence between nations or parties within the state.
40. Feminism is a movement founded by a group of women who believe in the principle that women should have political, economic and social rights equal to those of men.
D. Translation From Ordinary Language to Categorical Form

Translating statements from ordinary language into categorical form is not always easy. There is no mechanical formula that can be applied in each case in order to make a correct translation. Yet, having to make a translation forces us to reflect on the meaning of the statement proposed and to separate sentiment from fact. To illustrate, consider the following statement:

(1) Ain't nobody going to help you in this world today.

While many might agree with the sentiment expressed by this statement, few would accept as fact the characterization of the world that the statement makes. What that characterization is, however, is not immediately obvious since it is not immediately obvious what the subject and what the predicate classes are that are being related.

Translating a statement into categorical form forces us to analyze and rephrase that statement in terms of quantity, subject, copula, and predicate. Rephrased in accordance with those parameters, (1) proposes that two classes of things are related in a certain manner: the class of things which are people in today’s world (subject), and the class of things which will help you in today’s world (predicate). The manner in which these classes are related is exemplified by the E form “No S are P.” Thus, (1) translated into categorical form becomes:

(la) No things which are people in today’s world are things which will help you in today’s world.

An alternative translation of (1) could be given by taking as its subject the class of “people in the world today” and as its predicate the class of “people that will help you”; and then relating these classes in accordance with the E form to express the proposition.

(lb) No people in the world today are people that will help you.
Both (la) and (lb) are acceptable translations of (1) into categorical form. Of course, neither sounds natural. People don't ordinarily make statements like, “No people in the world today are people that will help you;” even less seldom would one hear a statement like, “No things which are people are things which will help you in the world today.” Both (la) and (lb) are propositions expressed in accordance with the structure of Aristotelian logic, but Aristotelian logic is not a natural language. Aristotelian logic is a formal language. And, while it does have an advantage over natural languages in making clear (a) what classes of things are being related by a statement and (b) how those classes are being related, economy of words is not one of its virtues.

Perhaps the closest analogue in everyday life to a formal language is the language of legal documents. In such documents, the parties involved and their relationship to one another must be spelled out as fully and specifically as possible, and in strict accordance with the form required by the legal system. In this way the chance for ambiguity, vagueness, and misunderstanding is reduced to a minimum; and systematic relationships can be clearly exhibited. It is similar with any formal system, and, in particular, with the system of Aristotelian logic. The subject class, the predicate class, and their relationship must be spelled out fully in accordance with the form prescribed by the system. In general, every formal system has certain advantages and certain disadvantages, depending on the context and the job to be accomplished. That is why there are many formal languages: the system suitable for one job may not be suitable for another.

To use the system of Aristotelian logic, one must construct phrases that clearly designate the class of things referred to by the subject and the class of things referred to by the predicate. As (la) and (lb) illustrate, there is usually more than one correct way of doing this. Only after the subject and predicate have been characterized is it possible to choose the proper copula (is, is not, are, are not) and proper quantifier (all, no, some). To illustrate this again, if the subject of (1) had been phrased as “people in the world today” and the predicate phrased as “people that will not help you,” then a correct translation of (1) would have been:

(1c) All people in the world today are people that will not help you.
The fact that (la), (lb), and (lc) are all correct translations of (1) shows how there is no one correct translation for a given statement of ordinary language. But this does not mean that, for a given statement, all attempted translations are correct. It would be incorrect, for instance, to translate (1) by:

(1d) All people who will not help you are people in the world today.

(Id) does not preserve the meaning given by (1c). This is best seen by contrasting the form of (lc) with the form of (1d).

Form (lc): All S are P
Form (1d): All P are S

Often, when the proposition of the form "All S are P" is true, the corresponding proposition of the form "All P are S" is false. Thus, while "All women are human" is true, "All humans are women” is false.

The only cases in which "All S are P" means the same as "All P are S" are cases in which “P” provides a definition of “S”. In such cases, the proposition "All S are P” is a tautology, a statement which is true by definition. In tautologies, both the subject and the predicate refer to the same class of things, as in "All bachelors are unmarried males." When statements are not true by definition, however, a proposition of the form "All S are P" does not generally mean the same as a proposition of the form "All P are S." “All mothers are female” does not mean that “All females are mothers”.

In each of the categorical propositions (A, E, I, O), the meaning of the subject term and the meaning of the predicate term is best given by their genus and difference. The genus of both the subject and the predicate is the same, and denotes the general class of things of which the subject and predicate are subclasses. The difference of the subject term is that property (or set of properties) that distinguishes its extension from the extension of the predicate term.
Thus, in 1c (All people in the world today are people that will not help you) the genus for both subject and predicate term is "people"; and the property that distinguishes the predicate class is the property of being such "that will not help you." In 1b, (no people in the world today are people that will help you), the genus is again "people", and the subject's difference is "in the world today", but the predicate's difference is "that will help you." Finally, for “no things which are people are things which will help you in the world today”, the genus is "things" and the specific difference for the subject is "which are people" and for the predicate is "which will help you in the world today." This is summarized in the following chart:

<table>
<thead>
<tr>
<th>Genus</th>
<th>subject's difference</th>
<th>predicate's difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a things</td>
<td>which are people</td>
<td>which will help you in the world today</td>
</tr>
<tr>
<td>1b people</td>
<td>in the world today</td>
<td>that will help you</td>
</tr>
<tr>
<td>1c people</td>
<td>in the world today</td>
<td>that will not help you</td>
</tr>
</tbody>
</table>

In ordinary language, the genus of the subject and predicate term is often unstated. In order to give a clear and precise definition of the subject and predicate terms, however, it is important to rephrase them in terms of genus and difference.

Some items that typically translate into universal propositions are:

- every; each; whenever; none; only; proper names; direct references

Following is a collection of examples of correct translation from ordinary language to universal categorical form. Each statement from ordinary language is numbered, and is followed by one or more correct translations.

1. Every Sunday I go to church.
   1a. All days which are Sunday are days that I go to church.

2. Each of my children has a pet.
   2a. All people who are my children are people who have a pet.
3. I love going to the beach.
   3a. All people that are me are people that love going to the beach.

4. Whenever I hear you coming I run and hide.
   4a. All times I hear you coming are times I run and hide.

5. None of her friends smoke.
   5a. No friend of hers is a friend who smokes.
   5b. No person who is her friend is a person who smokes.

6. Only lawyers become judges.
   6a. All people who become judges are people who are lawyers.

7. Only women are mothers.
   7a. All mothers are women.

8. Mayor Jenkins presides over the City Council.
   8a. All people that are Mayor Jenkins are people that preside over the City Council.

9a. Mary Jane won a medal.
   All people that are Mary Jane are people who won a medal.

10a. That pencil on the table belongs to me.
     All things that are "that pencil on the table" are things that belong to me.

While we may gain in clarity when the quantity of a statement is universal, we typically lose information when statements translate into particular propositions. A particular proposition is true if there is at least one individual in the subject class that is related to the predicate class in the manner indicated by the quality of the copula. If there is at least one such individual, then it is irrelevant whether there are many more or few more such individuals. This is illustrated by the following two statements:
(1a) Most children don't like spinach.
(1b) A few children don't like spinach.

Each of these statements could be translated into the categorical proposition:

(1) Some people who are children are not people who like spinach.

While (1) makes clear that part of the class of children are not members of the class of people who like spinach, it fails to indicate how big a part. In ordinary language there are many ways of indicating how much of the subject class is being included in or excluded from the predicate class. Such information is lost when we translate into categorical form. Some words that typically translate into particular propositions are:

most; a few; few; a part of; a majority of; a minority of; a speck of; a heap of; most of; a little bit of; a portion of; x% of; many of.

The following is a collection of examples of translation from ordinary language to particular categorical form. Each statement from ordinary language is numbered and followed by one or more correct translations:

1. Most football fans drink beer.
   la. Some people who are football fans are people who drink beer.

   2a. Some people who are American are people that voted for Barack Obama in the 2008 elections.

3. A minority of the world population consumes 60% of the world's resources.
   3a. Some people who are a minority of the world’s population are people who consume 60% of the world's resources.
4. A speck of sugar fell on the floor.
   4a. Some thing which is a speck of sugar is a thing which fell on the floor.

5. A lot of wage earners don't pay taxes.
   5a. Some people who are wage earners are not people who pay taxes.
   5b. Some people who are wage earners are people who do not pay taxes.

6. A few fish can fly.
   6a. Some things which are fish are things which can fly.

7. Few fish can fly.
   7a. Some things which are fish are not things which can fly.

8. A few women are millionaires.
   8a. Some people who are women are people who are millionaires.

9. Few women are billionaires.
   9a. Some people who are women are not people who are billionaires.
2.D.1. Exercises: Translate from Ordinary Language to Categorical Form:

1. Michael Bloomberg was mayor of New York City, NY for over three years.

2. None of the buses were on time this morning.

3. Few youths have any purpose today.

4. Most of my clothes don't fit.

5. All carry-outs sell expensive food.

6. Some movie stars ain't got much intelligence.

7. Most athletes have strong bodies.
8. Without Koca-kola, no party is complete.

9. Nobody loves me.

10. Every lover knows what happiness is.

11. Few birds wear colored glasses.

12. Not many people swim well.

13. Ain't no child supposed to tell me what to do.

15. Most of the problems in today's economy derive from our involvement in the Iraqi War.

16. Every Sunday the preacher comes to our house for dinner.

17. Only a miracle could have saved me.

18. Everything I did was for her.

19. Most residents of the city don’t run for mayor.

2.D.2. Exercises: For each statement below, circle the letter of the best translation into categorical form:

1. Every horse has a liver.
   a. Most horses have livers.
   b. Some animals that are horses are animals that have livers.
   c. All animals that are horses are animals that have livers.
   d. All animals that have livers are animals that are horses.
   e. All animals are horses that have a liver.

2. Many arrows hit the target.
   a. No object that hit the target is an object that is an arrow.
   b. All objects that hit the target are objects that are arrows.
   c. Some objects that are arrows are objects that hit the target.
   d. Some objects that are not arrows are objects that did not hit the target.
   e. Some objects that are arrows are not objects that hit the target.

3. A few men are honest.
   a. Some people who are men are not people who are honest.
   b. Many people who are men are people who are honest.
   c. Most people who are men are people who are honest.
   d. Not many people who are men are people who are honest.
   e. Some people who are men are people who are honest.
4. Few men who are ambitious are trustworthy.
   a. Some men who are ambitious are men who are trustworthy.
   b. Some men who are not ambitious are men who are trustworthy.
   c. Some men who are not ambitious are men who are not trustworthy.
   d. Some men who are trustworthy are men who are ambitious.
   e. Some men who are ambitious are not men who are trustworthy.

5. Only students who take their tests will pass this course.
   a. All students who take their tests are students who will pass this course.
   b. Some students who take their tests are students who will pass this course.
   c. Some students who will pass this course are students who take their tests.
   d. All students who pass this course are students who take their tests.
   e. All students who take their tests are not students who will pass this course.

6. Jane Brown will make the team.
   a. All persons who are Jane Brown are persons who will make the team.
   b. Some person who is Jane Brown is a person who will make the team.
   c. Some person who will make the team is a person who is Jane Brown.
   e. No person who will not make the team is a person who is not Jane Brown.