

THE ARTS
OF
LEARNING AND COMMUNICATION

A Handbook of the Liberal Arts

Benedict M. Ashley, O.P.

*with the collaboration of
the staffs of the*
ST. XAVIER COLLEGE SCHOOL SYSTEM
and the
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Errata

The Arts of Learning and Communication

The word “savage” for people with a simple food-gathering and hunting culture in Chapter 1 may seem offensive. Actually, the word is from the Latin meaning “those living in the wilderness.” Perhaps I should have written “indigenous” or “native.”

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INTRODUCTION

The Story of the Liberal Arts



ADAM

INTRODUCTION

The Story of the Liberal Arts

ADAM

Adam looked around at the world God had made for him. Was it just a place to eat and sleep? Was it just a place to work with strength of body and skill of hand? Adam at first did not even think about eating or sleeping, and he had no need of working. He only thought, "What strange things I see and hear! They are all mine, but what are they?"

Reaching up he touched the leaves. Bending down he felt the grass and smelled the warm earth and the flowers. In the sky he saw the sun move to the zenith and begin to descend again. In the shadow of the woods he saw the animals playing, and in the boughs he heard the song of birds.

As he examined each strange thing, touched it, listened to it, he began to understand its nature. The lion was different from the rabbit; yet every rabbit was the same as every other rabbit, and every lion was the same as every other lion. In his mind Adam formed a name for each thing he saw and understood, a mental word that stood for the nature of the thing. "The man named all the cattle, all the birds of the air, and all the beasts of the field, but he found no helper like himself" (Gen. 2:20).

At first Adam was not surprised that he was the only one of his kind, the only thing with a human nature. He knew that he was very different from the animals about him. He understood that they were interested only in food and their families. Adam was interested in all things, in just looking at the universe and trying to understand it. It seemed to him that he could never tire of exploring the world about him, particularly because he had begun to realize that God, who made so great a world, must be still more great. Sea and sky had their limits, but there was no boundary to the everlasting wonder of God. How could he ever finish exploring the mystery of God? Would there be a day when God would finally let Adam see him face to face? There was only one God, and Adam knew that it was in God's image that he had been made. Why then was it so strange that just as there was only one God, so there was only one man?

Adam realized that in being king over the world about him, he must imitate God, who is the King and Father of all things. How could Adam be king and father to his world? He could not create it anew, but at least he could keep it in perfect order. He could tend the garden, watch over the animals; but how could he share the greatest of all gifts which God had shared with him, namely, wisdom and understanding? The animals could not share this wisdom and understanding with Adam. If only Adam had children of his own kind to whom he might be a father as God was Father to him, children whom he might teach to understand the wonder of the world, and the infinite wonder of God!

After sleeping on this problem, Adam awoke to find a companion at his side whom God had made for him to be his helper in raising a family of his own. Adam understood that this was Eve, "the mother of all the living" (Gen. 3:20). Adam and Eve were to share the world together, to be its king and queen. How could they also share each other's thoughts? Adam had named all things in his mind with mental words or concepts. Some of these were *proper names*, like the name of Eve, each belonging to a *single* thing. Others were *common names*, representing a *universal concept*, as the name "woman," or "lion," or "bird." These were in Adam's mind, but he did not know at first how to teach them to Eve.

Around them he heard the animals calling, some with squeaks and growls and some in song. Adam understood these *signs* which the animals made by instinct. They were *natural signs* because there was a natural connection between the sign and the thing it stood for. When Adam saw the footprint of a lion, he knew that this was the natural sign that a lion had passed by. When he heard the lion's roar, he knew that this was the natural sign that the lion was hungry. At first Adam and Eve themselves may have used only such natural signs. They smiled at each other to show their love; they pointed or cried out to call each other's attention. This natural language was enough for the animals who had only their feelings to talk about. Adam and Eve, however, wanted to talk over all the things that interested them. Eve saw a lion and turned with questioning eyes to Adam. "What is it?" her eyes said. Adam wanted to explain it to her, to tell her what he had learned about the nature of the lions. He longed to tell her about all the things he had explored; about his plans for the future; above all about God their Father, who had made this world and whom he hoped they might some day see face to face. Natural signs were not enough to say all this, and Adam, with Eve's agreement, began to invent new sounds to stand for the natures of everything he knew. These spoken words were not natural signs, but signs whose meaning came from agreement, *conventional signs*.

Adam in this new language taught Eve all that he knew about the world and God, and she listened in delight. Adam explained it all so clearly! Still there was one thing he said that puzzled her. He said that God had given them the whole world to know and use, but had forbidden them to taste the fruit of the tree of the knowledge of good and evil. When she asked why, Adam explained that he did not know why God had given them this command, but that he was sure that it must be for a good reason. In fact, it was because God wished to test them. He wanted to give them soon the greatest knowledge of all, the most wonderful secret. He wanted to let them see him face to face so that their happiness might be complete, since all the beauty of the world is only a sign of God's perfect beauty. This gift he intended to give them as the reward of their obedience and trust.

They did not earn their reward. Eve one day listened to another teacher, not to Adam, and that teacher was the evil one, "who is a liar and the father of lies" (Jn. 8:45). The devil suggested to Eve the wicked idea that God had forbidden them to eat of the tree because he wished to keep men in ignorance lest they become his equals. If Eve had asked Adam, he would have explained how impossible it was for their heavenly Father to be envious of his children. But Eve did not wait to ask Adam about what the serpent said. Curiously she ate of the fruit, and then persuaded Adam that, since she had already eaten, he must join her.

After they were cast out of their garden into the wilderness, they found life very hard. Adam had to work all day to keep his family alive. He had little time any longer to explore the wonders of the world and little time to give to Eve and the children. Eve too was kept busy all day keeping the children clothed and fed; she was often tired and impatient with them. Their minds filled with a thousand worries and their hearts with restless hunger and anger, Adam and Eve often misunderstood each other and quarreled. Their children grew up missing much that Adam might have taught them, if he had had more time and if there had been more peace at home. The children of Adam and Eve grew up without that clear and wonderful vision of the world their parents once possessed. To these boys and girls life seemed rather puzzling and often very dull.

Today we "poor banished children of Eve" also find the world pretty hard to understand. Often we give up trying to understand it and are content to be ignorant and bored. Who is there to teach us the answers? Many false teachers in television, movies, books, and newspapers give us lying answers when we look for the truth. To get back the beautiful vision of truth and reality which God gave to Adam and Eve we will have to study very hard.

S A V A G E S

Living in the wilderness the family of Adam and Eve and all their descendants struggled to recover their lost heritage of knowledge and their lost control over nature. Their life was probably a great deal like that of savage peoples of today, the jungle people of Africa, the desert people of Australia, or some of our own American Indians.

Yet even such savage people have discovered many *arts* of making a living and recreation. They honor as heroes those who invented these arts and taught them to their tribes. In the book of Genesis it is recalled that Cain and Abel, two of the sons of Adam and Eve, soon learned to earn the necessities of life by their skill. "Abel was a keeper of flocks and Cain a tiller of the soil" (Gen. 4:2). Soon they were not content with bare necessities, for we read that among the descendants of Cain there was a man named Jabel who "was the forerunner of those who dwell in tents and have flocks. His brother's name was Jubal; he was the forerunner of all who play the harp and the flute" (4:20-21). Thus there were not only *useful arts* for the food, shelter and clothing that men require for life itself, but also *arts of recreation*, like music, which men needed to enjoy life and to live well.

At times these savages seemed as poor and ignorant as the animals about them, and yet it took great intelligence to discover and develop any of these arts. It had been easy enough for Adam and Eve to pluck fruit from trees in the garden of Eden, but to earn a living in the wilderness was difficult, and that is why arts were required. To discover even so simple an art as making a tent, a savage had to figure out four things:

1. He had to fix clearly before him his purpose or *end*, exactly what he was trying to accomplish: to make something that would keep out the rain, yet let out the smoke from the fire, and which could be easily moved.
2. He had to picture what the *form* or pattern of such a tent would be like.
3. He had to decide out of what *material* it would be suitable to make it.
4. He had to find the *power* and *instruments* to cut, shape and fasten this material.

As time went by, men discovered how to use even very difficult materials. "Tubalcain was the forerunner of those who forge vessels of bronze and iron" (4:22).

Nor were the savages content to live their lives in mere work and occasional recreation. Men cannot be content with the things that satisfy mere animals. Adam and Eve had found their greatest

happiness in exploring the world, and in friendship with each other and with God. Cain killed Abel because he was jealous of Abel's friendship with God which Cain himself had not deserved. Seth, the third son of Adam and Eve, had a son named Enos, who taught men how to pray rightly to God. When men pray to the true God and seek to do his will so that they can serve him perfectly, they also want to know the truth about the world which God has given them. Throughout ancient times some men pondered on the law of God and recovered something of the wisdom which Adam had possessed.

Yet as the human race was scattered over the world, those living in small groups without wiser men to teach them sometimes became almost like animals in their way of living. Others developed many arts, but also tried to gain still more power by the practice of magic and the worship of the evil spirits. Gradually their ideas of God became clouded and colored by their own cruelties, lusts, and ambitions. Some of them worshipped not God, their Father in heaven, but the earth, which they thought of as their mother who had given birth to them and to whom they would return at death. As they forgot the true God, so their ideas about human conduct and the world of nature in which they lived became twisted and strange.

All over the world these savage people have left their traces: the stone tools which they made, the pictures they painted in the caves, even their living descendants in the backwoods and corners of the world. The simplest and oldest of these tribes which remain today still remember the true God, but many have ideas and customs which seem like a nightmare of fear, cruelty, and impurity.

When the human race had sunk very low, God brought disasters upon men, such as the great flood recorded in Genesis, to warn them that they must turn back to seek him or be extinguished. After this warning he promised that he would let the human race develop once more and strive to rise again to the glory it had lost.

A N C I E N T C I T I E S

Once more men began to struggle and work to rebuild paradise on earth. Some 6000 years ago men began to build great cities. The first were in the country we now call Iraq, along the Tigris and Eu-

phrates Rivers, and in Egypt along the Nile River. Somewhat later they were built in India, in Crete, in China, and finally in Central America.

Today as scientists dig about in the ruins of these cities they find proof that the men who built them were experts in many arts. Irrigation improved the art of agriculture. With a more ample food supply men could live in large groups, and each could specialize in a particular art, exchanging what he made for the other things he needed. Tools and weapons were no longer made of stone but of copper, bronze, and finally of iron.

The life of these cities also became very colorful as the arts of recreation flourished. In the ruins are evidences of the physical games of the people: their ball-games, wrestling matches, chariot and boat races—as well as such mental games as puzzles and checkers. The fine arts made their buildings beautiful with paintings and sculpture in which we see also portrayed musicians, dancers, and actors.

Yet if these city-dwellers had known only such arts, they would still have been savages. It was their discovery of *writing* that proves they were truly civilized, because it shows that they had begun to appreciate the value of human *thought*. They wrote down business contracts and city laws because they saw the importance of living according to fixed principles. Thus their *social thought* was recorded in writing. They also wrote down records of the movements of the stars and kept a calendar. This was their thought about *nature*. Above all they recorded the prayers and ceremonies by which they worshipped God. To all these thoughts they began to try to give clear and beautiful language and expression.

Nevertheless, although they appreciated the value of thought, they did not always appreciate the value of *truth*. The true ideas they recorded were also mixed with all kinds of imaginings that grew out of their pride, ambition, rivalry, and hatred. In Genesis we read how men built the Tower of Babel (11:1-9), not for any useful purpose, nor in order to worship the true God, but merely to display their pride. As a punishment God made this ambitious undertaking the occasion of quarreling, confusion, and social division. As society became divided into rival groups, each city tried to outdo the next in a display of power and skill, and finally each came to war with

the other. Great conquerors like Nemrod (Gen. 10:9) built up huge empires based on cruel slavery.

Only a few men kept the right idea of human life and of man's relation to God; among them was Abraham, who lived near Babylon in the city of Ur. At God's command he took his family out of these evil cities and found a home for them in Palestine, where later, after his descendants had been freed by Moses from the power of Egypt, they built their own holy city of Jerusalem with a temple dedicated to the one true God. Here they kept the Sacred Scriptures in which they wrote down—just as did other peoples—their laws, their science, their prayers to God, all in beautiful and exact language. This sacred book, or rather library of books, seemed much like the libraries of the other people of that period. But while other ancient books, except for pitiful fragments, have been destroyed, the Bible remains the best-seller of all books today. This is because it was inspired by God and preserved by his Church.

In this Bible we read about the wisest man of ancient times, King Solomon, and the wisdom which he taught his people. "God gave to Solomon wisdom and understanding exceeding much, and largeness of heart as the sand that is on the sea shore. And the wisdom of Solomon surpassed the wisdom of all the Orientals, and of the Egyptians. . . . Solomon also spoke three thousand parables: and his poems were a thousand and five. And he treated about trees from the cedar that is in Libanus unto the hyssop that groweth out of the wall: and he discoursed of beasts, and of fowls, and of creeping things, and of fishes. And they came from all the nations to hear the wisdom of Solomon, and from all the kings of the earth who heard of his wisdom" (III Kings 4:29-34). It seemed that Solomon had regained the wisdom of Adam. Yet in his old age he was led by his pagan wives into foolishness, and to please them he began to worship idols.

G R E E K S

It was not in these most ancient lands that the arts and sciences came to full flower, but in Europe in a more youthful country, in the small and busy cities of Greece. Unhappily, even there slavery

was common, and the useful arts were left to slaves who had no ambition to make new inventions. It was only in those arts which were thought fitting for free men that the Greeks showed unique genius.

In the Olympic games athletics became an art. As men developed a keen appreciation for the strength, proportion, and control of the human body displayed in these games, they also learned to make and appreciate buildings, statues, and paintings that were strong, well-proportioned, and yet graceful. The same sense of balance and symmetry helped them to write stories and plays, such as the epics of Homer and the tragedies of Sophocles, more dramatically told than those of former times.

Finally, this search for clarity and order in all that they did led the Greeks to discover the *art of arts*, the art of clear and orderly thinking which is called logic. It is the art of arts, because clear thinking is the basis of every art and science.

To think clearly is to give the precise reason or proof for whatever we claim to be true. There were many clever men in Greece called *sophists* (wise men) who were constantly arguing and talking and proposing new and surprising ideas. What one man said was true, another claimed was false. Men began to doubt that it was possible to be sure what was really true.

Then appeared a man who was truly wise but refused to be called anything but a "lover of wisdom" or a *philosopher*. He showed that the only way to settle an argument about what is true and what is false is to begin by defining your *terms*. He was named Socrates, and was finally put to death because he angered men when he pointed out that they were always talking without knowing what they were saying.

His pupil Plato continued the work of Socrates and showed that to think clearly one must not only define his terms, but must also *state his principles*, that is, the basic truths on which knowledge rests. In youth Plato excelled as a wrestler, and he knew that to throw an opponent in wrestling one must plant one's feet firmly on the ground. It was in a gymnasium that he established the first great university called the Academy, and here he made **mathematics** the basic study, because it is by the hard intellectual wrestling of mathematics that the mind is developed in the art of logic.

In the Academy were taught **arithmetic** (or algebra) and its application to **music**. These had already been invented by another philosopher named Pythagoras. Also **geometry** was taught, although it was only somewhat later that it was brought to perfection by Euclid, and its application to **astronomy** fully developed by Ptolemy.

It was the greatest of Plato's pupils, Aristotle, who realized that logic should be strictly applied not only to mathematics but to all branches of learning. He founded his own school, the Lyceum, with a museum and laboratories, and there established the first complete curriculum of studies. He showed that the chief task of logic is not merely to define terms and to state principles, but to make *proofs* or demonstrations. He discovered that there are four kinds of proof and hence four kinds of logic:

1. Sometimes in studying the sciences we can prove that a statement is certainly and exactly true. This is **demonstrative logic**.
2. Sometimes in studying the sciences we cannot prove a statement exactly, but we can give probable proofs and keep searching. This is **dialectical logic**.
3. Sometimes what is needed to convince people are reasons which persuade them by moving their emotions so that they will accept the truth and act on it. This is **rhetoric**.
4. Sometimes what is needed is to entertain people by helping them to appreciate and enjoy the truth. This is **poetics**.

The followers of Aristotle founded a still greater school at Alexandria in Egypt, called the Museum (after it all our museums are named), and from there Aristotle's system of education spread to the whole western world and became the basis of all our education today. In this system of education a student has four main subjects to master:

1. The four types of logic and the four types of mathematics just listed. These are called the **liberal arts**.
2. **Natural science**, the study of the nature of man and the world in which he lives.
3. **Social science**, the study of man's life.
4. **Theology**, the study of God.

THE ONE TRUE TEACHER

The attempts of savage people to restore paradise on earth by their corrupt arts had ended in such disasters as the flood. The attempts of the great ancient cities to restore paradise on earth had ended in warfare and vain schemes like the Tower of Babel. The search of the Greeks after wisdom seemed at first to succeed, but it too came to an end when the Romans established a world empire in which wisdom became only a tool to gain power and wealth. In Rome the emperor was made a god, and Rome began to go down to the same destruction that had followed all the foolish pride of previous civilizations.

Of all the people in the world only the Jews had kept the true idea of God, of his law, of the relation of man to nature; but they kept themselves pure only by remaining narrow. The fate of their great wise man Solomon had shown them the danger of mixing with foreign nations, and they knew no way to combine the wisdom of the Greeks with the truth contained in their own Bible. This truth that the whole world needed was stored up in Jerusalem, and, like grain that is kept too long in storage, it had begun to mildew. Who would open the granaries of truth and feed the famished nations?

Mankind had proved that by itself it could not restore paradise. Then from a most unlikely place the true teacher of mankind, the second Adam of the human race, appeared. He seemed to be only a poor young workman, a carpenter of the Jewish nation. He was not a student of the philosophy of the Greeks. Nor was he a king like Solomon. He was the Son of God, who had become a man like us to save us and to teach all men by his example and his preaching.

Jesus Christ was not a student of the philosophers. He was the supreme philosopher and teacher who required no one to teach him. He gave an example to those who practice the useful arts by himself working for years as a carpenter. He gave an example also of fitting recreation, for he did not hesitate to come to the banquets of the people. In his teaching he used stories which are masterpieces of poetics and of rhetoric. He corrected our understanding of nature when he showed how all things in the world follow the law of God's providence and how man has a dignity above all other visible crea-

tures. He also corrected our understanding of life and society by teaching that all law is summed up in the love of God and neighbor. Finally, he revealed to us the supreme secret about God himself, that he is one God in three divine Persons, a truth hidden (except in shadowy outlines) from all ancient thinkers.

Now that Jesus Christ has shown us the true way we need never be in any doubt as to where to find the truth. He taught us all the great truths we will ever need. Until he comes again, we have only to remain faithful to that truth, strive to understand it better, and use it as a guide in our search for the lesser truths that will complete the picture. Our Lord has even provided the Church and the help of his grace to guide us in remaining faithful to his teaching. When he ascended into heaven he left this Church, headed by his apostles and their successors, the bishops, to educate the whole human race. He warned his apostles, however, that this work of educating the world would be a difficult task which would not be completed before he comes again. Many would not understand what the Church was trying to do and would claim that the bishops were trying to suppress the truth, because they were correcting teachings which were only partly true.

Jesus promised that gradually the Church would go on gathering together the fragments of truth wherever they were to be found, cleansing them of error, and fitting them into the broad framework of his own teaching.

CHRISTIAN EDUCATION

In order to bring the truth of Christ to the world, the Church had to overcome three great efforts of the forces of darkness to put out the light which she held so high.

The first threat was the effort of pagan Rome to absorb the Christians, when it found that it could not destroy them by persecution. The pagan philosophers tried to water down the truth of Christ's teaching and turn it into a mere form of pagan philosophy. The great Fathers of the Church—teachers like St. Ignatius of Antioch, St. Irenaeus, St. Basil, St. Gregory Nazianzen, St. Augustine, and St.

Jerome—defeated this threat by showing how much greater was the teaching of Christ than that of the philosophers, although whatever was *true* in philosophy might be used in Christian education.

The second great threat was the period of disorder called the Dark Ages. The Roman government, weakened by its failure to accept Christianity wholeheartedly, collapsed under the onrush of Germanic barbarians from the north and Mohammedan barbarians from the south. During this dark time of war and confusion the Church kept patiently at work building the foundations of a new civilization. It was in the monastery schools, especially those of the Order of St. Benedict, that the ancient education was not only kept alive, but purified of its paganism and given a new and truer form based on the study of the Sacred Scriptures.

Gradually peace was restored in Europe; many of the barbarians were converted, others were driven back. The Church at last was able to establish the great schools called the **universities**. Here the wisdom of the Lyceum and the Museum was restored, except that now on the throne of wisdom sat a new queen, no longer natural theology, but Sacred Theology based on the teaching of Christ. In the beautiful cathedrals of the Middle Ages we see Sacred Theology portrayed in stone, surrounded by all the arts and sciences which made up medieval education. They are symbolized as follows:

I. THE LIBERAL ARTS:

A. The Trivium or *three ways* to knowledge:

1. Grammar (and with it poetics), symbolized by the figure of Donatus, a Roman teacher who wrote the Latin grammar-book used in all medieval schools.
2. Rhetoric, symbolized by the figure of Cicero, the great Roman orator.
3. Logic (including both demonstrative and dialectical logic), symbolized by the figure of Aristotle.

B. The Quadrivium or *four ways* to knowledge:

1. Arithmetic or algebra, symbolized by the figure of Pythagoras.
2. Geometry, symbolized by the figure of Euclid.
3. Music, symbolized by the figure of Tubalcain (rather than his brother Jubal, because in the Middle Ages bells were a

favorite musical instrument and Tubalcain was the inventor of metal work).

4. Astronomy, symbolized by the figure of Ptolemy.

II. PHILOSOPHY (science), symbolized by a noble woman with her head in the clouds and her feet on the earth:

A. Natural science and with it medicine, sometimes symbolized by the figure of Galen, the great Greek doctor and disciple of Aristotle.

B. Social or moral science and with it law, sometimes symbolized by the figure of Justinian, the Christian Emperor who codified the Roman law.

C. Metaphysics or natural theology, represented by Plato, who was regarded by the earlier Middle Ages as the great pagan theologian.

III. SACRED THEOLOGY, symbolized by a queen holding the Sacred Scriptures, or later by St. Thomas Aquinas, the Common Doctor of the Church.

This system of education was perfected by the great Doctors of the Church (of whom St. Thomas Aquinas was the chief, along with St. Bonaventure and St. Anthony of Padua, St. Albert the Great, and later St. Robert Bellarmine and St. Peter Canisius) and by educators like St. Ignatius Loyola, St. John Baptist de la Salle, and St. Angela Merici. It remains the foundation of all education today, even of that given in non-Catholic schools.

The third great threat to the Church is still not wholly overcome. The reign of Christ had to be extended beyond the borders of Europe to the whole world. Yet this very expansion brought dangerous temptations. The Crusades opened up the East with its romantic luxuries and its mysterious cults. The discovery of the New World opened up the West as a source of enormous riches and power. The life of Europe became very colorful with the growth of the interest in literature and fine arts which we call the Renaissance. Dazzled with worldly riches and glory, the rulers of Europe began to struggle with each other for supremacy. They even sought to make the institutions of the Church serve their own purposes rather than those of Christ.

The result was the decay of religious unity which we call Protestantism, and the growth of indifference to spiritual things which we call Secularism. The progress in art, in science, in invention, and in geographical exploration were all achievements which had their roots in the education given Europe by the Church, but men forgot this and began to attack the Church as the enemy of progress. The Church, in spite of these persecutions which for a long time deprived her of much of her educational influence in Europe, continued patiently to spread her missions into other lands.

CHRISTIAN EDUCATION TODAY

We are living in a time when the Church has finally become world-wide and is teaching all nations. Yet the world is full of wars and quarrels that make it difficult for the voice of the Church to be heard. In our own country we have two systems of schools. There are the Catholic schools which teach the wisdom of Christ in a complete way. Most of our young citizens, however, attend non-Catholic schools.

These non-Catholic schools (which are excellent in many ways) actually had their origin in the schools of the Church but are now separated from her influence. They still teach much of what they learned from the Church and from the civilization which she preserved and developed, but they are required to leave out the teaching of many truths, because there is so much disagreement about basic principles among non-Catholics.

Your own school is not perfect, because it has been hindered from developing perfectly by all the confusion and troubles in the world. Nevertheless it has a sound Catholic foundation and is striving to give you the best possible education, to give you the whole teaching of Christ, and to show you how all the other knowledge which the human race has discovered can be fitted into this framework and developed still further.

Because of outside pressures and influences on Catholic schools, the names and arrangement of courses are often different from our traditional curriculum, although the subjects taught are still essential-

ly the same. Thus under the term "English" we include all the branches of logic. Arithmetic is today called "algebra." The term "social science" has replaced the older term "moral science" or "ethics." Natural science is split into many branches: general science, biology, chemistry, physics, psychology.

The special work of improving Catholic schools began when Leo XIII in 1879 recommended that all Catholic teaching be placed under the guidance of the philosophy and theology of St. Thomas Aquinas. The present Holy Father, Pius XII, has repeated this advice and urged us also to fill in the Thomistic framework with all the new discoveries of our age.

In your lifetime you will play a part in this great story of the advance of truth. Like all men and women since Adam, you will find that living involves problems concerning the four great fields of human knowledge:

1. **Liberal arts**, or arts of thinking and expression, because it is these arts that will make it possible for you to think clearly, to study well, to teach and persuade others.
2. **Natural science**, because our knowledge of the world and of human nature is the basis of everything we think and do, and of all human progress.
3. **Social sciences**, because they are our guide in living with others.
4. **Christian doctrine**, because it tells us about God and the purpose of human life.

Of these the liberal arts must first of all be mastered, since to try to study other subjects without using the arts of study would be to try to fight without weapons. Already in elementary school you have been preparing to study all these subjects, but now you are entering a new phase of education when you will complete your liberal arts studies.

In the rest of this book you will find a guide to this work of completing your knowledge of the liberal arts. You will learn to think clearly and to read and speak effectively, by mastering four types of logic:

1. **Demonstrative logic.**
2. **Dialectical logic.**

3. Rhetoric.**4. Poetics.**

Everything you say or read, even a comic-book, involves these four types of logic. You will learn all four together, emphasizing demonstrative logic, then seeing how its rules apply to other kinds of logic. This means learning to do three things, the three processes which Socrates, Plato, and Aristotle showed are needed for clear thinking:

- 1) *To define your terms* (Chapters I and II).
- 2) *To state your principles* (Chapter II).
- 3) *To prove your conclusions* (Chapter III).

QUESTIONS FOR DISCUSSION

1. How do our emotions interfere with clear thinking?
2. Why do parents and children frequently misunderstand each other? Why do friends sometimes quarrel?
3. Can you name some other men or women, besides those listed in this chapter, famous for each of the arts and sciences? If you were going to symbolize each of the arts and sciences in a modern cathedral, whom would you pick to represent each art and science?
4. What are the advantages of attending a Catholic school, rather than a non-Catholic school?
5. Can you place every course which is taught in your school in its proper place in the outline on page 22?

DEFINITIONS

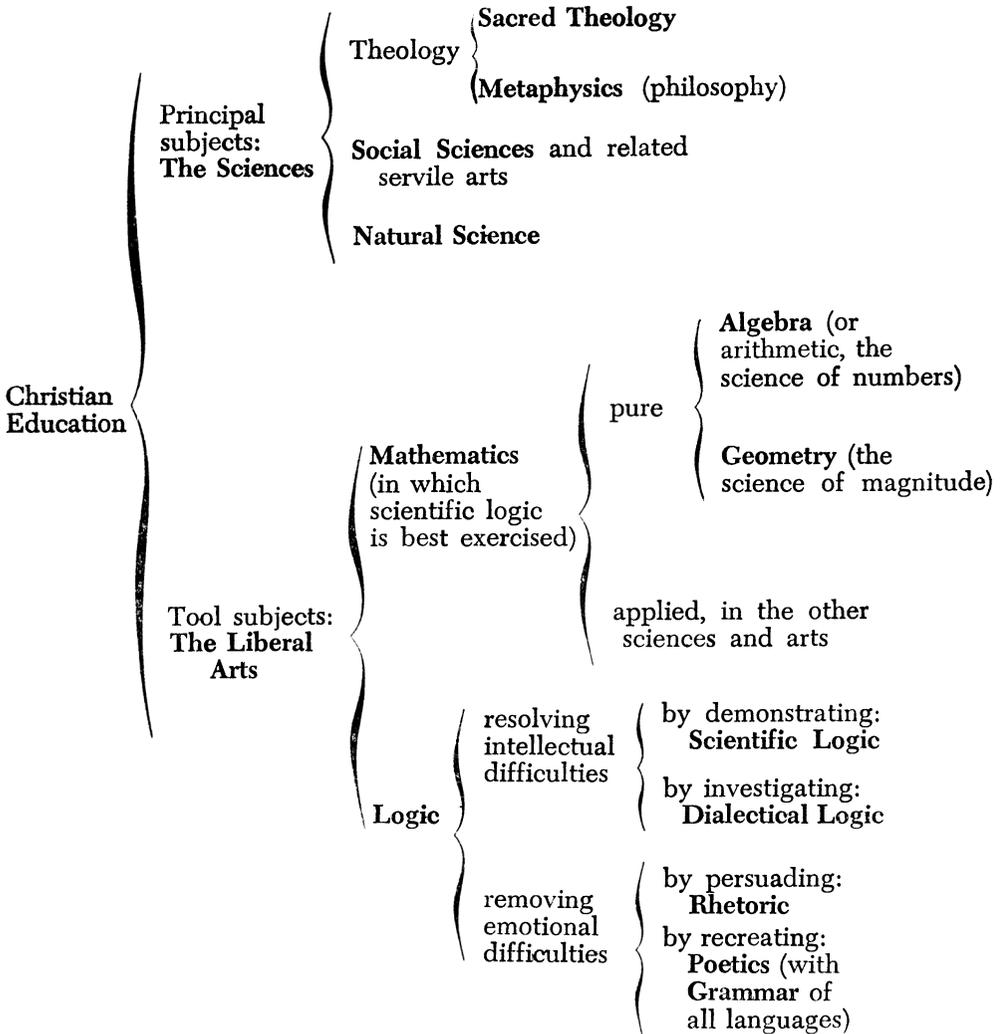
Memorizing may seem to be a very tedious task. There is no use in memorizing a great many random facts, but to memorize *definitions* and *classifications* of the fundamental concepts in a science or art is the most efficient way of studying. Such definitions and classifications summarize a great deal of orderly information in a very short and easily remembered form. If you have trouble in studying for examinations, it is probably because you waste much of your time on unimportant points. If you list the important terms in the subject and memorize their definitions and their classification, you will be quickly and thoroughly prepared. It is important, however, to memorize a definition *exactly*, since every word in a good definition is chosen with care.

1. An art is an intellectual ability acquired by practice of making something in a reasonable way.
 - 1) A *servile art* is an intellectual ability, acquired by practice, of making something outside the mind in a reasonable way.
 - 2) A *liberal art* is an intellectual ability, acquired by practice, of making something within the mind in a reasonable way.

2. **Logic** is a liberal art by which our reason is enabled to give a right mental order to the things it knows, so that it may proceed in an efficient and safe manner to attain truth.
 - 1) *Demonstrative logic* guides us in attaining scientific, that is, certain and exact, truth.
 - 2) *Dialectical logic* guides us in choosing the more probable opinion, when we do not yet know enough to have scientific truth.
 - 3) *Rhetoric* guides us in persuading others to right opinion and action, when their emotions might incline them to the opposite way.
 - 4) *Poetics* guides us in recreating others with the contemplation of beautiful deeds and the quieting of restless emotions.
3. A **sign** is something which leads to the knowledge of something other than itself.
 - 1) A *natural sign* is something which leads to the knowledge of something other than itself because of a natural similarity or natural connection between them.
 - 2) A *conventional sign* is something which leads to the knowledge of something other than itself because of human custom and usage.
 - 3) A *distributive universal sign* or concept is one which signifies a nature possessed by each and every one of many things.
 - 4) A *singular sign* or concept is one which signifies one single thing.

CHRISTIAN EDUCATION

(A classification to be memorized)



PART ONE

Logic as an Art



DANTE

VERGIL

CHAPTER I

Poetics: The Art of Storytelling

HOW TO READ A STORY

THE DIFFERENCE BETWEEN A STORY AND A SERMON

Most of us enjoy reading a story more than any other kind of reading. Many readers, however, find it difficult to enjoy any but the most simple and obvious type of stories such as the "western" or the "true romance." There is a whole world of enjoyment which is closed to them—the world of stories which can be appreciated only by those who understand something of the art of storytelling. A Chinaman at a baseball game does not enjoy it until the rules of the game are explained to him and he begins to appreciate the art of baseball. The purpose of this chapter is to introduce you to the fundamental rules of the art of storytelling.

The first reason many people do not know how to enjoy literature is that they do not realize that the word "literature" covers very different kinds of writing which have very different purposes. Some people think that all good literature is supposed to teach us a moral, while only cheap literature is entertaining. As a matter of fact there are at least two great types of good literature. One is called *imaginative*, the other *persuasive*. The art of writing and of analyzing

imaginative literature is called **poetics**; the art of writing and of analyzing *persuasive* literature is called **rhetoric**.*

Imaginative literature includes a great variety of types: the epic, the novel, the short-story, the play, the lyric poem, some essays, and many other forms. Literature is imaginative or poetic when its purpose is to entertain and delight us by telling a story. Its purpose is *recreational*, but it gives us a different and more intimate type of recreation than sports or games. Sports and games primarily recreate and refresh the body, although they also give some rest to the mind and emotions. But imaginative writing directly and profoundly rests and delights our souls by lifting our minds and emotions above the cares, confusions, strains, and frustrations of everyday life to a wider and clearer vision. It is not a mere escape from life. Rather it is a glimpse of the goal ahead which encourages and inspires us to live more fully and perfectly.

Persuasive or rhetorical literature does not aim at entertainment, but seeks to persuade us *to do something*. Propaganda, advertising, selling, the political speech, and the sermon are all examples of persuasion. The imaginative writer invites us to relaxation and enjoyment, while the rhetorical writer urges us to action and achievement. The imaginative writer inspires us with a wider vision of life; the rhetorical writer urges us to a decision about some problem which is immediately at hand. Thus the aims of imaginative and rhetorical writing are, as it were, opposite to each other. As a result, in most cases good imaginative writing is bad rhetorical writing, and good rhetorical writing is bad imaginative writing.

These two arts differ also in this, that the imaginative writer wishes us to notice and to enjoy the skill with which his story is told, but the rhetorical writer seeks to conceal the fact that he is trying to influence us.

We must learn to distinguish these two kinds of writing and judge each by its own purpose and rules. When we ourselves wish to entertain others in conversation or to persuade them in practical

*The terms **poetics** and **rhetoric** go back to the philosopher Aristotle. Do not make the mistake of thinking that poetics applies only to "poetry" in verse. It applies to many prose compositions, such as the novel and short story. Also do not make the mistake of taking "rhetoric" in a derogatory sense as in the phrase "mere empty rhetoric." Much of the greatest writing in the world is rhetorical, for example, the sermons of our divine Lord or the letters of St. Paul.

life, we need to understand the techniques of these two arts. When others try to entertain or persuade us, we must be able to appreciate and enjoy the entertainment and yet not be unduly influenced by the persuasion.

In this chapter we will be concerned primarily with imaginative writing, in the next with persuasive writing.

THE SOUL OF A STORY

In imaginative writing the soul of the writing is its story or *plot*. No matter how long a novel may be, every detail of it is tied together by its plot, just as every part of our body receives its life from the soul. A part of our body which is separated from the soul dies and is useless. Similarly any word or incident or character in a story which does not contribute to the plot is deadwood. The great storyteller Edgar Allen Poe said:

A skillful literary artist has constructed a tale. If wise, he has not fashioned his thoughts to accommodate his incidents; but having conceived with deliberate care, a certain unique or single *effect* to be wrought out, he then invents such incidents—he then combines such events as may best aid him in establishing this preconceived effect. If his very initial sentence tends not to the outbringing of this effect, then he has failed in his first step. In the whole composition there should be no word written of which the tendency, direct or indirect, is not to the one pre-established design. And by such means, with such care and skill, a picture is at length painted which leaves in the mind of him who contemplates it with a kindred art, a sense of fullest satisfaction.

We all recognize this in the telling of a joke. One person tells a joke and it is funny. Another tells the same joke and no one laughs. Why? Because the artful storyteller makes every word and every pause contribute to the comic effect, while the dull storyteller spoils the point by introducing irrelevant remarks and by bad timing. The first rule of the art of storytelling is to grasp the plot, which is the very soul of the story, and to make every detail contribute to it.

At first sight it seems quite easy to find the plot of a story. Most people can repeat the incidents of a movie they have seen or a novel they have read. A mere listing of incidents, however, is not the plot. As Poe indicates in the quotation above, a writer does not begin with a series of incidents. He invents the incidents to bring out a central

effect or idea. It is this central idea, and not merely a string of incidents, which is the plot.

The central idea of a story, however, is not some abstract thought, it is an *action*. The plot is some single action of which the various incidents are only parts. In a long novel this action may be made up of hundreds of incidents all of which form a single whole. In a short lyric poem this action may be a single event which takes place within someone's mind and heart. If we can discover this single action or plot on which the whole story is built, we will truly appreciate it. In order to learn to do this, we should practice trying to state the plot of each story we read in a *single sentence*. Of course such a sentence only gives us a faint notion of the reality of the plot itself. If a writer could present the plot to us fully in a sentence, he would not have bothered to write his story in so many pages. But such a summary sentence is a test of whether we have really begun to see the plot. If we try this exercise, we will soon realize how poorly we have been reading and how much we have been missing. We will probably find that we have only been reading incidents and have missed the plan of the whole story. We are like a man who works in a skyscraper and has been in every room of it, but who never sees the building from a distance. Such a man has no idea of the size or beauty of the whole building.

Some people, even famous critics, do not appreciate the plot of stories. They think that only rather trivial writers of mystery stories or adventure stories pay much attention to plot. Such critics often say that the important thing in a story is the *characters*, or the *thought*, or the *style*. It is true that in some very fine stories the element of plot may be very simple, while the element of character or thought or style is very much emphasized. There are plays, for example, in which the incidents are quite simple, but the psychology of the characters is very vividly portrayed. There are other plays in which we are most interested in the witty dialogue or thought of the speakers, and others in which the beauty of style seems to make up for lack of action. Nevertheless, if we study such plays carefully we will discover that they do not hold our attention unless the characters, the thought, and the style contribute to making the plot strong and effective, regardless of how simple it may be. This is especially clear in a play,

but it will be found to be true also in all kinds of imaginative writing. The reason for this is that character can be known perfectly only through *action* ("by their fruits you shall know them"), while thought is imaginative and poetic only when it expresses the motives which move people to act. Abstract thought, separated from human action, does not have an imaginative effect. As for *style*, human words are much more suited to narrate actions than to paint pictures or descriptions in static terms.

Thus we may say that an imaginative work has three objects of representation or imitation' namely, *plot*, *character*, and *thought*. Of these, plot is primary. All three are the **form** of a poetic work, while the *style* pertains to its medium or **matter**.*

THE QUALITIES OF A GOOD PLOT

What makes a plot good? Not every account of an action makes a good plot. We might write an accurate account of some battle which would be very poor entertainment. Mere dry fact does not catch our imagination, nor please us. Yet Shakespeare in many of his plays took such dry historical accounts and turned them into exciting stories. This was because he knew how to put feeling or *emotion* into his account.

Both imaginative and rhetorical writing differ from matter-of-fact writing, because they not only state facts but also arouse our emotions and feelings. They make us tense and excited about what comes next, or satisfied and delighted with the way things turn out. Rhetorical writing arouses our emotions in order to get us to do something. Hence the preacher or salesman attempts to keep us emotionally keyed-up until we can act. The imaginative writer, on the other hand, is trying to entertain and refresh us. Hence he not only arouses our emotions, but also satisfies them and brings them to rest in the contented enjoyment of the beauty of his work. At the end of a good novel or play we feel calm and at peace, although during the read-

*Do not confuse the term "form" used of the plot with the term "literary forms," such as the novel, short story, lyric, sonnet, blank-verse, etc. The true form of a work is its plot. Its literary "form" is merely a convenient classification of the *technique* with which it is told, and really pertains to the **matter** of the work.

ing or performance we may have felt fear or excitement, or even have wept. This peace of soul enables us to look back over the novel or play and see it as a beautiful whole which expresses some deep truth about life which we had never fully appreciated before, but which seems to us so perfectly embodied in the artist's work.

This is true even if a story is sad. Some people cannot endure to read a sad story because it leaves them depressed. This is either because the author has not told his story well or because the reader does not know how to appreciate the art of storytelling. A good reader enjoys the story even if it is sad, for he delights in the beauty with which it has been told. In fact, sad stories are often more truly entertaining than joyful ones, since they seem so true to the facts of life, which are often very sad, and since they help us to look through this sadness to the great and perfect pattern of God's providence, which is working to bring eternal beauty and joy out of the sorrow of this world. Even the Greeks, who as pagans had only a dim notion of God's providence, realized that in tragedy there is something grand and noble in the restoration of the law of the universe through the punishment of sin.

This power of a story first to arouse the emotions and then bring them to rest in the vision of life was called by the Greeks *catharsis* (purification), because it cleanses the soul of disturbed emotions. Most people live a rather petty life of worries, frustrations, and routine. Their emotions are out of tune, and their vision is narrow and blurred. The magic of the imaginative writer releases the emotions from their daily worries and sets them in tune like a beautiful melody, so that they lift the mind on wings to take a broad view of the universe. A wise man or philosopher (a lover of wisdom) is able to take this broad view at will. Such wisdom comes only after a long life of discipline and thought, but the poet is able to give us a glimpse of that broad vision even when we are young and perhaps foolish. Even the wise man grows weary at times and needs the refreshment of the poet's spell.

If a story is to produce this catharsis and this vision, it must be very vivid and concrete, since the emotions are not aroused by something dry and abstract. It is only when one can imagine very clearly how an event took place—and can sympathize with the people to

whom that event happens that one becomes emotionally involved. That is why a poor reader can enjoy a movie but not a book. When he reads, he does not know how to imagine the events. But a good reader finds the book even more vivid than the movie; and when he sees a movie made from some great book he has read, he usually finds the movie version very thin and uninteresting. The great writer is the one who has firmly grasped the central idea or single action of his story and then has been able to render that action entirely concrete and vivid.

Since the plot is the soul of the poetic work it must be *unified*; otherwise it would not weld the part of the work into a perfect whole. It is unified when it consists of only one *principal action*. There may be other interwoven sub-plots, but these must strengthen the main plot by emphasis or contrast, and must not confuse or hinder it. Nothing should be admitted to the story that does not contribute to this main plot, although in some types of writing (particularly the novel), we permit the organization to be looser than we expect in an intensely moving play, short story, or lyric.

The plot must be *complete* or it will leave us unsatisfied. To be complete it must have a *beginning*, in which a new action arises from some situation. This new action should unfold in a series of connected events or incidents which form the *middle* of the story, and these should lead to a final rest or *resolution* (the end), in which all the forces set in motion at the beginning work themselves out. These requirements seem rather obvious; yet many plays and stories will be found which are faulty because the writer is either too slow in getting his action started, or because he does not work out the middle in a series of connected but contrasted incidents, or because—and this is the hardest task of all—the writer cannot bring the forces set in motion to a real rest and conclusion.

Sometimes a plot is *simple*; then its action moves in one straight line from beginning to end. More interesting is the complex plot, in which the action seems first to move toward one goal and then suddenly to *reverse* itself and move toward a contrary goal. This reversal is also often called the *climax* of the play, while the resolution or ending is called the *denouement*. The magnitude or length of a story or poem (the number of incidents, etc.) must be sufficient for

the forces set in motion to work themselves out. It should be no longer.

CHARACTERS AND THOUGHT

The characters who carry out this action must appear to be *consistent* and like real human beings; they must also be *appropriate* to the type of action they are to perform so as not to make the plot itself seem improbable. It is in the characters that the reader sees both the outward action and the inward action or *emotion*. It is this sharing in the emotions of the characters which helps one to enter into their experiences and to understand them more fully than if they were only known in an abstract way.

The characters reveal themselves chiefly through what they do, but if we could see only their actions we would not fully understand their interior motives. Hence a third element in a story is the thought expressed in the speeches of the characters and also by the comments of the author. Unless this thought helps us to understand the action and enter into it, it is irrelevant and boring. If it is to represent the way in which one character seeks to persuade or influence another, it is clear that thought must obey the rules of rhetoric. In the next chapter we will study these rules which must be known by an imaginative writer if he is to express thought well in his stories. The imaginative writer, however, must be careful in making use of rhetoric that his story does not become a sermon. Thought and the rhetoric used to express it must be kept strictly subordinate to plot if a story is to be good imaginative literature.

Plot, character, and thought are the form of the poetic work because they are the objects represented or portrayed by the writer. They are the pattern which he wishes to embody in his materials, just as a builder wishes to embody a blueprint in stone and brick, glass and steel. What are the materials of the imaginative writer? They are *words*. The great storyteller is one who so thoroughly understands the magic of words that he is able to use them to make his story, with its characters and thoughts, live in our imagination. This is not to say most authors first work out their plot completely and then find words for it. As they write, words and plot, matter and form, body and soul,

weave themselves together so that the plot gives form to the words and the words give body to the plot.

Many people have no conception of the magic powers of words. In the second part of this chapter we are going to study words very carefully with the purpose of learning something of this magic. The study of words constitutes the first step in the study of *style*. Words must be put together into sentences, sentences into paragraphs, and paragraphs into whole compositions. This weaving of the matter of a story to fit its plot is what is called *style*.

Before taking up this study of words let us consider an example of good story telling. On page 407 you will find a short story by the French writer, Alphonse Daudet, called *The Last Lesson*. This simple story is told with very great art. Let us see how we would begin to appreciate the storytelling skill of the author.

First we try to grasp its central idea or plot. Some readers if asked for the plot of this story would say:

An Alsatian boy was late on his way to school. On the way he saw people looking at a notice before the mayor's office, but he did not read it. When he got to school he found not only the teacher and the pupils but some of the townsfolk. He learned that this was the last class to be taught in French, because the occupying Germans were abolishing French in the schools. The teacher was in his Sunday best and he taught the lesson very solemnly. All the pupils, impressed by the occasion, studied very hard. Franz, the boy in question, did not know his lesson. The teacher did not scold him, but pointed out that he and all the rest had not appreciated the French language when they were free to use it. Now the schoolmaster after so many years of teaching had to go away. The lesson came to an end when the teacher wrote *Vive la France* on the blackboard because he was so overcome by emotion that he could not speak.

This is a summary of the incidents of the story, but it does not at all make clear the plot or central action. The plot can be much more clearly expressed by a single sentence:

A country which lacked patriotism learned it only on the day when it lost its right to its own culture.

When we express the plot in this compact way we see that the various incidents, such as the boy's tardiness, the crowd at the bulletin board, the faulty recitation, etc., were invented by the author to bring out his central story.

We should now see if this plot is complete and unified. The obvious *beginning* is the incident of the boy's running late to school, but this is only a way of expressing the real beginning of the action:

A country lacked patriotism so that it permitted a foreign country to occupy it without realizing what it had lost.

The *end* of the action is:

This country finally realizes its loss just when it is too late.

This is expressed by the last words of the schoolmaster when he writes "*Vive la France*" and closes the school.

The *middle* is the series of incidents that lead from this beginning to the end. They are:

1. The crowd reading the bulletin board.
2. The boy's surprise at the unusual scene in the schoolroom.
3. The boy's poor recitation and the teacher's speech.
4. The earnest application of the students to their lesson.
5. The sound of packing of trunks upstairs which reveals that the teacher must leave town.
6. The sound of the clock and of the Prussians returning.

The plot can be judged to be unified if each of these incidents is needed to carry the action forward to the end. It is complete if the end brings this action to a full rest.

A study of these middle incidents will quickly show us that the plot is indeed unified and complete. The running boy's glimpse of the crowd at the bulletin board suggests to us what is about to happen and arouses our interest. This is increased by the strange scene in the classroom. At this point we finally understand the situation and the beginning of the story is complete. The incidents of the teaching and the teacher's sorrowful speech are the *climax* of the story. Up to this point we have probably been thinking that the cause of the disaster is merely the tyranny of a foreign nation. Suddenly at this point we see that the deeper cause is the failure of the French themselves to appreciate their own culture. It is this that has led to the occupation by a foreign nation. The fifth incident stirs up our anxiety about how the story will end. What will the teacher do or say before he leaves forever? Thus the conclusion is complete, because the teacher's words written on the blackboard express the final outcome

of the action: the resolution of all present to be true patriots in the future. The story seems to end sadly, but it does not end in defeat, since now the village has acquired the patriotism which it lacked before. The author is very skilful in making the teacher write rather than merely speak these words. The fact that they are written on the board symbolizes that they are now forever written in the hearts of the village.

We should then ask if this plot is truly imaginative; that is, does it produce a catharsis? We can answer this by showing that the emotion of anxiety and fear aroused at the beginning of the story is brought to rest in the act of patriotic determination in the souls of the villagers. At the end they are sorrowful, but they are also filled with grim courage and loyalty they had not known before. We can see how the author created this emotional effect. He does not describe emotions, but he renders his plot in concrete terms. We see the boy running, the crowd at the bulletin board, the strange scene in the classroom, the sound of the Prussian troops drilling. These scenes create the impression of fear and anxiety. This is renewed just before the end by the sounds which indicate the end is approaching. Finally the emotion of determination is expressed by the clear-cut action of the teacher as he writes on the board.

Once we have learned the central idea of the plot, we should then see how the characters and thought have been employed to bring it out. Why is the story told through a little boy? Why is he a poor and tardy student? Why is the teacher a rather harsh and unsympathetic teacher? As we study the characters we will see that the chief character is really the teacher. He is the one who at this crisis of his life finally wakes up to his own importance. It was his duty to teach the villagers to be true patriots, and he has never really devoted himself to his task. He has acted as if he were just a daily drudge driving little boys to learn about participles, instead of the teacher of the whole village who should have taught noble virtues and ideals. The author has shown us what a humdrum, uninspiring teacher this poor man was, and yet at the last moment how noble he becomes. Is this consistent and lifelike? I think we should answer "yes," for the author has indicated that once this teacher had great ideals, but that he had fallen into a rut.

The little boy stands for the other villagers. He is a symbol of his whole village, in his laziness and lack of clear-sighted ideals. The author has selected him because a child receives vivid impressions and suggests to us how the village will have to maintain its determination until its children have grown to manhood and are able to strive for liberty. Among the other villagers, only old Hauser is singled out as typical of the older generation. The character of the foreign invaders is merely hinted at, since the story is not about them. Thus the author has used only such characters as will contribute to his plot effectively, and these are consistent with themselves, with their function in the story, and with human nature.

The thought element in the story is found in the speeches of the teacher and in the boy's own hidden thoughts. The author carefully distinguishes the simple, concrete reactions of the boy and the dignified but emotional speeches of the teacher. The boy's wandering imagination is beautifully shown by his fancy that even the birds must learn to sing German, a fancy which slips itself into his thoughts in spite of his intense concentration on his lesson. This shows how wandering those thoughts must have been at school on other days. It is noteworthy that in this very short story the author chose to tell the story in the boy's own words, thus avoiding any comment of his own.

The art of Daudet in telling his story thus becomes very clear, and the more carefully we read the tale the more astonished we are at how perfectly every incident contributes to the effect. Can we find a similar care in storytelling in a poem which at first sight seems to tell no story at all? Let us look at a short poem, Emerson's "The Concord Hymn," written on a theme similar to that of Daudet.

"The Concord Hymn" (page 412) is a type of short poem called a *lyric*. In such poetry the plot is not as obvious as in a *narrative work* like an epic poem or a novel. Nevertheless there is a plot. What happens in "The Concord Hymn"? It can be summarized as follows: As we come to erect a monument on this almost forgotten battlefield, we begin to realize how much we owe to those who died here and how little gratitude we have shown; and we feel moved to pray that future generations will better honor and preserve their heritage of freedom. This is a little story, which has a beginning, a middle, and an end.

- Beginning:* We come to this battlefield to erect a monument to dead heroes. (1st stanza)
- Middle:* a. We begin to realize that we had almost forgotten what they did and have showed little appreciation. (2nd stanza)
- b. Our act of raising a monument seems inadequate. (3rd stanza)
- End:* But we pray that God, who never forgets, will maintain this memory and this heritage in future generations. (4th stanza)

Thus we have the story, not of some external action, but rather of the *internal thought* and *feeling* of Emerson and the group for whom he speaks. It will be noticed that what is expressed is not merely thought, but also the *arousal* and *quieting*, or *catharsis* of feeling which is the characteristic of all poetic argument. Thus the first stanza indicates a feeling of wonder or desire to understand, and then *awe*, a kind of fear which we feel when suddenly confronted with something great and unknown. Emerson suddenly begins to realize what a great historic spot this is which he has so often passed without even thinking of it. This awe deepens in the second stanza into a sense of *sorrow* and *shame*, mixed with a certain indignation or anger, on thinking of the ingratitude and forgetfulness with which the dead have been treated. Then in the fourth stanza the emotion begins to resolve itself, as he turns to the monument with the determination and courage to make up for the past by setting up the monument, and yet with a feeling that this is not enough. Finally, in the last stanza the emotion turns to one of solemn reverence and of hope—even joy—to think that, however men may forget, God, who is eternal and unforgetting, will never let the memory or the example of the heroic dead be lost. Thus accompanying the thought is a movement of emotion:

love-desire-fear-anger-resolve-humility-hope-joy

This last emotion brings the poem to a close, since all emotion ends either in sorrow and resignation, or in joy and delight. This emotion reinforces and blends with the thought, so that our sense of surprise in the first stanza helps us to realize the greatness of the battle and our feeling of prayer and hope in the last stanza brings

us face to face with the realization that the true honor due to patriotism comes from God, who justly rewards all men.

The story is the chief thing in this poem—as in every poem—since it gives the whole shape, unity, and meaning to the work. Nevertheless, the story would not be possible unless it happened to some **character or characters**. Who are the characters here? Obviously the chief is not a single individual, but rather the whole group, the people of America who have come to raise the monument, the “we” of the poem. Does the poet characterize these people in any way? Not directly. But indirectly he shows us that they are simple, sincere, and frank; that they have the nobility to be ashamed of having forgotten, and the humility to admit their weakness; that they are busy people looking to the future and hence likely to forget; and finally that they are a reverent and courageous people with confidence in God. One of the reasons this poem is so beautiful is that the movement of emotions which it contains shows us the soul of the American people as we like to believe it is: simple, reverent, humble, courageous. The other characters are the dead—both the heroic Americans and their foe—and the Americans of the future. Nothing much is said about any of these except the dead heroes, and they are shown us in a simple vivid picture at that great moment of the battle when they fired the first shot. This is enough, however, to make us think of them as simple (because farmers) but mighty and courageous (they fired the shot heard around the world). It is better that they be characterized only in this simple fashion since it makes them a better symbol.

A person's character is shown both by his actions (the plot) and by his feelings or attitudes, his like and dislikes. The thought of a character, however, is not the same as his feelings, sometimes they may even be in conflict. Thought in a poetic work is the statement not of the character's feelings but of what he considers to be true or false.

This poem contains four thoughts which correspond neatly to its four stanzas. In the first stanza the poet tells us that *the heroic deed of the minutemen had world-wide consequences*; it was a “shot heard round the world,” because other nations than our own took our

American Revolution as a model in their own struggles for freedom. In the second stanza he tells us that *great deeds are soon forgotten*. The third stanza does not express a very distinct thought, but it implies that *men have a duty to try to preserve the remembrance of great deeds*. The fourth stanza has the most important thought: *God at least always remembers*.

If we look at the poem as a whole we see that it is not just a series of disconnected items, but that it forms a beautiful unity. This unity is found first of all in the plot, while the character and thoughts expressed are present only to contribute to the plot. The plot is not an exterior action in this poem, but an interior one. Within his own mind the speaker meets a situation which raises a question in his mind (thought), and a disquiet in his heart (character or emotion). As the poem moves from stanza to stanza this question finds its answer as the emotion is purified (catharsis) and brought to rest in the speaker's new insight into life, an insight in which we too have come to share. Our pleasure comes from the sense that every word of the poem has contributed to this new vision.

THE MAGIC OF WORDS

USING THE DICTIONARY

To learn to read stories well or to tell them, we must first be equipped with a rich vocabulary. We cannot build a magnificent building out of scraps. We must have a great and rich variety of materials. Fortunately, we have ready at hand a wonderful supply of such materials in the **dictionary**.

The dictionary is a printed vocabulary, a magic chest out of which we can draw every material we need to build the world of imagination. The words which it contains have been invented by countless

generations of men, women and children who have coined or re-made words to express their personal thoughts and experiences. No one has contributed more to this treasure chest than the tellers of tales, who are always looking for richer and more striking words.

The big unabridged dictionary contains the most commonly used words. Let us look up a few entries in it. We will select the two main ideas which we found in *The Last Lesson* and the "The Concord Hymn." We found that both concern patriotism, and that each tries to show that *patriotism* is a true *virtue* which few people appreciate properly. We will also make use of a rhetorical example on the same theme, Lincoln's "Gettysburg Address" (page 413), to show that persuasive writing uses many of the same methods as does imaginative writing. If we look up *patriotism* and *virtue* in Webster's Unabridged Dictionary we find the following:

pa'tri-ot (pā'trī-ūt; pāt'rī-; 277: *the first pron. distinctly prevails in the U. S.*), *n.* [F. *patriote*, fr. LL. *patriota* a fellow countryman, fr. Gr. *patriōtēs*, fr. *patrios* established by forefathers, fr. *patēr* father. See FATHER.]
1. A fellow countryman; compatriot. *Obs.*
2. One who loves his country and zealously supports its authority and interests.
3. In ironical use, esp. in England in the 18th century, a seditious disturber of the government; — from the name being borne or assumed by persons whose right to it was questioned, denied, or ridiculed by others. *Specif., Eng. Hist.* [*pl. & cap.*], a Whig faction which violently opposed Sir Robert Walpole, esp. c. 1732-42.
4. Erron., a lover; ardent advocate; — with *of*. *Obs.*

pa'tri-ot-ism (pā'trī-ūt-iz'm; pāt'rī-), *n.* [Cf. F. *patriotisme*.] Love of country; devotion to the welfare of one's country; the virtues and actions of a patriot.

vir'tue (vūr'tū), *n.* [ME. *vertu*, fr. OF. *vertu*, fr. L. *virtus* strength, courage, excellence, virtue, fr. *vir* a man. See VIRILE; cf. VIRTU.] **1.** a *Archaic*. Supernatural power or influence exerted by a divine being. **b** An embodiment of it. *c pl.* One of the celestial orders. See CELESTIAL HIERARCHY.

2. Moral practice or action; conformity to the standard of right; moral excellence; integrity of character; uprightness of conduct; rectitude; morality. Also, a particular moral excellence; as, the *virtue* of temperance, of charity, etc. "The very *virtue* of compassion." *Shak.* Socrates identified *virtue* with wisdom, which he conceived to be knowledge of the good, holding it to be incredible that any man could know and yet not act in accordance with the good. Plato distinguished four *cardinal virtues*, wisdom or prudence, courage or fortitude, temperance, and justice or righteousness. Aristotle regarded *virtue* as a habit implying the choice of excellence in conduct, the excellence being realized in a mean between excess and defect. He divided the virtues into the *moral*, having to do with practical life, and the *intellectual*, the virtues of wisdom and insight; and in this he was followed by the medieval writers. St. Augustine conceived charity as the source of all virtue, and he distinguished as *cardinal virtues* (following Plato), prudence, fortitude, temperance, and justice. Christian moralists considered these the *natural virtues*, and further distinguished from them the *supernatural, theological, or Christian virtues* of faith, hope, and charity, these being infused by God into human nature. Patience and humility are sometimes added to the *cardinal virtues* by Christian writers.

Virtue is not to be considered in the light of mere innocence, or abstaining from harm, but as the exertion of our faculties in doing good. *Bp. Butler.*

3. Active quality or power, whether of physical or of moral nature; capacity or power adequate to the production of a given effect; energy; strength; potency; efficacy.

Jesus, immediately knowing in himself that *virtue* had gone out of him, turned him about. *Mark* v. 30.

A man was driven to depend for his security against misunderstanding, upon the pure *virtue* of his syntax. *De Quincey.*

4. *Specif.:* a Manly strength or courage; valor. **b** A particular beneficial quality or efficacy in something, as a plant or precious stone.

5. Excellence of any kind; merit; worth; value; as, to make *virtue*, or a *virtue*, of necessity, i. e., to make a merit of what cannot be helped, to yield to necessity. "I can sing, weave, sew, and dance, with other *virtues*." *Shak.*

6. The virtues (sense 2) collectively; as, *virtue* is its own reward; — often [*cap.*] personified.

So *Virtue* dies, the spouse of Liberty. *Campbell.*

7. *Specif.,* chastity; purity; esp., the chastity of women.

8. Thrift; industry. *Scot.*

9. = VIRTU, 2.

10. *Obs.* a Miraculous or occult power; also, a work of great power or efficacy, as a miracle. **b** Physical force or energy. **c** Operation; — of laws. **d** An ability or accomplishment.

Syn. — See GOODNESS.

Ant. — Weakness, ineffectiveness, impotence; evil, sin. See CRIME.

COMBINATIONS (all adjectives) are:

virtue-armed virtue-loving virtue-tempting

virtue-binding virtueproof virtue-wise

— *in, or by, virtue of.* Through the force of; by authority of. "This they shall attain, partly in *virtue of* the promise made by God, and partly in *virtue of* piety." *Atterbury.* — *to make a virtue of necessity.* To do what one must as if so doing were a meritorious choice.

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These two examples show us the kind of information given us by an unabridged dictionary. Notice the following:

1. **The pronunciation of words.** A word is a conventional sign (see pages 5 and 21); that is, each is a sound that leads to the knowledge of something other than itself because of human custom and usage. Animals make sounds only by instinct; but men have control over the sounds they make, and they agree to use particular sounds to stand for definite things. That is why men have different languages; but every robin has the same song, and every lion the same roar.

Although the connection between the sound and the idea in human language is only a matter of custom, sometimes a sound is chosen as a word because it resembles the thing it stands for, as when we call a dog "a bow-wow." This method of making words is called *onomatopoeia* (on-o-mat-o-pē'ya). Sometimes the sound is not an imitation, but is somehow appropriate to that for which it stands. Thus the word "gloom" suggests a dark and sad effect because of the long *ōōm* which gives it a deep, murmuring sound; the word "shining" sounds bright and clear because of the high, thin "i's."

The sounds of words can be very beautiful and expressive, a spoken music. When we hear music, even without words, it fills our minds with images and makes us feel happy or sad, peaceful or excited. All speech, when properly pronounced in a musical voice, is very pleasant, charming, and moving to the hearers. When it is mumbled, sloppy, harsh, it repels the listeners and detracts from the effect of what is said.

The study of sounds as tools of expression belongs to the art of music. Every sound has several qualities: it is high or low because of its quality of *pitch*; it is loud or soft because of its quality of *volume*; it is rich or thin, etc., because of its quality of *timbre*.

When a sound has a definite pitch, it is a *musical* sound and is pleasant to the ear. When it is a mixture of unrelated sounds, it is a *noise* and is unpleasant. In speech certain sounds are musical and can be sung on a sustained pitch. These are called *vowels*: *a, e, i, o, u* in their various pronunciations. Others are sounds made at the beginning or ending of a vowel sound and cannot be pronounced or sung by themselves. These are called *consonants* (Latin for "sounding with") because they have to be pronounced with a vowel. A few consonants

(*l, m, n, ng, r, w, y*) include a vowel sound; therefore they can be pronounced alone and are called *semi-vowels*.

In singing, the pitch moves up and down a series of definite tones called the *scale*. In speaking, there is no definite scale but only a slight rise and fall of the voice, called *inflection*. The increase in volume on the principal syllable of a word is called the *accent*. A similarity between vowels is called *assonance* (Latin for "sounding too"); when this similarity also extends to the final consonants of a word it is called *rhyme*. When the similarity of sounds is at the beginning of syllables, there is *alliteration*.

If we learn to appreciate and use the music of words, we will find a new pleasure in speaking and listening, and will be able to influence those with whom we speak.

* * * * *

In the above entries for "patriotism" and "virtue," the pronunciations are given with the exact sound of each vowel and with the accent for the principal syllable. In *Webster's New International Dictionary*, pages xxii-lxxviii, one finds a very detailed and scientific discussion of the sounds of the English language and the difference in pronunciation in different parts of England and the United States. What is meant by a "southern accent" or a "Brooklyn accent" or an "Irish brogue"?

In "The Concord Hymn" there are many examples of the choice of words whose sound is musical and appropriate. Notice, for example, the quiet and mysterious effect given by the second stanza. The *alliteration* of the *s* sounds and the *l* sounds is largely responsible for this effect. Notice also the pattern of *rhymes*. In the "Gettysburg Address" the alliteration of *f, n, and l* helps to make the first sentence very musical. A careful reading aloud will show that Lincoln took care to choose certain vowels like the long *o* throughout his speech to give it a solemn and ringing sound. (See page 413).

2. **The origin of words.** The dictionary also tells us how a particular combination of sounds came to stand for a particular idea. This is called the *etymology* or word-origin. Words usually were invented to describe something of everyday life. They were *concrete*, and referred to something individual and apparent to the senses. Then they came to be used in a more *abstract* way to refer to some

general idea which could be applied to many things, and which appealed more to the intellect than to the senses.

Knowing the origin of a word helps us to grasp the basic idea that underlies it, since we too have to learn abstract ideas by beginning with what is concrete. It takes time and thought to understand an abstract idea.

* * * * *

The word "patriotism" had its origin in one of the most fundamental words of our language, the word "father" (Latin *pater*), which goes back to a still simpler word "papa" which is one of a baby's favorite sounds. The word "virtue" goes back to the Latin for "man," because it is a quality every real man should have.

In "The Concord Hymn" the word "votive" comes from the word for "vow," and the word "deed" from an old form of "to do," and "redeem" from the Latin for "buy back." When we realize this, we understand that a "votive stone" expresses a vow to thank and to imitate the heroic dead, while "to redeem their deed" means to bring back from the past the memory and example of their heroic actions.

In reading the "Gettysburg Address," it helps to know that "civil war" means a war between citizens of the same state because "civil" comes from the word for "city"; that "consecrate" comes from words meaning "to set aside as something holy"; that "dedicate" means "to declare that a thing is holy"; and that "vain" means "empty."

Emerson, the author of "The Concord Hymn," in his essay *Language* advises us to use words with something of their original meaning if we want to speak or write forcefully:

Every word which is used to express a moral or an intellectual fact, if traced to its root, is found to be borrowed from some material appearance. *Right* means *straight*; *wrong* means *twisted*; *spirit* primarily means *wind*; *transgression*, the *crossing of a line*; *supercilious*, the *raising of the eyebrow* The etymologist finds the deadest word to have once been a brilliant picture. Language is fossil poetry.

3. **The grammatical function of words.** The dictionary also indicates to which part of speech a word belongs. Sometimes a word may serve as several different parts with a slightly different meaning and perhaps a different pronunciation for each.

If we had the simplest kind of language, we could get along with nothing but the names of things. Notice, for example, how the second

stanza of "The Concord Hymn" would read if it were made up of names only:

Foe. Silence. Sleep.
 Conqueror. Silence. Sleep.
 Time. Bridge. Ruin.
 Darkness. Stream. Sea.

Each name calls up an object before the mind and we quickly supply the necessary connections between one object and another. Children love to know and to repeat the names of things. Prayers and poetry make great use of names.

The names of things are called *nouns*, and this is the most important of all the parts of speech. Sometimes, however, it becomes awkward to keep repeating the noun which names some object we are discussing. Hence most languages also have *pronouns*, which substitute for a noun already used. Obviously it is very important that it be clear exactly to which noun a pronoun refers. To show this connection a pronoun has several forms indicating gender (*he, she, it*), number (*he, they*) and person (*I, you, he*) which must agree with the noun for which it substitutes. Pronouns are called **personal** when they refer to a definite person or thing, or **indefinite** (*any, some, etc.*). They are **reflexive** when they refer back to the subject (*herself, own, etc.*), or **relative** when they introduce a clause (*who, which, what*), or **interrogative** when used in a question (*who? which? what?*).

We say that a noun is the name of some *thing*, but in the example given above is it true to say that "silence," "sleepy," "darkness" are things in the same way that "foe," "conqueror," "stream," and "sea" are things? Strictly speaking, a *thing* is a **substance**; that is, something which can exist in its own right, not merely as the modification or relation of something else. Thus a man is a substance which can exist in its own right; but the color of a man's hair, his size, his shape, his position, and his actions exist only as modifications or relations of a man. In *Alice in Wonderland* the Cheshire cat slowly vanished until nothing was left but its smile. A smile, a shape, a color, a relation cannot exist in its own right but only in something else. Such secondary aspects of substances are called **accidents** or attributes of substances. Nouns were originally invented to name substances. When we use them to name accidents like a smile or a color, we do so be-

cause we are thinking of these accidents *as if* they could exist by themselves like the smile of the Cheshire cat.

The philosopher Aristotle tried to figure out very carefully just how many types or **categories** of accidents or modifications and relations of substances there are. He found that there are ten categories corresponding to ten questions that we ask about things. They are as follows:

1. What is this thing? Category of **substance**; e.g., *man, dog, rose, salt, iron, angel.*
2. How many or much of it is there? Category of **quantity**; e.g., *three, one hundred, whole, part.*
3. What sort of thing is it? Category of **quality**; e.g., *red, melodious, sour, soft, virtuous, healthy.*
4. What are its connections? Category of **relation**; e.g., *similar, different, bigger, smaller, equal, cause, effect, father, mother.*
5. Where is it? Category of **place**; e.g., *here, there, near, up, down.*
6. What is its position? Category of **position**; e.g., *upright, bent, prone, standing, sitting, reversed.*
7. Is it covered or uncovered? Category of **vestition**; e.g., *naked, clothed, armored, harnessed, uniformed.*
8. What is it doing? Category of **action**; e.g., *running, sleeping, cutting, building, flying, talking.*
9. What is happening to it? Category of **reception**; e.g., *being cut, being heated, being built, being plowed.*
10. When is it acting or being acted upon? Category of **timing**; e.g., *today, yesterday, now, then, once.*

Fundamental natural science will teach why there are only these ten categories. As we learn each part of natural science, we will learn each of these classifications. Outlines of them can be given, as we shall see, but they will never be wholly completed, since science goes on discovering things to go into each classification.

These categories are used in all human thinking and by every race of men, but each language has its own way of expressing them. All of them can be expressed by *nouns* (or pronouns), but since the nine categories of accidents are not really things, but modifications or relations of things, it is more satisfactory to have other parts of speech which express these categories as modifiers of nouns.

The categories of **quantities** and **qualities** include modifications of substances (nouns); hence the part of speech called the *adjective* was invented as a modifier of nouns especially to indicate **quantities** (the numerals) and **qualities**. The special forms of the pronoun indicate quantity (plural or singular) and gender (which is a quality). The category of **vestition** is also indicated by an adjective since clothing can be thought of as a kind of quality of the thing clothed.

The category of **relation** is indicated in many languages by a modification of the form of the noun called *case*. For example, in Latin *vir* means *man*; *viri* is the *possessive case* (indicated in English by 's) which indicates a **relation** of possession; and *virum* is the *objective case* (indicated in English by special forms of the pronoun: *him, them*) which indicates **reception** or **relation**.

In English, however, we usually express relation by a *preposition*. This is convenient because in every relation there must be two things which are related. The preposition expresses the relation between the modified word and another noun called its *object*. Thus in the sentence "The bridge was built by him," the relation of the builder to the bridge is indicated by the preposition *by*.

The other categories of **place, position, action, reception** and **timing** are not relations, but since they involve relations also, they are often expressed by prepositions. **Action** and **reception**, however, are extremely important, because we know substances mainly through what they do or through the changes they undergo. Hence almost all languages have a special part of speech, the *verb*, to give full expression to these two categories. Thus the *noun* which names a substance and the *verb* which shows how that substance reveals itself through what it does or undergoes are the two most important parts of speech.

Among verbs, the verb *is* is called the *copula* (joiner) because it expresses the act of the mind by which we join two ideas to make a sentence, as when we say, "The man is patriotic." Other verbs actually contain the copula, plus the idea of some other action besides the action of our mind. Hence they can be analyzed into two words, the copula and another word which is the name of an action. Thus "The man fights" can be analyzed into "The man is fighting." This name of an action when used as a noun is called a *gerund* (from Latin *gerere*

meaning *to bear*, because it bears the part of a noun) as in "Swimming is fun"; when the action is expressed with *to*, it is called an infinitive (from Latin for "without a limit," because it is not limited to a particular action) as in the sentence "To swim is fun;" when the name of the action is used as an adjective it is called a *participle* (because it is *part* of a verb) as in "The boy is swimming."

Since an action must take place in time, the verb also expresses the category of **timing** by its *tense*. This is the special mark of a verb which distinguishes it from all other words.

In English these ideas are often made clearer by the use of helping verbs or *auxiliaries*, such as *have*, *will*, *shall*, etc., which contain the copula plus the idea of time.

Actions can have various degrees of *intensity*, because they produce their effect more or less perfectly. Hence *adverbs* have been invented to modify verbs and to indicate their intensity, as in the sentences "He ran swiftly" or "He hit hard." Since the effect of an action is often to produce some **quality**, adverbs are also used to modify adjectives, as in the phrase "The smoothly polished surface." Finally, since an action always requires time and place in which to occur, adverbs often modify a verb by showing the time or place in which the action happens. *Conjunctions* (*and*, *therefore*, *because*, *but*, etc.) also express relations, but these relations are not between things, but between sentences or parts of sentences. These are mental relations and will be discussed in the next chapter. *Interjections* are sometimes classed as a part of speech, but they express emotion rather than thought.

Thus we see that the parts of speech, although they do not perfectly correspond to the categories, have been invented to express the categories with a clarity which is sufficient for ordinary writing and speaking. In order to understand the function of a part of speech we have only to ask "What does it modify?" and "What type of information does it give and how?" and "What category does it express?" Unless we know the part of speech to which a word belongs we do not know its whole meaning.

The diagram on the opposite page of the first stanza of "The Concord Hymn" shows how in a single sentence many categories of information may be given. This sentence contains all the categories

THE FARMERS (substance; plural indicates quantity; "the" indicates concept is *particular* not universal)

WERE (copula, with past tense for timing)

a. **EMBATTLED** (reception, means that farmers were attacked)

b. **STANDING** (action):

1. **HERE** (place)

2. **ONCE** (timing)

3. **BY BRIDGE** (place, indicated as a relation to a substance, since "bridge" is an artificial substance,)

(a) **THE** (indicates *particular* concept)

(b) **RUDE** (quality)

(c) **ARCHED THE FLOOD** (really a quality, i.e., shape, and a position, i.e., over the river, but described with the river as an object completing action; "the" for *particular* concept)

c. (**HOLDING**) **FLAG** (implied action, completed by its object, an artificial substance)

1. **UNFURLED TO BREEZE** (position of flag, indicated as a relation to a substance [air] in action [breeze])

APRIL's (timing indicated by a personification)

2. **THEIR** (relation of possession)

d. **FIRING SHOT** (action completed by its object, i.e., shooting, which is another action)

1. **HEARD** (reception)

ROUND THE WORLD (place indicated as relation to a substance; "the" for *particular*)

except *vestition*, which we might add by writing "The farmers in their work clothes. . . ."

4. **The current meanings of words.** It would be very convenient if we had a different word for every concept, and if every word stood for only one concept. When a word has a single meaning, it is said to be *univocal*. Actually, however, the world is too full of things and our minds are too full of new experiences for language to keep pace with thought. Confronted with a new idea we grope for a word to express it, and cannot find one ready at hand. Hence we tend to take the name of something previously known and apply it to the new object. Thus a word acquires several meanings and is said to be *equivocal* (from Latin for "equal" and "sound," that is, a sound which means at least two things). When there is no apparent connection between these meanings, they are said to be *purely equivocal*. Pure equivocation is not very common; usually the diverse meanings have some connection, and hence the term is said to be *analogical*. If this connection is one of similarity, we have *analogy of similarity* or *proportionality*. If this similarity is a merely accidental resemblance between things, the analogy is said to be *improper* or *metaphorical*. If it is a similarity which is essential, the analogy is said to be *proper*.

If the connection is of any sort other than one of similarity, the analogy is called an *analogy of connection* or *attribution*. Such connections when examined will be found to be due to some relation of cause and effect. These different terms are shown in the diagram on the following page.

* * * * *

The dictionary shows that the word "patriotism" has been taken from "patriot" and that the latter has four uses, two of which are now obsolete. These are all connected with each other by similarity, but meaning 3 is derived from meaning 2 by an accidental comparison (a rebel is not essentially like a patriot, but only accidentally like him, since both claim to be fighting for freedom) and hence is used by *analogy of improper similarity* or *metaphor*.

"Virtue" has no fewer than ten different usages, all of which are based on some similarity which is essential. Hence all are analogical by *analogy of proper similarity*.

which is essential, they have analogy of proper similarity or proportionality

which is accidental, they have analogy of improper similarity or proportionality or metaphor.

by a similarity

by some other connection, they have analogy of connection or attribution.

one meaning, it is univocal

if these meanings are connected with each other

if these meanings are unconnected with each other, they are purely equivocal

if a term has

many meanings, it is equivocal:

In "The Concord Hymn" the poet has obviously used "stream" to stand for "time" and "forgetfulness," since the stream has carried away the bridge that once marked the battlefield just as time has caused us to forget the battle itself. On the other hand, he uses the "stone" to stand for remembrance of the battle. These are *analogies of similarity*; but the resemblance between a river and time, or a stone and memory is merely accidental or *improper*. The comparison of "death" to "sleep," however, is an essential comparison; hence the analogy is *proper*. We should notice, nevertheless, that although the former comparisons are *improper analogy*, this does not mean that they are poor writing. We will explain below why metaphor is very useful and artistic in writing and speaking.

The expression "shot heard round the world" is an interesting example of *analogy of connection*, and so is the use of the "bridge" as a symbol of the battle, and the "flag" as a symbol of the army. "The shot" is not similar to the battle, but only connected with it as one of its incidents. The "bridge" is not similar to the battle, but only connected with it as the place on which it occurred. The "flag" is not similar to the army, but only something used by it. Yet all of these have connection with the thing they stand for.

The "Gettysburg Address" contains an *analogy of proper similarity* which runs throughout the entire speech, since Lincoln keeps comparing the conception, birth, struggle, and rebirth of our nation to that of a child. There really is an essential similarity between the birth and growth of an individual and that of the whole society.

In our selections it is not easy to find an example of pure equivocation, because good authors avoid purely equivocal expressions. A careless reader of the "Gettysburg Address," however, might think that Lincoln said "Four score and seven years ago our fathers brought *fourth* on this continent a new nation." "Forth" and "fourth" have the same sound, but utterly different and unconnected meanings. Or this poor reader might mix up the meanings of "vain" in the last paragraph with those of the word "vane," or "perish" with "parish."

5. **The connotations of words.** Sometimes two words mean the same thing and are called *synonyms* ("together-names"); sometimes they mean opposite things and are called *antonyms* ("opposite-

names"). Even synonyms, however, have different "shades of meaning." The things to which any word can be applied are called its *extension*, because it extends to cover them all. A word is said to *denote* (point out) all the things to which it extends. If it denotes only one individual thing, it is a *singular* term. If it denotes many things each one of which is exactly like the other, then it is a *universal* term. If it denotes *some* or a few of these things which are exactly alike, it is called a *particular* term. If it denotes a group of things taken as a group it is a *collective* term.

However, two words can have the same extension or denotation and yet have a different content of meaning. One may tell us only a little about the things to which it extends, another very much. This is a difference in *comprehension* or *connotation*. Words with a rich comprehension convey a great deal of information, but are more difficult to understand. Ordinarily if a word has a rich comprehension it has a narrow extension and can be applied to a few things only, since the more meaning a word has, the fewer are the things which it will fit.

* * * * *

In "The Concord Hymn" the words "flood" and "stream" are synonyms, as are "votive stone" and "shaft." "Foe" and "conqueror" are antonyms, as are "sires" and "sons." In the "Gettysburg Address" "dedicate," "consecrate," "hallow" are synonyms; so are "fitting" and "proper." But "living" and "dead," "add" and "detract" are antonyms.

In "The Concord Hymn," "embattled farmers" denotes or extends to all the minutemen. "Conqueror" extends to all the minutemen buried by the bridge; "foe" to all the English soldiers buried there. "Farmers" is a universal term. "Flag" is a singular term. "The foe" and "the conqueror" are collective terms since they mean the two armies each taken as a group. If Emerson had said that "some of the minutemen are now sleeping in death," then "some of the minutemen" would be a particular term.

The terms "flood" and "stream" have the same denotation or extension here, but their connotation or shade of meaning is not the same. "Flood" makes us think of the river as filling its banks, while "stream" only suggests that it is flowing. The connotations of "dedicate," "consecrate," "hallow" in the "Gettysburg Address" are quite

different: "dedicate" indicates only that the battlefield is set aside as a memorial; "consecrate" adds the idea that it is to be used only for this purpose; "hallow" brings out the fact that it is to be a holy place, worthy of deepest veneration.

USING A THESAURUS: VIVIDNESS OF WORDS

A *thesaurus* is a collection of synonyms, antonyms, and other related words. The most standard work of this sort is *Roget's Thesaurus*, but there are many other similar works. Such a work helps us to discover all the different possible words which the language contains to express similar ideas. By using it we can discover the word which best suits our purpose.

In using words we are always aiming at two goals: *clearness* and *vividness*. It is not easy to achieve both these goals at the same time, because clear words are often very abstract, while vivid words must be concrete. Clarity comes from the use of exact or technical terms and these we will consider in the last section of this chapter. Vividness is achieved by using words which are concrete, rich in connotation and imagery, and pleasant to the ear. Poetry especially requires this sort of vivid language. Readers often complain that poetry is not clear. This is because the poet sometimes deliberately chooses to sacrifice something of clarity in order to achieve vividness.

One of the most useful ways to increase the vividness of language is to use words with unusual meanings, because this attracts the hearer's attention and makes him search his imagination. These special uses of words are called *figures of speech*, generally involving some type of *analogy*.

The most important figure of speech is the one based on an *analogy of similarity* (see pages 49-51), known as *metaphor*.* Sometimes this is reversed, so to speak, by using a term which is just the *opposite* of what we mean, or which contrasts what we actually say with what is expected. This is called *irony*. When a metaphor is made very explicit by using such words of comparison as "like" or "as" it is

*The term *metaphor* in Greek simply means "transferred"; hence it was used by Aristotle and is still used by some authors to mean *any* figure of speech.

called a **simile**. Sometimes it is not merely a word which is treated as having a hidden meaning, but a *thing*. Then we speak of this thing as a **symbol** or **type**, as Moses who led his people out of slavery was a historical symbol or type of our Lord who leads us out of sin.

Besides these figures based on the *analogy of similarity* there are others based on the *analogy of connection* (see pages 49-51). These are called **metonymy**, or the transference of a word from its original meaning to something connected with it in some way other than by similarity or dissimilarity. The most important type of metonymy is called **synecdoche**, the transferring of the name of a part to the whole, or of the whole to a part. Sometimes this is done by substituting the name of a class for a member of the class (genus for species), or vice versa.

There are many other figures of speech based on these two types, but since most of them involve not only words but sentences and whole compositions, we will treat them in later chapters.

Not only do figures of speech and the choice of words with rich connotations and striking sounds make language more vivid, but they also produce an emotional effect. This is important in poetry, but most especially in rhetoric. Juliet argued that "A rose by any other name would smell as sweet," but nevertheless we are very much affected in our attitudes by the names we give things. Some suggest the ideal, or the lovable, while others suggest something hateful or disgusting. In using words we have to consider the audience to whom we are speaking, and observe its reaction to particular words.

When we use *slang* or newly invented words, we can often get very vivid effects; but it suggests to those to whom we speak that we are very young, impressionable, imitative. If we use less formal or colloquial language we give the impression that we are being friendly and easy-going. When, however, the occasion demands that we be formal and serious, we must be careful to use only formally correct language; otherwise people will think that we have no respect for them or that we are ignorant of good manners. The dictionary usually indicates whether a word is slang, colloquial, or formally correct.

The great rule in choosing words is to use words which are appropriate to the audience, and as simple and clear as possible, and yet the composition should be spiced with a few well-selected figures of speech or less common words to give vividness.

In "The Concord Hymn" the *bridge* is a symbol of the battle that once took place there and of the forgetfulness of the people, since it has fallen into ruins and been swept away. The *river* is the symbol of time since it destroys the bridge, that is, the memory of the battle. The *sea* is the symbol of the past and of total oblivion. On the other hand, the memorial *stone* is a symbol of renewed memory. *River* as used in the poem is a metaphor based on the similarity of the things compared. A river is like time, because it is perpetually flowing. The bridge is used by metonymy, since the bridge is not similar to the battle for which it stands, but is merely connected with it. "The shot heard round the world" stands for the *whole* battle of which it was merely the first part; hence this expression is an example of *synecdoche*. *Irony* is seen throughout the poem in the contrast between the glorious deed of the minutemen and the forgetfulness of their descendants, in the struggle between the two armies and their quiet sleep in death side by side, alike forgotten, and finally in the fact that soldiers must "die and leave their children free." In each case the truth is brought out by contrast to its opposite. The poem contains no explicit *similes*.

The "Gettysburg Address" also contains no *similes*. Nor do we find in it any use of *metonymy* or *synecdoche*, although there is something of these in the way in which Lincoln uses the battlefield to symbolize the battle itself (*metonymy*) and this single battle to stand for the whole war (*synecdoche*). A beautiful *metaphor*, however, runs throughout the entire speech. Lincoln compares our nation to a child which was "conceived in liberty," "brought forth" "four score and seven years ago," and "dedicated to liberty." It has almost died in the course of the civil struggle, but is now to have "a new birth of freedom." *Irony* is found in the contrast between the littleness of human speech and the greatness of the soldiers' sacrifice, and in the contrast (as in "The Concord Hymn") between the soldiers' death and the new life given to their country.

USING DESCRIPTIONS

The choice of the right word or phrase, however, is often not sufficient to make our terms really understood. To make them clear we must *define* them; that is, replace the name of the thing by an explanation of it. Such an explanation gives the full *comprehension* and connotation of the name. It also gives us its *extension* by showing exactly to which things the name can be applied.

The simplest way of defining is by a *description*, and this is the method commonly used in poetic and rhetorical writing. The description must fit the thing defined and distinguish it from anything else, that is, it must have the right *extension*. It should also bring the thing defined vividly before the imagination if it is to be used for poetry or rhetoric. This is accomplished by selecting the details which are most characteristic and unusual, and by taking care to appeal to all the senses. Thus in describing a man we must pick out those features which are most unique and interesting, and we must mention not only his appearance, but his gestures, his clothing, the sound of his voice, perhaps even his smell.

If we remember the *categories* they will assist us in describing well. We should explain the nature of a **substance** by telling what it does or undergoes (**action and reception**). These actions must be in a **place** and a **time**, and will produce some **quality or quantity**, some **position or vestition** in the substance, and will result in its having certain **relations** to other things. Thus in describing a man we should tell how he behaves and when and where, and how this gives him certain qualities and a certain size, position, and habit of dress, and certain relations with other people and things. Frequently in writing we make the mistake of describing only the qualities of a thing by the use of many adjectives, when a careful use of the other parts of speech, especially of verbs, would give a much livelier picture.

Vivid speech and writing depend largely on the power to present the subject being discussed and what is being said about it (the two main terms) by striking descriptions. The careful selection of words and the use of figures of speech are the main tools in giving such descriptions.

* * * * *

“The Concord Hymn” does not describe its main terms in an obvious way. Nevertheless, Emerson presents them in a deeply moving

manner. We see the "bridge" which is characterized by two words: it is "arched" over the flowing river, and it is "rude." It stands for the battle that takes place there. Then the battle is presented to us by the picture of the "flag" flying in the spring breeze, and suddenly in this cheerful and simple scene we hear the first crack of gunfire, and its echo, "the shot heard round the world."

All these details describe for us the subject of the poem, the *patriotism* of the minutemen. Emerson leaves us to fill in the details for ourselves, having given us very sharply the outline of the description.

The second idea of the poem is that patriotism should be *honored*. This notion of honor Emerson presents to us first by ironical contrast. He pictures the bridge, symbol of heroism, falling into ruins and being swept away by the dark stream down to the sea of utter forgetfulness. Here symbol and metaphor are used to picture the reverse or opposite of honor, namely forgetfulness and ingratitude. Then he pictures honor as the memorial stone set on the green bank, but at once indicates that the real memorial can only be the determination of future generations to imitate the minutemen by being true patriots themselves.

Lincoln also avoids obvious description in the "Gettysburg Address" because he aims at lifting the minds of his audience to a lofty spiritual ideal. He defines "patriotism" by his solemn references to the dead and to their total sacrifice. He then defines "honor" by using the metaphor of the "rebirth of the nation," showing that the greatest glory of patriotism is that it produces a new life for the fatherland.

In *The Last Lesson* Daudet avoids any detailed description so as not to overload his very brief and simple story; yet he is very careful to give us enough detail to make clear to us the main terms. *Patriotism* is embodied in this story in the form of the schoolmaster. Daudet tells us what the schoolmaster is like, not by describing his appearance, but by picturing his actions and attitudes. The height of this description comes in the paragraph which reads:

From time to time, when I raised my eyes from my paper, I saw Monsieur Hamel sitting motionless in his chair and staring at the objects about him as if he wished to carry away in his glance the whole of his little schoolhouse. Think of it! For forty years he had been there in the same place, with his yard in front of him and his class

just as it was! But the benches and desks were polished and rubbed by use; the walnuts in the yard had grown, and the hop-vine which he himself had planted now festooned the window even to the roof. What a heart-break it must have been for that poor man to leave all those things, and to hear his sister walking back and forth in the room overhead, packing their trunks!

It will be noticed that *time* is used in the description in a beautiful way to show us the deep, loving attachment a man has to his home. This makes clearer to us the true meaning of patriotism than a great deal of talk could do.

The *honor* due to patriotism is defined for us in the boy who gradually comes to see something great and honorable in his teacher which he had never before appreciated. It is by the change that takes place in the boy's attitude, shown in his reception of the schoolmaster's action, that we come to appreciate the worth of what the teacher stands for.

A careful reading of *The Last Lesson* will show that while Daudet uses very little visual description, he makes a special use of *sound*. The whistle of the blackbird in the first paragraph and the suggestion of the sound of the sawmill bring before us the loveliness of the country. In contrast to them is the sound of the soldiers drilling in the field. The same contrast is repeated at the end in the sound of the Angelus contrasted to the sound of the Prussian bugles. Daudet obviously intends the sounds of the country and of the church to symbolize the traditional life of the village, while the sound of the army symbolizes its destruction. This theme is also found in the middle of the story, where the boy hears the cooing of the pigeons and wonders if they too must learn to speak German! There are other sounds such as the insect wandering into the room, the sound of the little students singing "ba, be, bi, bo, bu." Each of these sounds has a special emotional effect in the story. Can you explain the function of each?

DEFINITIONS

These definitions summarize everything that has been discussed in this chapter. If you memorize them, understand their meaning, and use them in your reading and writing you have thoroughly mastered this chapter.

1. A **univocal sign** is one which has only one meaning.
2. An **equivocal sign** is one which has more than one meaning.
 - 1) A *purely equivocal sign* is one which has two or more meanings which have no connection with each other.
 - 2) An *analogous sign* is one which has two or more meanings which are connected by similarity or causality.
3. A **distributive universal sign** or concept is one which signifies a nature possessed by each and every one of many things.
 - 1) The *comprehension* of a universal sign is its meaning content.
 - 2) The *extension* of a universal is all the things to which it can be applied.
4. A **definition** is an expression showing what a thing is, or what a name means.
 - 1) An *etymological definition* gives the original meaning of a name.
 - 2) A *nominal definition* is an expression showing what a name means.
 - 3) A *real definition* is an expression showing what a thing really is.
5. A **category** is a classification of things which are not a part of some larger classification.
 - 1) The category of *substance* is a classification of created things that can exist by themselves. The modifications of a substance are called its *accidents*.
 - 2) The category of *quantity* is a classification of all the accidents by which a substance has parts each of which if separated would be a thing.
 - 3) The category of *quality* is a classification of all the accidents by which a substance is characterized in itself.

- 4) The category of *location* is a classification of all the accidents through which a substance is immediately contained by surrounding bodies.
- 5) The category of *vestition* is a classification of all the accidents through which a substance is loosely contained by surrounding bodies.
- 6) The category of *position* is a classification of all the accidents by which a substance is orientated in relation to surrounding bodies.
- 7) The category of *timing* is a classification of all the accidents by which a substance and its changes are measured by some regular motion.
- 8) The category of *action* is a classification of all the accidents by which a substance changes another.
- 9) The category of *reception* of action is a classification of all the accidents by which a substance is changed by another.
- 10) The category of *relation* is a classification of all the accidents by which a substance is merely ordered to another.

TEACHING AND STUDY SUGGESTIONS

It is suggested that a grammar handbook or workbook be used (such as John Warriner and Francis Griffith's *English Grammar and Composition, A Complete Handbook*, or John E. Warriner and Joseph C. Blumenthal's *English Workshop, New Series, Grade Nine*; both published by Harcourt, Brace & Company) and one of the standard anthologies of literature. One main objective of the year, however, should be to read poetic arguments in complete books other than the anthology. The work of the year might conveniently be divided into the following units:

Introduction: (pp. 3-22)

Read and discuss "The Story of the Liberal Arts" in home-room period or Christian Doctrine class as an orientation to the whole work of the high school. See discussion topics on p. 20.

Unit I: Analyzing stories (pp. 25-38).**A. Reading:**

Study the rules of analysis given in this book and apply to a number of short stories and poems contained in the anthology. Stress the exercise of trying to state the plot in a single sentence and insist that in all analyses the student show how the other elements contribute to this one central idea.

B. Writing:

At least one short writing assignment should be given weekly. Subjects like the following are suggested:

1. Sentences expressing the plot of each story in three different single-sentence versions.
2. Simple expositions with the first paragraph telling what the paper will do, the last one telling what it has done, and the body increasing gradually throughout the year from one to three paragraphs. For any given story explain or describe:
 - a. The action which starts its plot.
 - b. The action which climaxes its plot.
 - c. One incident in the middle of the plot.
 - d. What a particular character thinks about something and how you were shown that.
 - e. What kind of a person a particular character is and how you were shown that.
 - f. How you feel toward a particular person and one reason why.
 - g. One reason why you like the story.
 - h. How you would have ended the story.

C. Grammar:

Review and require in all writing assignments throughout the year:

1. Words correctly spelled (*E. W.*, "Usage and Spelling" sections).
2. Words properly syllabicated, compounded, and hyphenated (*E. G. C.*, pp. 627-8).
3. Apostrophe properly placed in contractions (*E. W.*, "Usage and Spelling" sections; *E. G. C.*, p. 607).

4. *An* before a word beginning with a vowel sound.
5. Avoidance of omission of necessary words, double subjects, double negatives.
6. Titles properly capitalized, punctuated, centered, and followed by a vacant line (*E. W.*, p. 97; *E. G. C.*, pp. 611-2, 568-9).
7. Titles which briefly summarize the subject of the paper.

D. Speaking:

1. Careful enunciation: *t, ed, ing, wh.*
2. Correct pronunciation: just, because, been (*bin*), question (*kwes-chun*), surprise, probably, government, athlete, get, root, our.
3. Projection of voice to those farther removed.
4. Visualizing a group of words and then saying them while looking at the audience.
5. Pausing for two counts between sentences.

Unit 2: Using the dictionary: word-origin, pronunciation, and parts of speech.

A. Reading:

The examples of onomatopoeia given on pages 419 ff should be studied, and other examples should be found in anthology selections. It is not enough merely to point out such examples, their *function* in the story must be stressed. Word-origins on pages 422-424 should be studied. Then the student should look up various difficult words in the selections read to see how their etymology casts light on their meaning. Why did the author use these particular words? Was he conscious of the same connotations given them by their origin? Does he use these connotations? (See *E. G. C.*, Chap. 20-23.)

B. Grammar:

The parts of speech should be reviewed (*E. W.*, Sec. 1-3; *E. G. C.*, Part I, Sec. 1-3), after studying dictionary examples of words which can very well be used as several parts of speech, and discriminating among the meanings of each. The students should give the conventional definitions of the parts of speech; then the teacher should explain these *logically* in terms of the categories (pp. 44 to 47).

C. *Writing:*

The student should rewrite some of the assignments previously written, trying to improve the vocabulary, sound, quality, and grammatical variety of his composition. There should be exercises in trying to write the same ideas. It should be emphasized that the purpose of knowing grammar is not merely to ensure "correct speech," but mainly to provide a variety of methods of expressing our ideas so that they will be more clear or more vivid.

Other suggestions for short expositions are explanations of:

1. One particular figure of speech used in a particular selection.
2. One particular sound effect used.
3. How two meanings of a word are associated.

Assignments for writing rhetorical arguments might be:

1. A letter to a friend persuading to some action.
2. A short speech urging the class to some definite action.

D. *Speaking:*

Some of the stories or poems analyzed should be read aloud (perhaps memorized). The student should see how well he can bring out the *sound effects* intended by the author: the onomatopoeia, the rhythm, the melody, and the emotional expression of the characters. Proper vocal production and breathing may be discussed and illustrated.

Unit 3: Using the dictionary: word meanings, figures of speech.

A. *Reading:*

The major literary selection for the year (perhaps *The Merchant of Venice*) should be read and analyzed, using principles studied in Unit 1. Special attention should be given to word meaning, imagery and figures of speech. The theory given on pages 49-58 and the examples on pages 424-427 should be studied in preparation for this. (See *E. G. C.*, Chap. 1.)

B. *Writing:*

Assignments like the following are suggested to give practice in using the techniques studied in poetry:

1. Write in rime the names of classmates that fit a certain rhythm.

2. In about four lines of verse describe one character of a story:
 - a. Using the rhyme and rhythm of a poem studied.
 - b. Using an onomatopoetic word.
 - c. Using the recurrence of a similar vowel sounds.
 - d. Using the recurrence of similar consonant sounds.
 - e. Using the figure of speech last taught.
3. In about four lines of verse describe one single action in a story read, using two of the previously mentioned techniques in each assignment.
4. In about four lines of verse describe some vivid sense experience, choosing words which by sound effects and meaning produce:
 - a. A sorrowful emotion.
 - b. A joyful emotion.

C. *Grammar:*

The teacher should insist on the value of grammar in interpreting difficult passages in reading, for example, in Shakespeare. Continue with the study and application of topics previously suggested, including others as need arises. (Cf. *E. G. C.*, Part VIII; *E. W.*, Sec. 6 and 7.)

D. *Speaking:*

Vocal interpretations of passages from the work should be given.

Unit 4: Description

A. *Reading:*

Anthology selections in which description is well used should be read, along with theory on pages 56-58 and examples on pages 520 ff. (See also Cleanth Brooths and R. P. Warren, *Modern Rhetoric*, Harcourt, Brace and Company, Chap. 5.)

B. *Writing:*

Short essays on topics like the following are suggested:

1. The Most Interesting Person I Have Ever Met.
2. The Most Interesting Place I Have Ever Seen.
3. Students should attempt to imitate the technique of some particular author in some definitely assigned details.

3. Two descriptions of the same person or thing, trying in one of them to make it *attractive*, in the other *repulsive*.

C. *Grammar*:

The agreement of subject and verb, pronouns, antecedents, irregular verbs (*E. W.*, Sec. 8 to 10; *E. G. C.*, Part II, Sec. 6 to 8). The teacher should review these matters to correct errors in the foregoing compositions.

D. *Speaking*:

The year may end with a series of oral book reports of similar or contrasted works compared to the major work studied during the year. The speaker should make an explicit comparison of work studied in class with one which he has read privately. He should build his report around a statement of the plot and the means used by the author to present that plot.

ST. AUGUSTINE



CICERO

CHAPTER II

Dialectics and Rhetoric: Arts of Discussion and Persuasion

D I A L E C T I C S

THE ART OF CONVERSATION

In the first chapter of this book we studied the art of storytelling. A storyteller unfolds his tale while the audience listens, charmed by its magic. The charm of conversation, however, is found in an *exchange* of ideas. The art of conversation consists both in speaking and in listening. Of all kinds of recreation, conversation is the most important and universal in human life, and the very heart of friendship.

Unfortunately many conversations are boring. People who would like to be friends meet and yet can find nothing to say. They exchange a few remarks about the weather, their health, business, yesterday's baseball games, or the neighbors next door. Then the conversation "falls flat." To be sure, there are some people who can always find something to talk about, but this does not prove that what they say is interesting.

Conversations become interesting only when there is something to share, and this usually means that there is some *difference of*

opinion about the topic of conversation. Some people are afraid of differences of opinion. They say "never talk about politics or religion," because they think that every difference of opinion is impolite and will lead to a quarrel. Yet it is only when there is some contest of minds about a topic important enough for people to have definite opinions that a conversation can become lively. A baseball game where there was only one side would not be much of a game.

But just as in a sport contest the player must learn how to play hard to win without breaking the rules of the game or losing control of his temper, so in conversation we need to learn the art of courteous *debate*. The art of storytelling is called poetics. The art of conversation, discussion, debate, and inquiry is called *dialectics* (from the Greek for "through" and "speak," that is a "talking through" or discussion of a problem).

DISCUSSION AND DEBATE

It is not only in friendly recreation that discussion and the contest of opinions is important. Today almost all organizations are run by policy-making boards. In business, in government, in the army, in clubs, the important decisions are not made by a single man, but by boards of officials. They meet to exchange and discuss ideas, in order that the final decision may embody the experience and wisdom of all. Such discussion can be a way of avoiding responsibility, however, if those who engage in them do not discuss with the purpose of coming to a genuine agreement, and if they do not know the art of good discussion.

The man or woman who knows how to discuss well can be very powerful in such organizations. It is well known that the influence which some Communists have had in American life was largely due to their ability to influence others through skillful discussion at public meetings. Catholics and others who stand for basic principles can also have great influence for good if they know how to discuss intelligently and effectively.

Sometimes such discussions are held publicly before an audience and are called *debates* or *forums*. The meetings of legislative bodies, like the Congress and Senate of the United States, are occupied with

such debates. In order that such meetings should be carried out in an orderly fashion, the **rules of parliamentary procedure**, first developed in the British parliament, are usually followed.

For all discussions and debates there are three informal rules which ought always to be followed:

1. **Try to come to an agreement.** There is no use discussing a problem if there is no possibility of agreement. If you keep this goal before you, you will try hard not to lose your temper, nor use harsh, cutting words, since these make agreement more difficult.

2. **Listen to the other side.** You do not know if you agree or disagree with another until you know what he thinks. Unless you know what he thinks and why he thinks it, you cannot change his mind. Many people make the mistake of thinking only of what they are going to say next while the other person is talking. Consequently they do not hear what he says, and do not really reply to it. If you do not clearly understand what the other person is saying, then question him until you are sure. Questioning is a very important part of every discussion.

3. **Give your reasons for what you think.** Too often persons in a discussion keep making statements over and over again, without ever giving any proof for what they say.

It is this last rule which requires a good deal of study, and which is the key to all effective discussion and debate. In order to know how to apply it, we must first consider the nature of a **statement**, since every discussion consists in making and defending statements of our opinions.

The Form of a Statement

Every statement consists of three parts:

1. What we are talking about. This is called the **subject**, because it is the subject under discussion.
2. What we say about it. This is called the **predicate** (from Latin for "about" and "say").
3. The **copula**, that is the linking word (**copula** in Latin means a coupling or joining) which is either *is* or *is not* (see page 46).

Thus if the **subject** under discussion is women, we may make either the statement "Women are logical," or "Women are not logical."

These two statements have the same subject and predicate, but the former is an *affirmative* statement, while the latter is a *negative* statement. They are made out of the same material, but they are said to be different in **quality**.

Why are these three parts the essential parts of any statement? The **subject** is like the clay used in a statue; it is a thing which we know in a rather vague and indefinite way. The **predicate** is a modifier or *form* by which we mold the subject and make it more clear and definite in our mind. This form or mold has to be actually applied to the subject, as a mold must be pressed into the clay to give it form. The **copula** signifies this act of the mind by which it actually applies the predicate to the subject. The copula makes the predicate dynamic, so that a statement is not just two ideas hooked together, but a single truth in which one idea (the predicate) forms the other (the subject), just as the figure of a statue gives shape to the clay and produces a single work of art. If the statement is negative, then the negative copula indicates that the mold will not cut or fit the material to which we are trying to apply it; the predicate does not fit the subject.

The Quantity of a Statement

In a debate each side affirms or denies some basic statement, but this statement may also be either *universal* or *particular*, that is, it may affirm or deny a predicate of an *entire* class of things, or only of *some* members of that class. Thus we might argue whether "Every woman is illogical," or "Some women are illogical." This difference in statements is called a difference in their **quantity**. The combination of different **qualities** and **quantities** of statements give us four possible types of statements:*

1. A *universal affirmative* statement; for example: "Every woman is illogical."
2. A *universal negative* statement; for example: "No woman is illogical."
3. A *particular affirmative* statement; for example: "Some women are illogical."

*Do not confuse this use of "quality" and "quantity" of *statements* with the categories of quality and quantity (page 46) which are accidents of *real things*. This is an example of an *analogical* use of terms.

4. A *particular negative* statement; for example: "Some women are not illogical."

You will notice that it is the copula (not the predicate) which makes a statement negative. Thus the statement "Every woman is illogical" is affirmative, although the predicate "illogical" contains a negative idea. Also you will notice that in English we have a rather peculiar way of expressing the universal negative statement. One would think that it should be "Every woman is not illogical," but in English this last sentence really means, "Some woman at least is not illogical," which is a particular statement. Sometimes universal statements are written as "*all* women are illogical." This is also correct, but not as clear as "Every woman is illogical," since a universal statement does not mean that the predicate belongs to the subject taken as a collection, but that it belongs to *each* and *every* member of the class.

DISAGREEMENT

This classification of four basic forms of statements is useful in debate and discussion because it helps us see just how strong the disagreement is between two sides of a question.

1. If one side makes a *universal affirmative statement*, and the other side wishes to disagree completely, it should make a *particular negative statement* using the same subject and predicate. Thus the *complete* denial of the statement that "Every woman is illogical" is the statement that "Some women are not illogical" (not that "No woman is illogical"). Such a complete denial is called a **contradiction**. When two sides take contradictory positions, one must be right, and the other wrong. It is not possible for both to be right, or both to be wrong.

2. If one side makes a *universal negative statement*, it is contradicted by a *particular affirmative statement*. Thus the contradiction of "No woman is illogical" is "Some woman is illogical."

3. If one side asserts the *universal affirmative* and the other the *universal negative*, then their disagreement is not complete, because although both cannot be right, *both may be wrong*. Thus it is possible that both the statement "Every woman is illogical," and "No woman is illogical" are false, because it may be true that "Some women are illogical and some are not." Such a disagreement is not a con-

tradition, but is between **contrary** statements. In debating we should try to avoid arranging the two sides in this way, since the audience may very well conclude, "Why, neither side should win; both are wrong." Similarly a *particular affirmative* and a *particular negative* position do not make a clear disagreement, since both sides may be *right* or *wrong*. These are called **sub-contraries**.

4. In arguing we may always go from the universal to the particular of the same quality, but we cannot go in the other direction. For example, if I can prove that "Every woman is illogical," I have also proved that "Some woman is illogical." Or if I have proved that "No woman is illogical," then I have also proved that "Some woman is not illogical." But from the fact that "Some woman is illogical," it is not certain that "Every woman is illogical"; nor from the fact that "Some woman is not illogical" does it follow that "No woman is illogical." Such statements are called **subalternates**, and are a source of a great deal of confusion in discussion and the cause of many pointless arguments. How often we hear someone argue, "Every Catholic is dishonest, because Mr. Kelly who is a Catholic is dishonest," or "Every Negro is dirty, because the Jones' who are Negroes are dirty," or "No Englishman has a sense of humor, because the Englishmen I have known have had no sense of humor." This is often called **illegitimate generalization**.

Hence we should try if possible in a debate to state the problem so that the two sides are **contradictory**, so that one side must be right and the other wrong. Furthermore we should notice that the side which defends the *universal* statement is the more difficult, since the other side has only to prove a *particular* statement in order to win. Thus if one side argues either that "Every woman is illogical," or that "No woman is illogical," the other side can defeat them if they can prove a single *exception* to this statement—if they can point to a single woman who is not illogical, or a single woman who is illogical. Hence a clever debater prefers to take the particular, rather than the universal side of the argument. Some debaters, however, make the mistake of trying to prove *too much*. They try to disprove a universal statement, not by proving its contradictory (which is particular), but by trying to prove its contrary (which is universal). This is much harder to do, and is unnecessary.

THE SYLLOGISM

Reasons for Basic Statements

We have seen that the chief task of every speaker in a discussion is not only to make statements, or to contradict the statements of others, but to give *reasons* to back up his statements. This is true not only in dialectics, but in every form of writing or speaking, and especially in *scientific* writing. Man is a reasonable being, and he is not satisfied to accept a statement without reasons for it. It is not enough merely to claim that a statement is true, or to repeat this loudly, for it to be accepted. It is an old rule of discussion that "What is asserted without a reason, can be denied without a reason." Hence if we are to be sure that a statement is true, we must know the reason for it.

When we know that a statement is true immediately from our experience it is said to be an immediate truth or principle. Thus the following statements are seen to be true as soon as we understand what the words mean and compare them with our experience:

1. The whole is greater than the part.
2. Every effect has a cause.
3. If equals be added to equals the sums are equal.

But other truths are not known to us merely by knowing the subject and the predicate. We must see that the subject and predicate are connected through a *third* or **middle term**, which gives us the reason why the predicate is connected to the subject. We can write these in parallel columns:

| Statements which are not immediately evident. | Why is it true? (middle term) |
|---|--|
| S | P |
| M | |
| 1. A cow / is / an animal with many stomachs. | Because it eats grass, which is hard to digest. |
| S | P |
| M | |
| 2. X-ray technicians / are / often anemic. | Because X-rays injure the bone-marrow which makes blood. |

| | | |
|-------------------------------|---------------|--|
| S | P | M |
| 3. Man / is / the only animal | which laughs. | Because it requires intelligence to see what is laughable. |

| | | |
|------------------------------------|-------------------------------|----------------------------------|
| S | P | M |
| 4. Adrenalin / is / able to revive | a person in a state of shock. | Because it stimulates the heart. |

When a statement is said to be true through a middle term, it is said to be *demonstrated* (from Latin for "pointed out," because we point out the reason why it is true). It may be written in the form of parallel columns as above, or merely as a *causal* statement; for example, "A fish has fins because it lives by swimming." However, if we wish to make it perfectly clear and explicit we put it in the form of a *sylogism* (Latin for a "linking together of words or ideas"); the *sylogism* points out that this truth in fact depends on two other truths which show that the *middle term* is the link between subject and predicate.

| | |
|---|---------------------------------|
| M | P |
| 1. An animal which eats things hard to digest, e.g., grass. | is one which has many stomachs. |

| | |
|-----------|---|
| S | M |
| And a cow | is an animal which eats things hard to digest, e.g., grass. |

| | |
|------------------|---------------------------------------|
| S | P |
| Therefore, a cow | is an animal which has many stomachs. |

| | |
|--|-------------------|
| M | P |
| 2. People exposed to X-rays which injure the bone-marrow which makes blood | are often anemic. |

| | |
|-----------------------|--|
| S | M |
| And X-ray technicians | are people exposed to X-rays which injure the bone-marrow which makes blood. |

| | |
|------------------------------|-------------------|
| S | P |
| Therefore, X-ray technicians | are often anemic. |

M

3. The only animal which has the intelligence to see what is laughable

S

Man

S

Therefore, man

M

4. Heart-stimulants

S

adrenalin

S

Therefore, adrenalin

P

is the only animal which laughs.

M

is the only animal which has the intelligence to see what is laughable.

P

is the only animal which laughs.

P

are frequently able to revive persons in a state of shock.

M

is a heart-stimulant.

P

is frequently able to revive persons in a state of shock.

In the foregoing syllogisms you will notice that the terms are arranged in the following pattern:

Every **M** is **P**

And: every **S** is **M**

Therefore: every **S** is **P**.

There are other forms of the syllogism but this is the most common and the most useful. In it there are two statements called **premises** (Latin for "something put first"), in both of which is found the middle term (**M**), and a **conclusion** which does *not* contain the middle term. Of these premises the one which contains the predicate of the conclusion (**P**) is called the **major premise**, and is often (but not always) written first. The other premise contains the subject (**S**) of the conclusion and is called the **minor premise**.

How to Make a Syllogism

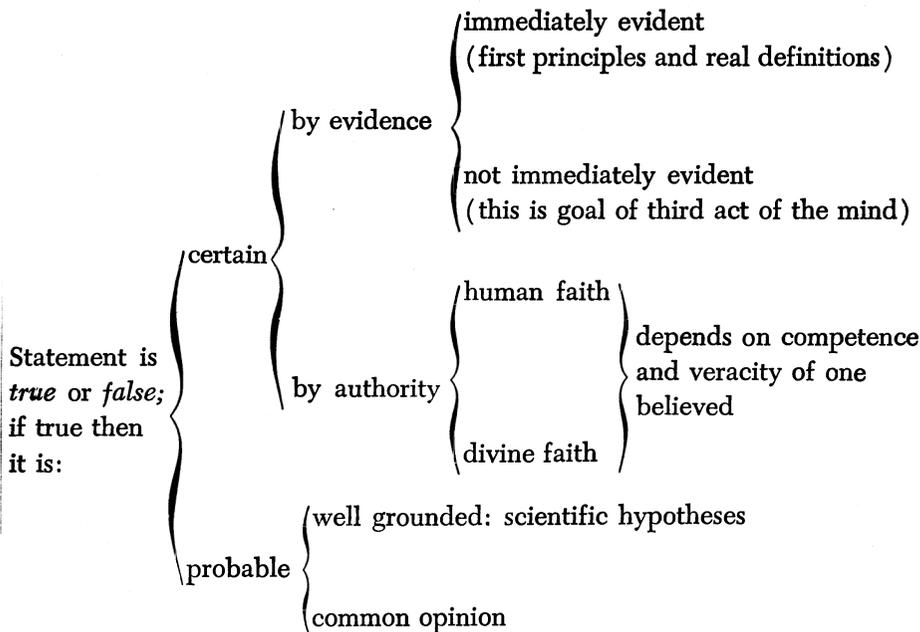
When we wish to form a syllogistic argument (for example, in geometry) we should first ask ourselves: What am I trying to prove?

to a and to b. Similarly, in geometry we begin with the theorem to be proved and then try to discover something which we know to be equal both to the subject and the predicate of the theorem. Thus in the example on page 566 we prove that vertical and opposite angles are equal by recognizing that these angles are the *remainders of equals minus equals*, which is our middle term.

Ordinarily it is sufficient in our thinking to use the method of parallel columns, or causal statements given above, but these are only abbreviations for the syllogism, which states explicitly why we know the conclusion is true. In the next chapter we will show why the syllogism is the basic form of all reasoning.

THE TRUTH OF STATEMENTS

Evidence and Faith



It is obvious that truths known by reasoning are based on premises, but these premises are either demonstrated themselves (and this merely moves us back another step), or they are immediately evident.

Thus all our thinking rests on a foundation made of immediately evident truths which are rooted in experience.

Sometimes the experience on which an immediate truth is based is our own personal experience, and then the truth is said to be *evident*. Sometimes it is based, not on our own experience, but on that of someone else whom we know to be trustworthy, and then the truth is said to be known by *faith*, or on authority. If we know from our own experience that this person is really trustworthy, then our faith is *reasonable*. If we do not know this, then our faith is foolish or *credulous*. When we know that a person is truthful we ought to believe what he says, even if it may seem very surprising and outside our own experience. Some people refuse to believe anything they have not seen for themselves, but this is unreasonable and would greatly limit our knowledge. Only if we take the word of reliable experts can we have a very wide knowledge, for no man can see very many truths for himself. On the other hand, many people are quick to believe anything they hear or read, or to suppose that any famous person must be an expert on whatever he says. The reasonable man makes sure of his authorities before he accepts what they have to say.

In all our reading and listening we should ask ourselves whether the principles stated by the author are really true from our own experience, or if he gives a good authority for them. If not, then we should not accept these principles, nor the conclusions based on them. In writing or speaking ourselves we should never expect others to take our word unless we back it up with facts, or with reliable and well known authorities.

Certainty and Probability

In scientific writing of the demonstrative type it is not sufficient to begin with merely probable statements (that is, statements which seem to be true, but which possibly will turn out to be false). Nothing certain can ever be proved from merely probable statements. For a strict demonstration it is necessary to start with principles which are *certain*, and which could never be false. Thus the principles of Euclidean geometry (the *axioms*, *postulates*, and *definitions*) are certainly true, as we can test for ourselves by imagining the geometrical figures on which they are based. Again, in history some

facts are certainly true, because we have many reliable witnesses on whose authority we can believe them, although we were not on the scene ourselves.

If someone beginning to study a work of science is not certain of the principles, then he must go back to the facts and make sure of these principles before he proceeds. If a student raises doubts about such principles the teacher can only refer him to the facts to see for himself. If he still has doubts, then these can be answered only by the highest sciences (theology and metaphysics) whose business it is to remove doubts and confusions about the principles of the other sciences. Thus occasionally one reads today that the principles of geometry have been disproved, because modern science says that there may be more than three dimensions. The student of geometry can either make sure that there are only three dimensions to the figures used in the study of geometry by looking at them for himself, or he can wait until he studies philosophy. The philosopher will show him that it is not true that science has discovered more than three dimensions, but that this statement is due to a confusion about the meaning of the word "dimension" in science, since this word is used in several equivocal senses (see page 389).

Dialectics and Probability

In dialectics, however, probable statements are a sufficient starting point, since in discussions, debates, or inquiries the dialectician is only exploring; he is not yet trying to demonstrate anything. Hence the dialectician starts with opinions (*probable* statements, or *certain* statements which have not yet been carefully criticized). These can be opinions which almost everyone holds, or those held by experts, or at least by the group of people with whom we are discussing. The dialectician, however, does not remain content with these opinions. He begins to argue them, showing the arguments for and against them. As he proceeds he usually revises and modifies the opinions with which he began, correcting them so as to make them more and more probable.

Frequently a dialectician uses an opinion in a discussion which he himself doubts, or is even sure is wrong, in order to test it or expose its falsity. Thus, a good dialectician knows how to suspend

judgment, to consider a question first from one side, and then from another. He knows how to doubt systematically. Even the things of which he is sure he tests as if they could be doubted. This makes some people uncomfortable. They like positive statements, not debates and difficulties and doubts. In trying to arrive at the truth, or to know the truth more clearly, however, we must make use of this method. On the other hand, we should not fall into the error of always doubting everything and never coming to a positive conclusion.

Poetics and Probability

The statements of the poetic writer do not have to be strictly true, but only *probable*. The probability of poetry is that the story corresponds in its broad outlines to the universal experience of human life, although the details may be entirely fictitious. Thus the story of Macbeth, who sought to be king by murder and whose life ended in failure and despair, may have no detailed correspondence to history; yet it is probable, because we know that it fits the general pattern of the lives of ambitious criminals.

The details used by the poetic writers also have a kind of probability in that they form a consistent whole that fits the general story. The more vivid and circumstantial the details of the story the more probable and life like it appears. When stated in a mere abstract or in a factual way it may not be very convincing, but when it seems to live before our eyes, then we are convinced. Hence in poetic writing, merely abstract or factual statements are of little value. If you have read Defoe's *Robinson Crusoe*, you know how convincing Defoe makes the story by his use of detail. In order to bring about this probability the poetic writer must draw on his own experience and observation, and make us aware of details of our experience on which we may not have reflected.

Just as some people find it hard to listen to the pros and cons of dialectic, because they prefer flat dogmatic statements of truth, so many find it hard to accept the attitude of the poetic writer. They feel that fiction is hardly better than a lie. The dialectician is not a sceptic. He considers both sides of a question in order to make the truth more evident. A rhetorician is not a flatterer. He appeals to

the opinions of his audience in order to find a common ground between them and himself on which to consider the truth. The poet is not a liar. He invents a fiction, but only so that the fundamental and universal truth which he depicts will become vivid to us in terms of personal experience.

Misunderstandings arise in our reading, writing, or speaking, only when we fail to see whether the demonstrative, the dialectical, the rhetorical, or the poetic mode of speaking is the appropriate one.

EXAMPLES

The Demonstrative Mode of Speaking

In *Whether Piety is a Special Virtue?* (see page 417) St. Thomas has as his thesis or conclusion the statement: "Yes, piety is a special virtue."

He states two basic principles from which he attempts to prove this thesis:

1. "Piety pays duty and honor to parents and country and to whatever is related to them."
2. "A virtue is special when it relates to some object under a special aspect." But he does not merely state these principles dogmatically. The first he proves to be true by showing that we have a special debt to honor our parents and country, because they are the "connatural principle of being and government." The second he does not explain in this article, because he has already explained it earlier in the *Summa* (see First Part of the Second Part, Question 60.)

In this article we also notice how St. Thomas confirms his thesis by an appeal to an authority, namely, Cicero: "On the contrary is the statement of Cicero that [piety] is a part of justice, as he says in his *On Invention* at the end of Book II." Cicero, the great Roman orator and philosopher, was one of the greatest experts on the philosophy of the virtues known to the Middle Ages. In medieval writing it is usual for a writer to give an authority confirming his opinion, before he states and proves his own view. This does not mean that the

conclusion is presented to us on faith, since it is proved by clear reasons, but only that it is confirmed or strengthened by an additional appeal to authority.

In answering objections we will notice how St. Thomas makes use of his knowledge of the relations between different kinds of statements.

1. In the first objection it is argued that *every* act of honor and service is given to persons because we love them; therefore piety is nothing but love. St. Thomas answers by pointing out an exception to the principle stated. Certainly we love God and worship him because we love him, but it has already been proved that worship (religion) is not the same thing as love. Thus it is clear that the principle stated by the objection is not *universally* true.
2. The second objection argues that *every* act of honor or worship is an act of the virtue of religion; therefore piety must be the same virtue as religion. The objection is backed up with the authority of St. Augustine. St. Thomas answers by saying that *some* acts of honor and worship (namely, those given to God) are acts of religion, but not all. Those given to our parents and country are not acts of religion but of piety. Once again he has pointed out the exception to the too general statement of the objector. He also backs up his answer by quoting another authority with whom St. Augustine certainly would have agreed.
3. The third objection argues that *whatever* relates to the fatherland is a matter of legal (social) justice; hence piety must be the same as legal justice. St. Thomas again finds an exception: that *some* things that relate to the fatherland (namely, as it is the common good) are a matter of legal justice he admits; but he denies that *every* thing which relates to the fatherland is a matter of legal justice, because *some* things relate to it only as it is "a principle of existence." This exception leaves room for piety to be a special virtue.

Thus St. Thomas proves his own point from solid and universal principles, and answers his objectors by contradicting their universal statements, showing that they admit of exceptions.

The Dialectical Mode of Speaking

Chesterton in *A Defence of Patriotism* is dealing not with certain principles but with common opinions. Throughout his whole essay he takes it for granted that a man ought to love his native land. No one in his audience would really doubt this, and so he makes no attempt to prove it. What he wishes to refute is another opinion held by many of his audience because they have never stopped to think about it seriously. This is the false opinion that patriotism consists in imperialism, or a "lust of territory," the desire to take away the fatherlands of other nations. In order to refute this view he makes use of two other opinions shared by his audience:

1. That there is a difference between lust and honorable love. Using this accepted opinion Chesterton tries to show that there is the same difference between genuine patriotism and imperialism as between lust and love.
2. That an Englishman is a very sensible and civilized kind of person. Chesterton uses this to show that in mistaking imperialism for patriotism, and in bragging about his country's military strength instead of its achievements in science, art and philosophy, an Englishman is making a fool of himself and acting like the ignorant savages for whom he has so much contempt.

It will be noticed that in selecting these two opinions Chesterton has a rhetorician's eye for his audience. He knows that the English pride themselves on their sense of decency (opinion 1) and on being a most civilized nation (opinion 2), and he shows that these opinions are inconsistent with their imperialism. Still Chesterton is acting here more as a dialectician than a rhetorician, since what he desires is not so much to get Englishmen here and now to vote against imperialism, as to help them wake up and *think* about the basic principles on which they act. He is trying to help them untangle their true opinions (namely, that patriotism is noble, and that England is a great nation), from their false opinions (namely, that imperialism is noble, and that England is great because of military power).

Notice, however, that Chesterton does not deny all truth to the other side. "Colonies are things to be proud of, but for a country to be only proud of its extremities is like a man being only proud of

his legs." He is not saying that *every* colony is bad, but only that colonies are bad if they are sought for the sake of mere military power. Chesterton's essay, however, tends to fall short of ideal dialectic, because he does not sufficiently bring out the other side of the argument. It is essentially dialectical, but with too much rhetoric thrown in.

The Rhetorical and Poetic Modes of Speaking

In the works of Emerson and Lincoln it is quite easy to see that both build on the common patriotic emotions and attitudes of their audiences. Lincoln well understood that the people to whom he spoke were bitter about the losses and sacrifices of a war. Consequently he did not ignore this grim feeling but rather used it. He showed them they must be "highly resolved" to see the task which had cost so much carried through to its finish.

Emerson was not trying to persuade his audience of anything; he only wished them to share his own insight into the experience which he depicted. He wanted them to see how glorious patriotism is, but he did this by the ironic contrast between the greatness of the battle and the forgetfulness and quiet peace of today. The *probability* of his poem lies in the vividness of this contrast. On the one hand, we see vividly the great historic moment when the first shot was fired at Concord. On the other hand, we also see vividly this quiet moment on the river bank where nothing is left to mark the site of the battle except the traces of the graves which cover conqueror and foe alike. Thus the greatness of patriotism as an abstract truth becomes concrete for us in this experience of an ironic situation. For a moment we are suddenly alive to the greatness which we had almost forgotten.

R H E T O R I C

THE MOST PRACTICAL OF ARTS

Without discussion and debate, free men cannot work together for common goals, and the inquiry after truth is greatly hampered. Discussion alone, however, seldom leads to agreement and decision without *leadership*. Even when a leader is chosen by a group, he

still must get that group to understand and carry out willingly the decisions which he proposes. Of course, as the lawful authority accepted by the group he may impose his decision by force when this is necessary, but no group will long continue to accept a leader who rules by force alone. If he is to remain a leader he must *persuade* his followers to accept his decision and put them into practice willingly and intelligently.

The art of storytelling is called **poetics**, the art of discussion and inquiry is called **dialectics**, and the art of persuasion is called **rhetoric** (from the Greek for a "speaker").

Poetics aims to produce stories that recreate and refresh us. Dialectics has many applications in all phases of our life, but it is always used to prepare the way for something more decisive: it is tentative and exploratory. Rhetoric, however, belongs to the world of practical life: it deals with *action*. Nothing is more practical in daily life than this art of persuasion, since success in every human endeavour, be it business, love, politics, or the Christian apostolate, depends on our power to persuade others "to see things our way."

SALESMANSHIP

Every American knows that "salesmanship" is essential to business success, but salesmanship is only one small part of the great and noble art of persuasion which includes "the art of public speaking," "propaganda," "publicity," "advertising," "journalism," and the "apostolate." We *persuade* a friend; we *command* a subordinate; we *beg* a superior; we *plead* with a judge or a jury; we *advertise* to prospective customers, and we *sell* an actual customer; we *encourage* the weak; we *threaten* the enemy; we *preach* the truth; we *pray* to God. All these varied processes of persuasion are only parts of the one great art of rhetoric.

Today, because of the growth of "high-pressure" advertising and the "big lie" of political propaganda, many people think that all persuasion is dishonest, and that rhetoric is the devil's art of lying and deceiving. They forget that the greatest master of persuasion was our divine Lord who is Truth itself, and that the Gospels are largely a record of his persuasive words that had such power to move the hearts of all kinds of men and women.

We do not say that medicine is an evil art because there have been wicked doctors who *misused* their art of healing to poison and to kill. Just as the purpose of medicine itself is to heal, although it may be misused, so the purpose of rhetoric is to persuade men to act prudently, although it may be misused to drive them to foolish and wicked acts.

THE DIFFERENCE BETWEEN RHETORIC AND POETICS

Dialectics is easily distinguished from rhetoric and poetics, because it carefully avoids an appeal to the emotions. In good discussion or debate we should try to keep clear of emotional appeals, because once a discussion becomes emotional it becomes inflexible. Each side begins to defend its position at all costs without any real effort at coming to an agreement. But rhetoric and poetics both appeal to the emotions. How then are we to distinguish rhetoric from poetics, or are they really one and the same art?

A poetic writer (as we have seen in Chapter I) is not immediately concerned to persuade us to do or avoid anything, but simply to present to us a story which excites our emotions and then brings them to rest in the enjoyment of the beautiful way in which his story of human life has been told. To be sure, the habit of reading good literature of this sort does help us develop an appreciation and admiration of what is noble in human life, and a disgust with whatever is base and mean, but our immediate aim in such reading is refreshment and delight, not a moral lesson.

The rhetorician, on the other hand, is immediately concerned with persuading his audience to act, to do or to avoid something. He hopes that at the end of his speech they will hurry away with a look of determination to put into practice what he has urged them to do. When the coach of a football team sees his men run to the field of battle with grim courage, he knows that his talk to them was a rhetorical success.

THE INSTRUMENTS OF RHETORIC

If the rhetorician is to get his audience to act he must help them to see that the goal he proposes is (1) good, (2) important, and (3) possible. No one will act unless by doing so he has real hope of at-

taining something really important to him. On the other hand if the rhetorician wishes to persuade the audience to avoid something or refrain from acting, he must show them that it is (1) evil, (2) trivial, or (3) impossible.

To achieve this effect the rhetorician has five weapons, two of them of lesser importance, and three of major importance:

1. His **delivery** of the speech—that is, the volume and quality of his voice, his pronunciation, and his gestures and facial expressions. It is obvious that no matter how good the contents of a speech it will fail of its effect if the audience cannot hear what the speaker says, or if they are irritated or bored by his mannerisms.
2. His **style** of composition—that is, the organization of his material, the structure of his sentences, and his choice of words and figures of speech. A speaker who expresses himself awkwardly, vaguely, obscurely cannot win his audience without difficulty.
3. His **personal character** as it appears to the audience. He will be most effective in persuading others to follow him if they are convinced that he is himself *honest, well-intentioned, and intelligent*. We quickly accept the advice of a man whom we trust, like, and admire, while we may reject the same advice if it is offered by one whom we distrust, dislike, or despise.
- 4 His appeal to the **emotions** of his audience. A speaker will never get people to act if they remain cold and indifferent, or if they consider his proposals in a purely theoretical and objective way. He must move them to be concerned personally with the problem, and to view it as involving their own pain and pleasure, their own profit or loss.
5. His appeal to the **reason** of his audience. A speaker does not want to stir up a mob of people who blindly follow their emotions. He wants them to have a reasoned and sane conviction that what he asks them to do is the practical and moral thing to do.

Of these five instruments the first two are often the most stressed in classes in public-speaking or books written about this art, but they are less important than the remaining three, which are often neg-

lected. Although a good speech is much improved by excellent style and delivery, its effect will not be totally destroyed by a lack of good style or faulty delivery unless these are extremely bad. On the other hand, no matter how excellent a speaker's style or delivery may be, he will not get us to follow him if we dislike him or doubt his reasoning. Ultimately we are persuaded to take a speaker's advice only because we trust him personally, or because his reasons really move us and convince us that what he proposes will be profitable for us. Indeed, we might include both delivery and style as parts of the impression made by the character of the speaker, since it is to this that they chiefly contribute, although they also serve to enhance the appeal to the emotions and reason of the audience.

Delivery is better learned by direct guidance than from a book, so that it will not be treated here. Style is required both in poetic and rhetorical writing and is discussed in Chapter I, and partly in a later section of this present chapter.

THE APPEAL TO EMOTION

Since the most important instruments of the rhetorician are his character, his appeal to emotion, and his appeal to reason, he must give much thought and study to using these well. Above all he must remember that he is assuming the position of a leader, and hence he must show himself to his audience in the best possible light as likeable and admirable. He cannot do this unless he well understands what his audience likes and dislikes, and what arguments appear true to them, and what would be very hard for them to understand or accept. Hence he must understand both the obvious and the hidden motives of human behaviour. The poetic writer studies the characters *about* whom he writes; the rhetorician studies the characters *to* whom he writes or speaks.

Before writing a speech the rhetorician must ask himself: "What is my audience like? What kind of people do they trust and admire? What are the things in life which they value or fear? What rules of conduct do they really respect and follow? What kind of experience guides them in deciding practical questions?" He must ask himself what the members of a given audience have in common. Are they united by their virtue and ideals (for example, an audience of priests,

of sisters, doctors, lawyers, or experts of some sort), or by their riches (an audience of businessmen), or their poverty (a crowd in the street)? He must also consider their nationality, religion, and education, and whether they are young, middle-aged, or old.

In order to sway all these classes of people the rhetorician concerns himself with arousing love and hate, anger and benevolence, fear, shame, kindness, pity, or envy. He does not do this, however, in order to make men act from blind emotion like animals. The propagandist or the leader of a lynch-mob who whips his audience into a blind frenzy of hate and fear is misusing rhetoric in a diabolic way. The genuine rhetorician appeals to men's emotions to lead them to truth and to a more reasonable way of acting. He appeals to what is best in his audience, and he studies selfish and evil emotions, not in order to produce them, but in order to prevent them from interfering with right action.

If the rhetorician is to move men to do what is right, he must not merely advertise any product he is hired to sell, promote any program adopted by his political party, or defend any criminal who hires him as a lawyer. He must know ethics, or the art of good human living, so that he knows what is truly virtuous and honorable, and he must have a thoughtful acquaintance with politics and practical affairs.

EXAMPLE

If we examine the *Gettysburg Address* (page 413), we notice first of all that Lincoln was acutely sensitive to the attitudes of his audience, and took care to establish his true character with them, because he realized that the character of the speaker is the first great instrument of rhetoric. Lincoln knew that his audience at Gettysburg battle-field was doubtful whether he was anything more than a cheap politician. They rather expected him to make an awkward and tasteless speech defending himself and his much-criticized administration of the war. They were contrasting him unfavorably to the polished orator Edward Everett who had just spoken so well and at great length.*

* See the account of the delivery of the *Gettysburg Address* in Carl Sandburg's *Lincoln*.

Consequently Lincoln first of all aimed at giving the impression of great dignity and sincerity. He showed himself not as a cheap politician but as a great statesman, far above all mere partisanship, a man who had no desire whatsoever merely to make an impression. He was simple, solemn, deeply moved. He appeared to them as a man who had eyes only for the future of his country. This impression (which was a true one) was conveyed by the whole tone of the speech. It was simple, brief, but sublime in its concentration on the single theme of *dedication*.

Next we notice the reasons which he used to persuade his audience. He wished them to agree with his own view that *they should continue the war for democracy*. This was the central thought and purpose of his speech. Why should they continue the war? *Because this was the best way to honor the dead*.

MASS MEDIA

THE MASS MEDIA OF COMMUNICATION

At one time the most typical work of the art of rhetoric was a formal speech or oration to be delivered to a limited audience. Today formal oratory seems to play only a small role in public life. Its place has been taken by what are called "the mass media of communication," which reach audiences of millions. Every citizen is strongly influenced by these "mass media," and if a man as a public leader is to influence others he must understand the power and the use of these new instruments of persuasion.

A detailed study of the mass media of communication pertains to the social sciences, because these media have originated in the special circumstances of modern society, and their effects cannot be evaluated without a study of social facts. New as some of these media may be, however, the principles that underlie their power are the same principles of the liberal arts which we are studying. Indeed, these novel instruments of persuasion are only an extension and development of time-honored methods. Consequently we will very briefly point out some of the ways in which our study of the liberal arts can assist us in judging and using the mass media.

The Newspaper

The oldest of these mass media is the newspaper. Nothing is more widely read (except perhaps the billboards), and yet it is a fact that many people do not read the newspaper at all, or confine their attention to the comics and the sport-page. When we open a newspaper, the first question that ought to occur to us is this: What is the newspaper's purpose? Is it a source of information? Is it intended to persuade us to do something? Is it entertainment? Or is it all these things?

If we begin to compare newspapers we will see at once that there are a few which obviously aim at giving their readers a great deal of information. If the student compares the *New York Times* with most newspapers, he will immediately see that the *Times* gives much fuller reports of almost every item of news than do most newspapers. It prints many speeches and documents in full, and it emphasizes foreign news, political news, economic news, and other areas which are important but not always very "interesting." The average reader would find the *Times* rather dull, and he would find it hard to wade through so much factual material.

At the other extreme a student should examine the sort of newspaper that aims at "reader interest." He will find the stories short, the headlines startling, the emphasis centered on personalities and striking events. It is typical of such a paper to try to develop a day-to-day interest in some currently sensational story. This it works to the limit, and then discards in favor of some new theme. Clearly such papers aim more at entertainment than at information. The art of storytelling dominates them, although it is an art usually badly abused and cheapened.

The strictly persuasive or rhetorical aim is not very evident in our papers. It is supposed to be confined to the editorial page (not read by most people) and to signed articles by "news analysts." Yet if we begin to compare papers we will see that actually a rhetorical note pervades a great deal of the material. Certain policies or groups favored by the newspaper owners color the book reviews, the theater news, some comic-strips, and the news reporting itself. By its selection of topics to emphasize, its manner of reporting the facts, and the sort of reporters and feature writers that it hires and

develops, a newspaper presents an organized view of the world which can be powerfully persuasive.

We must learn how to read a newspaper well. We should take two papers of widely different types and read each through. Few people have tried even skimming a paper all the way through, but we should have this experience at least once, in order to become really aware of what a paper contains. We should compare the different uses of the same news services, and how the make-up and style are typical of each paper.

The most important thing is to try to figure out the intention of the editor and his estimate of his audience. What sort of person does he think you are? What is he trying to make you into? Ask yourself if you want to be the kind of person the editor thinks you are or wishes to make you.

When we face that question it becomes rather obvious that a truly free man or woman who wishes to live a genuinely liberal life cannot depend on the newspapers as his chief source of information. The man whose mind is formed by the newspapers is a slave. Yet a good newspaper contains many features and many bits of information that can be highly useful to the man who reads critically.

Advertising

Today advertising appears in all the mass media. Not only is it the common element in them all, but it is the source of financing for all, or almost all. Advertising is produced by companies who spend great sums for research on human psychology, and who are always experimenting with new techniques of persuasion.

The fundamental fact about advertising which makes it different from other kinds of rhetoric is that its purpose can hardly be concealed. For this reason people are generally sceptical of advertising claims, and in consequence advertising cannot depend on actually convincing the public. Rather it works on the fact that the purchasing public today is faced with a large number of choices and must choose between products which seem very similar and concerning which it knows very little. In such a dilemma the purchaser is likely to be swayed by the most vague and tenuous motives. The fact that he happens to remember the name of the brand, or

he half-consciously associates it with some pleasant or attractive idea, or that its package strikes his eye—these factors, or one of them, may be decisive in his confused deliberations. If there are 25 brands of breakfast cereal to choose from, all very much alike, the purchaser can hardly help but be influenced by some such motive that advertising can control.

This means that in reading advertisements we ought to develop two habits: (1) The habit of discounting this barrage of impressions which the advertiser seeks to implant in our mind; (2) the habit of trying to glean from the advertisement such definite factual information as it may contain about the nature of the product, its special features, and its price. Only this information has any real utility for the purchaser. In this way the advertising section of a newspaper or magazine can be very useful to a reader who studies it to find out what products are being offered and by what companies. Beyond this we have to learn to free ourselves from the psychological enslavement of advertising impressions.

The vast importance of advertising in modern life is undoubtedly an evil, since it constitutes a very big expenditure which brings only a small profit to the purchaser. Hence the purchaser should resist advertising as much as he can, and let companies see that there are many purchasers who demand reliable information. The person engaged in the advertising business should work to develop advertising that is more informative and educational. In present circumstances, nonetheless, he is permitted to compete with other advertisers in using methods of mass-appeal as long as his advertising is not dishonest and does not appeal to immoral emotions of impurity, irrational fear, hate, greed, etc., and provided that the product is a legitimate one. This does not absolve him from his social duty to strive for better practices in his business. Social authorities have even a greater responsibility gradually to reduce the social waste of excessive advertising and to forbid or control the advertising of socially dangerous products.

Radio, Television and the Movies

For many people, radio, television, and the movies take the place of the newspaper as the source both of information and of enter-

tainment. Most of the time spent on these media is devoted to entertainment, and should be analyzed in terms of the principles of poetics and the fine arts.

Such an analysis reveals that radio and television provide us with three main classes of entertainment:

1. Quality programs in which the producer aims at producing a real work of art: well-played music whether classical or jazz, an effective drama, or a sports exhibition. These programs are usually a rather small part of the total offering and the listener must study the program offerings in order to select them. If he selects only such programs he will probably not give a great deal of time to the medium, but he will be able to find some excellent entertainment which was once available only to a few.
2. Mass-appeal programs in which the producer aims principally at getting as large an audience as possible in order to please an advertising sponsor. These programs may be of high quality, or they may be exceedingly poor entertainment, but these considerations are really irrelevant. People watch a program in vast numbers for all sorts of strange reasons, some of them quite irrational. Defenders of such programs usually say that they are "giving the people what they want." We know that such a policy with children is very injurious to the child. The public is an amorphous group which can be influenced to act like a child or to act like an adult. If the mass media treats the public as a child it will make it childish.

Nor is it true to say that people are always entertained by the things they watch or listen to. Curiosity, laziness, boredom, lust, and all sorts of hidden motives drive people to listen and watch programs which do not truly recreate them, if by recreation we mean a resting and strengthening for daily tasks and for a higher human life. People have been known to flock to a movie which left them frightened and depressed after the momentary satisfaction of a morbid curiosity.

3. Time-killing programs which are produced to hold an audience which wants to be able to have something to watch or listen to whenever it turns on the set, or drops into a movie. A very large part of radio, television, and movie fare is of this sort. This has a good and a bad aspect. The good aspect is that in modern life people have to live by strange schedules, and they need relaxation at odd moments of the day. The unfortunate aspect is that it is the path of least resistance for many. They fill up their day with utter foolishness which is not really entertaining, but which saves them from thinking or praying, or from conversation with friends or family. They waste their lives with shadows and day-dreams which are not even their own.

As *rhetorical* media, radio, television, and the movies at present do not have a very great function in our society. The codes of these industries and the federal control over the first two operate at present to keep "controversial" material at a minimum, and this is powerfully reinforced by the desire of the commercial sponsors not to offend any group. Political speeches and interview programs on which the principal parties are permitted to buy time, or in some cases are given equal time, are the obvious places for rhetoric. Speakers have learned to develop a special style which is more direct and intimate than platform speaking. Of maximum importance is the speaker's ability to create an impression of sincerity, simplicity, plus the ability to answer any question on the spur of the moment without betraying anger or lack of information. Speakers are sometimes expected to have all the charm of a professional entertainer, and must aim more at being pleasant than at being forceful.

It is obvious that in the future these media may be used more for direct propaganda for a particular point of view. We have already seen this in war time, and it is current practice in anti-democratic countries. There is some reason to believe, however, (since it has never proved possible for a country completely to exclude the reception of foreign broadcasts) that these mass media are most effective when they give the appearance of the objective presentation of both sides of a question. When they fail to seem objective, listeners will grow suspicious and listen to competing broadcasts.

The *informational* aspect of these media, and particularly of television, can be very great, but at present it is confined to short news broadcasts which are no real substitute for a good newspaper article, to views of public ceremonies, etc., and to "educational programs." The educational programs may grow in number and popularity, although at present they are still of minor importance. It is not to be expected, however, that the mass viewing of public spectacles will greatly contribute to people's real understanding of social events. The great events of history are not ordinarily public events and what the cameras show us is only the outward display.

In making use of these three media for our own consumption we should try to be selective and to leave ample time in our life for more rewarding activities, rather than to become a slave to the mass-mind. In using them to influence others we must realize the serious responsibilities of which the Popes have frequently spoken, and should learn what these responsibilities are by a study of the papal encyclicals and the ethical codes of each industry. All of the mass media are extremely expensive to provide; one consequence of this is that their control is not in the hands of individuals, but of immense corporate bodies. It is necessary for the individual to work within such a corporation for the gradual improvement of standards.

The Many Kinds of Printed Material

Besides the newspaper, we are provided with a vast amount of printing, ranging from pamphlets to magazines, and through a vast variety of magazines to many types of books. Here the important thing is to become acquainted with the whole spectrum of available reading material. There are "pulp-magazines" devoted to time-killing popular fiction. There are "slick-magazines" devoted to a varied fare. There are digests, some devoted to general collections and some to special fields. There are news summaries and economic summaries. There are magazines like the *Saturday Evening Post* with a mixture of fiction and feature articles that appeal to a business-class audience. There are magazines like *The Atlantic Monthly* which aim at somewhat more "highbrow" audiences, and the "little magazines" of a literary or political character that aim at very "highbrow" audiences. There are scholarly, professional, and trade journals.

A student ought to spend some time in a library which has a full range of periodicals and become acquainted with what is available to him both in the way of entertainment and of information. Especially should the courses he may be studying in school encourage him to enquire from the teacher what periodicals or works of bibliography pertain to these particular subjects and to examine and use them. He will quickly discover that the mass media magazines are only inferior versions of much better publications from which they copy a good deal of their information.

American publications, however, are generally weak in effective discussion or genuine rhetoric. The best examples of rhetoric are to be found in the works of a few commentators or public-spirited men who wish to advocate a definite policy and who write with the plain purpose of persuading others to accept this view. Such work, if it is not dishonest or based on gross fallacies, is always profitable; for, even if we are not convinced, at least we obtain a clearer and broader vision of the problem.

Discussion is often very neglected today. In most American papers and magazines the "letters to the editor" department does little more than provide us with a gauge of a favorable or unfavorable public reaction. The letters are too brief, or they are written by extremists. The serious thinker is not often attracted to write in such columns, so that controversy, once very popular, does not play a very big part in our press. Americans seem afraid of the direct refutation of an opponent, and people seem more interested in proving that they are acquainted with both sides of a problem than in trying to make a judgement.

THE WEAKNESS OF THE MASS MEDIA

In spite of the enormous propaganda machines which operated in World War II, and the vast variety of the devices which they attempted to use, it is admitted by many that one of the most effective works of persuasion was the series of radio speeches given by the British Prime Minister, Winston Churchill, during the Battle of Britain. These speeches were rhetoric of the classical type, which Cicero would have admired. They were effectively timed to anticipate each crisis, but their chief power came from the way in which

Churchill made every Englishman feel that he and his leaders were all joined together in the same risks and the same heroic defense of a great tradition.

These speeches were proof that the genuine classical forms of rhetoric still remain great. Only such rhetoric has the real power to convince, because only in such direct speech are we made to feel the personal conviction of a leader who appeals to us as free human beings capable of deliberate choice. The mass media, when they descend from this true rhetoric to the devices of mere advertising, debase the public and turn it into an irrational mass of slaves acting on animal impulses.

The Christian must use the grace given in confirmation to bear witness to truth, and to resist the constant pressure of mass thinking. He must critically weigh the sources of his information and rely only on what is best. He must have the freedom of mind to engage in honest discussion, and he must have the generosity to listen to men who will accept the responsibility of leadership, and if treated by them as a free man, he must be willing to follow them loyally.

THE NEED OF GOOD STYLE

In planning to persuade an audience to act as we think right, the most important problems are the ones we have already discussed in the first part of this chapter, namely, how to analyze an audience and decide which arguments will most appeal to them. Even after these problems have been solved, however, a further very serious one remains: *How to express these arguments in winning words.*

In Chapter I we studied something of the magic power of words to arouse the imagination and move the emotions. The poetic writer uses this magic to recreate for us some story of human life. The rhetorician also must use this magic to arouse the attention and sympathy of his audience and then to move them to accept his arguments. This magic of words consists, not only in the selection of appropriate words, but also in their organization into sentences. The manner in which this is done effectively is called **style**. We say that a person who makes a pleasing appearance by his manner of

dress is "in style." Similarly the clothing of our ideas in neat and attractive language is called "good style."

To be effective in persuasion we must have a good style of speaking and writing, and good style has two qualities: (1) It should be appropriate to our audience and our subject matter; (2) it should express our own individuality, since the character of a speaker is one of the most powerful means of persuasion. It is often said that "the style is the man," meaning that our use of words in writing or speaking shows our character to others.

To have these two qualities of appropriateness and individuality style must first of all be *clear* and *orderly*. A confused presentation of a subject is always displeasing to an audience and creates a bad impression. A poetic writer will tell a good story, as we have seen, only if he keeps before him the outline of his plot and makes every word and every detail contribute to that single effect. So also the rhetorician must keep before him what he is trying to achieve and make every step of his speech contribute to it. If we examine a well-written advertisement we will soon see how careful the writer was to choose every single word and sentence to make the strongest possible impression on the reader in the shortest possible space.

Therefore, the first rule in acquiring a good style is this: **begin by making an outline of what we wish to say.**

OUTLINING A COMPOSITION

Any piece of speaking or writing is made up of many sentences or statements, but only a few are of chief importance, for only a few ideas in any such piece are the chief ideas. Just as we try to find the two main ideas in a composition, so we must look for the *chief statement*. This chief statement will be a combination of these two main ideas; we call it the author's **thesis** or **conclusion**. Everything else in the composition is there only to explain this chief statement. Once we have discovered the two chief ideas, it is obvious that the conclusion will either *combine* these, or *deny* that they can be truly combined. We must either say "Patriotism is honorable," or "Patriotism is not honorable." The former statement is *affirmative*, the latter *negative*.

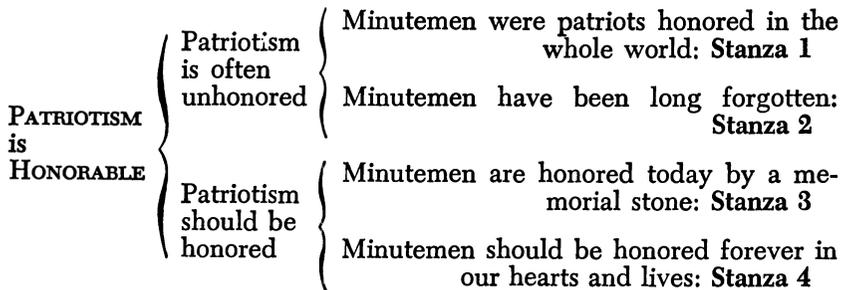
In making an outline, therefore, our first step is to write down the main conclusion or thesis, combining or denying the combination of the two main ideas. The second step is to discover the *parts* of the composition, and then to find the main statement in each of these parts. Thirdly, these parts can also be divided into parts, each of which has a main statement. This process of breaking down the whole into parts, and these parts into smaller parts can be continued until we arrive at the single sentences of the composition.

In a poetic work the thesis or conclusion will state the plot or story of the poem. The outline will show the different stages of this plot. In a play these different stages are usually called "acts" and "scenes"; in a novel they are commonly chapters, and sections of chapters; in a lyric poem they will often be stanzas.

In a rhetorical work the thesis will be what the speaker is trying to persuade us to do; the outline will show the steps by which he persuades us. In a dialectical work the thesis is not a definite affirmation or negation, but the statement of the case on *both sides*; the parts of the outline show the stages by which each side makes out its own case. In a scientific work the thesis is the conclusion to be proved as *certainly* true or false; the outline will show the steps by which this proof is made firm and solid.

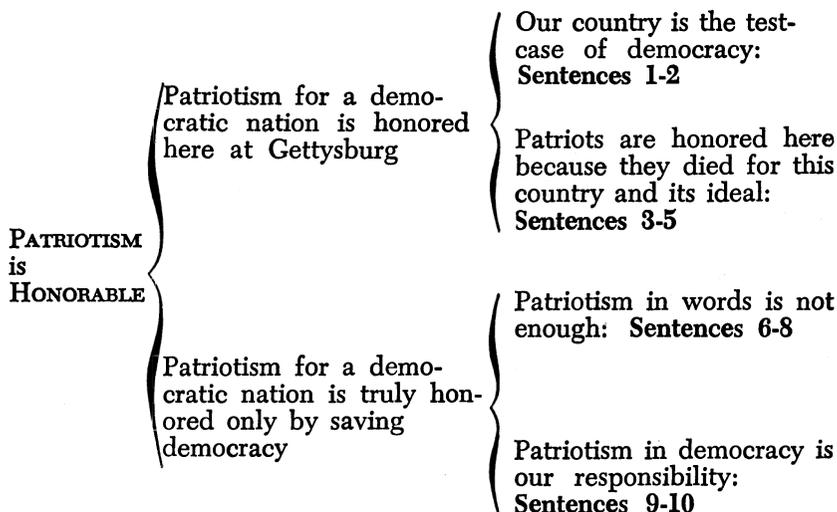
1. Outline of the "Concord Hymn."

If we try to make a first draft of an outline of the "Concord Hymn" we might get the following diagram:



2. Outline of the "Gettysburg Address."

The "Gettysburg Address" might be outlined as follows:



3. **Analysis of the outlines:** You will notice that a perfect outline is simply a *classification* of the different statements contained in a composition. It is like a branching tree: the trunk is the thesis of the whole composition, which divides into two great branches, and these into smaller and smaller twigs. Each branch and twig represents a subdivision of the main thesis. Many students make the serious mistake in outlining of merely listing a series of statements. A heap of lumber is not a tree, and a list of statements is not an outline. An outline is an *orderly* classification of statements in which each general statement is divided into lesser general statements until finally the ultimate unit of statements of the composition is reached. Outlines for other examples will be found on page 470.

DIAGRAMMING A SENTENCE

If the process of outlining is carried out completely, it will classify every single sentence in the entire composition. It might seem that this would be a complete analysis. But the sentences themselves can also be broken up into the parts of which they are composed. We call this process of analyzing a sentence *grammatical analysis* or *diagramming*.

The fundamental point in diagramming is to realize that in a complete statement or sentence there are only the three principal

parts we have already studied (see page 69), the **subject**, the **predicate**, and the **copula** which joins or separates them.

1. **Sentences and modifiers.** When we examine sentences, however, we find that some have several subjects and predicates. When these are linked together by the word "and," the sentence is **compound**, and we can easily divide it into several distinct sentences or statements. When, however, the several subjects and predicates are linked by *subordinating conjunctions*, then the sentence has only one *principal* subject and predicate, and the other sentences (**subordinate clauses**) are really modifiers. The chief subordinating conjunctions are the following:

| | | | |
|------------|---------------|----------|----------|
| after | because | than | where |
| although | before | though | whenever |
| as | if | unless | while |
| as if | in order that | until | |
| as long | since | when | |
| as long as | so that | whenever | |
| as though | | | |

In diagramming, our whole purpose is to discover the principal subject and predicate, and then to list the other parts of the sentence as modifiers of these. Since the predicate itself is a modifier, we can actually turn the sentence into a subject with a whole series of predicates. Thus the simplest way of conceiving the building of any sentence is to think of it as a subject with a series of modifiers, each one of which could serve as the predicate of a separate sentence.

2. **The moods of verbs.** Our notion of a sentence can be still further simplified by noticing that the **verb** is either *is* (or *is not*), plus a predicate word or series of words.

This is very plain in **declarative** sentences, which simply state something true or false. Sentences in which the verb expresses some other manner of speaking (a request, for example, or a command), rather than a simple declaration of truth or falsity, are said to be in a different **mood** (manner of speaking) than these simply declarative sentences, which are in the **indicative mood**. But we can make them into declarations in the **indicative mood** by saying "I am asking or commanding you. . . ." Thus:

1. The *question* (**interrogative mood**): "Are you coming?" is equivalent to a declarative sentence: "I am asking you whether you are coming."
2. The *request* or *supposition* (**subjunctive mood**): "May God bless you," is equivalent to the declarative sentence: "I am praying that God will bless you."
3. The *command* (**imperative mood**): "Come here!" is equivalent to the declarative sentence: "I am commanding you to come here."

3. **Actions expressed by verbs.** We should also notice that some verbs name an action which is clear and definite. These verbs are said to be *intransitive*; they need no other noun to explain them. But frequently it is necessary to make a verb clearer by adding to it a noun called its **object**: "I made a *house*." Sometimes it is even necessary to add a second object noun or an adjective, which is called the **objective complement**: "I made the house a *home*," or "I made the house *comfortable*." Verbs of this kind demanding an object or objective complement are called *transitive*.

When a verb names an action which is clear and definite it is said to be *intransitive*. Frequently, however, it is necessary to make the nature of this action more definite by indicating its *effect*, since action is completed by bringing about some result. This can be done by adding, in one of several ways, a noun or an adjective which indicates the result or effect of the action:

1. The **direct object** is a noun which indicates the thing acted upon: "I made a *house*."
2. The **objective complement** is a noun or adjective indicating the effect produced in the object: "I made the house a *home*," or "I made the house *comfortable*."
3. The **indirect object** is a noun which indicates the person to or for whom the action is performed: "I made *him* a house."
4. The **infinitive** (which is a noun naming an action) can also be used just like a direct object in order to indicate that one action results in another: "I am trying *to build* a house."

All these words which help to make a verb clearer are really its **modifiers**. The standard method of diagramming sentences, however, places the object on a straight line with subject and verb, and thus it

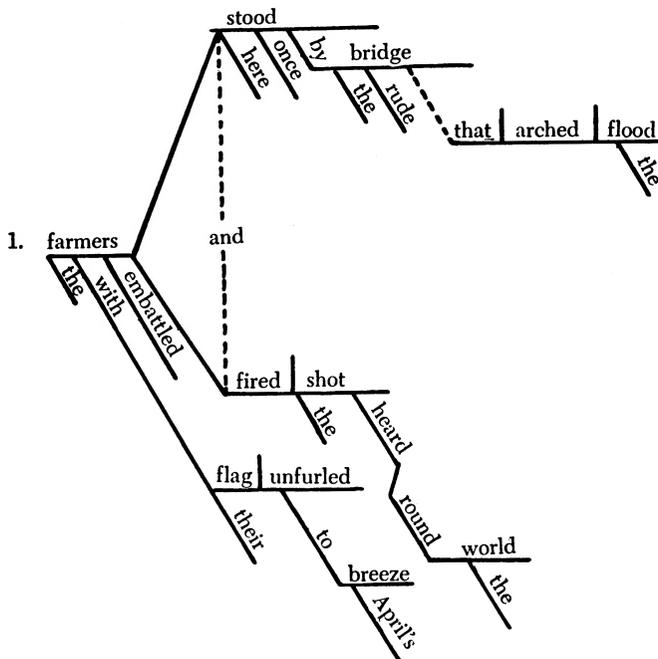
incorrectly makes it appear as if an object were a principal part of a sentence.

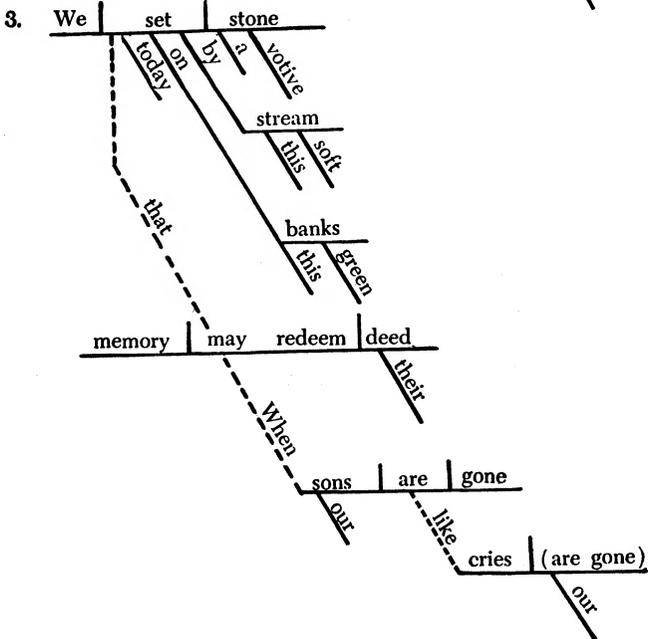
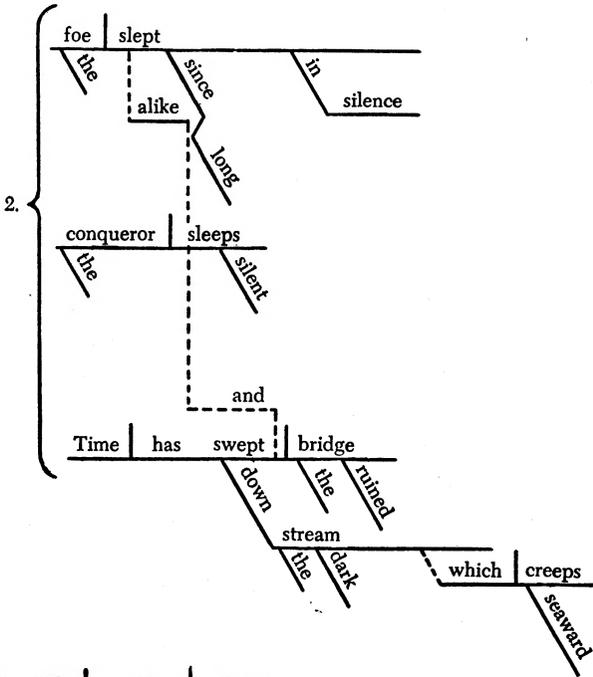
In the manner just explained, any piece of speaking or writing can ultimately be analyzed into a series of simple sentences, each having only a subject, predicate, and copula.

An Example of Diagramming

The "Concord Hymn" is made up of four stanzas, each of which is a single sentence. The simplicity and beauty of the poem comes largely from the way in which Emerson makes his ideas clear, and yet expresses them in a varied manner by a careful construction of each of these sentences. All of them are **declarative** sentences, except the last which is **imperative**. We can rewrite this last sentence in declarative form as follows: "We beg thee, Spirit that made these heroes dare to die and leave their children free, to bid time and nature gently spare the shaft we raise to them and thee."

If we diagram the first three declarative sentences according to the usual method, we get the following:





Relations of the Parts of the Sentence

These diagrams show the relations within each sentence. We see that each *compound* sentence (1st and 2nd stanzas) can be broken into separate sentences simply by removing the conjunction. Similarly the *complex* sentences (all four are complex) can be made into several separate sentences by rewriting each subordinate clause in the form of an independent statement. If we do this we get the following sentences:

1. The embattled farmers, with their flag unfurled to April's breeze, once stood here by the rude bridge.
2. The rude bridge arched the flood.
3. The farmers fired the shot heard round the world.
4. The foe long since in silence slept.
5. The conqueror also sleeps in silence.
6. Time has swept the ruined bridge down the dark stream.
7. The stream creeps seaward.
8. We today set a votive stone on this green bank by this soft stream.
9. Our purpose is to commemorate their deed.
10. This commemoration will last.
11. Our sons will then be gone.
12. Similarly our sires have gone.
13. We beg thee, Spirit, to bid Time and Nature spare the shaft.
14. The spirit made those heroes dare to die and leave their children free.
15. We raise the shaft to them and thee.

Thus fifteen sentences are compressed into four by Emerson without any loss of clarity. Indeed the four sentences are actually clearer, because by the use of conjunctions the author shows us which ideas are more important and which are of equal importance. An analysis of the "Gettysburg Address" will show the same skill in putting many ideas clearly in a few sentences. Study, for example, its last sentence which has become so famous.

The Ultimate Units of a Sentence

In order to see that the ultimate units of all our thinking and writing are subjects and predicates (that is, a noun and its modifiers)

let us take the first sentence of the "Concord Hymn" (see diagram on page (104) and break it down to its ultimate ideas:

We can write out these ideas as follows:

| | |
|------------------------------------|---|
| Farmers are <i>these</i> . | (particular substances, not universal ones) |
| Farmers are <i>many</i> . | (quantity) |
| Farmers are <i>fought</i> . | (reception) |
| Farmers are <i>standing</i> . | (action) |
| Farmers are <i>holding</i> . | (action) |
| Farmers are <i>firing</i> . | (action) |
| Standing is <i>here</i> . | (place) |
| Standing (was) <i>then</i> . | (timing) |
| Standing is <i>near</i> . | (place as a relation) |
| Bridge is <i>this</i> . | (particular) |
| Bridge is <i>near</i> . | (place as a relation) |
| Bridge is <i>rude</i> . | (quality) |
| Bridge is <i>arched</i> . | (quality) |
| Bridge is <i>over</i> . | (position as a relation) |
| Flood is <i>under</i> . | (position as a relation) |
| Flood is <i>this</i> . | (particular) |
| Flag is <i>theirs</i> . | (relation) |
| Flag is <i>held</i> . | (reception) |
| Flag is <i>unfurled</i> . | (position) |
| Unfurling is <i>in</i> . | (position as a relation) |
| Breeze is <i>around</i> . | (position as a relation) |
| Breeze is <i>blowing</i> . | (action) |
| Air is <i>blowing</i> . | (action) |
| Blowing (was) <i>then</i> . | (timing) |
| Then (was) <i>April</i> . | (timing) |
| <i>Firing</i> is <i>shooting</i> . | (an action defined by a resulting action) |
| Firing (was) <i>then</i> . | (place) |
| Shooting is <i>heard</i> . | (reception) |
| Hearing is <i>world-wide</i> . | (timing) |

These sentences are too awkward to be good English sentences, but they state the ultimate truths which are all bundled together in this one single sentence. So rapid is the human mind that it takes in many such thought-units in one swift movement.

VARIETY IN STYLE

Each part of the composition should be a development of one part of the outline. The main statement of each part of the outline can frequently be used as the first sentence of a paragraph, and is then called a *topic sentence*. The sentences of each paragraph should

be arranged so that the **subject** of the paragraph is emphasized, and the principal **predicate** or predicates applied to it stand out clearly. The other modifiers should be the less important ideas and should not be too many, so that the sentences are short and uncluttered.

This kind of writing is sure to be clear and ought to be the basic pattern for all writing. Writing that adheres closely to such a pattern is said to be in the **simple style**.

The simple style might use words and grammatical construction of three different levels of usage. The *formal* style is used for most expository writing and in speeches and lectures given on formal occasions. The *informal* style is that of the conversational speech of educated persons and makes use of *colloquial* words, contracted forms of speech like "don't" and "won't," and a simpler and looser grammatical construction. The *vulgate* level is used by uneducated persons habitually, and by educated persons occasionally for humorous effects. It makes use of *slang* (that is, of short-lived language of popular origin) and of *barbarisms* (that is, of distorted forms due to ignorance). We may also notice that in speaking or writing to special groups we may employ—and, indeed, must often employ—a restricted usage to which they are accustomed, but we should beware of attempting this unless we can do it well.

The simple style is not adequate to fulfill all the requirements of rhetoric and poetry. It lacks "color," that is, it does not arouse our imagination and emotions. Soon it becomes extremely monotonous and the attention of the reader or listener wanders. The simple style is best in scientific writing, but in rhetoric and poetry it is necessary to develop it in such a way that, without losing its clarity, it takes on *variety*, *emphasis*, and *continuity*. Variety holds the attention of the audience. Emphasis makes the important ideas stand out vividly and in a way that is easy to remember. Continuity, or the smooth flow of one idea into another, helps the audience to follow the thought easily and without tiring or getting lost. We will discuss continuity in the next chapter.

Variety is obtained by the use of the **sound** of the words, by **sentence structure**, and **figures of speech**.

Rhythm in Poetry and Prose

We have seen that the sound of a word gives it an emotional quality (see pages 41-42). When words are combined into longer units they take on melody and rhythm as in music. The melody is the combination of series of sounds differing in *pitch* according to some pattern or proportion. In speech, melody is very restricted, and yet beautiful effects can be obtained by the choice and arrangement of high-pitched vowels like *i* and *e* and low-pitched vowels like *o* and *u*, and by similar sound in **alliteration** (similar consonants at the beginning of words), **rhyme** (similar sounds at the end of words), and **assonance** (similar vowels within words) (see page 42). The basic principle in giving either prose or verse a beautiful sound is to avoid monotony by *contrasting* unlike sounds and to achieve emphasis by *comparing* similar sounds.

Rhythm is the regular arrangement of sounds according to *time*. The rhythm of speech or song is marked off either by *long* and *short* sounds, or by the arrangements of *accents*, and it is reinforced by the melody. When rhythm is regular it is called **meter** or **verse**. When it has only a loose regularity it is called **free verse**, and if very irregular it is **prose**. Latin and Greek used a rhythm based principally on long and short sounds, reinforced by accents. English, however, uses just the reverse system; its rhythm is based on accents, reinforced somewhat by the length of the syllables.

There are basically two units of rhythm (called "*feet*"): One has two beats, and one three. Any longer unit could be broken up into smaller units. The pattern would be monotonous or ambiguous if all these beats were exactly alike. Hence the two beat unit is treated as made up of a full beat, and two half-beats. If the full beat comes first the foot is called a **dactyl** (♣ ∪ ∪); if it is placed last it is called an **anapest** (∪ ∪ ♣). In music this rhythm is called 4/4 or **common time**. The three beat rhythm is either a **trochee** (♣ ∪) or an **iamb** (∪ ♣). These units can be arranged into longer units or **lines** (verses) and into groups of verses or **stanzas**. Meters are named by stating the *foot* and the number of feet to a line. Thus "iambic pentameter" is verse having *five* iambic feet in a line (*penta* is Greek for 5).

Rhythm itself requires variety and emphasis. Hence in meter it is necessary to *substitute* some different feet in the regular pattern. In prose it is important not to allow the rhythm to become too regular, since then it begins to sound like imperfect verse. A beautiful sound pattern, however, is not very useful in either verse or prose unless it lends *emphasis* to the ideas. Hence the pattern of rhythm and melody should serve to bring out the sentence structure.

Sentence Structure

Skillful sentence construction is the most important means of creating the emphasis and variety that are the mark of a good style. The unskillful writer is usually guilty of two errors: (1) He makes sentences which are confused, and thus *emphasis* is lost. (2) He makes every sentence alike, hence *variety* disappears.

In order to correct these faults, it is important to master the principles laid down in the previous section. We must understand how to begin with a subject and predicate, and never to let go of them in constructing the sentence. They are its basic skeleton and must stand out clearly. This removes the first fault. The second is corrected by the use of different types of modifiers: subordinate clauses, phrases, and different parts of speech. It is necessary to practice expressing the same idea in a great variety of ways, so that in writing a composition we can vary our expression as required.

More Figures of Speech

The final means of achieving this more colorful style is by the use of **figures of speech**. In Chapter I (pages 53-54) we treated of figures of speech that depend on the transference of words from one meaning to another. There are also figures which depend rather on the arrangement of ideas in a sentence. The most important of these are **parallelism** and **antithesis**.

The first of these is the arrangement of sentences, clauses, or phrases so that they are *alike* either in grammatical construction or at least in thought. **Antithesis** is the opposite, a *contrast* in structure or ideas. Parallelism and antithesis are often combined so that the grammatical construction is parallel, while the thought is antithetical.

Related to these is *climax*, or the arrangement of sentences or parts of sentences (often three) in the order of ascending importance. *Anticlimax* is the reverse arrangement. The use of a mixture of declarative, interrogative, and imperative sentences (see page 102 f.) has the effect of a figure of speech. To achieve this, inanimate things or abstractions are often treated as persons (**personification**); moreover, both real persons and personifications may be addressed dramatically as if they were present and listening to us. This is called **apostrophe**.

A style which makes use of all these devices is called *colorful* or *ornamented*. It should still retain clarity but it cannot possibly be as clear as the simple style. Hence poetry often seems rather obscure to the reader, but it would never be able to attain its richness and *intense* emotional quality in any other way.

Rhetoric also strives for great variety in order to keep the audience awake, but it is not as intense as poetry. The style of poetry can be delightful for its own sake, since it is intended to entertain, but the style of rhetoric must avoid attracting too much attention to itself, lest the audience enjoy the speech and yet go away unpersuaded. Hence rhetoric seeks the *medium* style, not so plain as to be uninteresting, nor so elaborate as to be distracting.

Both rhetoric and poetry must take care to maintain a definite *mood* or *tone*. They seek to build up a definite emotion in the audience, and such an emotion can easily be destroyed by a jarring note. Important in setting the tone of a composition are two figures of speech not yet mentioned. One is **hyperbole**, or the use of exaggerated statements to emphasize an idea. The other is **litotes** or **understatement**, the use of statements that are too weak and which also emphasize an opposite meaning, just as does **irony** with respect to words (page 53).

The basic rule with regard to style, therefore, should be as follows: *Begin with a clear expression of your basic ideas in a simple style; then if your purpose is poetic or rhetorical choose the appropriate devices of sound, of sentence-structure, and of figures of speech to achieve variety and emphasis and to sustain the desired emotional mood.* Nothing is gained and much is lost if these devices of style are merely tacked on to make your writing or speaking

“fancy” or decorated with high-flown language and “purple patches.” Unless you are sure that a device has a definite contribution to make, it is better to stick to the simple style. Indeed good writers generally revise their work with the purpose of cutting out all devices of style that are not really effective.

EXAMPLES OF STYLE

1. **The style of St. Thomas Aquinas.** Of our standard examples, that by St. Thomas Aquinas (page 417) is in the **simple style**. The original Latin is even simpler and more precise. St. Thomas is a master of the simple style in which every word and sentence aims at perfect clarity. He avoids almost all of the devices which we have been mentioning, except for some use of parallelism and antithesis.

2. **The style of Chesterton.** The work of Chesterton (page 413) is in the **medium style**, because although it is dialectical in its purpose it makes use of a rather rhetorical approach common in essays. Chesterton is fond of certain sound effects, especially of alliteration (“purifying passion,” “there would be no one left to say that lust bore none of the marks of love.” “only in consequence of such a decay could the current love of territory be confounded with the ancient love of country”). A careful reading will show that he avoids making this too obvious and that it has a definite purpose, namely, to emphasize his use of **antithesis**.

It is this use of **antithesis** that is very characteristic of dialectic and which Chesterton constantly employs: “If no type of chivalrous and purifying passion remained, there would be no one left to say that lust bore none of the marks of love, that lust was rapacious and love pitiful, that lust was blind and love vigilant, that lust sated itself and love was insatiable.”

Chesterton’s tone throughout is humorous, and hence he makes effective use of **hyperbole** and **anticlimax**: “The conviction must come to him at last that these men do not realize what the word ‘love’ means, that they mean by the love of country, not what a mystic might mean by the love of God, but something of what a child might mean by the love of jam.” Obviously “jam” is here an anticlimax, and it is made all the more effective by comparing it to “the love of God,” which is a hyperbole, since Chesterton has been using love

merely to mean patriotism or romantic love, not for something so lofty. Note also the anticlimax in "trade, physical force, a skirmish at a remote frontier, a squabble in a remote continent"; each phrase is less and less dignified. Notice finally the use of antithesis in the rather solemn close of the last two sentences of the composition.

3. The "Gettysburg Address." Lincoln's speech is one of the great masterpieces of the medium style, but its tone is solemn and grand, rather than playful, like that of Chesterton. Lincoln uses a style which at first sight seems to be simple, and yet on examination turns out to make use of very many rhetorical devices. Its simplicity is deliberate in order to remove the impression that the President on this occasion was striving to make a political display. Thus throughout there is a certain effect of *litotes* or understatement, especially in such a sentence as: "It is altogether fitting and proper that we should do this."

Its chief devices, however, are the beautiful use of *antithesis* and *climax*, and its solemn and flowing sound. Notice the rhythm of: "Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure." If we diagram the sound pattern in this sentence we get something like the following:

Nów wé are ẽngáged in ã gréat cívil wár
tésting whéthěr thát nátiõn
oř ány nátiõn

só cõncéived
ãnd só dédicãtẽd

cãn lóng ẽndúre.

It will be noticed that there is a basic iambic rhythm (˘˘) running through this whole sentence. In the first line, however, the rhythm is shifted to emphasize the words "now," "engaged," "great," and "war." Then the succeeding four lines are rather rapid because their rhythm is quite regular. Finally the succession of short sounds ("dédicãtẽd cãn") prepares for a solemn and slow close on the two very long heavy sounds, "long endure." Thus the beginning of the sentence sounds solemn and weighty, the middle part is more vigorous, and the conclusion is very solemn. This effect is enhanced by the paral-

lelism of "that nation/ or any nation" and "so conceived/ and so dedicated."

Each of nine sentences of the "Address" has an interesting construction:

1. The first sentence has a solemn, even pace. The subject "our fathers" has no other modifiers, but several modifiers are attached to the predicate "brought forth." They tell us *when* ("four-score and seven years ago") *where* ("on this continent") and the *result* ("a new nation"). This result, "the nation," is defined by two parallel phrases: "conceived in liberty," and "dedicated to the proposition that all men are created equal." Thus the mind is fixed at once on the notion of our "nation" and what it stands for.
2. The second sentence is parallel to the first, except that the position of "nation" is now taken by the term "war," which again is defined by balanced phrases, "testing whether that nation, or any nation so conceived and so dedicated, can long endure." If you compare these first two sentences you will see that they have the effect of balancing each other, and have a rather similar sound.
3. The third sentence is very short and matter of fact. It thus changes the pattern set by the first two sentences. It is connected with them, however, by a parallelism: "We are engaged in a great civil war . . .", "We are met on a great battlefield of that war."
4. The fourth sentence is parallel to the two preceding, since all three begin alike: "We are engaged," "We are met," "We have come." Notice the parallelism between "gave their lives" and "that that nation might live."
5. The fifth sentence again is very brief and matter of fact, with something of the effect of understatement. You will notice that each time Lincoln refers to himself and the crowd he speaks in a deprecating, brief manner. When he refers to the dead and their example, the sentences become rich and solemn.

6. The sixth sentence consists in a beautiful three-membered climax, "We cannot dedicate, we cannot consecrate, we cannot hallow this ground."
 7. The seventh is filled with emotion. Lincoln now directly refers to the heroes and defines them in simple terms, "The brave men, living and dead, who struggled here. . ." Notice how the series of very short words, "far above our poor power to add or detract," make the last part of the line swift in movement and suggestive of the weakness and inadequacy which the speaker feels in the presence of the great.
 8. The eighth sentence contains a parallelism: "The world will little note, nor long remember," and an antithesis: "what we say here" . . . "what they did here."
 9. The last sentence is the longest of all and provides a wonderful climax. You will notice that the first part of the sentence, "It is rather for us to be here dedicated to the great task remaining before us," is parallel to the preceding sentence. Then Lincoln makes a grammatical break, represented by the dash —. We would expect him to say, "It is rather for us to be dedicated to the great task, and that we should take increased devotion from these honored dead." This, however, would have been weak and complicated. So Lincoln boldly drops the sentence construction with which he began and forms the rest of the sentence on a new pattern. The rest of the sentence has two parallel members: "that from these honored dead we take increased devotion," and "that we here highly resolve." This last member then has three parallel members within itself: ". . . that these dead shall not have died in vain," "that this nation . . . shall have a new birth," and "that government . . . shall not perish." Finally the last of these itself contains three climatic phrases: "of the people," "by the people," "for the people."
4. The "Concord Hymn." The style of the "Concord Hymn" is the elaborate and intense style of poetry, although in this case Emerson keeps it relatively simple. He wishes to give it something of the

simpler tone of rhetorical prose, since the poem suggests a memorial speech. We have already seen how carefully varied are the four sentences that make up the poem. Notice also that parallelism and antithesis run through the entire poem and are supported by the arrangement of lines in the stanzas and by the rhymes. Thus in the first stanza the first two lines are similar in structure, neither one containing the subject or the predicate of the sentence, while the last two lines each contain a complete sentence joined by "and." In the second stanza this parallelism is even plainer. This balanced rhythm, the rhyme, and the figures of speech (see page 110) give an emotional tone which is smoother and freer than that of the "Gettysburg Address." This poem sings, while the music in Lincoln's words is muffled and broken.

The expression "shot heard round the world" is an excellent example of a **hyperbole**. The last stanza is an **apostrophe**, and in it "Time" and "Nature" are **personified**. We notice that the descriptive imagery of the poem, "dark stream which seaward creeps," "this green bank," "this soft stream," would not be very appropriate in the medium style of rhetorical prose, except perhaps at a moment of great emotion.

DEFINITIONS

(to be memorized)

1. A **statement** is the verbal expression of a judgment, signifying truth or falsehood, and is made up of a subject, predicate, and copula.
 - 1) A *subject* is something concerning which a judgment is made.
 - 2) A *predicate* is that which is attributed to a subject or denied of it by an act of judgment.
 - 3) A *copula* is the expression of the act of judgment.
2. A statement is **universal** or **particular** in *quantity* according to whether the subject is a universal distributive or a particular term; it is **affirmative** or **negative** in *quality* according to whether the copula identifies the predicate with the subject or separates them.

3. Statements are **opposed** when they have the same predicates and subjects but different quantities and qualities and hence differ in some way in truth value.
 - 1) *Contradictory* statements are two statements which are opposed in both quantity and quality. They cannot both be true nor both false at the same time.
 - 2) *Contrary* statements are two universal statements which are opposed in quality, cannot both be true at the same time, but can both be false.
 - 3) *Subcontrary* statements are two particular statements which are opposed in quality. They may both be true at the same time, but cannot both be false.
 - 4) *Subaltern* statements are a universal and a particular of the same quality. The truth of the universal implies the truth of the particular, and the falsehood of the particular implies the falsehood of the universal, but they are otherwise independent of each other in truth value.
4. A **sentence** is a group of words signifying a judgment, or its equivalent.
 - 1) A *declarative sentence* is one which signifies a true judgment.
 - 2) An *imperative sentence* is one which signifies a command (equivalent to a judgment).
 - 3) An *interrogatory sentence* is one which signifies a request for an answering judgment (equivalent to a judgment).
 - 4) A *deprecative sentence* is one which signifies a request (equivalent to a judgment).
 - 5) A *hortatory sentence* is one which signifies advice or counsel (equivalent to a judgment).
 - 6) An *exclamatory sentence* is one which expresses strong emotion (equivalent to a judgment).
5. **Certitude** is a state of mind which excludes doubt; **opinion** is a state of mind in which one of two contradictory statements is preferred but without the total exclusion of the other.
 - 1) *Merely subjective certitude* is a state of the mind excluding doubt, but not based on objective evidence.

- 2) *Objective certitude* is a state of mind excluding reasonable doubt, by means of objective evidence.
6. An **immediately evident statement** is one known to be certainly true from the meaning of its terms and immediate objective evidence.
7. **Faith** is a knowing assent to a statement as true, not because it is evident, but on the authority of another.
- 1) *Reasonable faith* is that given to an authority whose reliability is known to us by objective evidence. If this authority is God, then faith is *divine* (namely, the Catholic Faith); if human, then the faith is *human*.
- 2) *Foolish faith* is that given to an authority not known to be trustworthy.

TEACHING AND STUDY SUGGESTIONS

The major objective of this year should be the detailed analysis of one standard example of an excellent rhetorical speech, and the imitation of this speech in a brief talk, carefully written and delivered, to be presented in class toward the end of the school year. The grammatical exercises should be directed toward this objective.

Unit I: Dialectic: The Art of Discussion (pp. 67-84)

A. *Make a tape-recording of informal classroom discussion on some topic of current student interest:*

Play back to class and criticize. Was the issue clear? Did the different participants show that they were listening carefully to the others? Were good manners observed and tempers controlled? Did the discussion arrive at any conclusion? Was there any effort to sum up?

B. *Analyze dialogue in stories and plays:*

Why is this conversation interesting? *Write* brief conversations with imaginary persons. Point out the difficulties which teenagers experience in conversing with adults, or with strangers, and how this can be overcome by reading. A person who reads well always has something he can talk about with others.

C. Composition and speech:

After reading a selection in the anthology or current literature on a controversial topic, plan a debate. This debate should have an *exposition* of each side of the case, a *rebuttal* of the opponent, and a limited time for *questioning* the opponent. It should conclude with both sides attempting a *summary* of the agreement and disagreement. In writing this debate make use of the two points of theory developed in the chapter:

- (1) Use of the four types of statements and of contradictory disagreement (pp. 70-72). For helpful exercises see John Oesterle, *Logic*. (New York: Prentice-Hall, 1952), pp. 69, and 85-88.
- (2) Clear statement of reasons (pp. 73-84). In questioning his opponent the debater should take care to demand reasons for each important statement.

D. Correlation:

The use of reasons and basic statements (axioms, postulates, etc.; see page 330) in geometry and other courses should be discussed, and examples found in textbooks used in these courses.

Unit II: Rhetoric: The Instruments of Rhetoric (pp. 85-98)**A. Studying advertisements.**

Collect current advertisements. To what audience are they intended to appeal? How does the advertiser establish his reliability with his audience? Report on television commercials and their technique.

B. Reading the newspaper and collecting examples of the various types of magazines:

What are the features contained in several newspapers? What kind of audience does the newspaper or magazine seek to reach? How much of the material is of high quality? intended for mass appeal? intended to kill time?

C. Analysis of speeches and essays:

In the anthology or other literary material analyze speeches and essays which are rhetorical in character. What audience did the writer address? What was his technique? Why did such works have to be more subtle in their rhetorical appeal than in advertising?

D. Correlation:

From the history course bring in examples of great men who achieved power through their rhetorical ability. Read some of their speeches. Give examples also from current history. It would be well to read an oration of Cicero in translation and discuss reasons for taking third and fourth year Latin.

E. Speech:

Give brief informal talks aimed at the following purposes:

- (1) A sales-talk for some product.
- (2) A talk to beg funds for a school project.
- (3) A talk to elect a classmate for a school office.
- (4) A talk or letter intended to give a good impression of personal character and ability to a prospective employer.
- (5) A talk about the truth of the Catholic Faith, or the reasonableness of some Catholic practice, to a Protestant, a Jew, and an atheist.

Unit III: Outlining and Diagramming (pp. 99-107)

This material should not be treated as an isolated topic, but should be directed toward a detailed analysis of essays and speeches, and toward planning the speech to be written in Unit IV.

A. Finding the thesis or conclusion of a piece of literature:

Several selections of each type of discourse should be read and the student should formulate the author's thesis in a single clear sentence.

B. Outlining the piece of literature:

The student should now break the composition up into its main parts, and formulate the thesis of each part in a single sentence. Then each major part should be broken up into minor parts, and each of these formulated as a sentence. The outline should then be criticized (a) for *parallelism* of division and formulation, (b) for *clear relation* between parts and whole, between the theme of each part and the main conclusion.

C. Grammar review:

Review formation of paragraphs, use of capital letters in titles, etc. The general appearance of a composition should make its outline clear. (See *E. W.*, Grade Ten, pp. 179-190, for exercises in paragraph writing.)

D. *Diagramming sentences:*

(1) *The ordinary method of diagramming* should be explained (see pages 104-105). For a good treatment of diagramming see H. C. House and S. E. Harman, *Descriptive English Grammar* (2nd ed., Prentice-Hall, 1950). Then drill on diagramming and correction of sentence faults should be made. (See *E. W.*, pp. 23-24 and pp. 45-66.)

(2) *Theoretical grammar*: Review the use of the *categories*, pp. 45-49.

E. *Composition:*

Select passages from literature written in rather long and complex sentences and rewrite in short sentences. Then reverse this procedure, turning a composition written in short sentences into a few well-structured compound and complex sentences. Discuss the *rhetorical* value of each style. Which is clearer? smoother? Which holds our attention best? Which style would be appropriate for different types of audience?

Unit IV: Style:

A. *Study of theory of style* (pages 107-116):

Take short selections from the anthology to illustrate various types of style, and the use of devices of *sound*, *sentence structure*, *figures of speech*. The teacher may expand this section on *melody* and *rhythm*. A good treatment will be found in Enid Hamer, *The Meters of English Poetry* (New York: Macmillan, 1930).

B. *Reading and analysis:*

Study of a long work (novel, Shakespearean play, or other plays) with special attention to the use of these stylistic devices.

C. *Composition:*

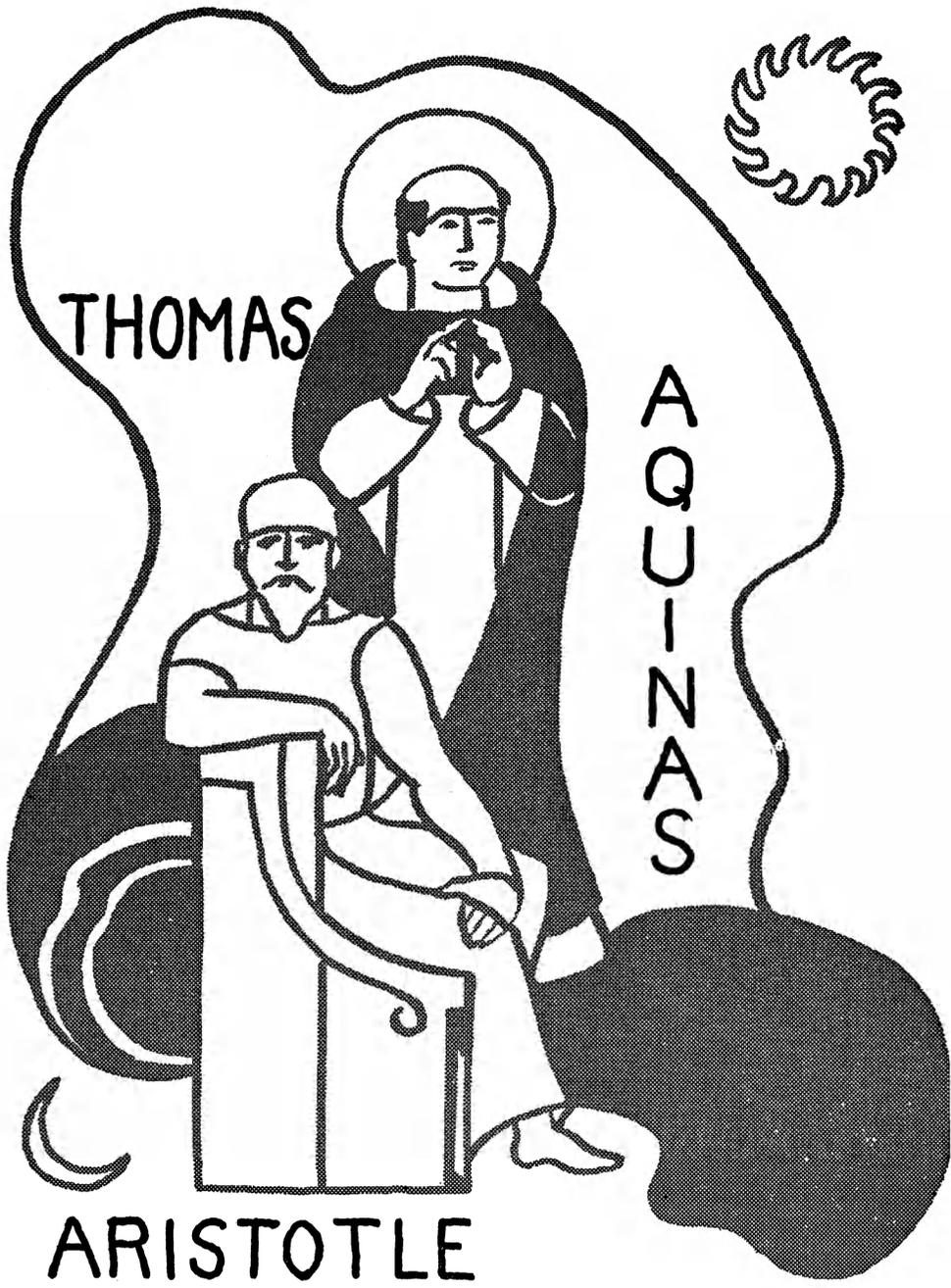
An essay on the theme of the work just read. Student should make an outline, decide on the type of discourse, and then should write with attention *to style*. After this essay is corrected, it should be *rewritten* by student in another style (simpler or more elaborate, etc.).

D. *Grammar review:*

The writing of the essay should be followed by a review of common errors (see *E. W.*, Chapters 6-12).

E. *Speech:*

Students may be asked to give oral book reports on some assigned reading. Attention should be given to *oral style*: speaking in complete sentences; beginning with an outline of what is about to be said, concluding with a summary, and making clear each step of the talk. What choice of words and sentence structure *sound* well?



THOMAS

AQUINAS

ARISTOTLE

CHAPTER III

Dialectics and Demonstrative Logic: Scientific Method

ART OF DEFINITION

INTRODUCTION

Science and Literature

The worlds of literature and of science seem to have little in common. Literature, whether it be poetic or rhetorical, is emotional, imaginative, intuitive, creative. The poet or novelist is free to invent a world of his own fancy. The rhetorician is not so free, and yet he has the liberty to carry us into the future, and paint for us the world as we can make it. The man of research and of science, on the other hand, seems cold, matter of fact, strictly logical. He deals with the world as he finds it, and scorns the imaginative flights and the emotional experiences of the poet and the politician. He tries to eliminate emotion and subjectivity from all his work.

Yet this impression is false. The world of literature and of science is the same world, the wonderful world that God has made more full of marvels than even poet or explorer realizes. Literature, to be good literature, must be essentially true to the world in which

we live; it must imitate nature and human life. Even the most fantastic fairy-story, if it is to have real charm for us, must reveal the marvels of God's creation under the form of imaginative symbols. On the other hand, even the most hard-headed scientist is a creative thinker, one who employs his intuitions and his imagination to find new and ingenious ways to unlock the secrets of nature. Literature must be true to life, science must be imaginative, or both will die.

Yet it is very true that there is a great difference between the methods and approach of literary thinking (poetics and rhetoric) and scientific thinking (dialectics and demonstrative logic). The former seeks to lead us to truth by the way of reasoning and emotion, the latter rises above emotion to pure truth. We have already seen how dialectics is useful for discussion and debate. In this capacity it is closely linked with rhetoric, since such discussion and debate prepare for persuasion. But it is also closely linked with science, since it is through dialectic that we make preliminary investigations that lead to scientific discovery and proof. Today when we speak of scientific research we are talking about that part of science which is largely dialectical. It is only when research is completed that science in the fullest sense begins, the establishment of basic laws.

Difficulty and Need of This Study

Many students and even teachers find literature and rhetoric interesting. These are warm and human subjects which deal with human problems. Scientific research and thinking at first seem very cold and dry and obscure. Yet the human reason is at its best only when it is able to attain to the clarity and sureness of science. This does not mean that science can ever replace literature. But science gives us a clear and exact knowledge about the world which literature cannot give. Both are necessary in our life, and both can go hand in hand.

In this chapter much of our time is to be spent considering the scientific ways of thinking, but we will not leave literature behind. Rather we will begin to see the difference and contrast between these two ways of thought, and then see how they have certain basic principles in common, and how they supplement and assist each other.

The Main Problems of Investigating Truth

When a scientist begins to study a problem such as the problem of cancer, he has two main tasks: (1) To get the facts; (2) to explain the facts, that is, to find the reasons or causes for these facts.

The gathering of facts, however, is not a mere random process. There are an unlimited number of facts in the world, and a scientist might go on forever collecting them without getting anywhere in understanding them. The great problem of investigation is to use one's intelligence to understand these facts. One must look through the facts to the *reality* which underlies them and gives them meaning. This is a matter of *intuition*, just as the poet's insight into life, or the rhetorician's insight into his audience, is a matter of trained intuition. This intuition into the nature of things which underlies the facts is nothing other than **definition**. The first problem of a scientist studying the problem of cancer is to gather and examine facts with the purpose of finding out *what a cancer is*. What makes a cancer different from a healthy organ of the body, or from some other non-malignant growth? The only answer to this is found in looking at the facts, but the facts give an answer only to a trained intelligence that is able to see differences and similarities.

TECHNICAL TERMS: USING THE ENCYCLOPEDIA

In Chapter I we studied the dictionary or nominal definition of terms, but in science we must have much more accurate definition of terms. In scientific thinking and writing, unlike literary work, what is needed is not vividness but clarity and accuracy. In such writing we should avoid metaphors and other figures of speech. When analogy must be used, then proper analogy may be employed, but we should try as far as possible to exclude all equivocation and to use *only univocal* terms.

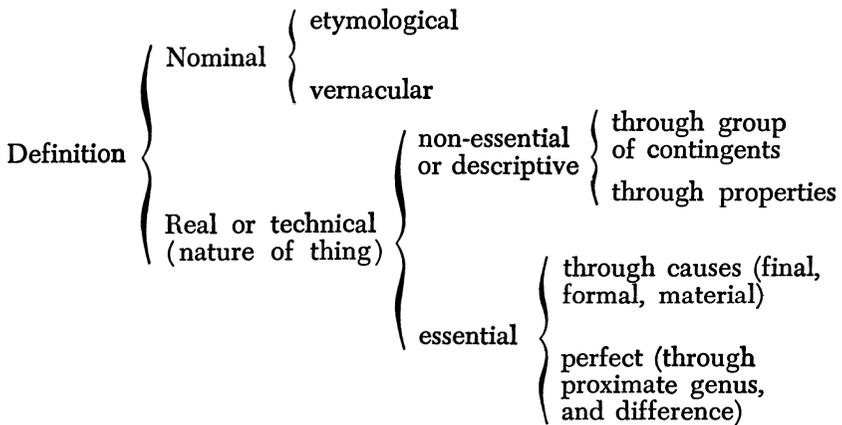
Such accurate words are said to be *technical terms* and they must be carefully defined. For this it is not sufficient merely to define the *word* (nominal definition); rather we need to define the *thing* (a *real* or scientific definition), since science is not so much concerned with words as with things.

To give a definition of a thing requires a great deal of knowledge about that thing, since we must know just what makes it different

from any other kind of thing. Hence we have encyclopedias which treat not merely of the usage of words but summarize our knowledge of things themselves.

A great deal of a student's time in studying mathematics, natural science, social science, philosophy, theology, or even grammar is devoted to learning technical definitions. Without this accuracy in thought and speech our knowledge of these subjects would become very confused and false.

Using Technical Definitions



A technical or scientific definition must satisfy the following rules:

1. It must be equal in extension to the thing defined.
2. It must be clearer than the thing defined.
3. It must not be circular (that is, it must not include the name of the thing to be defined).
4. It must not be merely negative.
5. It must be brief (that is, it must not include anything unnecessary).
6. It must be complete.

The last requirement is not easy to fulfill, but the great philosopher, Aristotle, showed that we can make a definition complete if we are careful to state the *four causes* on which the existence of the thing depends (see Introduction, page 7):

1. Its **final cause**: that *for which* the thing exists, its function, use or perfect development.

2. Its **formal cause**: what *kind* of a thing it is, or what it is *able to do*.
3. Its **material cause**: what it is *made out of*, or exists in.
4. Its **efficient cause**: what *produced* it.

The efficient and final causes are often very helpful in defining a thing, but they need not always be included, since often they are obvious once we know the formal cause. But the formal and material causes should always be included, except in mathematical definitions, where the formal cause is sufficient.

How can we state the material and formal cause of a thing in a brief way? A thing is made out of much the same material as are other things similar to it. For example, a monkey and a man have very much the same kind of tissues, muscles, and bones in their body. Hence we state the material cause by mentioning the class of things which most resemble the thing to be defined. This we call its **genus**. Nevertheless, the thing to be defined differs in some way from all the other things in its genus because it has its own special sort of form; this we call its **difference**. The two taken together state exactly what kind of a thing it is, and this we call its **species** or definition. Thus a man is defined as an animal (*genus*) who can reason (*difference*).

A **species** or definition applies to many individual things which are all essentially alike, but which differ from each other in unessential ways (color, size, location, etc.). These unessential differences, which are not included in the most perfect definition of a thing, are called **contingents**.*

When we define a thing by its genus and difference we have a perfect or **essential definition**. Unfortunately we cannot always find the precise difference between one thing and another, so that frequently in defining a thing we have to substitute something in the definition for the unknown difference. This can be either a **property** (that is, some difference which, although it is not the precise one, never-

*Commonly the term "accident" is used instead of "contingent." This leads to confusion, however, since "accident" can mean two things: (1) A real characteristic of a thing other than its substantial form. This is a "predicamental accident," and is classified in the last nine categories or predicaments. (2) Anything predicated of a subject in a contingent way. This is a "predicable accident." It seems better to use the term "accident" for the first meaning, and "contingent" for the second.

theless always marks this thing off from others) or it can be a group of contingents which *taken together* are equivalent to a property.

Examples of Definitions

1. The definition given by St. Thomas. In *Whether Piety is a Special Virtue?* we find the following definition: "Piety is a special virtue pertaining to justice which pays duty and homage to our parents and country." This states the species of piety. We can divide this definition into two parts:

1. The difference: That which makes piety the kind of virtue it is and distinguishes it from every other kind of justice is that it pays duty and homage to *parents and country*.

This tells us the *form* of piety, that is, exactly what kind of virtue it is.

2. The genus: The class of things which most resemble piety are the *other virtues of justice which pay duty and homage to something*.

This tells us the *matter* or subject of piety since (as St. Thomas has already shown in previous articles of the *Summa*) all types of justice exist in the *human will*. Thus piety exists in the human will as its subject, or material cause. From the difference or formal cause of piety we can readily see its efficient and final cause:

3. The final cause of piety (that is, its purpose) is the *honor of our family and country*.
4. The efficient cause of piety is *practice* in honoring parents and country, since it is by repeatedly giving honor to our parents and country that we develop the virtue of piety or patriotism. "Practice makes perfect," as the saying goes. When we are speaking about Christian patriotism, we must also remember that the grace of God is required to produce this supernatural virtue in us, as well as our co-operation with that grace by keeping the command "honor thy father and thy mother."

This definition fulfills all the requirements listed above. It is equal in extension to the thing defined because no other virtue accomplishes this work of honoring parents and country, and all piety has this function. It is clearer than the thing defined since it is made of more general terms—like "virtue," "justice," "duty," "homage," "par-

ents," "country"—which St. Thomas has already carefully defined earlier in the *Summa*. It is not circular, since the notion of "piety" is not repeated in the statement of either the genus or the difference. It is in positive and not negative terms. It is as brief as possible and yet complete, since nothing is included in it except the four causes.

2. **The definition of Chesterton.** In *A Defense of Patriotism*, the author defines patriotism as "a love of one's country because of its spiritual greatness." At first sight this looks like an entirely different definition than the one given by St. Thomas. Here the genus is "love," and the difference, "of one's country because of its spiritual greatness." Chesterton chooses this definition because it brings out clearly that we must love our country for its spiritual greatness and not for its wealth, power, or size, as many people seem to think. His definition is intended to distinguish true from counterfeit patriotism, since in dialectics the main concern is to compare one view with another, rather than to state a final conclusion.

Nevertheless, this definition is really in agreement with that of St. Thomas, although it is less complete. St. Thomas indicates that piety is a love, not only for country, but also for parents, and he shows that it is a form of justice. Chesterton, however, obviously intends to include the idea of justice in his notion of "love," since he insists that this "love" is not mere emotion, but a rational will to serve the country which has given us so much. St. Thomas in saying that it renders "duty and homage" obviously implies that we honor our parents not merely for physical goods, but for the spiritual goods they have given us, since only spiritual things deserve true honor. Thus the definitions are essentially the same; St. Thomas' definition is scientific, complete, and precise, while Chesterton's is rougher, less accurate, but more suited to bring out strikingly the contrast between true patriotism and jingoism. It is to be noted that Chesterton also brings out the efficient cause of patriotism in the later part of his essay when he shows that one of the ways to develop patriotism in youngsters is by having them study the great men and events of their country's history.

3. **The definitions of Emerson and Lincoln.** Neither Emerson nor Lincoln state their definitions of patriotism in an explicit way; rather they describe patriotism by giving examples of it. Thus they picture

for us the dead heroes of the Revolutionary and Civil Wars who paid their debt of duty and homage to their country by fighting and dying for her. They show that the genus of patriotism is *justice* by showing us the people of the nation meeting to honor men who did their duty. Emerson symbolizes this by speaking of the beautiful landscape, the monument, the gathering of the people, since all these imply that something noble, honorable, and just is being commemorated. Lincoln speaks of the soldiers as "giving their last full measure of devotion," and insists that we must imitate them. Both the act of the soldiers in dying for their country and our act in honoring and imitating them are acts of justice.

The specific character or difference of patriotism from other forms of justice is brought out by Emerson in the way he ironically dwells on the tendency of men to forget those who have done so much for them. These men died that we might be free; they are the fathers of their country and of us, and yet we forget them! Lincoln makes the same point in his use of the metaphor of birth and death. These dead have died that we might live. They are most truly our fathers since they have laid down their life for us. How great our duty, therefore, to give honor to them by imitating them!

Emerson and Lincoln do not dwell on the efficient cause of patriotism, but with Chesterton they imply that if we only meditate on what the dead have done for us we will be inspired to honor and to imitate them.

4. **Conclusion.** Thus all four pieces give the same definition of patriotism. St. Thomas gives it in precise, technical form, the other non-scientific writers in a broader, more literary way. Chesterton only brings out the contrast between true and counterfeit patriotism. Lincoln exhorts us to imitate the patriotism of the dead and to complete their unfinished work. Emerson helps us to remember and to honor the patriotism of the past and to feel deeply how noble and precious it is.

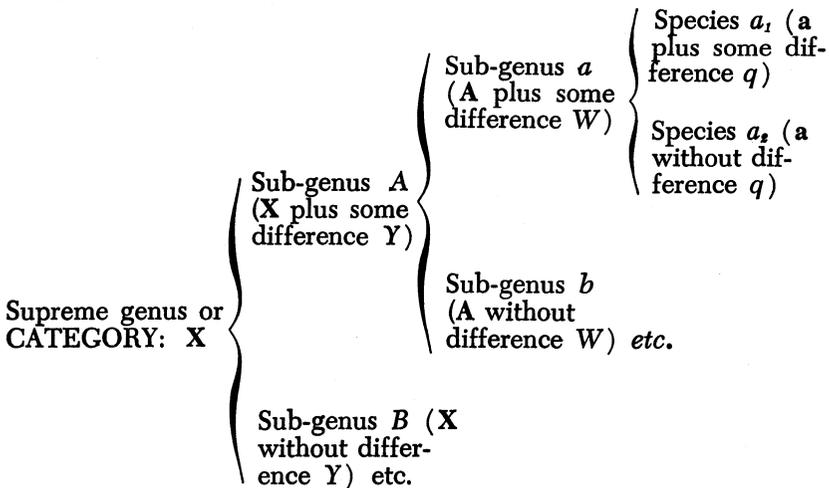
LOOKING FOR A DEFINITION

Sometimes a technical definition is given us by an expert, but where did he get it? How can we be sure that it really fits the thing defined? How could we find one for ourselves? Socrates was famous for stopping arrogantly confident people in the midst of one of their

speeches and asking them to define their terms. Usually they soon revealed by their confused definitions that they did not really know what they were saying. It is the special task of **dialectics** to look for technical definitions, which can then be used for scientific purposes.

In searching for a real definition we usually begin with a tentative *nominal* definition, and then gradually correct it by comparing real things one with another until their similarities and differences are clearly apparent. This dialectical procedure today is often called "the scientific method." We begin with a *hypothesis*, or with a tentative definition, and then see if it fits the facts of experiment. If it does not, we modify it step by step until we arrive at something more satisfactory.

This method of searching for a definition by comparison and contrast is what is called **classification**. To classify things we arrange them according to genus and difference, so that we can easily see where any terms fits in and how to define it. Classification saves us much time and effort, since it saves us from comparing the thing to be defined with everything else: we need only compare it with the things in the same genus. Here is a scheme which is used for every classification:



There can be as many subdivisions as necessary, but the last division is into **species**, not genera. You will notice that in each case the **difference** is *added* to one species and *denied* of the other.

When we do not know the essential difference, we make use of a **property**, or a group of **contingents**. These five relations shown by the diagram (**genus; difference, or property, or contingent; and species**) are called the **predicables**.

THE TEN CATEGORIES

A complete classification like the one which we have just diagrammed is called a **category**. Obviously it would be a great help in learning and research if we had such a category classifying all those things which have already been studied and defined by previous researchers. Long ago Aristotle attempted to do this, but discovered that it is not possible to classify all realities in a single category as long as we use *univocal* terms. It is possible, however, to put them in *only ten separate categories*, each of which supplies the answers to one of the kinds of questions that a scientist might ask. We have already studied these ten categories in Chapter I, and seen how the very structure of our language is based on them (see list of questions and categories on page 45). When you study **fundamental natural science** you will learn why there are only these ten categories. As you learn each part of science you learn each of these classifications as far as it has been worked out by scientists to the present time. On page 441 ff. there is an outline of each of them, but they will never be wholly completed, since science goes on discovering new things to go into each classification.

Rules for the Categories

Can everything we wish to define be found in a category? The answer to this question will reveal, on examination, that the following restrictions must be applied:

1. The term must be *simple*. A complex term like "a white man" has to be split into two terms. "Man" is classified as substance; "white" is classified as a quality.
2. It must be a *whole*. We define the part of something by placing it in the same place in the category as the whole to which it belongs. Thus "human foot" is part of "man" in the category of substance.
3. It must be something *natural*. An artificial thing, however, can be defined by its four causes, and it can be put in the

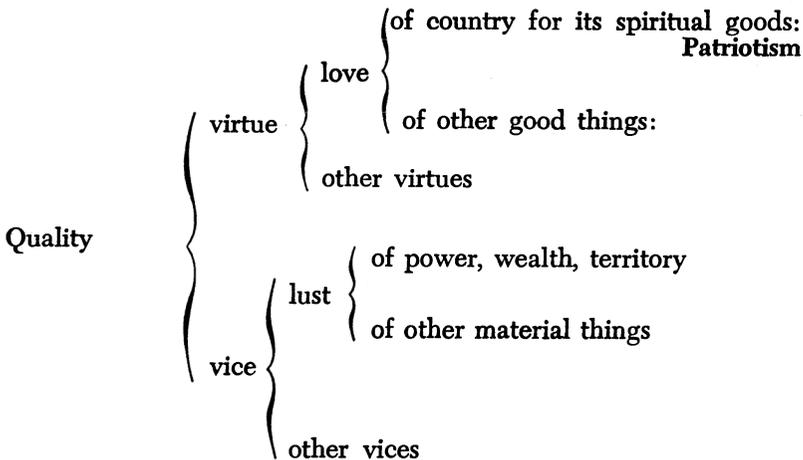
category with the natural thing which it imitates. On page 460 is a diagram of a classification of artificial things.

4. It must be *univocal*. Analogical terms have many meanings, and each of them may go into a different category. We define an analogical term by defining the meaning which we know best, and then we explain the other meanings as similar and dissimilar to this fundamental meaning.

Some Examples

“Patriotism” and “virtue” are not *things* (substances) but *qualities*. You will find them in their place in the category of quality on page 446. St. Thomas arrived at his definition of patriotism by asking himself: Is it a thing that can exist by itself? No. Therefore it is not in the category of substance. Which of the last nine questions does it answer? Obviously it answers the question “what sort of thing?” since we say that a man is a patriotic or virtuous kind of man.

Then he went step by step through each division of the classification until he located patriotism in its right place. Emerson and Lincoln did not need such a systematic classification. Chesterton was speaking dialectically and hence set up a tentative classification. We might diagram it as follows:



It is apparent that Chesterton was considering only a small part of the category of quality.

Although Emerson did not make any general classification, he did make use of many of the categories to show us all the aspects of a thing. You will notice that he speaks of the dead and the stone monument (substance, and an artificial thing made of substance), of the "*dark* stream," of the "*green* bank," the "*soft* stream," and "*free* children." The words in italics are all qualities. He gives us little about quantity except that there were a number of soldiers, and that the time was long. He speaks of relations: "foe and conqueror," "sire and sons," "to them and thee." He tells us of place: "by the bridge," "here," "seaward," and of position, since the bridge is "arched" over the river, and the stone is "on this green bank," "the flag unfurled." The poem, however, does not mention vestition, although Emerson might have mentioned that the minute-men wore no uniforms, but their work-clothes. It speaks of action, "fired the shot," "sleeps," "sweeps," "creeps," "set," "raise," etc., and of reception, since the bridge is "swept away," and the "deed" is "redeemed." Finally, it speaks of timing, since the battle was "long ago," "sons" will come in the future to remember and die in their turn, and we raise the memorial "today."

Both Emerson and Chesterton were *philosophical writers*, and this is apparent in their habit of looking at the things they wrote about from many different points of view. The habit of thinking in terms of categories helps us to develop this orderly and thorough way of looking at the world, and it will make our writing and speaking rich and varied.

ART OF REASONING

SCIENCE IS MORE THAN FACTS

At the beginning of this chapter we said that a scientist has two problems: to find the facts, and to explain them—or give their causes. We have seen how *dialectics* helps us to classify the facts and to arrive at certain definitions from these facts. It remains to see how a scientist arrives at an explanation of these facts, first by using demonstration to prove the connection between cause and effect.

This process of explanation has two stages:

1. The discovery of basic statements from which to reason, which are known to be true directly from the facts.

2. The process of drawing **conclusions** from these principles.

In Chapter II we have already studied the nature of a principle or basic statement. For example, in geometry you have learned that in this science you begin with definitions and with axioms and postulates (basic statements), and you then proceed to reason to **theorems**. Definitions, when put in the form of a statement, are themselves a kind of basic statement.

These basic statements can be of two kinds:

1. Principles which are immediately evident from the facts, or are known by human or divine faith.
2. Hypotheses, which are not known to be true, but which are assumed as true, in order to see what follows from them.

When we have principles, as in geometry, then we can be certain of the conclusion, and we have **strict science**. But when we have hypotheses we are still only in the realm of dialectics, since we are looking for certitude. A hypothesis is tested by seeing if the conclusions which follow from it agree with the known facts; this is called *verification*. But it remains only probable until it can be seen to be true from the facts themselves by intuition.

Thus geometry is built up on principles known to be true from experience. So are many truths in natural science, for example, our knowledge of the function of the human heart. Theology is based on principles known to be true from faith. But many areas of science are based only on hypotheses. For example, in recent science there have been several different definitions of the atom, all of which were hypotheses, and which were merely probable. For a long time the arrangement of the sun and planets was explained by a series of hypotheses. Today several hypotheses as to the nature of cancer are being used by researchers. Some day a true definition of cancer will be discovered, and then we will be able to explain the various effects that follow from it.

FINDING PRINCIPLES OR HYPOTHESES

A principle is known directly from experience, or taken on faith. When it is taken on faith our only problem is to be sure that the witness or authority is trustworthy and that we have understood what he says. If it is taken from experience we must know the facts,

have them clearly defined, and see that the subject and the predicate are necessarily connected. Indeed, most principles are simply definitions put in the form of a statement. Thus the principle that if equals are added to equals the sums are equal is obviously true once we have defined "equal" and "added."

When we do not have a principle we must choose a hypothesis. To do this we also examine the facts and select some definition that *might* fit them. We then verify it by seeing if this principle is true, and whether all the facts necessarily follow, as well as other new facts.

Whether we have a principle or a hypothesis the way of arguing or reasoning from it will follow the same plan.

WHY WE MUST ARGUE

People who are always arguing can be very tiresome, but argument is necessary if we are ever to know very much. If we knew nothing but what we can see immediately from our own experience we would know very little. It is only by reasoning from experience that we come to know that God or atoms exist, since we can see neither God nor atom. Argument consists in asking "why?", trying to find the answer, and in stating this answer clearly and precisely.

Sometimes even without reasoning we can see that a new statement is true merely because of its relation to another. In Chapter II (pages 70-71) it was pointed out that there are four kinds of statements. If we know that one statement is true we can sometimes be sure at once that another one composed of *the same terms* is true or false. For example, if I know that it is *true* that "every girl is pretty," then I also know that:

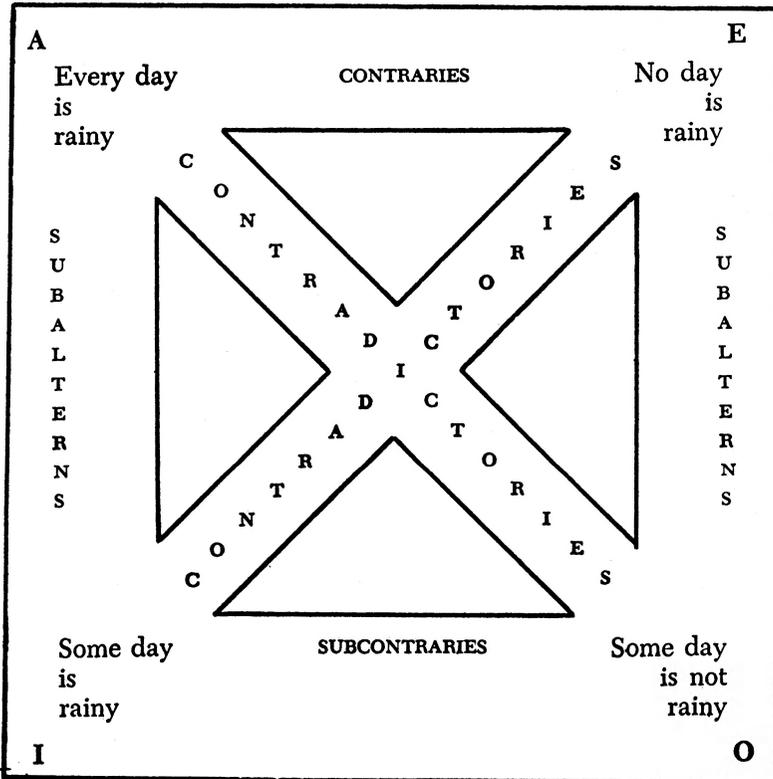
- 1) It is *false* that some girl is not pretty (the contradictory of the original statement).
- 2) It is *false* that no girl is pretty (the contrary of the original statement).
- 3) It is *true* that some girl is pretty (the subaltern of the original statement).

On the other hand, if I know that it is *false* that "every girl is pretty," I also know that:

1. It is *true* that some girl is not pretty (the contradictory of this second statement).

2. It may be *true* or it may be *false* that no girl is pretty (the **contrary**), because of course some girls may be pretty and some not.
3. It may be *true* or it may be *false* that some girl is pretty (the **subcontrary**).

These relations can be conveniently shown by a diagram which is called the **Square of Opposition**



If this square is memorized it will save us from making two common errors in thought:

1. The error of thinking that because "some Irishmen have hot tempers" it must be true that "every Irishman has a hot

temper"; or that because "some Germans are not hot-tempered," therefore "no German is hot tempered." This is the error called *unwarranted generalization*.

- 2 The error of thinking that if we prove that it is false that "every Irishman is hot-tempered" that we have proved that "no Irishman is hot-tempered"; or that if we have proved that it is false that "no German is intelligent" that we have proved that "every German is intelligent." This is the error of *mistaking a contrary for a contradictory*.

These relations help us to see how certain truths and falsehoods are related. But they are not reasoning in the strict sense, because they do not give us a new truth; rather they indicate a new statement of a truth already known, since each of these sets of statements is still composed only of the same two terms, with different *quantities* and *qualities* (see pages 69-70).

To arrive at a really new truth by reasoning we must make use of a **third term**. Thus when we say "the front teeth of a dog are sharp," we may know from experience, by looking at the teeth, that this is true. But we may also know it by reasoning: "The front teeth of a dog are sharp, *because* it eats meat." Here we have three terms: the **subject** (front teeth of a dog), a **predicate** (sharp), and a **third term** which is the *cause* that the predicate belongs to the subject (because it eats meat).

All reasoning consists in seeing the connection of a predicate with a subject by means of a **third** or **middle term**. We settle an argument between two sides by finding this middle term.

THE KINDS OF ARGUMENT

The third or middle term may be of two sorts: it may be a universal distributive term, or it may be a particular term (see page 70). It would be an unwarranted generalization, however, to link a subject with a predicate through a particular term, so that to reason through particulars we must have a *list* of them that is equivalent to a universal.

An argument in which the middle term is a universal is called a **syllogism** (from the Greek for "linking together of words or ideas"), and an argument in which the middle term is a list of particulars is

called an **induction** (Latin for "leading to," because it leads from particulars to a universal).

THE SYLLOGISM

The syllogism can be written in two ways:

1. In ordinary speech we say, "A is B, because of C"; "the teeth of a dog are sharp because it eats meat." This way of writing a syllogism is very simple, but it is a *complex* sentence. If we turn it into simple sentences we get a second way of writing the syllogism, which is clearer and more accurate.
2. This second way is to state the syllogism in three simple sentences:

| | |
|-------------------|--|
| C is B | Teeth for meat-eating are sharp. |
| And: A is C | And: the teeth of a dog are for meat-eating. |
| Therefore: A is B | Therefore: the teeth of a dog are sharp. |

In the syllogism written out in this way we have two truths called **premises** or **principles**, and a third, called the **conclusion**. To see how to form a syllogism correctly, one may begin by writing the conclusion. The **predicate** of this conclusion is called the **major term** (because the predicate is like the *form* in a statement, and form is greater than its matter; see pages 69-70). The major term combined with the middle term makes the **major premise**. The **subject** of the conclusion is called the **minor term**, and combined with the middle term it makes the **minor premise**. Ordinarily we write the major premise first, and the minor second, but this order is not really important.

You will notice that only the **middle term** occurs in both premises, but that it does not appear in the conclusion.

Since the two premises might be any one of the four kinds of statements contained in the *square of opposition* (see page 139), we might have a large number of different arrangements or *forms* (also called "modes") of the syllogism. Many of these, however, do not produce a genuine syllogism because in them the middle term is not universal or does not connect the major and the minor terms in a definite way. When tested (see page 572), only 14 arrangements are found to be useful. Even these can all be rearranged so as to give only four basic modes, and these are the ones most commonly used.

In the Middle Ages these were given rather odd names (the reason for them is explained on page 572. They are:

| | |
|------------------------------|----------------------------|
| Barbara: Every C is B | Celárent: No C is B |
| Every A is C | Every A is C |
| Every A is B | No A is B |
| Darii: Every C is B | Ferio: No C is B |
| Some A is C | Some A is C |
| Some A is B | Some A is not B |

It is obvious that Darii and Ferio are only weaker forms of Barbara and Celárent respectively, so that only Barbara and Celárent are of fundamental importance.

The Induction

The induction can be written in the same form as the syllogism, except that the middle term is a list of particulars. The premise which we used in our example of the syllogism above ("teeth for meat-eating are sharp") might be proved by an induction as follows:

| | | | |
|------------------------|---------------------------|---|---|
| a, b, c, d, e, etc. | are B | Teeth of cats, tigers, lions, dogs, bears, etc. | are sharp |
| And: C is | a, b, c, d, e, etc. | And: teeth for meat-eating | are teeth of cats, tigers lions, dogs, bears, etc. |
| Therefore: C is | B | Therefore: teeth for meat-eating | are sharp |

Different Forms of Reasoning

These two basic forms of reasoning, the syllogism and induction, also have *abbreviated* forms and *expanded* forms. Thus when one or the other of the premises of a syllogism is obvious, we may omit mentioning it. Sometimes we may merely state the premises and let our audience draw the conclusion. These abbreviated forms of the

It only remains to find the middle term (M) which is the *cause* of the truth of the conclusion. It can be found by asking, "Because of what is all piety a special virtue?" We see that St. Thomas answers: "Because it renders a special debt." Thus we can fill in the whole syllogism:

| | | |
|--|----|---|
| Every virtue that renders a special debt | is | a special virtue of justice. |
| And: all piety | is | a virtue that render a special debt. |
| Therefore: all piety | is | a special virtue of justice. |

Another example can be found in **Objection 2**. The conclusion here is: *No piety is distinguished from religion*. If we write this out we get:

| | | |
|---------------------|----|---|
| No M | is | distinguished from the virtue of religion. |
| And: all piety | is | M. |
| Therefore: no piety | is | distinguished from the virtue of religion. |

It will be noticed that the negative is placed in the major premise and the conclusion. Now if we look for the middle term, we will find that it is: "because piety renders worship to God," and we can write the following syllogism:

| | | |
|--|----|---|
| No virtue which renders worship to God | is | distinguished from the virtue of religion. |
| And: all piety | is | virtue which renders worship to God. |
| Therefore: no piety | is | distinguished from the virtue of religion. |

The first of our two complete syllogisms has premises which are both affirmative universal statements, which is the figure ("form" or "mode") called **Barbara**. The second complete syllogism has a *negative* universal major, and an *affirmative* universal minor, which is the figure called **Celarent**. By altering the minor to a particular statement (changing "all piety" to "some piety") we convert the two syllogisms into **Darii** and **Ferio**, respectively.

Example of Induction

This article does not contain an obvious example of induction, but it is easy to form an induction as follows. Write out some universal conclusion to be proved, then form a syllogism just as we have done before, but instead of a universal middle term find a list of particulars which are equivalent to a middle term. For example, let us suppose that we wish to prove by induction the major premises of the two syllogisms we have already given. The result will be as follows:

The virtues of piety, religion, reverence, obedience, gratitude, honesty, liberality, etc. are all special virtues of justice.

And: any virtue which renders a special debt is a virtue of piety, religion, reverence, obedience, gratitude, honesty, liberality, etc.

Therefore: any virtue which renders a special debt is a special virtue of justice.

This conclusion is the major of our first syllogism.

Neither prayer, devotion, vows, sacrifice, etc. is distinguished from the virtue of religion.

And: any virtue which renders worship to God is either prayer, devotion, vows, sacrifice, etc.

Therefore: no virtue which renders worship to God is distinguished from the virtue of religion.

And this conclusion is the major of our second syllogism.

Examples of Abbreviated Arguments

Our two syllogisms could be converted into enthymemes merely by abbreviating them. Thus:

Enthymeme: All piety is a special virtue of justice, because all piety renders a special debt.

When the argument is stated this way we assume that the hearer understands the other premise, namely, that "every virtue that renders a special debt is a special virtue of justice." On the other hand we might say:

Enthymeme: All piety is a special virtue of justice, because every virtue that renders a special debt is a special virtue of justice.

Similarly we can convert our inductions into examples simply by giving one clear case, instead of a list. Thus:

Religion is a special virtue of justice and it renders a special debt; therefore every virtue which renders a special debt is a special virtue of justice.

Devotion is not distinguished from the virtue of religion and it renders worship to God; therefore no virtue which renders worship to God is distinguished from the virtue of religion.

It should be clear from these passages that our inductions and examples are not certain arguments, but only probable, unless backed up by more evidence. To be certain, an induction must deal with matters which we know so well that we have certitude that our list of examples is either complete or a representative sample.

Example of a Hypothetical Syllogism

St. Thomas does not use a hypothetical syllogism in this particular article, but it is easy to state the objections given here as hypothetical and conditional syllogisms. For example, **Objection 2** could be written:

If piety is a special virtue, it must have a different function than other virtues.

But: piety does not have a different function than the virtue of religion.

Therefore: piety is not a special virtue.

USING ARGUMENTS

POETIC ARGUMENTS

The Argument of Poetry

At first sight it seems very odd to speak of an "argument" in a poem or novel, although we may have noticed that sometimes the summary of a play is called its "argument." The purpose of poetry does not seem to be to prove anything, nor to persuade anyone. Its

true purpose is to recreate us by arousing our emotions and bringing them to rest in the pleasure of contemplating some beautiful truth about human life. It gives us this refreshment and joy, not by "arguing," but by representing (imitating) some individual human action; that is, *it tells a story*.

But a story does contain a real argument. In entering into the story of another person, we come to see much more than a mere series of particular events. We also become aware of something *universal* which is exemplified in this particular story. We begin to see the great truths of human life and of the order of the universe in which man lives. The philosopher, Aristotle, said that "poetry is more philosophical than history," because history presents us with particular facts, while the poet, novelist, or playwright presents a story in such a way that the universal truth shines through its details.

Furthermore we do not merely watch the unfolding of this story as outsiders. We enter into it sympathetically, sharing in the emotions of the actors. The rhetorician helps us to see the truth of his conclusion by giving us something of his own feelings. Under the spell of his persuasion we hate what he hates and love what he loves. The rhetorician is trying to get us to *act* with him. The purpose of the poet is different. He casts an enchantment over us, not in order to get us to do something, but to fascinate us with the beautiful vision which he sees. We seem to enter a different world than the practical world of every day. We are not persuaded to act ourselves, but rather to enter by contemplation into the lives and actions of others.

The rhetorician arouses our emotions and focuses them so that we resolve to act. He is successful if we get up and leave him and set to work carrying out what he has proposed. The poet first arouses our emotions, but then he brings them to a delightful calm in which we share his vision of life. We are refreshed to carry on our own work in the light of a deeper insight into life, but we do not feel that we have been urged to go forth; rather the poet invites us to return to contemplation as soon as we may.

The Catharsis of Poetry

This special power of the poetic argument over the emotions is called by Aristotle *catharsis* or *purification*. In daily life only the

wisest of men are able to look at the world calmly and contemplatively. Most of us are so "upset" with the problems of life, its desires, its fears, its anxieties, and its frustrations, that we cannot stand back and see the beauty and pattern of life. We are like soldiers in a parade who are so busy keeping step that they cannot see the beauty of the marching formation. The wise man after years of experience and discipline is able even in the midst of troubles to maintain this calmness and objectivity and to enjoy life as it is. His emotions are purified and harmonious, like perfect music, leaving his mind clear and penetrating. This calm philosophical vision is beyond most of us, and even the philosopher grows tired and out-of-sorts. Consequently the poet, artist, and musician are greatly needed in society, because they have the secret spell of giving to us for a few passing moments something of this wonderful calm and clarity of vision. They enchant the boy or girl who is ordinarily too restless to be still, they awaken the care-ridden adult to think of more beautiful things than business or household worries, they refresh even the wise man in his times of weariness with this world.

The poet purifies our emotions first of all by arousing them and setting them free from their fixation on our everyday worries. He does this by helping us to enter into the emotional experience of others, that is, of the characters in a story. Then he sets these emotions moving in a harmonious, patterned way as the story builds up in a unified powerful action. And finally, as the story reaches its close, he brings those emotions to rest in a sense of fulfillment and completion as we see the pattern of action coming to a perfect end.

As this pattern of action emerges and we begin to see the parts of the story fall into place, the universal truth which it contains begins to become very clear to us and gives meaning and order to all that has taken place. Thus as our emotions are brought to a satisfying rest, our minds are filled with a wide and universal vision of truth. It is like the climb up a mountain. At the moment that we are able to rest at the top after a long climb, we also look around and see the world spread out before us below in all its glory.

The Power of Poetry

We should not make the mistake, however, of thinking that the value of poetic argument consists only in the conclusion. Some people

are fond of searching for the "moral" of a novel or play, and disregarding the story itself, as if it were a mere sugar-coating intended to make the moral "go down easy." This is just as wrong as to think that the force of a syllogism lies in its conclusion. Rather the force and power of the syllogism lie in its **middle term**, because it is the middle term which is like a *light* by which we see the truth of the conclusion. Similarly, in the poetic argument the story and its accompanying purification of emotion is the middle term by which we see the universal truth. In both cases, once the middle term is removed, the conclusion remains dark and unilluminated. We know that it is true, but we do not remember *why* it is true. Only while we are actually experiencing and enjoying a work of art do we see clearly into the truth which is contained in it.

Thus the play *Macbeth* contains the universal truth that "evil ambition works its own destruction." It is easy to put that truth into a single statement, but it is not so easy to *realize* that truth in our own minds. It is only as we watch the actual play unfold, and share the feelings of Macbeth in his apparent triumph and his terrible failure, that we really appreciate what that truth means.

Thus, from a logical point of view, a story is a typical case of some universal truth, which serves as a middle term through which that truth is known. It must therefore be an **example** or abbreviated **induction** (see page 143). It differs from an example used in arithmetic or science because it not only strikes our minds but also moves our feelings. It differs from an example used in rhetoric in that it is intended, not to prove that we must do something, but rather to give us a vision of life. This is why in rhetoric an example is ordinarily merely incidental, while in a poetic work it forms the whole argument.

The Imitation of Poetry

Sometimes it is objected that if the purpose of a poetic argument were to show a universal truth, it would not be so concrete and detailed. The answer is that the more particular and concrete an example is, the more vivid it will be to our imaginations. This is necessary since nothing moves our emotions unless it can in some way be imagined. Hence characters in a story which are mere "types" seem dull and uninteresting. As Shakespeare says, a poet must "give to airy nothings" (abstract truths) "a local habitation and a name"; that is, he

must make them vividly concrete. That is why the poetic argument is said to be an *imitation* or representation of life, since it presents the truth to us embodied in particular people and particular actions which live and move before us like life itself. On the other hand, such an imitation is not a mere photograph or historical record. It is an "imitation of nature," that is, of the inner and essential natures of things. The poetic writer does not merely copy or record outer appearances. He studies life so as to find truth and meaning in it, and to bring out this inner nature by the careful *selection* and *manifestation* of what is universal and important. In *Macbeth*, for example, we do not have a mere record of events. Shakespeare chooses every detail of his story to bring out the truth which it contains, to manifest the true nature of ambition.

In this way the story, or **plot**, is the very soul of a poem, novel, or play, that which gives unity to all its parts. For it is only in action that human beings become fully alive and manifest their inner nature or character. Through the action we know the **characters** themselves, their emotions, desires, and feelings. We also know their **thoughts**, or the reasons and motives which influence them to act or by which they disguise their real motives. So the *objects* represented in a story are first the **plot** or action (the *principal* object) and then the **characters** and their **thoughts** (*secondary* objects). These last two are secondary because thought is important to the story only as it results in action, and character is known to us and becomes fully itself only in action.

Characteristics of Good Poetic Argument

We have already explained why the soul of a poem is its plot (page 31). In any composition there must be **unity**. Every sentence and every word must have a genuine function in presenting a single, basic conclusion. In a poetic work this conclusion is the presentation of a human *action* or story which has significance for all men. This presentation of an action we call the *plot*.

In any composition the principal theme or conclusion is frequently reinforced by secondary themes which are subordinated to

it. Similarly in a story there may be *sub-plots*. These should not be merely thrown in as interruptions or interludes, but ought to contribute to the development of the main plot, either by amplifying certain of its aspects, or by bringing them into clear relief by contrast.

Every action must have a *beginning* at which the principal character begins to react to some situation in which he finds himself. He sees before him some goal to be achieved, whether some good to be won (the girl, fame, etc.) or some evil to be escaped (disgrace, loss of the girl, death, etc.) and he begins to seek the goal, or fly from the evil. His various efforts to carry through his purpose are the *middle* of the action. If the outcome of these efforts moves steadily to success or failure the plot is *simple*. But it is more interesting when he seems to be succeeding up to a point and then begins to fail, or when he seems to fail up to a point and then begins to succeed. Such a plot has a high-point, the *climax* or reversal, and is said to be complex.

The end of the action (denouement or resolution) comes when the goal is achieved, or the evil suffered irrevocably. A plot is *complete* if all these steps are clearly worked out (or at least vividly suggested). It has a proper *magnitude*, when the forces set at work have time and space in which to be made clear.

Any argument to have value must be true. In a plot the truth consists in the *probability* with which one episode leads to another. This probability comes from the universal truth which it embodies. Consequently we think a plot is very poor and improbable when it is resolved by some chance event (the rich uncle who dies and leaves our hero a fortune, etc.), because we know that true human happiness does not depend on chance but on the providence of God and the virtue of man. On the other hand, we think that a solution to a plot is very good when, in a surprising and unexpected way, the beginning leads to a result which is seen to be logical and in accordance with the laws of providence and of human life.

The action is carried by *characters*. If they are not lifelike, consistent and appropriate to the action, they will make the action

seem improbable. In the characters we see not only external action, but also the internal actions of thought, decision and emotion. Our understanding of the character of another human being depends to a considerable degree on the fact that we can sympathize with the emotions he undergoes. Hence in the poetic work the portrayal of emotion is of special importance in making clear both the characters and their action.

Poetry and the Emotions

It seems strange to many that so many great works of art have sad endings. A child or a very simple person often dislikes stories that end sadly, but as people become mature they also see a beauty and joy in a sad story or tragedy. Why is this? All emotion begins with *love* (that is, seeing that something is good or pleasant), or with *hate* (seeing that something is bad or painful). If we see that what we love can be possessed, we begin to move toward it and we experience the emotion of *desire*. If we actually possess it and enjoy it, we feel the emotion of *joy*. Sometimes, however, we find that there is an obstacle in our way, and this makes it *difficult* to obtain what we want. Then our desire becomes *hope*, or the conviction that by effort we can have what we want in spite of the difficulty. As we make an effort to overcome this difficulty, we experience *courage*, the spirit of effort and of battle, and then at last, if we conquer the difficulty and achieve our goal, we end in *joy*.

On the other hand, if we see something *hateful* and see it approaching, we feel *aversion*, or a desire to get away. If it actually meets us, then we feel *sorrow*. Perhaps, however, as the hateful object approaches us and our aversion grows, we see the possibility of escaping, and of achieving the opposite good, although at the price of an effort. Then we experience *hope*, *courage*, and, if we succeed, *joy*. But if we see that the difficulty may be too great either to escape the evil we dislike or gain the good we desire, then we begin to feel *fear* or anxiety; and if it becomes clear that the difficulty is certainly too great, then *despair* overcomes us. As the evil finally seizes us we may still struggle for a while, thinking that escape or revenge is still possible, and then we feel *anger*. But if no escape is possible, then

sorrow begins. Thus all emotion begins with love or hate, turns to hope or fear if difficulty appears, and ends in joy or sorrow.

Because of this interplay of our emotions, a story with a joyful ending is pleasant both because it brings our emotions to rest in the vision of truth, and because joy itself is pleasant. Sorrowful endings bring our emotions to rest, but sorrow is not pleasant to the normal person. How, then, can a sorrowful ending be pleasant? The pleasure is not in the sorrow, which is a painful thing, but in the *rest in truth* which we have achieved through sorrowful experience. As we see the death of a hero whom we loved, we feel sorrow, but our mind is also filled with delight that he has proved his nobility of character even at the price of death. This higher joy is worth the sorrow. Even when we see a great man punished for crime, we feel a joy in seeing that the law of justice in the universe has been preserved, and that this noble man has come to acknowledge and recognize his fault and repent.

This is why a tragedy is sometimes a greater work of art and a more real refreshment of our soul than is a comedy with a happy ending. The happy ending may give us a superficial joy, but the joy at the end of a tragedy is deeper and more complete, since it points to eternal things and not merely to something temporary. A fairy tale ends with "they lived happily ever after," but we are not so sure that they really did. The story of our Lord's death on the cross, however, is really much more emotionally satisfying for our souls, for in it we see that he has gained an everlasting victory over sin and death. Thus the *catharsis* or purification of the emotions in a tragedy is very deep and great, and it leads to a wonderful peace and insight into the real meaning of human life, which is sorrowful here in order that it may be joyful hereafter.

The Poetic Argument of the "Concord Hymn"

1. **The plot of the poem.** On page 36 we have already given a brief analysis of the plot, characters and thought of the "Concord Hymn." We have seen that this poem does not portray any obvious external action, but rather an action which goes on within the soul of the poet, who speaks not merely for himself but for the whole

assembly at the dedication of Concord monument. It would be very difficult to use such a theme for a lengthy novel or play, but it is quite suitable for a brief *lyric* poem. A lyric poem is one which resembles in length and in style a song, and a song usually represents the passing of some emotion through our mind and heart.

The unity of this poem is to be found in this single action which it represents. The speaker finds himself at a public ceremony. Perhaps he has come as a matter of form without caring much about what was going on. Now he finds himself standing at an historic spot and suddenly he realizes that perhaps it should mean something to him, and he begins to react to his situation. This constitutes the beginning of the interior action and is found in the first stanza of the poem.

The movement of the plot in this poem is a simple one and consists only of two episodes represented by the two stanzas of the poem. In the second stanza the speaker begins to feel his ingratitude at having so little appreciated the sacrifice of the dead. The feeling of uneasiness or awe at being at the solemn ceremony deepens into a sense of melancholy at the thought of how quickly men forget.

In the third stanza the melancholy turns into a sense of dedication. The speaker realizes that the erection of the monument must not be a mere empty gesture, but an expression of genuine gratitude.

In the last stanza this quiet but strong emotion resolves itself as he comes to the goal which he sighted at the beginning of the poem, namely a full realization of the meaning of the occasion in which he is participating, with a prayer to God that in the future his dedication may persevere.

The *catharsis* of this poem is the arousal and quieting of the emotion of awe and uneasiness felt at the beginning of the poem, and it is accomplished by the achievement of a full realization and dedication demanded by the situation.

2. The argument of the poem. How is this an *argument*? Emerson has told the story of one group of men who, on a particular occasion, began to realize how much patriotism deserves to be honored and how

frequently it is forgotten. Furthermore he tells us this story in such a concrete way that we ourselves experience his feelings and his realization of truth. Consequently we have before us an **example**, or abbreviated **induction**, by which we arrive at a general truth, namely, that "Patriotism is very honorable," or that "Patriotism is a great virtue."

This truth in its abstract statement does not enter our mind as we read the poem. Rather while simply listening to the story and entering into its emotion we come step by step to *see* this truth *without formulating it in any other words than those of the poem itself*.

If Emerson had added another stanza like the following:

This is the lesson we relate,
A lesson that is learned by few:
That patriotism is a virtue great
Which men forget to honor as is due.

the argument of the poem would have been destroyed, because the truth would no longer be presented to us as embodied in a story or example, and the emotion would be jarred and destroyed. This is the reason why many people dislike literary writing and especially poetry. They look for the writer to say "plainly and in so many words" what he means. They do not understand that the meaning of such an argument has to be conveyed and enjoyed in the story itself and not outside of it, and that yet there is a meaning, a universal truth, which we realize very deeply as we come to the end of the story. Indeed, Emerson's poem probably makes us appreciate patriotism much more than a piece of rhetoric would do, because its quiet reflective tone makes us aware of the reality of patriotism without any effort to persuade us or to moralize.

3. The role of the characters in poetic argument. Although the plot is the most important thing in this poem, it cannot take place except within the soul of some character or characters. We have already seen that the poet speaks not merely in his own name, but for all the assembly, and indeed for all the people of America whom they represent.

Emerson seeks to paint the character of the American people. It would not be appropriate to call attention directly to this in a poem which seeks to honor the dead, and so he portrays this character only by implication. The dead heroes are described in the simplest terms as plain men, farmers, who nevertheless did not hesitate at a moment's notice to rise to their country's defence without fear or argument or indecision. Emerson seems to say that these men are typical of the true American. When we stop to think of them, we realize that they stand for what is best in ourselves.

4. **The thought of the poem.** It might seem difficult to separate thought from action in a lyric poem, since the action is an interior one. Yet we can consider this thought either as part of the action or simply for its own interest and truth. On page 38 we have already seen that Emerson in this poem is expressing the idea that American democracy is of importance, not only for our own country, but as a model for other nations, in its defence of liberty and human rights. This thought Emerson expresses by a gentle *irony*, reminding us that we often are forgetful of the true importance of our own country.

5. **Evaluation of the poem.** If we wish to judge whether this poem adequately portrays its subject, we first have to ask if the plot is unified, complete and of the right magnitude. We have seen that it is unified, since each stanza and line contributes very economically to the unfolding of the action. It is also complete since it moves to a genuine catharsis and conclusion. It has the right magnitude, very brief as is suitable to a lyric, and with a stanza for the beginning, for each of the two episodes which form the middle, and another for the end. In each of these stanzas the author makes his point clear and vivid. Furthermore, this plot is a probable one, since the emotion and train of thought aroused follow from the situation and the character.

In this poem, brief as it is, the portrayal of character and the development of thought do not have any great importance in their own right. Yet the character of the American people is presented to us in a way which is consistent and life-like. Emerson speaks of an

ideal which we sincerely cherish in our nation. The thought also, simple as it is, is worthy of our reflection, and it is appropriate since it is an expansion of the action itself.

The weakness of the poem is perhaps to be found in the lack of intensity in the catharsis, and the lack of profundity in the thought expressed. The American nation has many great problems and perils. Does Emerson succeed in giving us the sense of the difficulties we face, and the firmness of resolution we must have? Or is he not rather too placid about it all? It was not easy for the Minutemen to make their decision or lay down their lives. Our forgetfulness of patriotism is not merely a slight fault, but something often rather ugly and despicable. Does the poem really succeed in giving vividness and reality to the truth it expresses, or is it not too genteel and perfunctory?

RHETORICAL ARGUMENTS

The Purpose of Rhetoric

A rhetorician is trying to persuade his audience to do something or to avoid doing something. Hence he is usually arguing about whether something is possible or impossible, whether something is likely to happen or not to happen, or whether something is important or trivial. No one will try to do what is impossible, nor to take into consideration what is not likely to happen, nor to concern himself about something which seems trivial.

The poetic writer makes every work into a single example or story. The rhetorician might also do this (see our Lord's beautiful sermon on the prodigal son), but ordinarily he only uses examples as an incidental device, and then they are usually *historical* examples, because a thing is more convincing in a practical way if it actually happened. The chief argument of the rhetorician is not the example or shortened induction, but the enthymeme or shortened syllogism.

The Work of the Rhetorician

In the enthymeme the rhetorician leaves one premise implicit. This premise must be some opinion which he knows the whole audience will accept without argument. He then bends his effort to setting the other premise before them in the most favorable light possible. If they will accept this second premise, then they will readily accept the conclusion. Indeed, occasionally the rhetorician lets them draw this conclusion for themselves, as, for example, Mark Anthony does in his funeral oration in Shakespeare's *Julius Caesar*. This is why the enthymeme is so suitable for rhetoric, because it builds on a premise already accepted and has only to establish one point in order to produce the desired conclusion.

The rhetorician has two especially difficult problems:

1. To establish his own character with his audience as *honest*, *well-intentioned*, and *intelligent*. If they like him and trust him, then they will be very quick to accept his advice as to what is to be done. But if they dislike or distrust him, it will be almost impossible to convince them. Indeed, the more he says the more they will be inclined to do the opposite.
2. To find the premise that the audience will accept without discussion and which can be left implicit, and to find a way to put the other premise of his enthymeme in such a way that it will appeal to his audience.

Both of these require the rhetorician to understand the likes and dislikes of the people to whom he has to speak. He must understand the emotions just as the poet does, but he must also know how to arouse them or quiet them in people of a certain type.

For this reason he must ask himself, before addressing a particular group, whether they are united by their virtue (for example, an audience of priests, sisters, doctors, lawyers, or experts of some sort), or by their riches (an audience of businessmen), or their poverty (a crowd in the street). He must also consider their nationality, religion, and education, and whether they are young, middle-aged, or old.

In order to sway all these classes of people, the rhetorician concerns himself with arousing love and hate, anger and benevolence, fear, shame, kindness, pity, or envy. He does not do so, however,

in order to make men act from blind emotion like animals. To do that would be vicious and sinful. The rhetorician appeals to men's emotions to lead them to truth and to a more reasonable way of acting. He studies selfish and evil emotions, not in order to produce them, but in order to prevent them from interfering with right action.

If the rhetorician is to move men to do what is right, he must not merely advertise any product he is hired to sell, promote any program adopted by his political party, or defend any criminal who hires him as a lawyer. He must know **ethics**, or the art of good human living, so that he understands what is truly virtuous and honorable, and he must have a thoughtful acquaintance with politics and practical affairs.

Example of Rhetorical Argument

1. Character of the speaker. As we have seen (page 89) Lincoln in his "Gettysburg Address" was very careful to remove from the minds of his audience the prejudice against him which he suspected they entertained. The preceding speaker was an orator famous for his learning and elegance of style. Lincoln was a man from the "backwoods," not very well educated, and considered by many in the audience to be a demagogue rather than a great statesman.

Lincoln attempted to overcome this prejudice by the solemnity, beauty and deep sincerity of what he had to say and the manner in which he expressed it. He also had in mind that a very brief speech would make more impression on the national audience who would read it in the newspapers than would a lengthy address.

2. The argument of the address. Lincoln's conclusion of which he wished to convince his audience was, "We should continue this war for democracy." If we state his argument we get the following syllogism:

| | | |
|------------------------------|-----|---|
| Patriots | are | to be honored by completing their work, that is, by winning the war for democracy. |
| And: these dead | are | patriots. |
| Therefore: these dead | are | to be honored by completing their work, that is, by winning this war for democracy. |

This syllogism is only stated by Lincoln in abbreviated form as an **enthymeme**. The minor premise is omitted, because everybody agreed that the dead were patriots to be greatly honored. To dwell on that point would have been useless. It might even have raised disturbing questions; some of his audience might have begun to ask themselves: "Were these men fools to enlist in the army for a war started by politicians like Mr. Lincoln?" Lincoln did not risk stirring up these prejudices, but took full advantage of the united conviction of the crowd that the dead ought to be honored. He dwelt only on the idea that no honor for these men could be sufficient, except the completion of the war in which they had died.

This idea, however, was not immediately acceptable to his audience, because (as Lincoln well understood) many of them did not appreciate the greatness of the cause for which these men had died, or what they had fought to accomplish. Therefore Lincoln made this the main burden of his speech.

He put his appeal in two parts:

1. He pointed out that mere ceremony and speech-making was no adequate honor for the dead. This he established very quickly and briefly in the middle section of his speech, sentences five to seven.
2. He pointed out the greatness of the cause for which these men died. This occupied most of the speech, both its beginning and its end.

This second part is one of *amplification*, as it is called—namely, to show that something is great and important. Lincoln began in the first sentence of his speech by recalling a previous **example** of a great historical event, the founding of our country. He was implying that just as the founding of our country had consequences for the whole world, so would the Civil War. The founding of our country was a birth, the Civil War would result in rebirth. In this way he clothed the Civil War dead with the acknowledged greatness of the founders of the Republic. Lincoln emphasized this comparison in sentences two and four of his speech. Then in sentences five and seven he introduced the other part of his argument, the inadequacy of mere words to honor the dead. This was a problem of *depreciation*, the

reverse of amplification. In sentences eight and nine he returned to the main point. Sentence eight is really the climax of the speech since it states the conclusion. Sentence nine drives this home by bringing forward two arguments:

1. It would be tragic for so great a sacrifice to be vain.
2. This sacrifice was for the great ideal of democratic freedom.

Lincoln saves this last argument for the end, and he clinches it by the saying that “. . . (true freedom is) government of the people, by the people, and for the people.” This is a kind of *maxim*, or pithy saying, which is an effective rhetorical device because it sticks in the memory of the hearers. It can be written thus:

| | | |
|----------------------|----|--|
| To seek true freedom | is | to seek government of the people, by the people, and for the people. |
| And: our duty | is | to seek true freedom. |
| Therefore: our duty | is | to seek government of the people, by the people, and for the people. |

DIALECTICAL AND SCIENTIFIC ARGUMENTS

The Problem to Be Solved

In dialectical and scientific arguments the problem of *emotion* is left entirely out of consideration. In these arguments the only problem is that of objective facts and of finding explanations of facts. It is presupposed that the audience for such arguments is honest and fair-minded and ready to listen to the evidence without prejudice. If this is not the case, then it is necessary first to clear away their prejudices by the use of rhetoric.

In objective, scientific research we begin with a problem or question. It can be one of four questions:

1. Does S exist?
2. What kind of a thing is S?
3. Does S have the property P?
4. Why does S have the property P? (*the cause*)

If we are not curious about each of these questions we will not want to learn anything. Science must begin with *wonder*. If we are

curious, then we will ask these four questions in the order above. For example, Madame Curie, who discovered radium, posed the following problems (see page 552 ff.):

1. Is there a new element in these materials which behave so unusually?
2. Once she had discovered that there was a new element, she wanted to know "what is it?"—how could it be defined so as to show that it is different from any element ever known before?
3. Then she wanted to know: "What are its properties?"
4. Finally she wanted to know: "Why does it have these properties?"

It took her many years of research to find the answer even to the first question.

In some sciences the first two questions are very easy to answer. In mathematics a teacher can show us in a few seconds that there is such a thing as a triangle and a circle merely by drawing them on the blackboard, and she can then quickly show how they must be defined so as to distinguish a triangle from a square, or a circle from an ellipse. These **definitions** are first principles, or immediately known truths. Once we understand them the rest of mathematics is very clear and certain.

In most sciences, however, the first two questions are hard to answer. We cannot find definitions or basic principles in these sciences without long research like that of Madame Curie. The **dialectical** argument is the one which we must use in this research, since it only requires *probable* principles. The strict scientific argument or **demonstration** (for example, those in mathematics) cannot be used until we have *certain* principles and have already answered the first two of our questions.

The dialectician proceeds to establish a **real definition** in the way we have already described in Chapter II. He begins with nominal definitions, which are the **opinions** that are commonly held. These may be common opinions, or they may be the opinions of experts. Then he makes a classification by comparing what is the *same* and what is *different*, and arranging his terms according to the predicables of **genus, difference, species, property, and contingent** (as we have al-

ready shown), until he finally locates the correct definition. Madame Curie kept trying to separate, from the mixture in the laboratory, the various chemicals which already fitted into a known classification, until she had isolated a new element and fitted it into a place in the classification that was previously blank.

Refutation of False Theories

The dialectician prepares the way for science in another fashion, namely, by refuting false opinions or theories. Until these have been eliminated, the true principles will be hard to separate from the false. Ultimately a theory may be shown to be false by the discovery of some new fact, but dialectics will often eliminate a theory on the grounds that it is inconsistent, or that it disagrees with facts already known but whose significance has been missed.

In refuting these false views the dialectician uses the method called *distinguishing* an argument. It is based on the fact that many arguments which seem to be true are really the result of **equivocal terms** (see page 49). Since a syllogism will be invalid if it contains more than *three* terms, we can destroy an opponent's argument by showing that he has used a term in *two* senses in his syllogism, thus using *four* instead of three terms.

For an example, let us suppose that we wish to refute the following theory:

| | | |
|--------------------------|-----|--------------------|
| Every animal that swims | is | a fish. |
| And: whales | are | animals that swim. |
| Therefore: whales | are | fish. |

We may proceed in one of two ways:

1. **By distinguishing the middle term.** In this case we use the following method: I *concede* the major premise in the sense that "every *cold-blooded* animal that swims is a fish," but I *deny* it if it means that "every animal, even a *warm-blooded one*, that swims is a fish." As to the minor premise, I distinguish it in the **contrary** sense, and *deny* that "whales are cold-blooded animals that swim," while *conceding* that "whales are warm-blooded animals that swim." Thus there is no middle term found in *both* premises taken in the sense in which they are true, so that no conclusion follows.

Written out this would appear as follows, and would be called a **contradistinction**:

I *distinguish the major* (middle term):

Every *cold-blooded animal*
that swims is a fish, I **concede**.

Every *warm-blooded animal*
that swims is a fish, I **deny**.

And I *contradistinguish the minor* (middle term again):

Whales are *cold-blooded animals*, I **deny**.

Whales are *warm-blooded animals*, I **concede**.

Hence: *no conclusion follows*.

2. By **distinguishing either the major or minor term**. In this case we use the following method: I *concede* the major premise in the sense that "every animal that swims is a 'fish' as this word is *popularly used*," but I *deny* it in the sense that "every animal is a 'fish' *in the technical sense*." The minor I *concede*. The conclusion I *distinguish* in the same way as the major, *conceding* that "whales are 'fish' *in the popular sense*," but *denying* that "whales are 'fish' *in the technical sense*." If the minor term is the one distinguished, then the major premise will be conceded, and the conclusion will be distinguished.

The following are examples of these two types of **distinction**:

Distinction of the major term:

I *distinguish the major* (major term):

Every animal that swims is a "*fish*" *in the popular sense*, I **concede**.

Every animal that swims is a *fish in the technical sense*, I **deny**.

And I *concede the minor*:

Whales are animals that swim.

And I *distinguish the conclusion* in the same way

(major term again):

Whales are "*fish*" *in the popular sense*, I **concede**.

Whales are *fish in the technical sense*, I **deny**.

In our example the term "whales" is difficult to distinguish. But it is sometimes used in a strict sense of the mammal called a whale, and sometimes in a broad sense of any large thing that swims, that

is, in the sense of a sea-monster. Using such a distinction we would get the following in which we also have an example of the third way in which a premise may be treated, since when we can neither affirm nor deny its truth, we may *pass over it*, and deny that the conclusion has been proved.

Distinction of the minor term:

I *concede the major*:

Every animal that swims is a fish.

But I *distinguish the minor* (minor term):

Some "*whales*" taken in the sense of any sea-monster
are animals that swim,

I **concede**.

Some *whales* taken in the strict sense
are animals that swim,

I **pass over**.

And I *distinguish the conclusion* in the same sense
(minor term again):

Some "*whales*" taken in the sense of any sea-monster
are fish,

I **concede**.

Some *whales* taken in the strict sense are fish, I **deny to have
been proved**.

In this last case we would not *deny* the second sense of the minor (since it is true but not relevant) but would say, "That some whales taken in the strict sense are animals that swim," I do not deny, but I pass over as irrelevant to the argument. In distinguishing, we should attempt to distinguish the middle term if possible, since this destroys the whole conclusion. If we cannot distinguish it, then we should first try the major and then the minor term.

This art of distinguishing makes it possible to refute an opponent and yet to agree with him as much as possible. It will also permit us to escape the ordinary *fallacies* in reasoning by which the opponent appears to prove something without really doing so.

The Order of Discussion

In a dialectical discussion or investigation it is important to proceed in an orderly fashion:

1. Make sure you understand what the opponent is saying, and state the two sides fairly, so that he will agree with your statement of his case.

2. Try to agree on every point that you can, or to put aside small disagreements that are irrelevant.
3. Try to reduce the issue to one single question, and then seek to establish how this question can be settled in an objective way.
4. Present the objective evidence or authority for your position.

The use of dialectic should eventually clear the way for us to establish some statements which are *certainly* true, that is, which are necessary and cannot be otherwise. These can be the principles or premises of a genuine proof or demonstration and are known directly from experience, not as dialectical conclusions. Dialectics has only led the way to discover these principles; it has not proved them, since dialectical proofs never yield certain conclusions.

Genuine Proof, or Demonstration

A strict demonstration has the cause of the conclusion as its middle term and is called an *a priori* demonstration, that is, one that goes from principles (causes) to effects. The following is an example:

| | | |
|---|-----|-----------------------------|
| Automobiles with 12 cylinders compared with those with only 8 | are | able to run faster. |
| And: automobile A compared to auto- mobile B | has | 12 cylinders compared to 8. |
| Therefore: automobile A compared to auto- mobile B | is | able to run faster. |

Here the middle term is "12 cylinders compared to 8" and is the proper cause of automobile A running faster than B. Sometimes, however, the middle term is not the *proper cause*, but a common or remote cause. For example:

| | | |
|--|----|---|
| The automobile able to run faster | is | the one with the most powerful engine. |
| And: automobile A compared to auto- mobile B | is | able to run faster. |
| Therefore: automobile A compared to auto- mobile B | is | the one with the more powerful engine. |

The middle term here is a true cause, but only a remote one. It is true that A runs faster because it has a more powerful engine, but our mind is not satisfied by this answer. We still want to know "Why is its engine more powerful?" Only when we know the proper cause are we fully satisfied.

Sometimes the middle term is not a cause at all, but an **effect**. For example, in the following demonstration:

The car that won the race is faster.

And: car A compared to
car B is the winner of the race.

Therefore: car A compared to car B is faster.

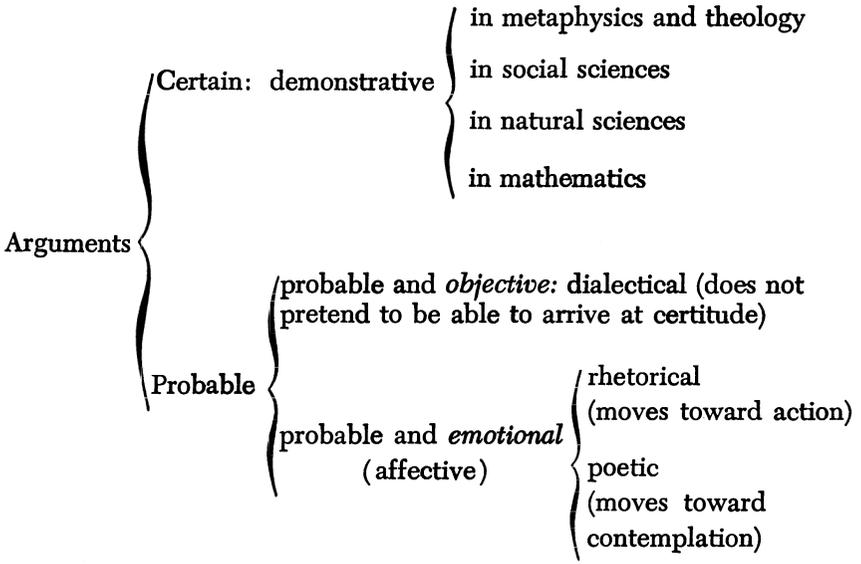
This argument proves the *fact* that A is faster than B, but it does not tell us *why*.

Thus three types of demonstration are possible:

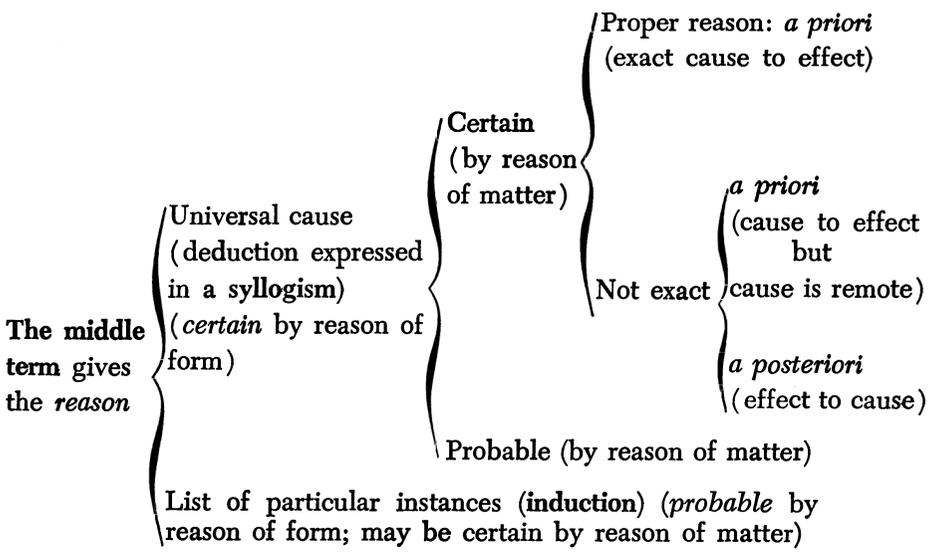
1. **Perfect demonstration.** This is through a middle term which states the **proper cause**. Technically this is called a demonstration which is *a priori* and *propter quid*. These are Latin for "from the cause" and "because of what."
2. **Imperfect demonstration:**
 - a. Through a **remote cause**. This is technically called *a priori* (through a cause), but *quia* (Latin for "that"), because it proves *that* a fact is true, but does not show exactly why.
 - b. Through an **effect**. This is technically called *a posteriori* (Latin for "from the effect"). It is also only *quia*, because it proves *that* a fact is true, but does not show exactly why.

The goal of the scientist is to achieve the first kind of demonstration, which completely satisfies our minds. In mathematics we can have such demonstrations in every theorem because mathematics deals with simple abstract quantities. But in other sciences it is hard to have such perfect demonstrations. For example, the proof that God exists is an *a posteriori* proof. We know that God exists because he has created the world, but that is not *why* he exists.

ARGUMENTS IN GENERAL



SCIENTIFIC ARGUMENTS



The Order of Science

Every science is organized so as to begin with the most *general* truths and then to proceed to study the more *special* truths. In geometry, for example, we study about the triangle *in general* before we study about equilateral, isocoles, and scalene triangles, and in zoology we study about animals, then vertebrates and invertebrates, and then each kind of vertebrate. This is for two reasons:

1. Because it is easier to be certain about what is general than about what is particular, just as it is easier to see that an approaching thing is an animal before we are sure it is a cow or a horse.
2. Because it saves repetition to treat of things in this order, since what is general is included in everything special. In this way everything in a science can be traced back to some general principles which are the first and most certain things in the science. For example, axioms and postulates and definitions are the principles of geometry, and the rules of addition, subtraction, multiplication, and division are first in arithmetic, and the Creed is first in Christian doctrine (see pages 77 ff.). These principles must be immediately evident statements or known by reliable witnesses, or they too would have to be proved and would not be the beginning of a science.

There are as many different sciences and arts as there are different sets of such first principles. Thus algebra (or arithmetic) is one science, while geometry is another, and Christian doctrine another, because each has a different set of postulates.

Example of Dialectical Argument

In *A Defense of Patriotism*, Chesterton assumes one opinion as accepted by all, and he disputes another.

1. He assumes that every one is agreed that patriotism is a good thing.
2. He wishes to raise a question about the unthinking ideas held by so many of his countrymen of what patriotism is.

He begins by stating two definitions:

1. Patriotism is a lust for territory.
2. Patriotism is a love of country.

He asks the question: "Are these two definitions identical, as many people seem to think?" He answers by listing the different properties of "lust" and "love":

- 1) Lust is low, automatic, rapacious, blind, sated.
- 2) Love is chivalrous, purifying, pitiful, vigilant, intellectual, primal.

Thus he argues that since the properties of lust and love are different, their essential nature or definition must be different.

He next brings forward a third definition similar to the first:

3. Patriotism is to be for your country right or wrong. He then disproves this by a similar method, showing that:
 - 1) Love is very sensitive of the honor and virtue of the thing it loves.
 - 2) Patriotism that cares nothing for honor therefore is obviously not love, but only lust.

He clinches this further by some more properties:

- 3) Love is serious, and loves truth even when it is frank criticism.
- 4) This false patriotism is frivolous, and refuses to face criticism of any sort.

This completes the first stage of his argument, which has established that patriotism is love and not lust. He then asks whether it would be right to say:

4. Patriotism is a love for more territory.

This he proceeds to disprove by showing that this kind of "love" is concerned only with *trivial* things. He does this by listing the signs of such patriotism:

- 1) Patriotism as a love for territory is shown by pride over trade, physical force, victory in petty battles far away, in colonies, in boastful speeches, and in "fists and boots."

- 2) Real patriotism ought to be a pride in central, intellectual things of "the head and heart," in ideals like those of Pericles and Athens.

In the final and third stage of his argument he asks the *probable cause* of the faulty reasoning which has led to this false view, and states a *hypothesis* which may account for the mistake so many have made. It can be formulated in a syllogism thus:

| | | |
|--|-----|--|
| The great qualities of England | are | its success in commerce, prize fighting, eating up provinces, and pulling down princes, i.e., in imperial power. |
| And: what a patriotic man takes pride in | are | the great qualities of his country. |
| Therefore: what a pa- triotic Englishman takes pride in | is | England's success in imperial power. |

The error, Chesterton says, is the major premise. It ought to read:

| | | |
|-----------------------------------|-----|---|
| The great qualities of England | are | its literature, science, philosophy, and political eloquence. |
|-----------------------------------|-----|---|

Then a different conclusion would follow, namely:

5. Patriotism is a love of country for its spiritual qualities.

This completes the main course of Chesterton's argument; he has discovered a correct definition of patriotism. The genus is "love," and the difference is "of one's country as having great spiritual qualities." The final part of the essay is an inquiry as to the *cause* why Englishmen do not know the great qualities of their country. Chesterton suggests that it is "our unique neglect in education of our national literature." And what is the cause of *this*? The emphasis in English schools on Latin and Greek only. This last argument is a *hypothesis*. It can be stated in a syllogism as follows:

Whatever causes the neglect of the study of national literature is a chief cause of decline of true patriotism.

And: the study of the Greek and Latin classics in English schools is a cause of the neglect of the study of English national literature.

Therefore: the exclusive study of Greek and Latin in English schools is a chief cause of decline of true patriotism.

This argument is only a probable one because Chesterton has not shown that the minor premise is really true. It is not obvious that the study of Greek and Latin necessarily involves the neglect of the study of English. Thus his argument has led to two conclusions, both of them still dialectical:

1. The definition of patriotism is a love of one's country for its spiritual qualities.
2. The cause of the decline of true patriotism in England is classical education.

The definition is still only dialectical because it is not clear that it has given us the ultimate difference. May there not be several types of love of country for its spiritual qualities, of which patriotism is only one? The other conclusion is also open to doubt since it rests on a premise which is merely probable.

As a piece of dialectic this article might be criticized on the grounds that Chesterton does not sufficiently bring out the possible arguments for the false definitions, but builds up one side with *rhetorical* devices, instead of giving the other side its fair and objective chance. We must remember, however, that these essays were intended to provoke thought, not to settle a question. Hence Chesterton defends the *less popular side*, knowing that his readers have heard the other side many times from other sources.

Example of Scientific Argument

Whether Piety Is a Special Virtue? is a strictly scientific piece of argumentation in which St. Thomas proves his own answer to the question, and carefully distinguishes the objections of his opponents. Each of these objections is itself a *dialectical* syllogism, that is, one which does not argue to a certain, but only a probable, conclusion.

St. Thomas' argument in his reply to the question can be stated formally as follows:

Major: Any virtue which has a special relation to its object is a special virtue.
Minor: *And:* piety is a virtue which has a special relation to its object.

Therefore: piety is a special virtue.

Major: This is the *definition* of what is meant by a special virtue. Definitions are immediately evident statements and do not require proof.

Minor: Proof:

A type of justice which renders a special debt is a virtue which has a special relation to its object.

And: piety is a type of justice which renders a special debt (i.e., to parents and country as principles of our being and governance).

Therefore: piety is a virtue which has a special relation to its object.

2nd major: This is the *definition* of justice, whose object is to render a debt.

2nd minor: This is the *definition* of piety.

Thus in this proof the premises go back to *definitions*. If these definitions are real and essential, then the proof is strictly demonstrative. St. Thomas has already established these definitions in previous articles (see pages 130 f.).

Furthermore, it is a demonstration through the proper cause (i.e., it is *a priori* and *propter quid*), since the middle term, "a virtue which has a special relation to its object," states the *formal cause* that makes a virtue special, and this is exactly and properly the cause, requiring no other explanation. To see this better we might ask ourself: "Why is John the brother of James?" The answer would be: "Because they are related as sons of the same parents." Thus the *relation* is the very definition or formal cause of being a brother. Similarly, the very reason piety is a special virtue is because it has a special relation to its object.

The second syllogism also gives us the proper reason or cause why piety has a special relation to its object; it is because its object is to render a special kind of debt.

The objections and St. Thomas' method of distinguishing each can be formulated as follows:

OBJECTION 1

| | | | |
|---------------|---|----|--|
| Major: | Any work which shows reverence and worship to someone | is | a work of charity. |
| Minor: | <i>And:</i> piety | is | a work which shows reverence and worship to someone. |
| | <i>Therefore:</i> piety | is | a work of charity. |

Answer

I *distinguish the major* (middle term):

| | |
|---|------------|
| This work as a <i>sign</i> is a work of charity, | I concede. |
| This work as a <i>specific object</i> is a work of charity, | I deny. |

And I *contradistinguish the minor* (middle term again):

| | |
|---|------------|
| Piety is a work which is a <i>sign</i> , | I deny. |
| Piety is a virtue which has this work as a <i>specific object</i> , | I concede. |

Hence: *no conclusion follows.*

OBJECTION 2

| | | | |
|---------------|-------------------------|----|---|
| Major: | To show worship to God | is | a work of religion. |
| Minor: | <i>And:</i> piety | is | to show worship to God. |
| | <i>Therefore:</i> piety | is | a work of religion (i.e., not a special virtue). |

Answer

I *concede the major*.

I *distinguish the minor* (subject):

Piety *in the wide sense* is to show worship to God, I **concede**.

Piety *in the strict sense* is to show worship to God, I **deny**.

And I *distinguish the conclusion* in the same way:

Piety *in the wide sense* is a work of religion, I **concede**.

Piety *in the strict sense* is a work of religion (i.e., not a special virtue), I **deny**.

OBJECTION 3

Major: To show reverence and care for the fatherland is a work of legal justice, which is a general and not a special virtue.

Minor: *And:* piety is to show reverence and care for the fatherland.

Therefore: piety is a work of legal justice, which is a general and not a special virtue.

Answer

I *distinguish the major* (middle term):

To show reverence and care for the fatherland *as a common good* is a work of legal justice, I **concede**.

To show reverence and care for the fatherland *as the source of our being* is a work of legal justice, I **deny**.

And I *contradistinguish the minor* (middle term again):

Piety is to show reverence and care for the fatherland *as a common good*, I **deny**.

Piety is to show reverence and care for the fatherland *as a source of our being*, I **concede**.

Hence: *no conclusion follows*.

DEFINITIONS

(to be memorized)

1. An **argument** is the product of the third act of the mind by which one truth is known through its dependence on other truths already known.

1) The *premises* or *antecedent* of an argument are these previously known truths, expressed in statements.

- 2) The *conclusion* or *consequent* of an argument is the truth which is known through its dependence on the antecedent, and which is expressed in a statement.
2. The **major term** of an argument is the predicate of its conclusion; the **minor term** is the subject of this conclusion.
 - 1) The *major premise* is that which contains the major term; the *minor* that which contains the minor term.
 - 2) The *middle term* of an argument is that to which the major and *minor term* are compared in the antecedent, and through which these terms are shown to be related.
3. The **syllogism** is an argument in which the middle term is a distributive universal concept.
 - 1) An *enthymeme* is an abbreviated syllogism in which one premise, or the conclusion, is not made explicit.
 - 2) The *induction* is an argument in which the middle term is a list of particulars.
 - 3) The *example* is an abbreviated induction in which the middle term is a single typical case.
4. A **perfect demonstration (propter quid)** is a syllogism whose middle term is the proper cause of the conclusion.
 - 1) An *imperfect demonstration (quia) a priori* is one whose middle term is a remote cause.
 - 2) An *imperfect demonstration (quia) a posteriori* is one whose middle term is not a cause, but an effect.
 - 3) A *dialectical argument* is one in which the premises are only probable, and whose purpose is to prepare the way for demonstration.
 - 4) A *rhetorical argument* is one whose purpose is to persuade to right action.
 - 5) A *poetic argument* is an imitation of human action whose purpose is to dispose the audience for contemplation by the purgation of the emotions.

TEACHING AND STUDY SUGGESTIONS

Unit I: Definitions of Technical Terms

A. *Review:*

A brief review of Chapter I (page 39 ff.) on the poetic and rhetorical use of terms. Test students on ability to apply these to the analysis of stories and poems.

B. *Analysis:*

So far as possible, analyze the textbooks used in all courses during freshman and sophomore years. Make lists of the most important terms used in each of these courses (different committees can work on different books). Try to arrange these terms in some kind of classification. Define each by four causes, and by genus and species.

C. *Use of books:*

Use of encyclopaedia to find more information on the four or five most important terms from each of these courses. Use of library to find books dealing with these terms.

D. *Reading:*

Reading of essays in which author writes about technical subjects clearly and accurately, but with literary color.

E. *Composition:*

Write an essay on the main terms in one of these courses, trying to be clear, and also interesting.

F. *Grammar:*

Review grammar to correct defects found in compositions. *E.W.*, Grade Eleven, Chapters I-IV and exercises, or *E.G.C.*, Parts 1 and 2, can be used for this purpose. They treat of the simple sentences, and problems relating to subjects, verbs, adjectives, adverbs, and pronouns, and their use and agreement.

Unit II: The Forms of Reasoning

A. *The form of syllogism and induction:*

The form of the syllogism (Barbara, Celarent, Darii, Ferio) and of the induction should be mastered (pages 141-146).

B. *Reading:*

Study several essays or speeches and reduce to syllogisms and inductions, taking care always to begin with *conclusion*, then

discover middle term. Select passages from textbooks currently being used by students and reduce short passages to syllogisms and inductions.

C. *Composition:*

After making an outline of a short composition, form a syllogism or induction to prove each topic sentence. Then rewrite composition in smooth prose style. Each syllogism or induction should form the matter of a paragraph.

D. *Grammar:*

Review compound and complex sentences, devices for subordination, and the formation of smooth running sentences (see *E.W.*, Grade Eleven, Chapters V-X, or *E.G.C.*, Parts 3 and 4). Show how such sentences are used to show argumentation, or the *dependence* of one statement upon another.

Unit III: Using Poetic and Rhetorical Arguments

A. *Reading:*

Read *Macbeth* (or some other long play or novel).

1. Try to discover the plot or action of the play and state it in a single sentence. Does it have a beginning, middle, and end? What are they? How does each act and each scene contribute to the movement of the plot? Are any unnecessary? Are there subplots? What is their relation to the main plot? What is the series of emotions aroused by each stage of the plot? Are they brought to a complete resolution or catharsis? What is the universal truth embodied in the story and seen as the play moves to its close? Is the plot probable?
2. Who are the characters? Why is each one necessary to the plot? Does the plot arise from within the characters, or from their situation? Are the characters consistent? Appropriate and lifelike? How does the writer reveal the characters to us?
3. Which speeches of the characters have special interest for their thought? Are the principles of rhetoric obeyed in the construction of these speeches? How do they contribute to or detract from the plot?

4. Study the style and diction of selected passages to see how these bring out the emotion, character, and thought effectively.

B. Writing:

Write a short-story or one-act play, trying to make use of the principles of plot which you have studied to make the story effective. What emotional effect are you trying to produce? What truth of life are you trying to exemplify?

C. Reading:

Read a speech or essay which is rhetorical in purpose, for example, one of the war speeches of Roosevelt or Churchill, or a sermon of Bishop Sheen or Monsignor Knox.

1. State in a sentence the action or attitude which each speaker wishes to produce.
2. How does the speaker present his character to the audience? What sort of an audience is he addressing? What are their emotions or prejudices? Which attitude does he wish to arouse toward himself? What aspect of his character does he show to produce this attitude?
3. What enthymemes does he use? Write them as syllogisms. Why are these chosen for the audience in mind? Why does he leave particular premises implicit? What is the most important argument? Does the speaker anticipate objections of the audience?
4. Study some current *editorials* or persuasive articles in newspapers and magazines in the same way.

D. Speaking:

Give a short persuasive talk on one of the topics studied in the reading, and have the class criticize it on basis of rhetorical principles.

B. Grammar:

Attention to punctuation and good organization of composition (see *E. W.*, Grade Eleven, Chapters XI-XV, or *E.G.C.*, Parts 5 and 8).

Unit IV: Using Dialectical and Scientific Arguments**A. Reading:**

Read current articles on a controversial topic (race relations, disarmament, divorce, etc.). Reduce arguments to syllogisms.

B. Speaking:

Hold a formal debate on the topic, with speeches written beforehand, but delivered without reading. In constructing debate, use dialectical method (page 161ff.), taking care to arrive at definitions of terms, and to criticize opponent's definition of terms. Solve his objections by the use of distinctions.

The teacher may use this as an occasion to develop the topic of *fallacies in reasoning*. (See John Oesterle, *Logic*, pp. 191-204, with exercises.)

A forum on a similar topic may also be held.

C. Reading:

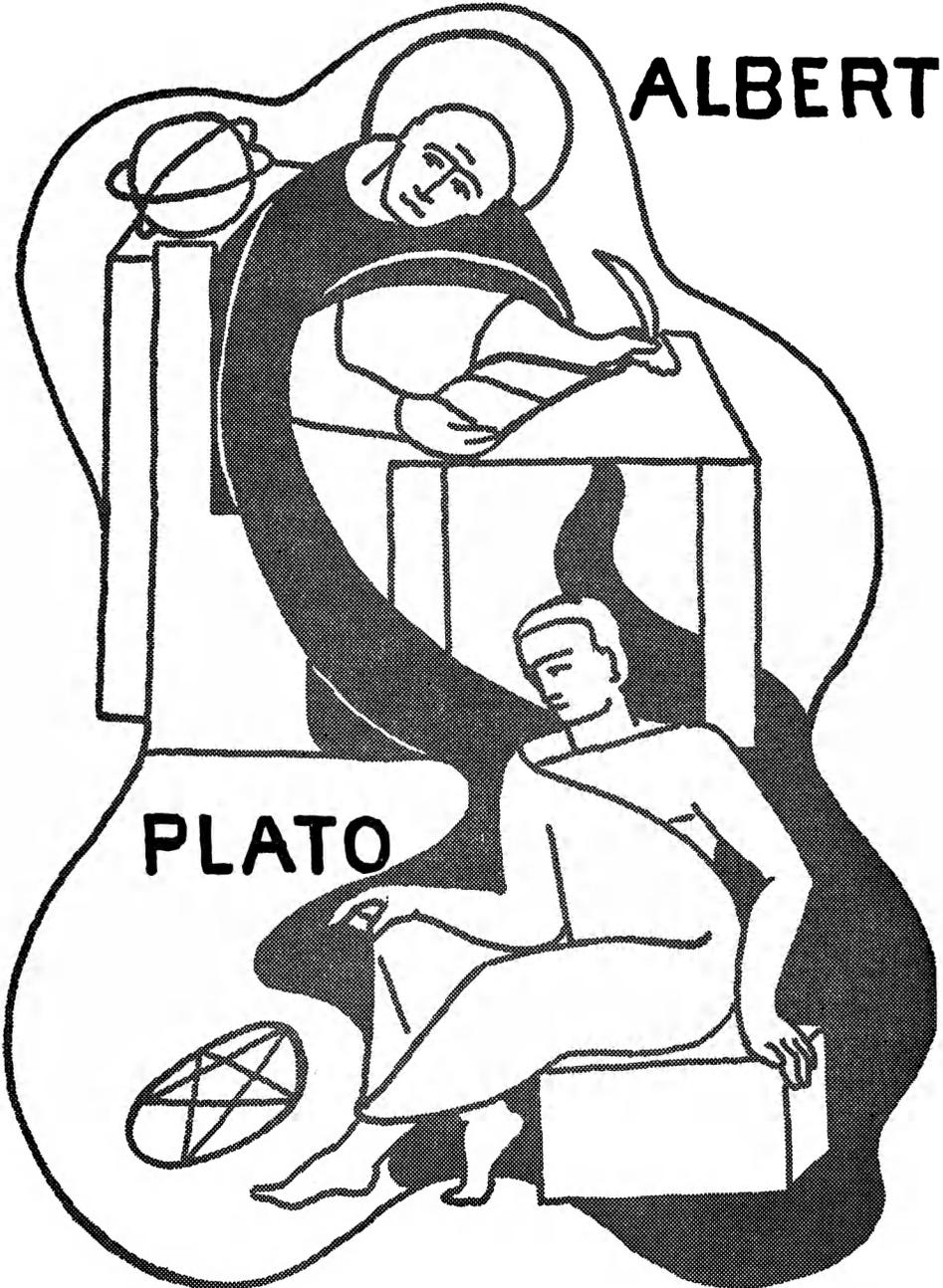
Read an authoritative solution to the above problem presented by a moral theologian, contained in a Christian doctrine textbook or in a more scholarly source. Write out the syllogism of proof. How does the author establish his premises? Are they from authority, or reason, or both? Which are the immediately evident premises? Most of these are definitions. How did the author get these definitions?

Is the conclusion certain? Does it settle all the objections raised in the debate?

D. Writing:

Write a short composition stating the scientific proof of some other conclusion taken from a social science or natural history course, using arguments given in textbook or collateral reading.

ALBERT



PLATO

CHAPTER IV

The Appreciation of Complete Works of Liberal Art

GENERAL RULES

In the preceding chapters we have studied the use of terms, of statements, and of arguments. All of these are used to make a complete work of liberal art, one in which every detail is fitted together to contribute to a single purpose, namely, to make clear to the reader or listener the thesis or central truth which is to be communicated.

In this chapter we will see that all we have previously learned can be used in trying to understand a work of liberal art as a complete whole in which every part serves its purpose.

RULES OF ANALYSIS

From all that has been previously said, it should be clear enough that in analyzing or composing any piece of writing or speaking, whether it be poetic, rhetorical, dialectical, or demonstrative in character, we should apply the following general rules:

1. Discover the author's principal conclusion or thesis.
2. Decide whether the argument for this conclusion is primarily demonstrative, dialectical, rhetorical, or poetic.
3. Decide which are the author's principal terms, and how he has defined them.
4. Decide which are the fundamental statements on which his argument is based, and discover the evidence or authority given for them.
5. Discover the principal arguments for the conclusion and evaluate them.
6. Consider whether or not all these different parts are present, properly balanced and ordered, and whether anything is superfluous.

USE OF THESE RULES

In reading or listening to the composition of another we should begin with a *tentative* answer to the first two questions, saying to ourselves, "I think that *this* is what the author is trying to say, and that he is trying to prove it in *this* type of discourse." We should then see if the details of the work (rules 3 to 5) are consistent with this supposed thesis. If they are not, we must admit that we have probably mistaken the purpose of the author, and we should try another hypothesis. Only after a very serious attempt to find a single thesis which will explain all the details of the work should we blame the author for being unclear or inconsistent. Poor readers and listeners are inclined to blame the author, when it is their own superficial analysis which alone is at fault.

In writing or speaking we should follow the same process. First we should formulate our thesis very clearly and simply and decide which mode of discourse we are going to use to communicate it (rules 1 and 2). Then we should carefully define our terms, state and justify our basic principles, and give our arguments for our thesis (rules 3 to 5). Finally, we should revise our composition to eliminate everything that is unnecessary and to make sure that we have omitted nothing which is needed (rule 6).

The actual writing usually can be done only when we are "inspired," that is, when we feel in the right mood and our imagination

is working well. After this "inspired" draft (which, however, should have been carefully prepared for by preliminary work of research, reflection, outlining, etc.), we must carefully revise and often painfully correct mistakes and strengthen weak points.

SCIENTIFIC EXPOSITION

When we wish to present a truth in the most perfect and certain form, we use a style of discourse which combines dialectic and demonstration, and which aims at being as clear and precise as possible. This is sometimes called the "thesis" or "dissertation form," or "scholastic disputation," because it was perfected in the universities of the Middle Ages and is still used by candidates for higher degrees in our modern universities.

A. The statement of the question:

1. *Rhetorical and poetic introduction:*

a. The use of rhetoric to render the audience:

- (1) *Benevolent*, by showing them what is to be gained by following the argument.
- (2) *Attentive*, by showing them the matter is somewhat difficult.
- (3) *Docile*, by showing them the order to be followed in order to overcome the difficulties.

b. *Poetics* may be used (for example a joke or interesting anecdote) to assist the rhetorical purposes above, or to give a preliminary insight into the solution.

2. *The statement of what is to be proved* (the thesis). We must know exactly what we are trying to prove, and we begin by stating this in as short and precise a form as possible:

a. Statement of thesis (conclusion to be proved).

b. Definition of terms. We must define and justify the definition of all the important terms *in the thesis*, as well as the **middle terms** to be used in the demonstration.

3. *Statement of the principles to be used in the solution.* These are the **premises** or basic statements which contain the terms already defined.

a. Statement of premises.

b. Defense of premises on the ground that they are (1) evident from experience, or (2) confirmed by trustworthy authority.

4. *The opinions held by others on this question.* The opinions should be stated in an orderly way. This is a dialectical procedure, and the purpose here is to show that the problem is genuine, and to contrast the conclusion to be proved with other views so that its meaning will be plainer.

B. The proof:

The proof should be stated in syllogistic form. If the premises used are not the principles stated above in A3, then we must demonstrate each premise by further syllogisms until we come back to premises which have already been established in A3.

C. Answers to objections:

The purpose here is to *confirm* the proof by showing that it is sufficient to meet all the difficulties and to save whatever truth is in them:

1. The opponent should state his first objection and give a proof for his contradictory opinion.
2. The defendant then refutes this objection by *contradistinguishing* or *distinguishing* the objector's proof (see pages 163ff.).
3. The opponent then "subsumes," that is, attempts to refute the defendant's refutation by showing that even if the defendant's distinctions are granted the thesis is still false. Or if he cannot subsume, then he tries a different line of attack on the thesis.
4. This continues until the opponent has no further objections, or the defendant's proof is shown to be inadequate.

This method makes for the most orderly and courteous type of argument. It is as clear as possible and avoids all unnecessary verbiage. Sometimes scholars and scientists are tempted to "sound important" by using many technical terms when nothing is gained but rather clarity and brevity are lost. The form of the scholastic disputation forces both defendants and objector to eliminate all undefined terms and to make explicit every hidden assumption.

Notice that this "thesis form" includes two main types of discourse. The proof is strict **demonstration**. The statement of the question and the answers to objections, on the other hand, are **dialectical**. Such writing is best for scholarly journals or textbooks whose purpose is simply to record exact scientific thinking. The scientist in his work of *research* does not follow this form, but rather that of *dialectic*. Demonstration can be used only when we have already found the

answer to a problem and wish merely to make it clear to others. Dialectic, however, can be used when we are still looking for an answer.

DIALECTICS

In the complete scientific exposition outlined above, dialectics is used to state opinions and refute objections, but it also may be used by itself. In dialectics the author cannot state a definite conclusion or thesis, since he is still looking for a solution to a question. A dialectical composition is based, not so much on a conclusion to be proved, as on a *problem* to be explored.

THE SEARCH FOR TRUTH

We have seen in Chapter III that there are four basic questions or problems with which any investigation can begin:

1. *Does S exist?*
2. *What is the definition of S?*
3. *Is P a property of S?*
4. *For what reason (cause) is P a property of S?*

The first question is settled not so much by argument as by observation. The last two questions are settled by demonstration. Hence the main problem of dialectics is the second one, "What is the definition of S?" Once we have discovered a real definition we will have an immediately evident principle on which to base a demonstration which will answer questions 3 and 4.

The method of search for a definition is the one explained in Chapter II. We are always inquiring about the predicables. We seek the **genus** and **difference** in order to know the **species** or essential definition. If we cannot find this, then we inquire about a definition through **properties** or **contingents**. We also make these inquiries about all **ten categories** (see pages 133 ff.).

We ask such questions either in a *theoretical* or a *practical* way. A theoretical problem has to do with the establishment or explanation of facts, like the questions: "Are there men on Mars? Where did they come from? How do they live?" Practical problems have to do with the choice of means to some end which we seek, like the ques-

tions: "Should we lower taxes in order to increase prosperity? Or should we raise them in order to strengthen our defenses?"

Some problems do not really interest us in themselves, but we need to answer them in order to solve other really interesting questions. For example, we may ask, "Is there water vapor in the atmosphere of Mars?" because that will help us to determine if men could live there. Some problems concern new facts on which we ourselves have no opinion, like the question: "Is there anti-matter?" Sometimes they deal with things on which the experts disagree with common opinions ("Are atomic explosions the cause of so much rain this year?"), or on which experts disagree among themselves ("Are atomic explosions seriously injuring world health?"). Other problems are about things on which most people line up on two sides ("Is communism a good thing?"), or about mysterious matters which are so great that no one really knows how to find a solution ("How old is the universe?").

Ordinarily, however, a dialectical thesis is one which some one proposes and defends in the face of what is generally accepted. Each of these problems remains a problem for us because we have not yet arrived at definitions and principles which are certain and which will permit us to demonstrate an answer. The dialectician attempts to show that the definitions and principles he proposes are more probable than those usually accepted.

We should not suppose, however, that all things are worth arguing about, or that an argument should continue forever. Some things are obvious to men of good will, and if someone refuses to admit the obvious he needs a spanking rather than an argument. Others rest mainly on a question of fact which must be settled by observation or authority, not by argument. Nor is there much use arguing about things which cannot be answered with solid probability, nor about things which can be strictly demonstrated. Dialectical argument is useful only when there are two sides, each of which is seriously probable, and the discussion is really directed to seeing which is more probable.

In dialectical argument, just as in demonstration, we use both induction and syllogism. Induction is more convincing because it is based on particular facts. Syllogism is more useful in refuting argu-

mentative opponents, since it exposes the weaknesses of their reasoning.

THE METHODS OF DIALECTIC

In beginning a dialectical argument we should employ the following four methods:

1. We must find **opinions** that relate to the problem at hand. For example, if the problem under discussion is, "Is there life on Mars?" we must begin by stating opinions on either side of the question.

Opinions can be found by referring to popular belief, or to the statements of experts, or to accepted principles borrowed from some art or profession, or finally they may be original views that seem striking and likely. Some experienced writers and speakers keep notebooks in which they jot down quotations from their reading that state such opinions which might apply to things they may have to discuss with others. These opinions can be drawn from literature or logic, from the social sciences and history, from natural science, or from philosophy and theology. It is best to begin a discussion with some general opinion and then show how it applies to the problem at hand; for example, "Life requires a very carefully balanced environment. Is it possible that Mars should provide such an environment?"

2. We must distinguish the senses of **terms** and carefully define them. We might say, for instance, "When you ask if there is life on Mars, do you mean merely plant life, or animal life, or human life?" It is very important not to let a discussion turn into a mere "war of words." Be willing to accept the terms in which the question has been put by others, insisting only that their meaning be defined. Too many arguments are really about words, not about things.

3. We must investigate the **differences** of things, since many problems arise from overlooking such differences. For example, we should ask, "But is Mars really like the earth? Isn't it much farther away from the sun? Isn't it true that there are no oceans on Mars? Isn't it considerably smaller than the earth?" These differences make it clear that, after all, the argument for life on Mars is not as strong as one might at first suppose.

4. We must also investigate the **likenesses**, which will be easier to see after we have noticed the differences. Likeness is the basis

of definition, of induction, and of argument through analogy. Thus we may argue: "Mars is much more similar to the earth in size and in distance from the sun than many other planets. It has polar ice-caps. Clouds float across it. Patches that look like green vegetation seem to spread on its surface during its summer season. Hence it would seem that Mars has life like the earth."

Thus in analyzing and writing dialectical arguments we can follow a method similar to that used in the complete demonstration, except that:

1. Instead of principles we use opinions.
2. We argue for both sides of the question extensively, bringing many arguments from both sides, since no single argument is conclusive.
3. We conclude to the more probable side, but we admit the inconclusiveness of our proof and show what still needs to be cleared up before certitude will be possible.

THE FORMS OF DIALECTIC

Scientific Research

Dialectic takes many forms. The most perfect type is that of **scientific research**. In research the scientist is already certain about his thesis, not from demonstration, but from observation. Demonstration goes from principles to conclusion, but research usually begins from a conclusion already known and seeks out the principles by which this conclusion can be explained.

1. **The discovery of radium.** For example, Madame Curie, who discovered the marvelous element, radium, began with a conclusion which she knew to be certain from her careful laboratory observations. This conclusion was as follows: "Certain ores are more radioactive than uranium and thorium, the only known radioactive elements." The problem of her research was to find the explanation or cause of this conclusion. (See page 552.)

Madame Curie began her reasoning with certain opinions accepted among experts in chemistry, especially the opinion that there probably exists an element to fit every position in the *periodic table*, or classification of the elements. She then proposed a **hypothesis** which would

be consistent with these accepted opinions and which, *if* it were true, would give the reason for her conclusion. Her hypothesis was: "An element, X, exists which is not uranium or thorium, nor any known element, but which fills one of the gaps in the periodic table and which is highly radioactive."

She then proceeded to *test this hypothesis* by seeing whether it would explain the facts in great detail and be a guide in the discovery of new details. To do this she carefully analyzed the radioactive ore, applying many chemical processes so as gradually to eliminate all other known elements. At last she arrived at a concentrated and highly radioactive substance, X, which behaved like an element. In this manner her hypothesis had stood many tests and had become *highly probable*.

She could have continued this dialectical reasoning indefinitely, making her argument ever more probable, but never arriving at certitude. In this case, however, once she had secured a pure substance, it became possible to drop her hypothesis and replace it by a genuine **principle**, namely, a *real definition of X through its properties*. She defined X (radium) in terms of its atomic weight and atomic number, and thus definitely located it in the periodic table. She was now able to give a **strict demonstration**: the proper and exact cause of the high radioactivity of the ore was the presence of a definite element of known definition.

2. **The stages of research.** Madame Curie was able to carry her dialectic up to the point where strict demonstration became possible. But it sometimes takes centuries before this last stage in research is reached. For example, the Greek and medieval astronomers for some 1800 years worked on a theory of astronomy based on the hypothesis that "the earth is stationary at the center of the universe." They were perfectly well aware that this was *not* certain; but as a hypothesis it was able to explain in a highly probable way all the detailed observations and measurements of the motions of the planets which they were able to make with the instruments they had.

Alternative hypotheses were proposed, but none proved so successful in fitting the facts as that of the astronomer, Ptolemy. Hence scientists made use of this explanation, even though they knew it was not certain. By the time of Copernicus (16th century), however, the

discovery of the telescope and of new facts little by little suggested another hypothesis. Copernicus held that the earth moves, a hypothesis which, in the light of the newly discovered facts, seemed more probable than that of Ptolemy.

Nevertheless, it was not until the time of Newton, over a century later, that the real reason or cause for the earth's motion was discovered, namely, the law of gravitation.* Once this was discovered, it became possible to demonstrate the motion of the earth and the positions of the planets through their proper causes.

The Greeks and medievals were not in *error* about their theory, since they knew that it was only a hypothesis. It is not an error in dialectics to propose a theory as probable, even though it later proves to be wrong. Error consists in claiming certitude when one does not have it, or in denying what has been proved to be certain.

The method of research just described is sometimes called "the scientific method." It is more accurate to call it "the scientific method of *research*," since perfect scientific knowledge is found only in strict demonstration.

3. Proposal of the solution to the problem. After a scientist has been successful enough in his research to arrive at a true demonstration—or at least at a hypothetical one—he should present his proof in the "thesis form." If he is writing for a more popular audience, he will also have to make use of rhetoric and even of poetic discourse, in order to interest his audience and make them receptive and attentive.

The use of vivid anecdotes and examples of a poetic sort make scientific writing pleasant, and they give to the audience a certain insight into the vision of the scientist, even when they cannot perfectly follow his scientific argument. Rhetoric gives variety, smoothness, politeness, humor, appropriateness to scientific writing, and

* There are, indeed, some scientists today who would say that even the law of gravitation is only a hypothesis, and that we can never be certain whether the earth moves or not, nor of any other scientific truth. Their reason for this sceptical position is the fear that if we claim a truth to be certain we will cease to make any more inquiries and scientific research will come to an end. This fear is groundless. We may know that something is certainly true without understanding it with perfect distinctness or clarity, or without seeing its consequences. To know these we must continue our researches. In fact, the establishment of a certain truth is what gives us confidence to go on with scientific study, and forms a firm foundation for further exploration.

adapts it to the background and practical interests of a particular audience. It is very important, however, that a scientist should not be carried away by his poetic and rhetorical style, so as to distort or exaggerate his scientific discoveries.

In reading or listening to scientific thought popularly expressed, we should be on our guard against such distortions. Many people, for instance, suppose that the theory of human evolution is certain because scientific writers have so vividly depicted the "ape-men" supposed to be our ancestors. Such "ape-men" are actually mere hypothesis. It is not science but poetry that has made them seem so real to us. Similarly, medical discoveries are sometimes presented with such striking rhetoric that the public believes a "sure cure" has been found, when the scientific evidence by no means establishes this conclusion. A parade of scientific terms, and an appearance of great "scientific objectivity" is itself sometimes only a rhetorical device.

The Dialogue

Another form of dialectic made famous by Socrates and Plato is the **dialogue**, in which people carry on a conversation, gradually reshaping their views until they approach agreement. In such a conversation there is usually a leader; otherwise it will not proceed in an orderly fashion, since people will tend to shift from one side to the other. The leader should require each speaker to hold to a position as long as he can defend it, and then to admit his error. The dialogue is useful as a way of showing the steps by which the mind moves toward a conclusion. It is not primarily a matter of research, but of teaching.

The Debate

The **debate** is like the dialogue, except that there are two or more parties, each of which holds to a fixed position until the end of the debate. It is used in courts and legislative assemblies and many public discussions, where a third person must come to a decision and wishes to hear both sides of a problem thoroughly explored. The business of the debater is honestly to make out the best possible case for the side assigned him, in order that the truth can be seen. He need not hold that his position is the more probable. However, one should not seriously uphold a position which is known to be false or vicious.

Other Forms of Dialectics

The **symposium**, **forum**, and **panel** are similar to the dialogue and debate. The **symposium** is more like a dialogue, and consists of a number of experts stating views on a general question and then trying to reconcile and synthesize these views by public discussion. The **forum** is a kind of open debate in which many people can speak, or question the speaker. A **panel** consists in a series of statements by different speakers on the same topic. To these we may compare the **interview** or **press conference**, in which questions are put to a single person.

The **essay**, **editorial**, and **column**, although usually rhetorical in purpose, can also be dialectical. This happens in the case where the author discusses a problem and current opinions about it without attempting a conclusive solution, but intending to stimulate thought on the subject.

RULES OF CONDUCT IN DISCUSSION

In all these modes of discussion it is important to preserve certain rules of conduct which prevent the discussion from becoming rhetorical or emotional. Mortimer Adler in his book, *How to Read a Book*, suggests the following cautions:*

1. *"You must be able to say, with reasonable certainty, 'I understand' before you can say any one of the following things: 'I agree,' or 'I disagree,' or 'I suspend judgment.'"*

(Adler points out that a good test of this requirement is whether one can repeat what the other person says in different words.)

2. *"There is no point in winning an argument if you know or suspect you are wrong."*
3. *"You must regard disagreements as capable of being resolved."*

If we can honestly say, "I understand but I disagree," we can then make one of the following assertions:

4. "You are uninformed"; and then we must point out the facts or sources of facts which the other person has neglected.
5. "You are misinformed"; and then we must point out the mistake and give the correct information together with our source.
6. "You are illogical"; and then we must point out the error in logic.

*Quoted by permission of Simon and Schuster, Inc.

7. "Your analysis is incomplete"; that is, the author has not solved all the problems raised, or has not used all the material given, or has not seen all the consequences, or has not made sufficient distinctions. We must point out definitely what he has omitted.

THE PURPOSE OF DIALECTIC

The great test of good dialectics is to ask whether the author has stuck to his problem and explored all the arguments pro and con for the various sides. If he is one-sided, then he has failed to provide us with the help we need to arrive at truth, although we may still profit from him if he has at least stated his own side plainly.

Today we hear a great deal in all professions and in public life about the need for "research," for "creative thinking," for "open-mindedness," for the "ability to discuss," and for the "art of conversation." All of these needs are really a recognition that few people know the art of dialectics by which they could consider all sides of a question fairly and flexibly.

On the other hand, we must remember that the purpose of dialectics is to prepare for demonstration whenever this is possible. Some people like to discuss endlessly, but can never come to a decision. They fall under the condemnation of Saint Paul who mocked at those who "are ever learning yet never attaining knowledge of the truth" (II Tim. 3:7).

APPLICATION OF THE RULES OF ANALYSIS

Chesterton's "A Defence of Patriotism"

In reading an essay such as Chesterton's *A Defence of Patriotism* we might apply our six general rules of analysis (see pages 184-185) as follows:

1. We should notice that the title itself indicates to us the author's thesis or principal conclusion. He is about to defend patriotism, that is, to show that *patriotism is honorable*. A more careful reading will help us to state this somewhat more accurately as follows: *True patriotism, namely, a love of one's country for its spiritual achievements, is honorable*. We may use this as a *tentative* summary of the author's thesis until we have examined the work more closely.

2. We should ask whether the author intends to establish this thesis by poetic, rhetorical, dialectical, or demonstrative arguments. It is easy to see that the work is not the *representation* of an action, or even of thought pictured as the interior action of some character. Hence it is not a poetic work. Nor does it appear that the author is attempting a strict scientific demonstration of this thesis. If he were, we would expect him to proceed by stating technical principles, bringing forward evidence for these principles, and carefully excluding all appeal to emotion.

Indeed, it would seem clear that the work is rhetorical since it is called "A Defence," and it obviously uses a style that has strong emotional appeal. If we interpret it as rhetorical, we can get quite a satisfactory explanation of its details, except for one interesting point. In a rhetorical work we would expect the author to argue his position by enthymemes, but Chesterton is concerned here mainly with a **definition**. His effort is to contrast different ideas about patriotism and to discover the true one.

Hence in spite of its many rhetorical elements, we may suspect that this work is *principally* a dialectical one, since it is characteristic of dialectics *to search for definitions*. This is an example of the fact that many literary works combine two or more forms of discourse. Nevertheless, they will be *principally* one or the other.

3. The third rule deals with the discovery of the author's main terms and how he defines them. Here we should apply whatever we have learned in Chapter II about terms and definitions. It is clear from his thesis that Chesterton's main terms are **true and false patriotism** and **honorable**. He does not actually use the latter term, but it is implied in the very idea of a "defence." Since this is probably a dialectical work, we do not expect the author to give a final definition of these terms, since that is just what he is looking for. Rather we should list the various definitions of **patriotism** which occur in his essay (see pages 169 ff.).

4. The fourth rule leads us to seek the author's fundamental statements or principles and the evidence offered for them. We can do this by making an outline, as we learned in Chapter III; such an outline for Chesterton's essay is given on pages 170f. We see that, as is to be expected in a dialectical composition, there are no strict

principles, but only a series of **opinions** or hypotheses. Chesterton bases these opinions on the common consent of men, on daily experience, and on various analogies.

5. The fifth rule brings us to the very heart of the essay, namely, its argument. We have already discussed this in Chapter III (pages 169 ff. The argument in dialectic consists in showing that *if* we accept the opinion in question, then we must accept certain consequences, which we then compare with other accepted opinions or known facts. Chesterton proposes a series of hypotheses, each of which is a possible definition of patriotism. He then shows that the commonly accepted ideas about patriotism lead us to absurd consequences. Only the definition which he is proposing stands the test. Hence it may be accepted as probably correct.

6. The last rule is to consider whether the author has used all the means required to establish his argument. To settle this we must consider the outline we have already made. Is the composition well ordered, or does it ramble? Are the parts in about the right balance and proportion? Does each paragraph have a unity of its own? What about the length, the continuity, and the variety of the sentences (see Chapter II, pages 107 ff.)? Is the style chosen suitable for the argument? Is the choice of words and figures of speech suitable for the style? Finally, does the rhythm and sound of the words and sentences contribute or detract from the total effect?

When we ask these questions we will see that Chesterton's essay is, on the whole, quite orderly and free from extraneous matter. His style is characteristic in its great use of **antithesis** and **paradox**. He seeks certain humorous effects, and he especially loves alliteration and sonorous sentences. This style is chosen because its light and humorous quality and its paradoxical surprises assist his audience to think about rather serious questions without realizing that they are engaging in dialectics. They suppose the author is joking, writing a little informal essay, while actually he is writing rather deep philosophy.

The more carefully we study the details of this style, the more we will see how wisely Chesterton keeps prodding us to think by surprising turns of thought and expression. When we have seen how every word in the essay contributes to this one effect of leading us

step by step to a better notion of what patriotism really is, then we can say that we have really *read* his essay.

Aquinas' "Whether Piety Is a Special Virtue?"

If we turn now to *Whether Piety Is a Special Virtue?* we can apply the same six rules:

1. There is no doubt of Saint Thomas' thesis. It is put first in question form and then declared in his answer to that question: piety is a special virtue and hence something honorable, just as Chesterton has tried to show.

2. But an application of the second rule shows us at once that Saint Thomas is using a different type of argument than that used by Chesterton. Clearly there is no appeal to emotions, but only to cold reason. Hence the work is neither poetical nor rhetorical. Furthermore, it gives every sign of being an attempt at a strictly scientific demonstration, and not merely a dialectical research, since Saint Thomas gives a positive and definitive answer to the question he raises. On the other hand, there is some dialectic involved here, since the composition begins with a series of opinions that are opposed to the thesis. We have here an example of a **complete exposition** in which dialectic is used to raise a question, but in which the question is answered by a strict demonstration.

3. It is at once obvious that the chief terms used are **piety** and **special virtue**. Saint Thomas defines piety very explicitly by an **essential definition**, showing that its genus is *justice*, and that its difference is *paying the debt of reverence an dservice due to country and parents*. Furthermore, he defines *justice* itself as a *virtue which pays a debt to another*. The term **special virtue** he does not define here, but rather refers back to an earlier section of his work where it has already been defined.

4. The fourth rule leads us to make an outline of Saint Thomas' work and to discover his basic principles. We see that all the parts of a complete exposition are present but in a different order than the usual one (see pages 185 f.). The thesis is stated as a question. Then come the *objections* and "*on the contrary*" which serve as a **statement of the question**, since they give the common opinions. The definition of terms, however, is included along with the proof in the "I answer

that." The reply to objections is in the usual place. We see that the basic principles used in his proof are the **definition of piety** which is immediately evident, since it is a definition derived from experience of human life, and the definitions of justice and of virtue, which he has already defended earlier in the *Summa*.

5. The argument contained in the "I answer that" has already been given in syllogistic form on page 173 in Chapter III, and is logically correct. Moreover, it fulfills the requirements of a strict proof, because its premises are certain and necessary (see pages 173 f.). Hence Saint Thomas' answer is certainly true and provides us with the exact reason (middle term) for the conclusion.

6. In applying the last rule concerning the economy and style of presentation, we cannot help but admire the way in which Saint Thomas has answered a deep scientific question in so brief a space. Nothing here is wasted. Everything is straight to the point. We cannot judge his use of the Latin language, since this is only a translation. Experts in Latin literature, however, greatly admire the purity and simplicity of Saint Thomas' Latin style, although he wrote in the Middle Ages when Latin had lost much of its literary polish. We can see, however, even in translation, his great care to use technical terms that will express ideas accurately, and his avoidance of any display of mere technical jargon.

If we compare the work of Saint Thomas with that of Chesterton, we can see how Chesterton by his use of dialectics, with a certain flavor of rhetoric, helps us to become interested in the problem of what real patriotism is. Once we have been awakened to the problem, Saint Thomas with clear and simple but exact language gives us a precise answer. Thus rhetoric and dialectics prepare the way for scientific demonstration.

R H E T O R I C

THE METHODS OF ORATORY

The Central Point or Thesis

The first step in writing a rhetorical composition is to formulate exactly the main point to be established, that is, to determine what we want to persuade the audience to do. Next we need to consider

the character of the audience itself, the things that appeal to them, and the things they dislike. Finally, we should consider what kind of arguments will be convincing to them.

In reading or listening to a rhetorical composition the process of analysis is the same: What is the author trying to persuade his audience to do? Has he rightly judged their reaction? Is he using the arguments that are effective for this audience?

In trying to discover a rhetorician's thesis, we must remember that rhetoric sometimes seeks to keep the thesis concealed until the audience is fully prepared to accept it. Otherwise if it were presented from the outset the audience might reject it decisively. Thus Mark Anthony begins his speech in *Julius Caesar* by saying: "I have come to bury Caesar, not to praise him," because he knows his audience is in no mood to hear Caesar praised. Only by indirection does he finally come to speak openly in Caesar's favor.

Sometimes, however, if our thesis is not something which the audience detests, but rather something to which they are indifferent, we may want to present it frankly at the start so they will not be suspicious. This *thesis must be something morally good and true*, or the whole work will not be genuine rhetoric, but only an abuse of rhetoric.

The Audience

In order to study the nature of the audience to which some speech has been addressed, we may have to do some research on the history of the period and the situation in which the speech was delivered. In composing a rhetorical work ourselves, we must carefully observe and study the people to whom we are to speak, trying to know as much about them as possible. Here the methods of the social sciences are useful when they can be applied. For this reason advertising firms carefully study the audience to whom they are trying to sell a product by the use of "opinion surveys," "consumer analyses," etc. When such elaborate methods cannot be applied, we should at least make careful inquiries, ask the advice of those who know the audience, and carefully watch the audience reaction during our speech.

The Means of Persuasion

Of all the means of persuasion, none is so fundamental as the impression made on the audience by the **character of the speaker**. Hence we must consider what the reaction of the audience is likely to be to our appearance, manner, and approach to the question. A speaker should realize his weak and his strong points relative to a particular audience, and he should try to counteract any prejudices they may have formed concerning him.

The second mode of persuasion is an **appeal to the emotions** of the audience. We must have a good idea of what will appeal to them and what they will dislike. Frequently a truth put in one set of terms will seem distasteful to them, while the very same truth differently expressed will seem pleasing.

These two means of persuasion, powerful as they may be, only *dispose* the audience to accept a thesis; they do not actually persuade them. Complete persuasion is achieved only through a third means, that of **rational argument**, and it is this which is most characteristic of rhetoric. Rational arguments must be based on premises readily acceptable to the audience, and they must be expressed in a forceful manner through enthymemes, examples, and maxims, rather than through the clearer yet less striking form of the syllogism. In analyzing a rhetorical composition we should pay careful attention to the arguments which it contains, since these are its very heart. Frequently readers and speakers make the mistake of looking only at the style, or the emotional appeal of a speech, and they neglect a study of the arguments in which its chief power really consists.

THE KINDS OF ORATORY

The particular form an argument should take depends upon the type of speech. A speech may be **deliberative**, that is, one intended to lead an audience to make a decision about some future action, (for example, a speech in Congress on a proposed law). Or it may be **judicial**, that is, intended to persuade the audience to make a judgment upon some past action (for example, a speech in a court of law). Or it may be **ceremonial**, that is, designed to make the audience appreciate some present situation or person as honorable or dishonorable (for example, a commencement speech).

Deliberative Oratory

In deliberative oratory the speaker must understand clearly what the public welfare truly consists in. He must also understand the characteristics of particular forms of government, and must be well acquainted with history, geography, war, and economics, so that he can show that a certain course of action in war or diplomacy, or certain policies with regard to civil liberties, business, taxes, etc., are really more or less expedient. Men who are to take part in public affairs, or to stand for public office, must have this kind of wide education in social science, history, and current affairs if they are to be effective speakers. They must especially be able to present their character in a favorable light to the public, and they must know how to establish their arguments by many examples from history and personal experience.

Judicial Oratory

In judicial oratory the speaker is chiefly concerned with crime and its motivation, and with the character of the criminal and of the victims of his crime. He must also be thoroughly acquainted both with the law and with the facts in the case at issue. He will appeal to the emotions of the judge and jury, but he must especially use forceful reasoning in the form of the enthymeme to prove his case or to refute contrary arguments, since judgment about past events frequently depends upon inferences from rather scanty evidence.

Ceremonial Oratory

The ceremonial orator must have an especially good knowledge of ethics, so that he has a profound concept of true nobility of character and is able to show its traits clearly. He makes especial use of the devices of *amplification* to help the audience appreciate the greatness of his subject. It is in this type of speech that beauty of *style* is of the greatest importance, and it is the kind of oratory which most resembles poetry.

Other Rhetorical Forms

History and **biography** (including autobiography, of course) are really forms of rhetoric similar to ceremonial rhetoric, when they are more than a mere recording of facts. The primary purpose of

history is to broaden our narrow personal experience of life, so that we can make more prudent decisions in our personal lives and especially as citizens.

The historian is not a mere propagandist. He seeks to establish his facts accurately on the basis of reliable witnesses, and he seeks to explain these facts in terms of psychology and other sciences, especially of social science. His explanations cannot be strictly demonstrative, because we cannot fully explain singular events, since science deals with what is universal. Hence the historian uses *dialectics* to make a research into the most probable explanations. He also uses something of the skill of the poetic writer in attempting to recreate a vivid picture of the past. The historian's ultimate purpose, however, is to help us to make better judgments about life by following men of great character, and avoiding the mistakes of evil men. This purpose requires the art of *rhetoric*.*

STYLE IN RHETORIC

Although ceremonial oratory and history especially require excellence of style, style is of great importance in all rhetoric. The speaker must select terms which are forceful and which have the right emotional tone for his purpose. He must avoid whatever is technical or pedantic or unintelligible to his audience. His sentences must have a smooth rhythmic flow so as not to impede the course of his thought, and they must be so constructed as to produce interesting variety and appropriate climaxes. Finally, they must be composed with a view to delivery, since there is considerable difference between a speech which is effective in reading and in listening.

The style of ceremonial oratory must be very polished. Judicial oratory must be vivid and striking. Deliberative oratory is less literary than either of these, but clear and practical.

No matter how excellent the content of a speech or its style, it will lose all force if it is badly arranged. We have all become exasper-

*Some believe that history is worth knowing for its own sake as a purely theoretical science like natural science, mathematics, or philosophy. But these latter sciences are worth knowing for their own sake precisely because they are about something *universal* and permanent, and they can arrive at precise and certain explanations. History deals with events which will never occur again and which we can only imperfectly understand. Hence it cannot be of great value for its own sake. It is, however, of immense value when used in the manner described above.

ated with the speaker who wanders from one topic to another, and seems to be getting nowhere. The basic arrangement of every speech is as follows:

1. The **introduction**, which aims at catching the attention of the audience and disposing them well to the character of the speaker.
2. The **statement of the case**, which is designed to put the practical problem clearly before the audience and make them see how important it is for them personally to arrive at the right decision.
3. The **argument of the case**, in which the reasons for deciding in favor of the orator's point of view are brought forth. This is the heart of the whole speech.
4. The **conclusion**, in which the emotions of the audience are particularly brought to bear to reinforce the argument and to leave them with a definite resolution on which to act.

It is obvious that these points are essentially the same as in a complete demonstrative exposition, except that more attention is given to disposing the audience to a good opinion of the speaker in the introduction, and to awakening a strong emotional conviction in the conclusion. The statement of the case and the argument, however, are very different in a rhetorical and in a demonstrative composition, because the demonstration is always trying to bring forward the **exact reason** or cause of his conclusion, while the orator is concerned with the **reason** which will be most *appealing* to the particular audience.

This does not mean, of course, that the rhetorician can use *false* arguments. His reasons must be true and good, but they need not be exact and essential. Thus if I wished to demonstrate that physical exercise is good for health, I would dwell on the fact that our bodily functions are stimulated by vigorous use. This is the precise reason and cause. But if I wished to persuade a fat man to take exercise, it might be more effective to point out that if he doesn't reduce people will laugh at him. This is not the essential reason that he needs to exercise, but it is the one which has the most emotional force.

ANALYSIS OF A RHETORICAL EXAMPLE

In previous chapters we have already given a rather complete analysis of the "Gettysburg Address" (see pages 159 ff.). Here we

will only summarize briefly the steps a skilled reader would take in analyzing it:

1. A preliminary reading would show that the thesis is probably: "You should imitate the patriotism of the dead by finishing the war."

2. This makes it clear at once that we are dealing with a rhetorical work, since it is an attempt to persuade the audience to do something, namely, to imitate the dead by finishing the war. Hence we must judge everything in the speech in terms of this rhetorical purpose: How does it contribute to persuading the audience?

Furthermore, we will quickly see from the contents of the speech that it is an example of **ceremonial oratory**, since it seeks to glorify the dead, but that it contains also in its main conclusion an element of **deliberative oratory**, since it also argues about the course of action to be pursued in the future. This deliberative purpose, however, is kept subordinated to the ceremonial purpose.

Hence we should modify our tentative statement of the thesis so as to bring these points out. The thesis is better expressed, therefore, as follows: "The patriotism of the dead is to be honored today and imitated by finishing their work in the future," for instance, or something similar.

3. We next consider the main terms, which obviously again will be the **patriotism** of the dead and the **honor** due them. We see that Lincoln has the task of defining these terms in such a way as to *amplify* them, that is, to make them seem very great. He amplifies the notion of patriotism (1) by showing how complete was the offering of these men, an offering of their own lives; and (2) by showing how great was the cause in which they fought, to carry on the mission of America of giving an example of free government to the whole world. In this fashion he defines patriotism in terms of its formal cause (reverence of country shown by sacrifice of one's life) and its final cause (to preserve the country in its ideals).

Honor he defines by showing that the honor due is beyond all *words*. This he does by *depreciating* his own words in order to amplify honor. The only fitting honor is **imitation**, the carrying out of the task already begun. Hence true honor is defined as reverence shown not in words but in deeds.

4. Next the reader should try to outline the speech and to see its most significant statements and their basis. We have already done this (see page 101). We will see that Lincoln bases his argument on the principle, accepted by all in the audience, that the United States was founded to carry on a great ideal, the ideal of free government which is worth the greatest sacrifices. He gives as his grounds for this assertion the accepted historical fact that this was the purpose for which the country was founded (first sentence).

A second principle he uses, but keeps implicit, is that this war is being fought by the North to defend the true ideal on which the country is based. Of course a Southern audience would not have accepted this notion. The Northern audience accepts it without question, but Lincoln does not feel that this is the occasion on which to discuss the point. Hence he leaves it implicit.

5 We have also already analyzed the arguments of the speech (see pages 159 f.). We have seen that Lincoln realizes that in establishing his own character before the audience he has to overcome their suspicions of him as a cheap politician. This he does by the simple dignity and lofty character of his speech as a whole, and especially in the grandeur of its opening lines.

Secondly, he uses their emotions effectively. He knows that this audience is bitter, tired, suspicious, and filled with sorrow. Hence he tries to raise their emotions to a higher plane of nobility, to give them a sense of the solemnity of the occasion, its historical significance, and the hopeful future of the cause. The speech begins solemnly but moves to a strong and resolute climax.

Thirdly, he makes use of a simple enthymeme (see page 160) which gives them a rational conviction that if the war for so noble a cause has cost so much already, they must see it through to the end. Thus he leads directly from their sense of the honor due to the dead to the practical resolution he wishes them to form.

6. Once we understand this course of the argument the fittingness of Lincoln's style becomes apparent. The regular rule of ceremonial oratory requires that it have a highly polished style. This is seen in three features: (1) the simple but noble choice of words; (2) the use of figures of speech, but especially of the metaphor of death and rebirth which runs through the whole oration; and

especially (3) in the beautiful rhythm of the words rising to the grand climax of the last sentence. The economy of the speech is notable, and its very brevity makes it have the character of an epitaph or proverb, something that can be easily memorized and retained like a motto. Its arrangement shows a very brief **introduction**, an **exposition** of the occasion, the **argument**, and a brief but powerful **conclusion**.

The more we analyze this speech the more we see that every detail of it contributes to the total thesis and that it is complete in all its parts.

P O E T I C S

FALLACIES CONCERNING POETIC WORKS

In judging a poetic work, whether it is in prose or verse, whether it is in the form of a novel, a play, a lyric, or an essay, we must keep clearly in mind the special purpose of such a work. This special purpose makes it very different from demonstrative, dialectical, or rhetorical works. We should especially avoid the following mistakes, which lead many readers to wrong judgments about works of literature and to a failure to appreciate true excellence.

First Mistake: Divorce from Truth

It is a mistake to think that a poetic work can be a good work of art despite the fact that it presents a false thesis or arouses in us immoral emotions and attitudes. A poetic work, just like demonstration, dialectic, and rhetoric, must present the truth. To use our power of thought and speech to produce something which is false or foolish is a misuse of God-given powers. To arouse immoral emotions or to read a work that arouses them is to place ourselves in the occasion of sin.

Many who make this mistake argue that certain great writers have written very clever works that present falsehood. In answer to this we may grant that an artist can misuse his art if he wills. He then produces a bad work of art as a *whole*, although this or that feature of it may be very good. Our admiration of the good features

of the work should not blind us to its bad features. On the other hand, a work of art is not to be condemned totally because it has some incidental falsehoods or errors in taste or morals. If these are minor and incidental and are not an occasion of temptation to us, we may overlook them. No human work is entirely perfect.

Again people argue that literature must present life as it is, and hence it must deal with falsehood and with vice as well as with what is true and virtuous. This is a most illogical argument. All discourse presents falsehood—not, however, in order to agree with it, but to refute it. Falsehood is used to make the truth more clear by contrast. So in literature there must indeed be a presentation of falsehood and of evil. Nevertheless, the purpose of this presentation of falsehood and sin must be only for the purpose of making truth clearer and goodness more desirable. The emotions aroused by the work must be virtuous and not dangerous, so that sin is never presented sympathetically, although the sinner should arouse our pity, and our fear for our own sins.

The reason for this is clear if we remember that the purpose of the poetic work is to purify the emotions so that we may be recreated by a vision of the truth. If the work arouses irrational emotions and presents a falsehood, it cannot give us this recreation.

Second Mistake: Divorce from Art

The second mistake is to think if a work does present the truth and arouse good emotions that it is a good poetic work. People who do not make the first mistake above frequently fall into this second mistake.

Any work of liberal art, whether it be poetic, rhetorical, dialectical, or demonstrative, must present truth; but it is not a good work of liberal art merely because its thesis or conclusion is true. An argument may have a true conclusion and still be a weak, or even a false, argument. Rather an argument of any sort is good when it has (1) good logical form, and (2) it presents the true middle term or cause of the conclusion.

In a poetic work the correct logical form is that of an **example**, and the middle term in this example is *a story which produces a catharsis of emotion*.

Granted that a poetic work presents a truth, it will be a good or bad poetic work insofar as it presents this truth in terms of such a story. If a poetic writer is a poor storyteller he is a poor writer, no matter how true and good may be his thesis. Some religious magazines are filled with pious stories and poems which have a good moral but which are very poor literature and which are quite unsatisfactory as recreation.

Third Mistake: Digesting Plot

A third mistake is to think that since the story or plot is the soul of the work that a poetic work is good if it has a good story. Some people think that if they read a digest of a novel, or even a summary of its plot, they have saved a great deal of time and got at the real heart of the work. This is not true of *any* work of liberal art. If it is a good work of art, every word in it has a purpose, and a mere summary of any argument does not do it justice.

But this is *particularly* true of a poetic work. The work does not achieve its purpose of purifying our emotions and leading us to a vision of truth except by helping us enter into the very experience of the story itself. We must not only "hear about what happened," we must seem to live it ourselves. For that reason the way in which the story is told, the descriptions, the characters, the dialogue, the choice of words and figures of speech, the sound and rhythm of the sentences—all are important. The story or plot is not a mere summary, it is found in every detail of the work and in every feature of its style, just as our soul is found in every part of the body to which it gives life.

The reader who reads only for the story and does not appreciate the style and art with which the story is told is missing most of its true recreative value. This is why he finds little enjoyment in the lyric, essay, or didactic poem in which the story element is less prominent, and character, thought, or style is more important.

Fourth Mistake: Fixed Forms

The fourth mistake is to approach a poetic work with a preconceived idea of its form. Some critics have attempted a neat classification of the forms of poetic work as if they were natural species, and

have laid down "rules" for each form. In the seventeenth and eighteenth century the *neoclassical* school of criticism attempted to impose such rules. They even considered that the great Shakespeare was a barbarian because his works failed to fit their models. Against this attitude a reaction called *romanticism* set in which stressed the idea that there are no rules in poetry, and that the artist is free to create as he pleases.

Today the romantic attitude is still the dominant one, and yet many fine writers and critics are again emphasizing that a poem must conform to the rules of some form if it is to be a real work of art.

In order to balance the classical and romantic positions, we should remember two points:

1. A poetic work represents (or imitates) nature; that is, it tells a story about human life and it will be successful in presenting such a story only if it is true to life. Hence no artist is free to create anything he pleases; he must design his work so that it achieves this purpose of presenting nature. The neo-classical critics realized this, and they believed that the great Greek writers had discovered how to present life truly; in consequence, they thought that the types of literature invented by the Greeks were the best, and they tried to discover the rules on which they were based, just as in architecture we still study the Greek temples to discover how they achieved such marvelous balance and proportion. It remains true that in developing a taste for literature, or even the ability to write, one should begin by a careful study and analysis of great works of literature invented by the Greeks and by later writers who attained success in their art. In this way the poet must be the pupil both of nature and of past artists.
2. Nevertheless, in imitating nature the artist can invent an infinite variety of ways to represent it. Human life is vastly complex, and no work of art can present the whole of it. Each artist sees some aspect of life which others have missed and he must design his own form in which to present that aspect. Even if he uses some well-recognized and fully developed

form he will have to modify and adapt it to make it serve his special purpose.

Hence the forms of art and the rules of writing can never be fixed once and for all; they are constantly being added to and developed. We must approach each new work with an open mind. This is what the romantics pleaded for. They, too, spoke of a "return to nature," because they believed that by imitating only the authors of the past writers lose touch with human life itself. The mistake of romanticism, however, (and it was a greater error even than that of the neoclassicists) was to think that nature is known by us only through our subjective impressions and emotions. A romantic poem is really not about nature, but about the poet's feelings about nature. This view of life denied the power of the human reason to understand the true nature of man and of the world, and gradually led to a type of literature which pictures life as without order or meaning. Realism is only the other side of romanticism, since the realistic writer simply records what he sees without trying to understand it.

POETIC FORMS AND METHODS

Differences in Manner

A true theory of poetry requires the poet to be true to life as it really is—not merely to its appearances or his reactions to it; but it leaves him free rein to invent new forms and methods by which to present this truth about life. In criticizing a work we should try first of all to discover this basic idea, which is the soul of the work. If it is false, then the work as a whole is bad, and nothing remains but to consider such excellence as its parts may exhibit. If the idea is true, then we must try to see if the artist has invented or made use of the right form in which to represent this truth down to its last details of word and sound.

In discovering this basic idea or form which is the plot or soul of the work, we have to proceed by stating it in the form of a hypothesis, and then see if this hypothesis can explain all the details of the work. Sometimes it is useful to try several hypotheses and

find out which best explains the work. In doing this it is a help to be acquainted with the forms of poetic work which have already been invented and perfected by previous authors, but we should not try to force the work we are criticizing into one of these molds. Rather we should try to see why the author has modified the recognized forms in order to present his own idea more perfectly.

Differences in Method

Related to differences in manner are differences resulting from the freedom with which the author deals with his materials. Thus a story may be **historical** when the author draws the material from actual history, or **purely fictional** when he invents it all. He may treat this **realistically** by describing daily life in a literal fashion, in which case he may use either an *impressionistic* or a *documentary* technique, according as he builds up his picture from little fragments or from a detailed description; or he may write in a **romantic style**, that is, coloring his story with the marvelous and imaginary, or at least with the heroic and unusual. He may also present his story in a **literal way** by saying directly what is intended; or **figuratively**, either by making use of occasional *symbolism* (metaphors), or by an extended *allegory* or *parable*.*

Differences in Length

A third classification is according to the *magnitude* or length. Thus the trilogy, the novel, the novelette, and the short-story differ principally in their relative length. Along with this can be grouped the classification of works according to their **completeness**. Thus we can speak of *major works*, like the play, the epic, and the novel, all of which are long, deal with all the objects of imitation (plot, character, thought), and use a rich variety of means; and *minor works*, which limit themselves more narrowly. Also we can speak of *sketches*, *essays*, *descriptions*, and *experimental studies* which do not aim to present a complete and finished work.

*An allegory is a story which has a hidden meaning corresponding to almost all of its details. A parable has a hidden meaning also, but one which has only a general correspondence between story and meaning, the details not requiring any special interpretation.

Differences in Form

The third classification just mentioned is closely related to a fourth. This is the most important and fundamental classification, because it is based not merely on the matter and manner of the work, but on its object or form.

Classification of Poetic Works

I. The most obvious classification of works is with respect to their *matter* or means employed:

1. **Works in verse:**

a. In *free-verse*:

b. In *meter*:

These can be subdivided according to the kinds of meter, and the kinds of stanza forms used; for example, *blank verse*, *rhymed verse*, *iambic pentameter*, *quatrains*, the *sonnet*, etc.

2. **Works in prose:**

These also could be subdivided according to the *style* of prose, as *poetic prose*, *simple prose*, etc.

3. **Works which use additional means:**

Thus the words can be *set to music*, and they can be intended to be *performed*, either by reading, or by acting on the stage with the stage-setting (spectacle), or as movies or television. Thus the *opera*, the *drama*, the *movie*, the *reading* make use of the different combinations of means.

II. A second classification can be made according to the *manner* or method of presenting the story:

1. **Dialogues:** in which the story is told exclusively through *dialogue*. When these are intended to be performed they are *plays* or *dramas*.

2. **Narratives:** in these works the story is *recounted*. Most narratives, of course, also include reports of dialogues. A narrative may be told:

a. In the third person; this is the common way.

b. In the second person, such as a story related through *letters*.

c. In the first person; for example, a story told as an autobiography.

A cross-division which relates to *manner*, but which can be found both in dialogues and narratives is:

- 1) Stories told in straight chronological order.
- 2) Stories told by "flash-backs."

III. The third classification is based on the *object* or *form* of the work:

1. The work may emphasize the **plot**: (plays, novels, epics, short stories, ballads).
 - a. The plot results from the *deliberate choices* made by the characters. This may be called a **dramatic plot**, since the most crucial and agonizing situations result only when human decisions are involved. This dramatic plot may be either:
 - (1) **Tragic**: in the tragic dramatic plot the chief character is tempted to sin through *pride* and thus bring upon himself and society the most serious consequences. *Pride* is the sin by which man rebels against God and the order which he has set in the universe. It is opposed to the virtue of *humility* by which man acknowledges that he is subordinated to the common good. Two main types of tragic plot have been developed:
 - (a) The *Greek tragedy* in which the hero sins by pride and is brought back to humility only through an ultimate punishment. Shakespeare's *Macbeth* and *Julius Caesar* are modifications of this type of plot.
 - (b) The *Christian tragedy* in which the hero conquers the temptation to pride, but only at the price of enduring the suffering which is the punishment of pride. The life of our Lord is the most perfect model of this plot.
 - (2) **Comic**: in the comic dramatic plot the chief character is tempted not to pride but to the lesser sin of *vainglory*. Vainglory is not rebellion, but an inordinate desire for the good opinion of others. It is opposed to the virtue of *magnanimity* or nobility. The vainglorious man assumes a dignity which is not really his and thus appears ridiculous and laughable, but the consequences of his error are not serious. Two types of comedy also have been developed:
 - (a) The *Greek comedy* in which the chief character assumes a false dignity but is finally exposed as

ridiculous, and true human dignity is vindicated. Moliere's *The Bourgeois Gentleman* is a good example.

- (b) The *Christian comedy* in which the chief character overcomes the false standards of the world by true magnanimity of character. The great Spanish novel, *Don Quixote*, is a famous example.
- b. The plot results from the circumstances in which the characters are placed. A plot of this type may emphasize either:
- (1) The *external* difficulties which the characters must overcome and then we have the *adventure story* in which the interest is in the unusual external actions. The Greek epic, *The Odyssey*, and Stevenson's *Treasure Island* are examples. The "western" story, science fiction, mystery stories, war stories, etc., belong to this class.
 - (2) The *internal* sufferings of the character in which the interest is mainly *psychological*. George Eliot's *Silas Marner* is an example.

These last two types of plot may have something either of the tragic or the comic about them, but they cannot be strictly either tragic or comic since the truly tragic and comic depend on the moral choices of the characters. They also may be presented as novels, plays, epics, short stories, narrative poems, etc.

2. The work may emphasize **character**:

- a. The *biography*. This is more properly a **rhetorical** form, as we have explained above (see page 202), but even when the picture of a character is rhetorical it requires a great deal of poetic art to present it vividly. The interest is not in some action, but in character. It may be presented as a series of story episodes, or sometimes in the form of *monologue* or *dialogue*, as in Browning's so-called "dramatic monologues."

The distinction between tragic and comic can be reflected in character study:

- (1) There is a tragic tone when ideal men and women are portrayed. Plutarch's *Parallel Lives*, Sandburg's *Life of Lincoln*, and Willa Cather's *Death Comes for the Archbishop* are examples.
- (2) There is a comic tone when a ridiculous character or group is exposed. This is ordinarily a *satire* as in many

of the novels of Dickens, Thackeray, and Mark Twain. Related to satire is the *pastoral*, or contrast between the simple life of the country and the vicious life of the city, of which the *Book of Ruth*, *The Deserted Village*, and *Snowbound* are examples.

- b. *Lyric poetry* (and also some longer poems similar to lyrics) which portrays the transient states of character known as *emotions*. All poetic works involve emotion, but emotion is at the center in the lyric; hence the lyric is usually in verse, since this best expresses intense feelings. There are many types of lyrics, but they might be grouped as follows:
 - (1) The writer expresses the way in which his emotions are aroused by:
 - (a) a scene of beauty (or even of horror). This is *descriptive poetry* such as Pope's *Windsor Castle* or much of the poetry of the English romantic poets.
 - (b) a person or event. Thus we have *love poetry*, the *elegy*, etc. Shakespeare's *Sonnets* are a famous example.
 - (2) The writer deliberates about some action. This might be called the *soliloquy* and is frequently used in plays. Many of the lyrics of the so-called Metaphysical Poets of the 17th century are of this type.
3. The work may emphasize **thought**: *didactic poetry* and *prose*. Such work is hard to distinguish from rhetoric. If it is truly practical and leads to positive practical conclusions, it is rhetoric; but if its purpose is rather contemplative, leading us to be emotionally reconciled with life, then it may be poetic.
 - a. The *essay* in prose or verse, and sometimes the *letter*, develops some one theme in an informal or formal manner. The essays of Addison and Pope's *Essays on Man* are good examples.
 - b. The *philosophical poem* of greater length and complexity such as those of Wordsworth, or even Dante's *Divine Comedy* (which has something of the epic character but rather belongs here).
 - c. The *dialogue* or *soliloquy*, like those of Plato and Augustine which are not mere character studies.
 - d. Short poems like the *proverb*, *epitaph*, *epigram*, etc., in which thought is the dominant feature.

ANALYSIS OF POETIC WORKS

The Plot

After we have found the approximate form of the work to be criticized, we should try to state its plot in a single sentence. If it is a work in which plot is emphasized, this will at once give us the central idea of the whole work. If, however, character or thought are emphasized, the plot may be reduced to a minimum. In a lyric poem, for example, the plot will probably consist simply in the stages of emotion which are expressed. In a didactic work it will be the successive stages of thought and the sentiments which accompany them.

Keeping this tentative statement of the plot, we should ask if it is truly poetic in character; that is, is it a single vivid, typical example which expresses a universal truth and produces a catharsis? In deciding this we must ask if it is complete, unified, and probable (see page 150). We should also divide it into its beginning, middle, and end, and the middle into its various episodes. If in attempting to do this we find that the plot appears defective, we should re-examine our tentative statement to see if perhaps we have mistaken the author's real purpose. Only when we have seriously tried to find a complete, unified, and probable plot, should we conclude that he has failed.

We should also consider whether the magnitude or length is sufficient for the completeness of the plot, or whether it is unnecessarily long. In examining the plot we must also consider the other objects of imitation. How many characters are there? What is the nature of each? How do they contribute to the action? Are they consistent, life-like, and appropriate to the plot? If it is a work in which character is emphasized these questions will be the main basis on which to judge the work.

As to the thought, we must ask whether it follows the rules of rhetoric and at the same time maintains a contemplative and emotionally moving tone so as to be genuinely poetic.

Other Questions

After these questions that relate to the *object* of representation, we should consider the *manner*. Has the author rightly chosen the form of a play or is it more suited for a novel? Is dialogue used effec-

tively? Why has he chosen to present it in first, second, or third person? Why has he chosen a realistic or romantic tone, etc.?

Lastly we come to the *means*. Here we have to consider the writer's consistency of tone, his choice of words, his use of description and figures of speech, and the suitability of his work to be performed or to be set to music, if that is the intention.

After this careful analysis of the work we may ask ourselves if the author has abused his art by using it for an unworthy purpose to present what is false or dangerous. Finally, this analysis should be only the preparation for our own experience and enjoyment of the work.

The Experience of Poetic Works

In the actual experience of a work of art, all the points of which we have spoken are blended together into a unified whole. We are able to achieve this only when we have developed *good taste*. For a person of good taste the process of analysis of which we have been speaking becomes second nature, so that there is no need to think of it; only the beauty of the work is present. There is little use in learning rules of literary criticism unless we use them so frequently that they become second nature. Reference to them, however, will be useful in approaching new and unfamiliar types of works, and in discussing works with friends. Literary works are a fitting topic of discussion since such discussion recalls delightful experiences and helps us renew the refreshment we received from these works. It also helps friends to open up their own souls to each other, since it is in the appreciation of beautiful works that our gifts and beauty of soul appear.

AN EXAMPLE OF POETIC ANALYSIS

The Kind of Work

In reading the "Concord Hymn" we might apply our six rules in something of the following manner:

1. We gather first that the central idea of the work is that "patriotism is often forgotten but not by God." This is another way of saying that "patriotism is to be honored as a virtue," much the same

theme as we have found in the demonstrative, dialectical, and rhetorical pieces we have already analyzed.

2. We should not jump to the conclusion that this work is "poetic" merely because it is a short work in verse. Many so-called "poems" are really rhetorical or even scientific works. In order to decide if it is a rhetorical or poetic work, rather than scientific, we must ask ourselves if it has an emotional as well as an intellectual appeal? It is clear from the writer's care to speak in concrete and imaginative terms that he is trying to move us emotionally as well as intellectually. Hence the work is either rhetorical or poetical. If it is rhetorical it must be aimed at getting us *to do something*.

We see in fact that the author has indicated that we ought to honor the dead, just as did Lincoln in his "Gettysburg Address." But a more careful examination will show that while Lincoln is intensely practical in his approach, Emerson is content rather to help us appreciate and contemplate the beauty of patriotism rather than to urge us to do anything about it. This is apparent especially from the tone of the last stanza. Hence we can safely say that this probably is a poetic work.

It does not, however, have any obvious exterior plot. The story which it tells is largely an *interior* one, since it is not an account of the battle of Concord, but rather the poet's reflections concerning that battle. Hence we must be dealing with a lyric or didactic poem in which plot is reduced to a minimum. Analysis shows, however, that thought is not very central in this poem, since Emerson does not develop intellectual reasons for his conclusions, but rather emphasizes *emotional* reasons, namely, our sense of shame at forgetting what the dead have done for us.

Hence it would appear that we are dealing with a lyric poem of the type that represents a poet's emotional reaction to an event, in this case the occasion of erecting the monument. We see, too, from the sorrowful tone, that we are dealing with the kind of lyric called the *elegy*.

The Argument of the Work

Our attempt to appreciate the poem, therefore, must consist in an effort to see how the writer has made us share in his emotional

experience, an experience which ended in a deeper realization of the universal truth that patriotism is a noble and honorable thing.

In applying rule 3 (discovery and definition of terms) and rule 4 (basic statements and their source), we must remember that in a poetic work abstract statements and ideas are replaced by concrete **objects of representation**. Thus we see that Emerson does not write about "patriotism" or "honor," but about the minutemen, who are an example of patriotism, and the Concord monument, which is an example of honor. Hence in poetic works rules 3 and 4 can be applied along with rule 5 (argument), by inquiring about the objects of representation, namely, plot, character, and thought.

The plot here consists in the poet's gradual realization of the honor due to patriotism through an emotional experience. We see that it is *unified* because each stage of the poem leads up to this final realization. It is *complete* since it has a *beginning* in the first stanza with the poet's mental picture of the battle which took place years before on the spot on which he is standing, a *middle* in his realization and shame at the neglect and forgetfulness of men shown in the second stanza, and his determination to set up the monument in the third stanza, and finally an *end* in his prayer to God, wherein he realizes that true honor is with God who cannot forget. This is complete, not only as a thought, but as an *emotion*, since the awe and shame aroused in the poem come to rest in the prayerful joy and reassurance of the last stanza. In this way there is a catharsis of the emotion. The plot is also *probable*, for this succession of emotions comes from the realization of a great truth, each step leading naturally into the next.

This argument or plot is made up of the several stages of thought and emotion which constitute, as it were, the basic **statements** of the poem. Thus each stanza can be summarized as a single statement. The ground for these statements is to be found in the poet's experience communicated to us in the poem by concrete, vivid pictures. These pictures serve to define the terms of the poem. Thus "patriotism" appears in the poem in the vivid picture of the minutemen standing at the bridge "with flag unfurled." "Honor" appears in the poem in terms of three actions: men forget the dead, they remember and

erect a monument, and finally they pray to God. The poet defines each of these by his use of exact description and of symbol.

6. Finally we must see how the poet has used words, imagery, symbols and other figures of speech, and the sound of his words and sentences to represent the foregoing objects. We have already seen (see page 116) how well Emerson has used all these means of representation to produce his work. It is only when we see that every word and every syllable has been chosen with care to bring before us this single emotional experience in order for us to appreciate a great truth that we will truly appreciate this poem.

In a novel or drama the plot would probably be much more prominent, and require more careful analysis, than in a lyric of this sort. Similarly, in a didactic poem we should have to devote much more attention to the play of thought. But in all cases the same objects of representation and the same means of representation will be present in different proportions.

DEFINITIONS

1. A **literary genre** (literary type, or form) is a commonly accepted grouping of literary works which significantly resemble each other in form or matter.

Note: It has been explained in the previous chapter that such types are not fixed natural species, but are groupings of highly individual objects, and that an artist may invent new types or variations of these types. The following definitions, therefore, are *nominal* rather than real definitions.

2. A **complete demonstration** (or "thesis form") is the presentation of a proof for a definite conclusion, preceded by an introduction in which the terms of the conclusion are defined, the importance of the problem explained, the principal opinions about it listed, and the proper principles of solution manifested, and followed by a reconciliation or refutation of opposing views by means of the art of distinguishing terms.

3. The **dialogue** is a dialectical exchange between two or more persons aiming at the clarification of a question and the establishment of principles for its solution.
If the parties defend set positions which are formally opposed it is a **debate**, and if this debate is open to voluntary participation it is a **forum**. If the positions are not formally opposed, then it may be called a **symposium, conference, or panel**.
4. The **essay** is a short prose composition (although it is sometimes in verse) which may be in any of the four modes of discourse. When collected in topical order it is a **journal**.
5. **Deliberative** or political rhetoric is intended to lead an audience to make a decision about some future action; **judicial** or forensic to make a judgment about the merits of a past action; **ceremonial** or occasional (*epideictic*) to evaluate some present person or situation as honorable or dishonorable.
6. **History** and **biography** as a literary form pertain to rhetoric since they aim to persuade us to act in accordance with a wider experience of human vice and virtue, but the establishment and explanation of facts requires a skillful dialectical method, and a knowledge of the sciences.
The **autobiography, "profile," memoir, diary, and confession** are special forms. The **character sketch** may also be typical rather than individual.
7. The **epistle** or letter is an essay written to a particular person.
8. **Tragic literature** is a representation of a heroic action in which human virtue is tested by the most serious trials that expose human pride and thus produce a catharsis of sorrow and fear ending in a serene contemplation of the divine order in the world.
9. **Comic literature** is a representation of human action in which human vainglory is exposed by ridiculous and not serious situations so as to produce a catharsis of any unseemly emotion ending in a delightful contemplation of human dignity and social order.
10. A **tragedy** is dramatic imitation of a serious and complete action in language appropriately rich which by incidents arousing pity and fear produces a catharsis of these emotions.
11. A **comedy** is an imitation of an action which is complete but not serious in language appropriately rich which by incidents ex-

posing the ridiculous produces a catharsis of the unseemly emotions by which men are made ridiculous.

12. An **epic** is like the tragedy, but *narrative* not dramatic in form.
13. The **comic epic** is like the comedy, but *narrative* in form. When it parodies the style of the epic it is a mock-epic.
14. A **romance** is drama or narrative in which the marvelous in love or adventure is emphasized.
15. The **farce** is an extravagant comedy, the **melodrama** an extravagant romance, the **parody** an extravagant imitation of another work of literature.
16. A **mystery play** (Middle Ages) is one based on a mystery of the Christian religion, while a **miracle play** is one based on a miraculous incident in the life of a saint.
17. A **myth** is a narrative which seeks to explain historical, theological, natural, psychological, or moral truths in a *metaphorical* fashion. **Fairy-tales** are myths in which Christian writers replace the pagan gods by "little people." **Fables** are stories in which animals or even inanimate objects are personified. A **folk-tale** is any story handed down by tradition.
18. The **parable** is a narrative in which the things actually narrated, taken as a whole, are a metaphor for a hidden meaning. When this comparison extends even to details, the narrative is an **allegory**.
19. **Proverbs**, **epitaphs**, and **epigrams** are short statements of moral truth made striking by some figures of speech. When collected to form an extended work they are **wisdom literature**.
20. The **novel** is any longer narrative in prose. Most typically the novel is a **comic epic** in prose, but frequently it is tragic, or romantic, or even didactic, or it emphasizes the description of character.

Special forms of the novel are the *picaresque* (comic and adventurous), the *historical romance* (making use of historical material), the *realistic*, *naturalistic*, *social protest* novel (descriptive and ethical in purpose), the *mystery* and *murder* novels (in which the discovery of the crime is the chief element of the plot), the *horror* novel or *Gothic* novel (melodramatic and sensational), and various types of novels in *series*.

21. The **short-story** is like the novel but it does not treat an action which is truly complete, but rather an episode. In verse it is usually called merely a *short verse-narrative*.
22. The lyric poem is a short work in verse which approaches the nature of music since it principally represents emotion, that is, a transient state of character.
23. An **elegy** is a lyric representing sorrow for the dead or commemorating past happiness.
There are also *patriotic* songs, songs of *conviviality* (drinking songs, etc.), *wedding songs* (*epithalmia*), *love songs*, and *comic songs*.
24. The **soliloquy** is a lyrical poem or speech in which the character dwells on his own thoughts and feelings in a reflective mood.
25. The **ode** is a lyric of more elaborate form written in praise of a person, ideal, or thing.
26. The **ballad** is a lyric which makes use of narrative. The **dramatic monologue** is a lyric which resembles an episode of a play.
27. The **descriptive poem** is a lyric (sometimes, however, rather long) in which emotions are shown through the description of nature.
28. A **pastoral** (ecologue, bucolic poem, idyl) is a poem which contrasts the virtues of the simple country life or of ancient times with modern luxury and vice.
29. A **didactic** or **philosophical** poem is one in which the element of thought is emphasized in the representation, rather than plot or character.
30. The **sonnet** is a lyric in 14 lines of iambic pentameter verse divided into a contrasting octet (8 lines) and a sextet (6 lines).
The definitions of other verse forms and of the complicated "French forms" of verse will be found in the books mentioned in the bibliography.

TEACHING AND STUDY SUGGESTIONS

The principal task of the first semester should be the preparation of a documented term paper; of the second semester, the writing of an essay in literary criticism, or an original literary work with a self-criticism.

Unit I: Scientific and Dialectical Discourse (pp. 183-198)**A. Reading:**

The student should read several *essays* and magazine articles with a view to contrasting methods of treatment. He should then choose a topic for a term paper and prepare a bibliography of works to be read in order to gather material for writing on this topic.

B. Composition:

The student should make an outline of the essay or term paper to be written, giving careful attention to its logical completeness and following the form of the exposition given on pages 185-186. (See also *E.G.C.*, pp. 377-440 and *K. and D. IV*, pp. 198 ff.)

C. Speaking:

The student may present a brief preliminary talk on his topic based on the outline already prepared, making a special effort for clarity. The class should raise questions and objections, which can then be incorporated in the final paper.

A debate, symposium, or forum may be planned by a committee which will make use of the material of these talks.

D. Grammar:

During this year there should be diagnostic work on grammar. It is supposed that the entire theory of grammar has been covered in previous years so that after diagnosis of the individual student's defects by the teacher, the student should be required to review these problems himself. In preparing the outline of the term paper special insistence should be placed on parallel sentences and correct punctuation. (See also the section on argumentation in *K. and D. IV*, pp. 240 ff., etc.).

Unit II: Rhetorical Discourse (pp. 198-207:)**A. Reading:**

Reading with special attention to style. If English literature is being read during this year, compare Elizabethan, neoclassical, romantic, Victorian, and contemporary style. If American literature is being read, then consider, for example, the difference in style between Washington Irving, Hawthorne, Melville, and Emerson on the one hand, and a similar group of contemporary writers on the other.

B. Composition:

The student should rewrite the formal term paper as a popular talk aimed at a particular audience. He should consider how to keep the clarity of his formal presentation while gaining in color and interest. (See *K. and D. IV*, p. 33 ff. on exposition).

There should be class discussion on the problems of analyzing an audience, and of concealing the rhetorical appeal.

C. Speaking:

The student should deliver his paper as a short speech. There should be discussion of the difference between written and oral style, and the problems of expressive delivery.

D. Grammar:

Review should concentrate on sentence structure and variety. (See *E.G.C.*, pp. 11-19 and *K. and D. IV*, pp. 240-281).

Unit III: Poetics: Narrative Forms (pp. 207-221):**A. Reading:**

Discussion of the drama, epic, novel, short-story, and short verse-narrative. The principal theme of discussion should be to show the organic unity of each work provided by the action and catharsis. The characters and thought should be shown as required for the action. Then the use of language, symbolism, meter should be shown functionally, not as a mere series of "beautiful passages" or rhetorical figures. The difference between the narrative forms in the subject selected and its treatment should be thoroughly explored.

B. Writing:

The student should write a critical essay on a single work showing its organic unity. An effective device is to ask why the totality of the work would have been injured by a different treatment of its various features.

Alternatively the student may attempt to write an original work, with a short essay in self-criticism explaining why he has constructed his work in this way.

C. Speaking:

Students should read scenes from plays and explain and discuss their efforts at interpretation. Special attention should be

given to the art of reading aloud and its use as family entertainment.

D. Grammar:

See *K. and D. IV*, pp. 133 ff. and grammatical problems in narration. On appropriate vocabulary, review *E.G.C.*, pp. 18 ff.

Unit IV: Poetics: Lyric and Didactic Forms (pp. 207-221):

A. Reading:

Detailed analyses of lyric and didactic poems from English or American literature. Emphasis should be on the organic unity of each poem, but contrast and comparison of moods and styles will assist appreciation. Special attention should be given to diction, rhythm, and melody of the verse.

B. Composition:

Students should attempt the writing of the prose-poems and verse-poems of a lyric and descriptive character. There should be detailed class discussion of the results. After discussion the student should attempt to improve his poem.

C. Speech:

Students should listen to records of poets reading their own poems and discuss their interpretations. Then students should prepare a concert of oral poetry. Better readers should give solos, others should take part in a verse chorus. The writing of an oral poem with choral and solo parts as a part of senior graduation program might be undertaken.

If possible a formal debate or set speeches should form a part of the senior class activities or graduation program. These should grow out of class discussions and should not be merely individual activities, but an expression of the school community.

D. Grammar:

See section on description in *K. and D. IV*, p. 111, or other rhetoric text.

PART TWO

The Fine Arts



PALESTRINA

PYTHAGORAS

CHAPTER I

The Matter of Works of Fine Arts

WHY WE NEED FINE ARTS

OUR SHARE IN GOD'S CREATIVE POWER

God is our heavenly Father. He made all things by his creative power, and now he rules over the world he has made so as to guide its development until it is a perfect and finished work of art.

To us men, whom he made in his own image, he has given a share in this fatherhood. He said to Adam and Eve, "Increase and multiply, and fill the earth and subdue it, and rule over the fishes of the sea, and the fowls of the air, and all living creatures that move upon the earth" (Genesis 1:28).

Thus, along with other living things, man has the power from God to multiply, to increase and perpetuate his kind in the world. Yet this share in creative power is more than the mere physical reproduction which plants have. Even among animals the parents not only beget their young, but they feed, shelter, and even train them. Human young need to be carefully raised and guided for many years. A human father begets his children, and then he must provide for them. Not only must he gather food from nature, but he must

cultivate food, and he must invent means of clothing and shelter. Hence men develop the useful arts by which to take the things provided by nature and develop and modify them so that they better serve human needs.

When man applies art to nature, he is only bringing nature to the perfection which God has intended it should have. Man by his art co-operates with God in perfecting nature. If, on the other hand, man misuses his art to destroy nature or to turn it to evil uses, then he is taking side with the devil, who above all desires to destroy God's work and to bring it to naught.

OUR SHARE IN GOD'S GOVERNANCE AND TEACHING

When a father has provided his family with its material needs by his skill in the useful arts, his task as father has only begun. Children need food, clothing, shelter, and many material things, but they have far greater need of education. The father educates them so that the image of God which is in them may develop, and they may become not only like their earthly father, but like their heavenly Father. "Be you therefore perfect, as your heavenly Father is perfect" (Matthew 5:48).

A father helps his children develop to perfect maturity in two ways. First he helps them develop right habits of living, which we call **moral virtues**, so that they are temperate, and brave, and just. Without these virtues they would be weak and enslaved by every temptation; with them a man grows up self-controlled, strong, honest, and truly free. Without his father's guidance, without his encouragement, and sometimes his punishments, a child would find it very difficult ever to develop such virtues. But his father knows how to guide the child, because he himself has the virtue of **prudence**. Prudence is like art, in that both help a father carry out his work. Art, however, perfects material things, while prudence perfects human beings in their actions. Thus prudence is the "art of life" and greater than any useful art.

Secondly, a father teaches his children not only to live rightly, but to *know* how to live. It is the **intellectual virtues** which are the developed powers by which we know things (see diagram, pp. 448 f.). Under his father's guidance the child learns the useful arts himself,

and he also learns prudence to govern himself and others. These are the *practical* intellectual virtues, and without them a child could not become a father and help others. But the father also teaches his child to know, not only the things which man can make and control, but also the greater things which God has made, the universe and man himself. Above all he teaches the child to know God, their heavenly Father. The virtues by which we know these things are the *theoretical* intellectual virtues of understanding, science, and wisdom.

CIVIC FATHERS AND SPIRITUAL FATHERS

Our own earthly father, however, is not able to do for us everything that he would wish. As a child grows he needs guidance that his family alone cannot provide. Hence part of our moral development comes not only from our natural father, but also from our civic fathers, the officials of the government. By their laws and regulations the President, the Congress, the Governor, the State Legislator, and all the officials of the government help us to become good citizens. Even when we are adults and have ourselves a share in government, we need also the help of our fellow citizens and of their representatives to guide our lives and help us become perfect in virtue.

Similarly, we need not only to be taught by our fathers, but we need also wise and learned men who have a profounder knowledge to teach us in order that we might develop perfectly in wisdom. Our universities, our scientists and writers, and our teachers in the lower schools, all devote their lives to study of the truth and to teaching it to others. Even when we ourselves become expert in some field of knowledge, we will not be able to know everything for ourselves. We will need to seek the help of those expert in some other field, and we will need light from those great minds who see deeper into truth than we.

These governors and teachers did not give us physical life as did our own father, and yet they are truly our fathers, since they give us the perfection of our moral and intellectual life. But this is still not enough. For our heavenly Father has willed that we should be prepared, not only for this life, but for life with him in heaven. There we will come to know him face to face, and we will see that he is

three divine Persons, Father, Son, and Holy Spirit. Our education would never be complete unless we were prepared also for this.

For this reason our heavenly Father sent us his Son to redeem us from sin and to begin on earth his heavenly kingdom, the Church. Our Lord is both a King to govern us in developing the supernatural moral virtues which culminate in the theological virtues of hope and charity, and a Teacher to help us develop the supernatural intellectual virtue of faith which should grow into wisdom. In order to carry out this mission in his Church as it grows here on earth, he has given us the Pope as our spiritual ruler and teacher, and under him the bishops and all whom they commission to guide and teach us. Thus the bishop and priest is most truly our father, for in baptism he gives us spiritual birth, and by his teaching and guidance and through the other sacraments he educates us supernaturally for life with God.

PLEASURE AND HAPPINESS

Our heavenly Father and our earthly fathers beget and provide for us and educate us because they love us. Because they love us they wish us to be *happy*. True happiness is not something that can be merely given to us; it is something which we must earn and possess for ourselves. Even our heavenly Father does not give us the joy of heaven until we are prepared for it by a life of merit. Happiness is a reward and it completely pays for all the effort we have undergone to earn it. The way to happiness, however, is only by effort and by striving, and hence by *suffering*.

Our heavenly Father and our earthly fathers, therefore, do not pamper us, or keep us from work and effort and suffering just because they love us. To keep us from these hardships would also keep us from earning true happiness. Nevertheless, because they love us, they try to make the way of effort as easy as possible for us, although it can never be without pain. When God made Adam and Eve he intended that the road to heaven should be very easy for them, and still he gave them a test, the test of obedience and of sacrifice. Because they failed that test, he had to subject them to a harder way.

The way in which God makes our way as easy as possible is by giving us *pleasures* as the reward of efforts, just as an earthly father

gives his children little treats when they do well. Pleasure is not happiness, because it is a passing thing, while happiness endures; but pleasure is like happiness. It is the foretaste of happiness that should lead us on to the real thing.

If we review the various things a father does for his children, we will see that each has its reward of pleasure. Thus the physical activities of eating, drinking, of begetting children, of sleep, of comfort, even of physical exercise, all are pleasant, and this pleasure makes it easier for us to perform them. How tedious having to eat three times a day would be, if there were no pleasure attached to it! When these activities are carried out reasonably and moderately they can make life very pleasant and healthful, but when they are indulged in to excess they make us sick, or they so enslave us that we are unable to seek true happiness. The man, for example, who has become a slave to food, or drink, or sexual pleasure may tell us that he is happy, but truly he is miserable; and happiness can never be his, neither in this world nor the next.

The useful arts, therefore, not only make useful things for us, but they also try to make these things pleasant. The cook not only makes food to nourish us, but also to be attractive both to our eyes and our taste. The furniture maker not only makes a bed in which we can sleep, but strives to make it one in which we can sleep with comfort and which is attractive to see. All this is good and a part of civilization. If God has made the physical world not only useful but very very pleasant, then we also should strive to make our works of useful art not only useful but pleasant. Yet it is important for us not to become soft and luxurious. The nation that spends too much effort in making life easy and pleasant soon is enslaved to physical needs and cannot gain true freedom and happiness.

RECREATION

A wise father not only makes a home a pleasant place to live but he also uses pleasure in a child's education. He teaches the child moral virtue by obedience and discipline, but he also permits a child to *play*. The freedom of play is very pleasant. This pleasure is not merely physical like that of food and drink which even a tiny infant enjoys. The pleasure of play comes also from our *imagina-*

tion, skill, and intelligence. A child only gradually learns how to play, and when he plays he is very much awake and using his imagination and mind. More complicated games are possible only for youths and grown men.

Why do we need play? Because it gives us pleasure and rests us from serious work and effort, and yet it is not mere rest and idleness, for it, too, contributes to our power to make a greater effort. When a soldier is being trained to fight, from time to time he is allowed to play some game. This is both because it is relaxation after his intense training, and because even while playing he is hardening his muscles for further effort. Thus recreation is a *pleasant form of activity which rests and restores us for renewed effort.* Children play hard. The young athlete plays hard. Yet for both this is a preparation for something more serious, or it is not true recreation.

Recreation is of two kinds, corresponding to the two kinds of education and the two kinds of serious human activity. **Moral activity** with its constant effort at carrying out one's duty and responsibilities has its counterpart in the kind of recreation we ordinarily call *games*—whether physical sports, or intellectual games like cards or chess. In all such games we find the element of a *contest*, either against an opponent, or against one's own score. In this way our emergency or fighting emotions, which are so constantly required in carrying out our moral duty, find rest in a game in which we have the pleasure of winning, without threat of losing anything really serious. Thus games are character-building for the youth, teaching him courage, responsibility, and fairness, and for the mature man they provide a suitable recreation from his duties in which he can still maintain his health.

There are also *mental* games which have the element of a contest: chess and checkers, cards, puzzles, etc. These do not have the same advantages for physical health, but when played with moderation they are good for the health of the mind.

The second kind of activity is the enjoyment of truth or **contemplation**. Many people are hardly aware that such an activity exists. To them it might seem a mere waste of time. Yet it is the highest of all activities and the source of every other activity which is fruitful. God himself rests forever in contemplation, and yet he has

created the entire universe and governs it every minute. The author of Genesis, knowing how quick man is to ignore this activity of contemplation, teaches us about it by showing that at the end of the six days in which he created the world, "God rested." It is to keep this alive in our life that we are commanded to abstain from servile work on Sundays and holidays, so that we may give some time to rest in the vision of God's truth.

All recreation, whether physical, mental, or contemplative, is a preparation for further activity. It rests and renews our strength. But contemplative recreation is more than just recreation; it is a foretaste of contemplation, and contemplation is not a preparation for activity, but the highest activity of all, the goal and end of every other activity.

THE FINE ARTS

The fine arts produce works which are not only useful but beautiful. Something is beautiful when it delights us merely to look at it. Hence works of fine art have their value, not in being used, but in being *contemplated*. When a piece of music is played, or a movie shown, or a novel read, we do not do anything with it, but simply listen and look and enjoy.

Thus the fine arts provide us with recreation, but it is a special kind of recreation. It is not primarily physical, like sports, nor is it a mental contest, like chess or cards. It is a contemplative recreation through which we begin to learn what contemplation is, and why it is so delightful. The pleasure we get from the fine arts helps us to understand what God's happiness and the happiness of heaven are like, where eternity passes in the vision of God's perfect beauty. The man or woman who does not appreciate beauty can never conceive how heaven is a place of perfect happiness, because they have never experienced any pleasures except those of the body or of competitive activity.

Making a work of fine art is a combination of all these forms of recreation. It takes physical skill like a sport. It also is a kind of puzzle in which the artist struggles with his material to give it the form he has conceived for it. Finally, it is a kind of contemplation, because the artist has always before him the beauty which he wishes

to produce. Hence, of all recreations, the making of something beautiful by singing, dancing, painting, writing, or acting poetry is the most inclusive.

WHERE THE FINE ARTS LEAD

The contemplation which we first taste in the fine arts is not, however, the end of contemplation. It is only the opening of a road. Works of art represent reality, but they are not the greatest realities. Once art has opened up to us the beauty of the world about us, we want to know that world better. It is no accident that the Babylonians, the Egyptians, the Greeks, all of whom were great artists, also became great students of natural science, nor that the advance of science in the Middle Ages also brought an advance in the fine arts. In natural science we come to contemplate the order of God's world, as Adam did when he first looked on it.

Art also opens up to us an understanding of human life. Through plays and novels, music and painting, our experience is broadened and we begin to appreciate the sufferings, struggles, and joys of other human beings, the drama of the rise and fall of nations and empires. Hence the fine arts lead us on to the social or moral sciences.

Finally, from the fine arts we wish to come to know Beauty himself, God the Holy Spirit. It is God's beauty which is reflected in the beauty of our world. It is his love and mercy which are reflected in the story of human life. It is when we come to meditate about God in the light of faith and with the love of charity that we come to know him, and that we arrive at true contemplation. The saints like St. Dominic and St. Francis of Assisi were so fascinated with the beauty and drama of the world that they thought of God every moment of their lives. So absorbed were they in thinking of him that they spent many hours in prayer, sometimes whole nights and days. When we see a movie, we are absorbed in the story for an hour or two and then we grow tired. What a marvelous vision St. Dominic and St. Francis had that held them enthralled for days at a time!

THE LITURGY AND FINE ART

The saints enjoyed this contemplation as the fruit of many years of effort to achieve it. In order that all of us might learn to pray

to God in this way, the Church with the most wonderful art has perfected the *liturgy*, which is a sacred drama wherein all the fine arts are employed to assist us in prayer. The Holy Sacrifice of the Mass is the great prayer of Christ in which, through the priest, he offers himself for all of us. In it is the great prayer of the Catholic Church which publicly unites itself with Christ in this Sacrifice. Hence it is carried out with all the beauty of a drama, in a noble setting, with rich vestments and solemn music.

Unfortunately, in the crowded life of today where men are so often starved for contemplation, or filled with the cheap and monotonous "contemplation" provided by television, the liturgy is often not celebrated with full solemnity. We become accustomed to a low Mass crowded into a half-hour, and people often avoid the High or Solemn High Mass where the liturgy is celebrated with its full rites. One of the most important things in education is to learn to appreciate the Solemn High Mass, to be able to sing it, and to learn to cooperate with its celebration by the making of vestments and the serving of the altar.

The diagram on the next pages shows how all the arts are combined in the liturgy and how historically they grew out of it.

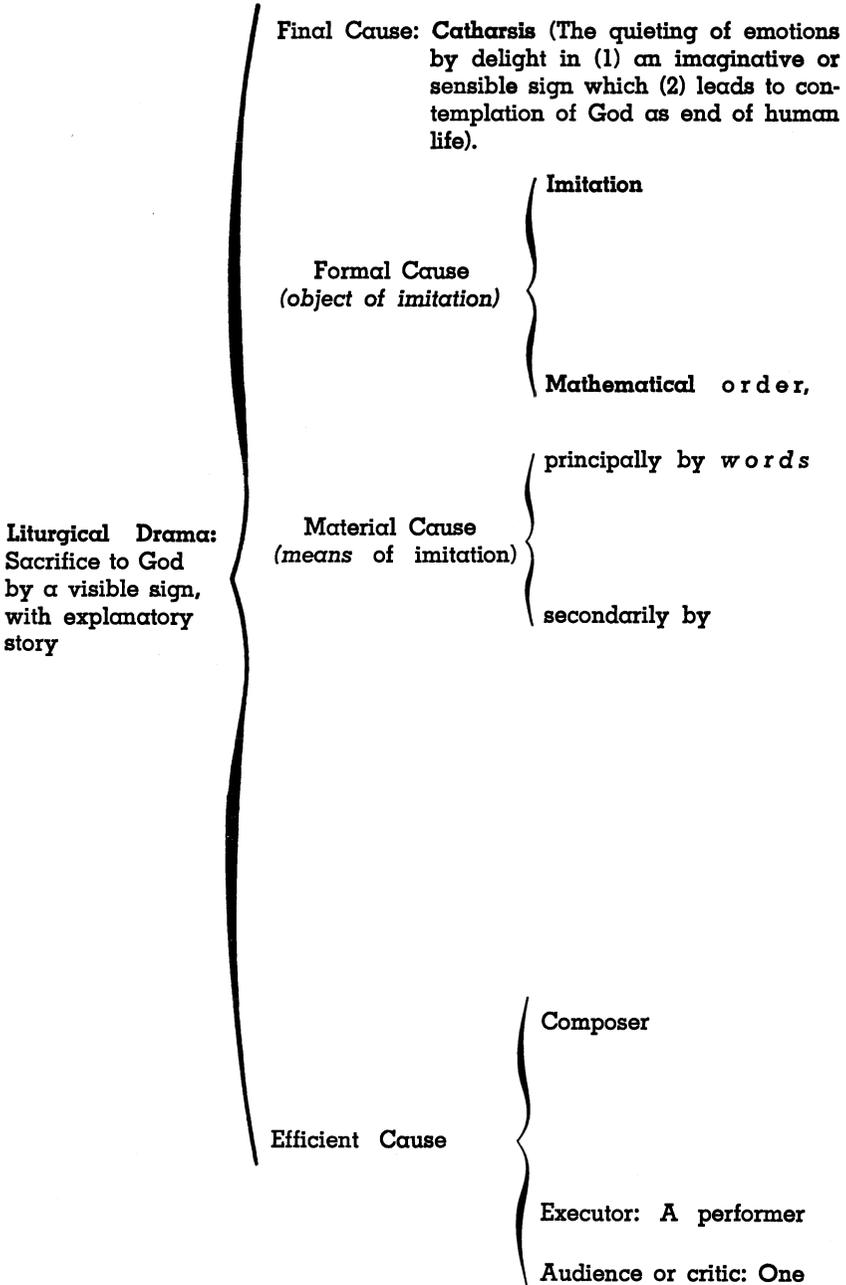
THE MATTER OF THE FINE ARTS

IS THERE A DICTIONARY FOR THE FINE ARTS?

In Part One, Chapter I, on the *Art of Storytelling* (pages 25-58), we have seen that the matter used by the storyteller is *words*. In the diagram on the next pages we see that the other arts use *sounds* and *sights* for their material. Words we can find in the dictionary. Is there a dictionary of sounds and of sights?

As a matter of fact, there are *color-charts* and *color-dictionaries* which give us an orderly arrangement of all the colors, and there are phonograph *records* and *tapes* which give us samples of all the kinds of sounds that can be produced by the human voice or by a full symphony orchestra. We will here consider only in a very elementary way some of the characteristics of sounds and sights which are the matter of the fine arts other than poetry.

THE CAUSES OF



THE FINE ARTS

{ principally of *human action* or *plot*
 (story of human life in relation to God)

{ secondarily { of *thought* (deliberation
 about action)
 and of *character* (person
 who thinks and acts)

easily perceptible in an imaginative or sensible sign

(which alone can directly represent thought).....Poetics

{ Sound (which represents emotion, the key
 to *character*)Music

{ Sight (which represents exterior
 action) { principally by
 motion of body: { **Dancing and Acting**

{ secondarily by
 place for
 action (setting) { **Architecture and
 Crafts**

{ **Sculpture and
 Painting**
 (images of super-
 human actors)

{ Principal (God as Inspirer acting through angel
 or other intermediary—the "Muse")

{ Secondary: { Artists having **Liberal Arts**
 of Poetics or Music.

{ Artists having **Servile Arts**
 of Dancing, Architecture,
 Sculpture, or Painting.

who is not a composer

who gives an interpretation to the work

COMMON MATTER

The artist begins his work by wishing to form something out of matter. He wishes to carry out the command of God which gave Adam power over material creation. When man molds and forms and arranges material things according to some idea in his mind, he is using this God-given power. When he does this for a good purpose, to produce something which is useful or beautiful, then he is imitating God himself, who made the world in its original state and gave it to man that man might help him bring the world to its final perfection. Thus the wise artist is God-like, but he remains God-like only when he respects the matter with which he works and uses it as God wishes him to use it.

PROPER MATTER

These various materials, however, are not chosen by the artist because of all their qualities, but only for certain ones needed in the work of art itself. Hence they are only the media or bearers of the qualities which the artist actually uses as the matter of his art. What are these proper qualities? They may be any of those qualities which we can directly sense: color, sound, texture, hardness or softness, temperature, smell, taste—all of which we call the **proper sensibles**. Actually, however, only color and sound have an important place in art, because only hearing and seeing give us a *distinct* impression, and without such clarity beauty is not possible.

It will be readily granted that taste, smell, heat, and cold play little part in works of fine art, although they may have some importance in poetic works. However, the sense of touch as it makes us aware of textures, figures, tensions, and motions, does seem to be a real factor in both the musical and the visual arts. We *feel* the impact of the beat of a drum, and we would like to touch the smooth curves and volumes of a statue. Even in painting, the roughness or smoothness of the paint has a definite effect upon us. Again, in watching a dancer we seem to feel in ourselves the motions of the dancer's limbs. This "in-feeling" is called **empathy**, and we experience it even when looking at buildings which appear to us very massive and heavy, or light and soaring. Everyone knows how the

designers of automobiles try to make the lines of their cars suggest a feeling of speed.

The reason that touch plays this role seems to be because it is the most certain of the senses and the one which makes us aware of the actual *presence* of things. (Did not St. Thomas the Apostle want to touch our Lord after the resurrection to make sure he was really there?) Thus sensations of touch reinforce and confirm what we know more clearly, but less certainly, by our sight and hearing. Hence a play on the stage is somehow more exciting than a movie or television play, because the actual presence of the actors affects us. Nevertheless, although touch reinforces sight and hearing, the information it gives us by itself is too vague to constitute the principal material of a work of art.

CHARACTERISTICS OF COLORS AND TONES

Color has three aspects: (1) **hue**; (2) **purity**; (3) **brightness**. In **hue** colors range through the spectrum or rainbow, in which we see clearly four *primary* colors (red, yellow, green, blue) and two *secondary* colors (purple and orange), and colors which are transitions between these.* Of these latter red-green, yellow-blue, purple-orange seem to form contrary pairs called *complementaries*. In **purity**, the colors of the rainbow are (approximately) pure. By adding white to them, a *tint* (pastel color) is produced, by adding black a *shade*. White, black, and their mixture, grey, are neutral colors, that is, white is a blend of all colors, black a negation of all colors, grey a mixture of white and black. In **brightness**, colors may range from very dim to very bright, but dim colors appear as shades, and very bright colors tend to look whitish. Pure yellow is very bright, pure purple very dark; the other hues are intermediate.

Similarly sound has three aspects: (1) **pitch**; (2) **quality** or **timbre**; (3) **volume** or **loudness**. In **pitch**, tones range evenly from very low to very high, but in such a way that any tone sounds very similar to those tones which have 2, 4, 8, etc., times as many vibrations per second as itself. Some similarity is felt between a tone and any

*This is a simplification of color theory which is quite complex. Green is regarded by some as secondary color blended from yellow and blue. Neither pure purple nor pure red are actually found in the spectrum and can be obtained only by a mixture of lights.

higher tone (overtone) which is related to it by a simple ratio between the number of vibrations of each (1:3, 1:5, etc.; see pp. 349 ff.). In *timbre*, tones have different qualities owing to a mixture of the lowest tone with various of its overtones. Thus the quality of a violin is similar to the human voice, but very unlike the sound of an oboe or French horn. When a tone has no distinct pitch but is an unrelated cluster of sounds it is called a *noise*. When it has a definite and sustained fundamental tone it is called a *musical tone*. In *loudness*, tones range from very faint whispers to very loud crashes.

The human power to distinguish the fine differences of colors and tones is very great, but we must train ourselves by constant observation to make these discriminations. Look at your hand and see how many different tones of color there are in flesh. Note the color of its shadows. Place it in different positions and in different lights to notice how these colors shift and change. Listen carefully to the voices of others. Can you tell just why you recognize the voice of a friend? What is peculiar about its pitch, its timbre? It is by learning to discriminate colors and tones that we make ourselves sensitive to what the artist is doing, and by studying the work of the artist we come also to be more sensitive to color and tone.

QUANTITY IN MATTER

Besides color and tone (and other proper qualities), our senses also perceive aspects of things that are *common* to more than one sense (technically called the *common sensibles*). These are quantity, position, figure, and motion. **Quantity** and **position**, we know, are distinct categories. **Figure** is a species of quality, closely related to quantity, since a figure is simply the *boundary* of a quantity. **Position** results from the relation of one part of quantity to another next to it. **Motion** is found in every category. To these we might also add **time**, which is the measure of a motion and which is known by sensing motion of some sort. Thus we can see the size (quantity) and figure of a colored square, but we can also know these aspects of the square by touching them, although we cannot tell its color except by sight. We can see the motion of a fan, and we can also feel and hear it.

These common sensibles are all *quantitative* and measurable, while the proper sensibles are *qualities*. From one point of view, it is this quantitative aspect which is most important for art, since it makes design possible (as explained in Part III, Chapter II, pages 344 ff.). But we must also remember that unless such designs were presented vividly in color or tone they would lack something of beauty, since they would not be so clear to our power of knowing which is rooted in external sensation.

THE MATTER OF POETICS

If we consider the words out of which poetry is made as sounds, then they are the same tones we have already discussed. But words are also conventional signs which bring to our mind something other than themselves (see page 5). What comes to our mind when we hear a word? First of all, the essence or nature for which it stands (some words, however, stand only for grammatical relations) which is known by our intellect; for example, the nature of a dog, the moon, or a flower. Hence the matter of poetry is, first of all, **objective concepts** (things known, see page 59), just as the matter of logic, dialectics, or rhetoric. But along with this concept there also come to mind the **images** or phantasms connected with it, as well as other concepts and images similar to or contrasted to it, which follow it by the law of association (recall and memory). Hence a single word, like the word "rose," may bring to our mind a flood of ideas, all of which are matter for the poet.

Poetry is different from all the other arts because

- 1) It lacks a direct appeal to the external senses, but it can appeal to our interior senses of imagination and memory. Hence in a way it can include the matter of all the arts.
- 2) It has the power explicitly to present to us intellectual concepts, while the other arts can only imply these.

Thus poetry by reason of its matter is the most perfect of all the arts and in a way includes them. On the other hand, it has certain defects which prevent it from replacing the other arts:

- 1) It lacks a direct appeal to the external senses. That is why we try to make up for this by combining poetry with music (the sound of poetry spoken or sung, or even of prose) or acting, as in the theater.
- 2) It represents its imagery in a vague way so that it cannot form a true design with mathematical beauty. The poet may talk of the beauty of the moonlit landscape, or of music, but he cannot convey to us their actual beauty of pattern.

CHAPTER II

The Forms of Works of Fine Art

THE NOTION OF FORM

"FORM" IS AN ANALOGICAL TERM

If we are ever to think clearly about the problem of "form" in art we have to realize that this word has many meanings; it is an analogical, not a univocal term.

In the broad sense of the word, "form" is relative to "matter," so that whenever we have some sort of material, some elements or parts put together in a sort of an order, arrangement, or structure, we may call that structure "form." In this broad sense, all the nine kinds of accidents (see pages 59 f.) are "forms," because all of them give some kind of order to the thing in which they exist.

Among the accidents, however, the one which most truly deserves the name of "form" is *quality*, the category which answers the question, "What kind of thing is it?"

Hence among the kinds of quality the *proper sensible qualities* of things which directly affect our different senses may be called "forms." *Color* is the form of things perceived by our eyes, *sound* the form of things perceived by our sense of hearing. Of these,

color and sound especially deserve to be called "forms" because it is by sight and hearing that we can best discriminate one kind of thing from another.

In the last chapter (see page 242) we saw that color and sound are forms of the common matter of the fine arts; the reason for this is that they give different qualities to paint, or glass, or stone, or to vibrating strings and columns of air. But although they are forms of the *common* matter, they are themselves the *proper* matter of the fine arts.

THE MOST PROPER SENSE OF THE WORD "FORM"

Although the term "form" may be used in these broad senses to apply to any accident, and particularly to any kind of quality, in the strictest sense it belongs only to one species of quality, namely, to **figure**.

If we ask most people what "form" means, they will spontaneously answer: "shape" or "figure"; and they will probably be thinking of the shape or figure of a beautiful woman. Thus "form" means "figure." If we wish to distinguish the connotations of the two words, we may say that "form" means a perfect *regular* figure. Figure and form are kinds of qualities, but they are qualities very closely related to quantity, and may be defined as follows:

Definition: *a figure* is a quality which is the boundary of a quantity.

Thus in geometry we construct and study such figures as the straight line, the curved line, the triangle, the polygon, the circle, the cube, and the sphere. Each of these is a quantity having a definite boundary. For example, the circle is an area (quantity) bounded by a curved line equidistant at every point from the center. These boundaries of quantity are its figure, and this figure is not itself quantity but a quality of quantity; it is a **form** of the quantity.

Closely connected with quantity and figure are four other categories: **place**, **position**, **vestition**, and **timing** (pages 45 ff.). If I draw the figure of a triangle on a sheet of paper, I can put it in various **places** on the page. I can also turn it in various **positions**; for example, with the vertex upward or downward. Similarly, the human

figure may be in various places, and in various positions (sitting, standing, lying down), and it may also be clothed (*vestition*) in "form-fitting" or in baggy garments. Finally, as the hands of a clock move through various positions on the dial, we can mark out parts of *time* to correspond with the parts of the circular figure; or as a runner speeds to his goal, we can mark off parts of the time to correspond with his progress along a straight line. Thus *timing* and the other categories we have just mentioned are closely related, and we can think of a series of events in time as arranged in a sort of pattern or figure.

Thus "form" strictly means *figure*, but it may also be applied to other categories closely connected with quantity. Quantity and the other categories which we have just mentioned all provide a foundation for various *relations* (see page 454) of equality and inequality, similarity and dissimilarity, nearness and distance, before and after, so that in describing figure we must also take into account these various relations.

We often refer to figure in painting, sculpture, or architecture as a "pattern" or a "design." In music the analogous arrangement of different tones in time may be called by the same names.

DESIGN IS ESSENTIAL TO FINE ART

It should now be evident that a work of fine art that does not have form in the sense of good design could not possibly achieve its purpose. A work with poor design would lack the most basic type of beauty. It might have expensive materials, beautiful colors, or rich sounds; it might portray an interesting subject, or tell a moving story, but it would lack *form*. It would be the material of a work of art as a pile of bricks is the material of a building, but it would not be the completed work. A girl may be healthy without being very beautiful.

Oddly enough, many people miss this point. Girls are sometimes admired for beauty who really do not have it. A girl with bright eyes, a glowing complexion, or a pleasant manner is often thought beautiful, although actually she does not have regular features nor a good figure. Similarly, in judging works of art many people are inclined to think that a work of art is good if it has bright colors, or if

it is about some subject that they personally like. A man who likes hunting is likely to think that a brightly colored photograph of the woods is a fine work of art; and a woman who likes children is likely to think that a picture of a sweet baby painted in lovely pastel shades is a masterpiece.

This is not unnatural, and we need not object to people enjoying bright colors and pleasant subjects. But we must recognize that it is not the work of art itself they are enjoying, but merely something accidental to it. That is why the opinions of the public and the opinions of experts in matters of art sometimes seem so far apart. The public cannot understand why a prize at an exhibition should be given to a rather dull looking picture of some apples on a table cloth, while a flashy picture of a beautiful girl is passed over by the judges. The difference is principally in the fact that the judges are looking for the form of a work of art, and in the picture of the apples they find a most complicated and interesting design, while in the flashy picture of the girl they find very little design at all.

The public, on the other hand, has perhaps not learned to look for design and probably does not even realize that it is the very essence of art. Good design may be greatly aided by brilliant, beautiful colors, and it should tell us something interesting and human (as we will see below); but without it all the colors and subject-matter in the world cannot produce a work of art. The same is true of music; brilliant or rich sounds, or easily memorized tunes, or a great deal of lively and noisy rhythm does not make a good piece of music, nor does the fact that the music is patriotic, or romantic, or tells a clever story. Without musical form or design such music is like a collection of pretty silks and laces that has not been cut and sewn to make a dress. It is the possible material of a work of art and nothing more.

ABSTRACT ART

It is the growing recognition of this true conception of art that has led to the surprising development of *abstract* painting and *pure* music in the last fifty years, a development which has outraged the public and which they find it very difficult to regard as anything but "insane art," or "boiler-factory music." In an abstract painting

or sculpture the artist gives us a pure design which seems devoid of all meaning ("What in the world is it supposed to be?") and which frequently is devoid of appeal in color or careful finish ("A child could do as well"). By giving us a work which seems "crude," sketchy, unfinished, the artist is trying to get us to forget about the mere superficial qualities of color and neatness, and by not picturing anything definite he is trying to get us to concentrate on the pattern. It is rather like a football coach deciding that the crowd is becoming more concerned about the hot-dogs, the pennants, the chrysanthemums, the marching bands, the majorettes, the cheer-leaders, and the mascots than about the game of football itself; so he decides to cut them all out and give the spectators nothing but a hard-played game by a team in dirty uniforms. The public would not like that, but the real sport fans wouldn't mind at all. They would be happy to concentrate on the game. In similar fashion abstract art and pure music are intended to be works of fine art cut down to the essentials with little appeal to the ignorant public, but with a very direct and strong appeal to those who really know what art is all about.

SIGNIFICANT FORM

We have just given the case for abstract art, but we hasten to add that the public is not altogether mistaken in its astonishment at this type of art. The figure or shape or design of things is only an accident. The human mind, however, is made to know *reality*, and the accidents of things, although real, are only the most superficial aspect of reality. Reality consists of things, of *substances* which exist in themselves. Accidents cannot exist in themselves but have reality only because they exist in substances. Until our mind penetrates accidents and grasps the substances of things it is unsatisfied. Perhaps at a circus or fair you have bought a paper cone full of pink "cotton-candy" spun out of sugar, and you remember that when you bit into it you found it was hardly more than slightly sweet air. The world of accidents is just as unsubstantial to the appetite of our mind.

Accidents are the natural signs (see page 5) of the substantial nature in which they exist. A man's color, height, shape, weight,

etc., are the outward signs of his human nature. When our senses take in these accidents our mind at once begins to try to read their meaning and to discover what they signify. Of all the accidents those which are most significant to us are the **figure**, the **sounds**, and the **motions** of things. If we see the shadow of a dog, hear its bark, or see it streak across the lawn after a rabbit, we recognize it immediately and we understand what its nature is.

So habitual is it for us to read the natures of things through their figures that when we sit idly watching the shifting forms of the clouds or the fire, or when a psychologist shows us an ink-blot, we immediately see in these random shapes the likeness of animals or human faces. The same is true of sounds, for if we listen to the wind or the waterfall for some time, or the sound of the wheels of the train on the track, they may begin to suggest words and voices to us. The tendency of children or of insane or delirious adults to see figures in the shadows and hear voices in the wind is only an exaggeration of a universal human tendency to seek for meanings in every shape and sound.

A form which quickly reveals a nature and which thus acts as an effective sign is a **significant form**, in contrast to one which seems meaningless. The reason we resent abstract painting or music is that it seems to promise a meaning which we can never discover. Purely abstract art is inhuman, because it offers us a mere surface, a flow of phenomena instead of the reality we naturally crave.

It certainly is legitimate for the mathematician to abstract from all reality except the accident of quantity, because he is a scientist, and science sometimes gains by sacrificing depth for the sake of exactitude (see page 370). The artist, too, may feel that by making his picture very mathematical he is gaining in clarity of form what he is losing in richness of content, but this sacrifice becomes too great when nothing but mathematical pattern is left. The history of art shows that cultures like that of the Jews or the Mohammedans (who, for fear of idolatry, banished the use of representation in art and confined themselves to abstract designs) did not achieve artistic greatness.

THE FUNCTION OF EMOTION

EMOTION AND ABSTRACTION

As a matter of fact, the abstract art of today is really not so abstract as it appears. Most of it actually has some meaning or significance because it conveys **emotion**. Very little music has even attempted to reproduce natural sounds (except as an incidental novelty); yet music does convey emotion, and has a rich emotional meaning. In an analogous way, visual design which seems to resemble nothing in particular may have a definite emotional content, and may convey a sense of joy or gloom, agitation or serenity. If it were not so, then architectural designs would not convey any mood to us—and they obviously do. Who has not felt the sense of serenity in the façade of the Parthenon, or the sense of prayer in the interior of the cathedral of Chartres? Abstract painting is a visual design which signifies emotion in somewhat the same way as music does.

What then about *pure* music, which seems to be free of any obvious emotional content? When we listen to the music of Bach, we do not sense, to be sure, the same violent and obvious emotions as in a piece by Tschaikovsky, or Wagner. We say that the music seems “intellectual.” The reason for this lies in the fact that there are two kinds of emotion. Some emotions are so violent that they carry us along, blinding our intelligence and clarity of thought. Other emotions are controlled, measured by our intelligence, kept in balance and harmony by our thought. Such emotions do not blind us, but rather sharpen our intelligence and help us to think more acutely.

This is not a difference in the *intensity* of emotion, but in its discipline. Controlled emotion can be much more profound and intense than sentimental, dissipated emotion. Many people who compare the music of romantic composers like Wagner to classical composers like Mozart and Bach at first find the classical music “cold,” “intellectual,” a mere pattern of sounds; but after they know it better they come to see that it signifies most intense and deep emotion.

HOW CAN A DESIGN HAVE EMOTIONAL SIGNIFICANCE?

Granted that "abstract" designs and musical patterns often signify emotion, it is rather difficult to explain how this can be. We need to recall what an emotion is:

Definition: An emotion is a movement of our sense appetites toward an object presented to the imagination as pleasant or away from an object presented to the imagination as unpleasant, with an accompanying physical change.

So, for instance, when we imagine a delicious dish of food we have a hungry impulse that moves us toward it, and we feel our stomach begin to get active and our mouth begin to water. The basic emotions are listed on page 152.

In order to signify these emotions by a musical pattern we need to produce a series of notes that move toward or away from sounds that are pleasant and unpleasant. A pattern of concordant or related notes seems pleasant, a pattern of unrelated notes seems unpleasant. The pleasant pattern seems restful and suggests a state of bodily relaxation; the unpleasant pattern is disturbing and indicates bodily tension. When a design is suggested but not completed, then we are in a state of anticipation and tension until it is completed. In this way a piece of music is a constant alternation between the building up and tearing down of a musical design, and this movement to and from an expected pattern or order signifies the emotions. If we see an expected design dissolving or incomplete, the emotions of sorrow are signified; if we see it building up in spite of obstacles, the emotions of joy are signified.

In dancing we have a similar alternation of visual patterns. In painting, sculpture, or architecture there is no actual movement, and at first it might appear that they could never signify the flow of emotion. But every motion begins and ends in rest, and in a static design it is possible to indicate that a motion is about to begin, or has just ended, by showing a design which is not quite complete, but suggested. Hence a picture in which a design seems to be dissolving or ready to fall apart suggests something sorrowful, and a picture in which the design seems just to be arriving at completion suggests triumph and joy.

UGLINESS AND BEAUTY

We can now understand why a work of art, if it is to have emotional meaning, must not be simply a perfect geometrical design or pattern; why it must contain something which is imperfect, incomplete, ugly, and disordered. It is not possible to present the pleasant in an effective and intense way without also suggesting the unpleasant, or at least the less pleasant. A piece of music which was all sweet chords, or a picture which had a perfect balance of pure colors, would seem emotionally empty because they would not suggest to us the movement of emotions from the unpleasant to the pleasant. A story with no villain, no conflict, no danger is bound to be insipid. That is why good works of art at first sight sometimes seem shocking or strange or depressing. It is because we have noticed the unpleasant element, and have not yet perceived how this unpleasant element is present only as a means to intensify the emotional movement toward the pleasant. The apparent disorder exists only to bring us to a profound order, just as in the universe sin and sorrow exist only to awaken us to the pursuit of true happiness.

This does not mean, however, that there must always be something ugly for there to be something beautiful. God is Beauty without ugliness of any sort because he is Eternal Beauty. But creatures arrive at beauty and goodness only by a long journey, and every journey not only has a goal, but also a place of departure. We journey toward Beauty only by leaving ugliness behind.

NATURAL SIGNS OF EMOTION

It may appear very surprising that we are able to read the emotional meaning of a piece of music or a design just by looking or listening to it, even when we have had no training in these arts. And yet people spontaneously understand the joyfulness or sadness of a great deal of music and design. The reason is that we are naturally inclined to read this visual or musical language of the emotions because the appearance of our bodies and the sound of our voices are natural signs of our emotional states.

Even a small child soon learns to read its mother's emotions from her facial expression, from her calm or nervous gestures, and from the tone of her voice. When we watch a fine actor we are amazed to

see how his body and his voice seem to reveal his interior feelings by their slightest changes. Thus the human body in its movements, postures, expressions indicates the interior tension or repose that accompany emotion (see definition above, page 254), and so does the human voice which is so affected by the muscular tensions of the face, throat, and chest, and by our breathing.

When our body is in repose (standing or sitting easily), it forms a perfect symmetrical pattern; and so, in a similar state, does our face. When we are moved by emotion, this pattern is disturbed and goes through a series of shifting appearances until we return to repose. In dancing or acting we see this alternation of repose and movement. The voice also has its rest and repose, silence or a clear, even tone. When we are moved, the voice rises or falls, grows stronger or weakens, and then returns again to repose. It follows, then, that the pattern of design or of music of which we have been speaking is natural to man, so from our acquaintance with the human body and voice we quickly come to read this natural language.

IMITATION IN THE FINE ARTS

ART AS IMITATION

We can now understand the famous saying of the great Greek philosopher, that art is **imitation**. In Greek the word is *mimesis*, the same word from which comes our word "mimic." No doubt Aristotle particularly had in mind the actor who mimics or imitates a character in a story. He says, however, that music also is imitative (*Politics*, VIII, 1340a, 19), because it so subtly portrays the emotions. By this he means that the work of art is a significant form, as we have already explained, not that it is a photographic copy of the appearance of something. If he had meant the latter he certainly could not have cited music as an obvious example of imitation, since music is no obvious likeness of anything.

Some have argued that "imitation" was taken by Aristotle to mean that the artist does for his work of art what nature does for the things it produces. According to this theory, just as nature helps the seed to grow into a beautiful tree, so the artist develops a design from

some germinal idea and embodies it in his material. It is perfectly true that human art does imitate nature in this way, but this is true of all arts—of farming, of medicine, of engineering, of teaching—and would not be especially characteristic of the fine arts. Yet Aristotle uses the term “imitation” as the specific difference of the fine arts to define them in contrast to these other arts.

Aristotle tells us himself (*Poetics*, IV, 1448b, 4 ff.) that the fine arts are imitations in the sense that they lead us to *knowledge*. By comparing the work of art with the thing it imitates we come to know something which we did not know before. How is that possible? How do we come to know by comparing the picture of a man with a man?

We can understand the answer to this question if we recall that we human beings learn to define things by comparing similar things and then noticing the differences. It is in this way that we come to distinguish between what is essential and important and what is accidental and insignificant. Hence when an actor “imitates” or mimics someone else, we first make a comparison between two persons who are unlike each other (the actor and the one he imitates) and then we notice their similarity, the tricks of gesture, gait, expression, and pronunciation which make them startlingly similar.

When we recognize this similarity we are very interested, because previously we had never realized the distinctive personality of the person who is being imitated. But when we see these traits put on by an entirely different person, we see them plainly and clearly and appreciate them as we never appreciated them before. The mimic has said to us, so to speak: “Here is the very essence of Mr. So-and-So. *Now* you know what Mr. So-and-So is really like, although you never realized it before.”

An imitation, therefore, is just the opposite of a photographic copy. The photograph is the *unselective* reproduction of the mere appearance of a thing. An imitation is the *selection* of a **significant form**, of those appearances which reveal the nature or essence of something. A photograph is made by a machine that is without intelligence. An imitation is the work of an intelligent man who sees through the accidents to the substantial reality of things and produces a sign that enables us to do the same. That is why a melody,

or an abstract painting, can be a true imitation, although they are far from a mechanical reproduction of anything. Between the melody or the design and the emotion which they imitate, there is a real similarity, a selective and interpretative likeness of movement and pattern existing in utterly different materials.

THE SCOPE OF IMITATION

Emotion and Action

Up to this point we have shown how even when works of painting or music seem very abstract or "non-objective" they may actually imitate the emotions. But emotions do not exist of themselves, they exist in human beings. It is the human being who is a *substance*, and emotion is only one of his activities. Nor is it the highest human activity. Man fully lives, not merely in feeling and suffering, but rather in thinking, willing, loving, choosing a course of action, and executing it. Furthermore, it is not merely in some passing experience that he truly lives; rather it is in his habitual, deliberate way of life that his character and personality are truly realized. If art were confined to imitating man's emotions, it would be able to show us only a very fleeting and superficial aspect of reality.

Hence it is that in poetic works, which are the fullest and most complete type of art, the writer does not merely portray emotion (this is paramount only in lyric poetry, see page 216), but deals with human action, that is, with human life as a whole. The scope of the imitation of a poetic work, therefore, extends beyond emotion to the whole of man's nature and life, and to the world in which he lives.

The Scope of Music

Is it possible for the arts which do not use words to go beyond emotions in their work of imitation? It would seem that music cannot go any further, unless it is united to words or drama as in a song or opera. Music presents emotion, and in that emotion we sense the control of reason and of virtue which gives that emotion its own balance and symmetry. But music alone can never tell us the objects of these emotions (the thoughts), nor the characters that feel them, nor the situation that provokes them.

In hearing a piece of music we witness someone's noble sorrow, or exultant joy, but we do not know who it is that feels these emotions, nor why. On this account music is very limited in its scope, although it compensates for these limitations by its extreme subtlety and power in imitating what it can imitate. The words of a poet or the expressions of an actor fall far short of music when it comes to imitating the shades and changes of feeling.

It is for this reason that music is so often used in connection with other arts, along with words, or as an accompaniment to acting or dancing. This is also the reason why it has such intense appeal to people of deep emotions, while it may seem tedious and empty to those who are more interested in the other aspects of life.

Limitations of the Other Arts

Architecture, which has been called "frozen music," has even narrower limitations. It cannot show the shift or changes of emotion, but only a certain mood or atmosphere of grandeur, or peace, or comfort, or whatever it may be. It may be said to imitate a habitual state of character or emotion, rather than the emotion itself. Abstract design has these same limitations, and in spite of the great fashion at the moment for such designs, we may be sure that people and artists will soon tire of so limited a medium. Abstract design has neither the power of music, nor the scope of representational art.

Why is it so popular at present? Partly, it would seem, as a reaction to the mechanical, materialistic, photographic ideal of art which is so prevalent in our mechanical age, but mainly because the artists of today are very ignorant of the fulness of reality. Like so many experts, they are narrow specialists and they find nothing to imitate which they know well except their own emotions. It is well known that among writers lyric poetry is the one field in which the young writer can excel, since it requires a minimum of knowledge and experience with life, and only a sufficient sensitivity on the part of the young poet. Abstract painting and sculpture are the lyric form of the visual arts, and today's artists, cut off from the fulness of life by their lack of education and general culture, tend to devote themselves to it. This is by no means all their own fault; it is largely due

to the fact that in modern life the fine arts have lost their social function and have become very narrow (see below, pp. 294 ff.).

Acting and dancing have a much wider scope, since vision is the most informative of all our senses. Before the "talking picture" was invented, the silent movies had proved that it is possible to go very far in telling an effective story without words. Nonetheless, everyone is aware that the silent movies were very limited in their dramatic scope. Without words it was difficult to express the shades of motivation, and the story had to be confined to very broad simple effects. The same is true of the ballet which can tell a simple story and express the related emotions very clearly—more clearly than can a play. Yet a ballet becomes confusing if the story takes on any complication or subtlety of plot, character, or thought.

In painting and sculpture even motion is eliminated. Hence these arts cannot effectively tell a story. The efforts of some painters to suggest a story in a picture is more clever than successful. To be sure, the technique of the comic-strip may be tried. In Chinese painting, in illustrations for manuscripts and books, in some primitive Italian and Flemish painting, and in certain large groups of mural paintings, successful efforts have been made to portray the separate incidents of a story in a succession of pictures. Even here, however, each picture has to have an interest of its own, and a single picture conveys a story only feebly.

The Imitative Function of These Arts

What these arts can do is to portray the repose that completes or precedes action, and by showing this repose as imperfect to suggest the action which is coming to rest or about to begin. In the famous Greek statue of the discus thrower, for example, we see the athlete poised to release the discus. In Michelangelo's statue of Moses we see the great lawgiver just about to rise from his seat in righteous anger. In the "Winged Victory" in the Louvre we see the goddess of victory just coming to rest on the prow of a ship and ready to fold her wings, and in Michelangelo's *Pietà* we see Our Lady gazing in silent grief after receiving the body of her Son. The history of Egyptian and Greek sculpture or of the painting of the Renaissance shows the gradual development of the art by which the artists learned to

suggest, in a static design, this beginning or coming to rest of motion. In the later periods of Greek and Renaissance art this skill was so abused that the static design was destroyed by motions too violent for successful portrayal without actual acting or dancing.

The Matter of the Arts as Limiting Principle

In fine, each of the arts tends to be limited in its scope by the effective possibilities of the matter. It pertains to the perfection of these arts to widen their scope, but not to do violence to it. The great musician tries to give a dramatic and intellectual quality to his music. The painter and sculptor attempt to suggest action in repose. The poet seeks to give a vivid pictorial and sound impression in his poem. All, however, if they respect their own art, will not attempt to compete with the other arts, nor try to do within the limits of one material what could be better done in another.

The musician who tries to paint a picture or tell a story, the painter who tries to turn his poem into a piece of music or a painting—all are striving to do the impossible, and thereby violating the nature of their own art.

OBJECTS OF IMITATION

Since an imitation receives its form from the object imitated, we need now to ask: what objects are imitated by the fine arts? The answer must be given in terms of two principles:

1. An artist should seek to imitate what is most beautiful in itself insofar as he can.
2. But he is limited in this by the kind of matter he uses.

The Beauty of the Divine

If we consider the first principle, then, of course, the most beautiful of all things is the One God in the three divine Persons. God's Being is seen especially in the Father, his Truth especially in the Son, and his Goodness in the Holy Spirit. Since beauty is a kind of goodness (namely, the good of knowledge), the Beauty of God is seen especially in the Holy Spirit. Since beauty is the splendor of truth, it is especially as the Holy Spirit is the very splendor of the Word of God that he is Beauty.

After God the most beautiful reality is the Triumphant Church (taking its Head and its members together) as it will be after the last judgment. This Church will then include all glorified rational creatures and the whole glorified physical universe as its temple. The damned in hell will remain to render this glory more clearly, in the same way that something of ugliness remains in a work of art as the sign of the catharsis achieved. In this Church our divine Saviour and Our Lady are most beautiful. By reason of his human nature, our Lord, who is a divine Person, is fitted to our knowledge, and is thus most beautiful to us. But even more evident than the beauty of our Lord as man is his *sublimity*, whereas his *beauty* is found most clearly for us in Our Lady, who so perfectly resembles him. Our Lord's beauty appears especially in his actions, his life, since it is by these that his Person is manifested to us. For this reason the history of the Church (and in it the story of our Lord's life) is the most beautiful of dramas. The life of Christ is also strongest in its catharsis, since we can completely identify ourselves with him who has become our brother, and his life moves from the extremes of sorrow to those of perfect joy. It is in the Sacrifice of the Cross and in the Resurrection that this catharsis attains its goal.

The Beauty of the Human

Among other human beings, the saints, who most resemble Christ, are most beautiful; and their heroic actions, especially martyrdom, share the tragic power of his own life. But it is particularly in the Holy Sacrifice of the Mass (which is a sacramental imitation of the Sacrifice of Calvary, truly re-presenting it) that this beauty is found at its highest.

It is also found, however, in the humble life of the home where he lived in Nazareth, and in his daily contacts with weak humanity. In these incidents is found the comic spirit, ranging from the burning satire of his exposure of the Pharisees, to the gentle humor with which he dealt with his disciples. The sublime sorrow of his life, however, prevents the comic from being seen there fully, but it is fully evident in the life of his members in the Church, who alone of men can afford to laugh at themselves. The sublimity of our Lord's life, on the other hand, is fully seen only in the entire panorama

of history outlined in the Bible and filled in by the details of secular histories.

The Chief Object of Imitation

Thus it is **human action** (whether tragic or comic) which is the chief object of imitation in fine art. For this is the highest object which appears perfectly adapted to our understanding and sympathy, and hence the one which produces in us the most perfect purification of our emotions (*catharsis*, see pages 152 ff.) and the most perfect contemplation of the beautiful. Divine things and cosmic things are represented, but as they are reflected in human action, as its law and goal. When we see human life in relation to its ultimate consequences beyond this life, in its relation to God and the society of the universe, we have a **tragic vision**. When we see human life in relation to the less consequential affairs of everyday life in human society, we have the **comic vision**. In the former the catharsis is more profound, because it is a lasting joy attained by conquering sorrow. In the latter the joy attained is less perfect and final; it is the commonplace joy of daily life.

When we consider things below man we consider them as ordered to man and reflecting human life, as similar to man and sharing in his beauty or ugliness. Sometimes they appear as obstacles to his action (hence as ugly), sometimes as the instruments and appropriate setting of his action (hence as beautiful). Such humble things also have a sublime aspect, since they reflect the cosmic order of which man is not the highest part. They suggest to us man's subordination to the Creator who made both man and ant. Thus in looking at apples on a table, not only do we see a design, but also a reflection of man in his daily domestic life, and, further still, a reflection of the mystery of the universe in which man finds himself as a part. Seeing the reality of the apples in sunlight we realize that the world is not our work, but the work of someone greater than ourselves whose art is infinite.

Consequently, the landscape painting, the still-life, the picture of animals, the poetic description of the weather, are subordinate and minor objects of imitation in art which take their meaning from their relation to human life and to God.

THE DIVISION OF THE FINE ARTS

Since human action is the principal object of imitation in the arts, especially as it reflects the divine action, we can now consider how we can give a classification of the fine arts. We can do this by seeing the ways in which this object can best be imitated in the different materials of words, color, or musical tone, which we have seen are the proper matter of the fine arts. The division rests on the three possible objects of imitation: **action**, **character**, **thought**, and on the three possible kinds of matter: **words**, **musical design** (which includes both melody and rhythm), and **visual design** (spectacle). Words and musical design must include *movement*, but visual design may be either *moving* or *static*. Words have their significance by *convention*, musical and visual design by the natural expressiveness of the human voice and body.

Finally, the difference between the *dramatic* and *non-dramatic* manner is basically a difference between the joint use of the arts to produce a synthetic work (in which human action is represented on the stage in all its aspects) and the individual work of poetics (where the other arts are omitted). Thus Aristotle's division of the arts (*Poetics*, I) according to objects, means, and manner is observed in the following division:

Classification of the Fine Arts

A. The *synthesis* of the fine arts, the **drama**:

Definition: The drama is a work of fine art whose **form** is the representation of *human acts* in their relation to divine and human law, along with the *characters* who act and their *thoughts* about their acts, and whose **matter** is *words*, along with moving *musical* and *visual designs* whose significance is derived from the natural significance of the human voice and body in repose and motion.

B. The *individual* fine arts, each of which produces a part of the drama but which may produce independent works:

I: Literature (poetics):

A poetic work excels in representing the element of *thought* by means of conventional signs or *words*, along with spoken musical design.

II: Music:

A musical work excels in representing *character* as it shows itself in *emotion*, by means of a *pattern of sounds*.

III: Visual Art:

1. Dancing excels in representing *character* as it shows itself in the movements of the human body, by means of a *visual design* using such movements.
2. Painting and sculpture excel in representing *character* as it shows in the repose of the human body, by means of a *visual design* using this repose.
3. Architecture and the crafts provide an appropriate *setting* or *instruments* for human motion or repose, by a *visual design* adapted to these.

CHAPTER III

The Purpose of Works of Fine Art

TOWARD A DEFINITION OF FINE ART

THE EXTERNAL CAUSES OF WORKS OF FINE ART

A work of fine art is good because of its matter and form, not because it was produced by a famous or fascinating person. Its purpose should be obvious from the work itself, as a well-made saw is obviously for sawing. Hence it would seem that the discussion of the matter and form of a work of fine art, such as that given in the previous two chapters, is sufficient for our understanding of such works.

Nevertheless, this is not the case. We cannot be sure that the form of a work of fine art is really excellent unless we have a very clear idea of the purpose of a work of fine art. We cannot say that a saw is good for sawing if we do not understand just what sawing is. Furthermore, we can judge that a work of art is well-made only if we have an accurate idea of the possibilities of a human maker. To expect too little or too much in a work of art would lead us to unfair judgments. Hence it is necessary to consider not only the internal causes of a work of art (matter and form), but its external causes as well (the artist and the purpose of art).

In raising such questions, however, we must be careful to confine ourselves to **proper causes**. The biography of an artist may be very interesting, but it concerns us only as it deals with his work as artist. The purpose of a work of art concerns us only as to its *artistic* purpose. An artist may be a murderer or a saint, and a statue may have value as a door-stop or a hitching-post, but these facts are *accidental* to the work of art itself. A failure to remember this leads to a great mass of irrelevant art criticism in which the artist is discussed at length, and the reactions of his audience are detailed, while the matter and the form of the work of art are scarcely mentioned. We are concerned with the artist only insofar as he produces an artistic form in a suitable matter, and we are concerned with his purpose and the reactions of his audience only insofar as these are strictly esthetic.

The answer to these problems will constitute a *search for a definition* of a work of fine art. We will first look for the **final cause** in the present chapter. Then we will relate the **matter and form** of art already discussed in Chapters I and II to this final cause. Then in the next chapter we will deal with the **efficient cause**. The final and efficient causes have already been briefly suggested in Chapter I (pp. 237 ff.), but we must now establish them in a more scientific fashion.

DO WE NEED THE FINE ARTS?

In investigating any subject scientifically we must first answer two questions: (1) Does it exist? (2) What is its definition? (See pp. 231 ff.). In the case of a work of art the first question really means: Do we need such a work? If a saw were not needed we would not be interested in whether it existed or not, and if it were needed then we would make it if it did not already exist. When we have decided whether a work of fine art is needed, we will have established both its existence and its final cause, and hence have found the first element of its definition.

That we human beings need works of fine art is obvious from the fact that in every country, in every age, and in every class of people such works have been made and valued. Even the most "low-brow" family has pictures on the wall at home, and enjoys a movie or a joke. Works of art are found not only in the highest

civilizations but also in the dwellings of the cave-man and the Eskimo.

Yet some people have actually denied the value of the fine arts for human life. This denial has come from utilitarians and puritans. Utilitarians are those who say that the fine arts are a waste of time and money, since they serve no useful purpose. We need food, clothing, shelter, comfort, they argue, but who really needs an oil painting or a symphony? Would not money paid for works of art be better spent in building houses or in improving health? Artists, they say, are weaklings who waste their lives in dreams instead of really working to improve the lot of mankind.

Puritans, on the other hand, argue that the fine arts are dangerous because they make men soft and luxurious and tempt them into sins of impurity or emotionalism. The puritan fears that a love of art will only distract a man from saving his soul and the serious business of life. He suspects that all artists are effeminate, dissipated, and probably drunken, and those who appreciate the arts are dilettantes and snobs.

In the United States these two objections are often made. The American business man is likely to be ashamed of a son who wants to be an artist, thinking that he will be a "sissy" and an irresponsible failure. Yet the experience of mankind proves that these are mistaken attitudes. If art has been valued in every nation as a noble and glorious thing, and artists honored as benefactors of the human race, art cannot be evil or a waste of time. The utilitarian is illogical when he says that only useful things are valuable. So is the puritan when he argues that art is evil because some artists and esthetes have been evil.

The clearest evidence for the value of the fine arts is that the greatest men of the past and of today have honored art. Our divine Lord himself loved the poetry of the Psalms which he recited even on the cross, and he himself was a great artist who in his parables composed great works of literature. The Catholic Church, following his example, has always fostered the fine arts, and requires their use in its most sacred functions, especially in the Holy Sacrifice of the Mass, and has condemned the puritans and utilitarians who tried to remove art from the churches.

THE NOMINAL DEFINITION OF FINE ART

The dictionary tells us that in present usage the term "fine art" has the following meaning:

Fine art is concerned with the creation of objects of imagination and taste for their own sake and without relation to the utility of the object produced.

Under the term "fine arts" we find:

Painting, drawing, architecture, and sculpture (these four being often called the *arts of design*); poetry, music, dancing, and dramatic art:—sometimes restricted to the first four named.

We discover also that this term is not an ancient one. In ancient and medieval times men spoke of *servile art* and *liberal art* (see page 20), but not of fine art. The term began to be used in English in the 18th century as a translation of a French term, *beaux-arts* (arts of the beautiful).

If we look up the word "art" we find that it is from Latin and has the same root as the word "armor" and the word "articulate." This root means *fitting*, appropriate, or suitable, as armor is made to fit the body, and as something is articulate when it is jointed (a joint being a fitting together of two parts). The Greek word *arete*, which means *virtue* (from Latin for *manly*, i.e., something suitable for a man) comes from the same root, because a virtue is the power of doing something which is excellent or suited to the dignity of human nature.

The word "fine" is from the Latin word *finis*, which means end or goal, and is an adjective meaning "finished, brought to perfection, subtle, delicate, refined, of marked excellence or superiority."

Thus the origin of the term shows that the arts are skills or virtues by which a man can produce something which is suitable or fitting for his purpose, and that the fine arts produce something which is in a special way finished, refined, excellent, and beautiful. Hence we can see why in current usage it refers to painting, drawing, architecture, sculpture, and sometimes also to poetry, music, dancing, and drama, since all of these are beautiful things which are valued, not merely because they are useful, but because they are enjoyable. Perhaps this is the deeper sense of the word "fine"; for a

thing is useful as a means to an end, but when it is valued for its own sake it is an end in itself, and *finis* means end.

SEARCH FOR A REAL DEFINITION

This nominal definition can guide us in our search for a real definition. We notice that there are two things to define:

1. The skill by which a work is produced, the **fine art**.
2. The product or object of this skill, the **work of fine art**.

Which shall we try to define first? Obviously a skill is determined by what it produces, so that it would seem we must first define the skill required to produce it.

This raises a difficulty, however. We know (see page 134) that only natural things can be properly placed in the categories and defined. Are works of fine art natural? Some people have argued that they are, pointing out that birds sing, bees build hives, and many animals have mating dances. But these are known to be natural precisely because they are instinctive and always performed the same way by all the animals of a species.

Works of fine art, however, are especially characterized by their *inventiveness*. Each artist shows great individuality in his work, and each work itself is unique. It is clear, therefore, that while the works of animals are produced by instinct and are natural, works of fine art are works of reason. To be sure, some authors have said that works of fine art are the products of our subconscious mind and they point to the fact that dreams are like poems, and some poems have actually been composed in dreams. They point out, too, that children, savages, and even insane people sometimes produce remarkable works of art, and that a whole school of modern art called *surrealism* deliberately seeks to produce an art that wells up from the subconscious without the control of reason.

However, without entering into difficult problems of psychology, we can see that generally speaking artists work quite deliberately and are able to explain and criticize works of art. Even when an element of the fanciful and the dreamlike enters art, the artist keeps it under control. Furthermore, the human subconscious and the imagination

are not merely instinctive but are influenced to some degree by reason. Hence we must conclude that works of art are not works of nature, but free human inventions.

Some esthetes have gone so far as to say that a work of fine art is of value without any reference to human needs. This would be the theory of "art for art's sake" in its most extreme form. These argue that just as the works of God, sun, moon, plants, animals, and men were created just to be themselves, so man makes works of art just to exist as perfect works. This argument is insufficient. God does indeed produce creatures each of which has its own value, but the things less than man have been made for man's benefit, while man has been created (as the Catechism tells us) "to know, love, and serve God." Irrational creatures are ennobled by serving man and being used by him. Man is ennobled by serving his God. If this is true of God's works, which are substances able to exist in their own right, how much more true is it of human works, which are only modifications of the things which God has made?

CHARACTERISTICS OF FINE ART

WORKS OF FINE ART NEED NOT BE USEFUL

When we look at the various things which man makes, we notice that most of them are *useful*. A kitchen stove is useful to cook our food, a table is useful to hold our food, a knife, fork, and spoon are useful to bring the food to our mouth, food itself is useful to nourish us. At first sight it might seem that unless a work of art were useful it would have no purpose or value at all. This is the opinion of the utilitarian, who says that all things have value only because they are useful.

But this view is self-contradictory. A thing is useful because it is a means to an end. The end itself is not useful since it is not a means to anything, and yet it must be valuable, since it is because of the end that the means has value. In fact, if we consider the various useful objects about us, we begin to see that many of them have a value which is above and beyond their use. Thus the chair, table, knife,

fork, spoon, may not only be useful, but they may be *beautiful*. We enjoy looking at them even when we do not use them.

Indeed, this is true, not only of human works, but especially of the works of God. Not only has he filled the world with things useful to man—the air, the sunlight, the earth, plants, animals—but to these things he has given beauty which makes them delightful to look at and to hear. Moreover, many things in nature for which we have little or no use are still very interesting to study. A butterfly collector, a collector of minerals, or a botanist eagerly seeks out and preserves in his collection many natural objects which he will never use.

Thus some works of art are only useful (a trash can, a paper clip); others are both useful and fine (a beautiful teacup, a handsome automobile); others are only fine (a painting, a piece of music).

We should notice, however, that when a thing is both useful and beautiful there ought to be some relation between these two kinds of value. In the Victorian age there was a common notion that beauty and utility are opposites. Consequently when they wanted to make a useful object beautiful, they tried to disguise its use. They concealed umbrella stands inside statues, they made stoves look like little iron cathedrals, and they made grocery stores look like Greek temples. This we can call the error of *ornamentalism*. That it is an error we can see from looking at the works of God. The beauty of a horse is not merely due to its mane or its color; it is found in its lean, clean, swift look. But this appearance is based on the fact that its skeleton and muscles are perfectly fashioned for the use or *function* for which they are intended.

Much of the beauty of nature is found, upon careful study, to be a result of the usefulness of natural objects. Modern artists have begun to realize this, and they have put forward the theory of *functionalism*. According to this theory, if we make a building or an automobile or any other object truly useful, it will automatically be beautiful. Functionalism is an exaggerated reaction against ornamentalism. The true view is that the beauty of an object ought to grow out of its usefulness, but that beauty is something above and beyond the useful, not merely a result of it.

A WORK OF FINE ART NEED NOT DIRECT OUR ACTIVE LIFE

Since a work of fine art is not necessarily useful, it must have its value in helping us live well. Because this is so, one of the commonest views of fine art has been that its purpose is to teach us morals and to persuade us by its charm to do what is right. This indeed would be a very high value in a work of art, and without a doubt some works of fine art are most effective in this way. For example, our Lord's parables are beautifully told short-stories, and they deeply affect us and lead us to a better life. The great novelist, Tolstoy, argued that all fine art must lead us to love God and our fellowmen, and that this is its real purpose. Similarly, most poets have defended their work by saying that it had great moral value. "Let me make the songs of the nation," one said, "and I care not who makes its laws."

Action and Contemplation

But moral teaching and persuasion is not the only value a work of fine art might have in helping us live well. Man has two kinds of activity which belong to him as a spiritual being. One is action in the ordinary sense (working, talking, making, leading, governing, loving, playing) by which he seeks his physical and social needs. We call this the **active life**, and it is lived by the business man, the man in government and communications. The other kind of activity (which seems to many not to be activity at all, but which is really the most godlike) is the activity of **knowing**. The scientist, the philosopher, the theologian, the mystic, all live this life which is most like the life which God himself lives. God lives a life of pure knowledge and love, and he has created and governs the world without in any way turning from that life of pure contemplation. It is this life which the saints in heaven share with him, and which we hope will be ours to share forever.

This contemplative activity is the highest kind of activity, but it is also a wonderful kind of rest or repose, a vacation of enjoyment, in which our activity is simply to enjoy ourselves. It is the highest kind of activity, because the active life of business and government exists only as a *means* to this end.

The Fine Arts and Contemplation

It is possible, therefore, that the value of the fine arts lies not in directing our active life but our contemplative life. Which is it? The answer seems clear enough. In speaking of the fine arts we always emphasize their *beauty*. But beauty is that which *pleases* when seen (see page 339): We delight simply to look at it; we do not use it, nor does it lead us to do something, other than simply to look and enjoy. Thus the work of fine art is characterized by the fact that we enjoy looking at it, we take pleasure simply in knowing it—and this is just what we have said is the mark of contemplation. Although a work of fine art may improve us morally, this it shares in common with many other things, and what is more characteristic of it is that it is of contemplative value.

Does this mean that works of fine art as such have no moral significance? This again is one of the ideas of the "art for art's sake" school, and is an exaggeration. The contemplative activity of man is the goal of his life, but it must be moral. This means that we can take a true pleasure in contemplation only if what we contemplate is *true*—that is, God, or something which God has made as he intended it to be, or something which we have made which is in accordance with God's wisdom and law. If we were to take pleasure in looking at things that are sinful or monstrous or false, we would be going against our own nature which was made to know and love God. To be sure, a work of fine art may contain a representation of something sinful or evil as one of its *parts*, just as in speaking we may sometimes quote words which are false or blasphemous, but the work as a whole must be true.

Furthermore, not only must the work be true and good in itself, but it must be suitable for a particular audience. Things that are good or true in themselves may still be an occasion of sin for those who are weak.

THE MORAL INFLUENCE OF THE FINE ARTS

These are negative requirements, but there are also positive ones. The things which we contemplate and enjoy influence us. We tend to become like those we live with and love, and we tend to become

like the things we contemplate and enjoy. This is not an immediate effect, but only a *remote* one, since we are not made evil simply by an occasional meeting with someone or something evil. But when this association is repeated, then the disposition to evil is produced in us. Hence the works of fine art which we contemplate have a *remote* moral effect on us, even when they do not actually tempt us to sin, or persuade us to do right.

Because of this fact, a work of fine art ought to make us delight in what is true, noble, courageous, hopeful, pure, charitable, so that we may become like these things. It ought not to make us habitually ambiguous, petty, fearful, sensual, gossipy. Finally, since human life is short, works of art which are not positively bad but which are trivial are a waste of time. We might be rather enjoying those which have a strong and true moral effect, even if this is a remote one. As we have seen, however, this moral effect is not the proper and specific character of the fine arts.

A Work of Fine Art Leads to Contemplation by Its Beauty

We have still not found a way to distinguish a work of fine art from many other types of human works. The things which are worth contemplating are so because they are true and beautiful. If they were not true, then, as we have said, it would be wrong to take delight in them. On the other hand, if they are not beautiful they are not delightful.

Of course everything which is beautiful must first be true, since we would not delight in knowing what is false—the false is not satisfying to minds like ours made to know the true. When people do seem to delight in what is false, this delight is perverse and unhealthy. On the other hand, everything which is true must also be beautiful, since a right-minded person cannot help but delight in the truth. It would seem, then, that the words of Keats, “Beauty is Truth, Truth Beauty, that is all you know or need to know,” are correct.

This is inaccurate, however. The beautiful adds something to the true, namely, a fittingness or appropriateness to the mind of the one who knows. Truth appears beautiful to us only when it is vivid, clear, perfectly achieved by our power of knowing. Thus all truth is beautiful to a perfect knower, but to human beings who have only

a weak power of knowing, much that is true has only a hidden beauty. To God and the angels this world appears marvelously beautiful, even though they see clearly the sin and disorder that fill it, because these evils appear only as the dark shadows which increase the splendor of its order as a whole. We stand so close to the world that we cannot see its whole design. We are like men standing at the foot of a skyscraper unable to see its beauty.

For us human beings the things that are greatest, most true, and most worth knowing are not always the most beautiful, while the things that appear most beautiful to us are not always the things most worth knowing. Works of art excel in beauty, but they need not always excel in the importance of the truth which they contain. But since time is short in this world, we should not waste too much of it on beautiful trivialities when it is possible to find works of art which are at once very beautiful and concerned with great truths.

A WORK OF FINE ART LEADS TO CONTEMPLATION BY CATHARSIS

The Significant Form

A work of fine art, therefore, is above all something beautiful; yet this is not enough to define it, since many beautiful things are not works of art. On another page (248 f.) we have seen that beauty for us is found principally in mathematical patterns of color or sound. What is peculiar to the beauty of a work of fine art? It is not to be found merely in the fact that the work of fine art has a beautiful mathematical design.

We have seen in the last chapter (page 251) that such beauty is not fully satisfying to us because we naturally desire to know more than surface beauty. Unless the form is *significant* of some underlying nature, it seems trivial to us. If human art had only the beauty of mathematical design it would be inferior to natural things, whose forms are significant of the nature of the things. That is why the modern architect admires the *functional* beauty of natural forms, and despises the merely ornamental beauty of surface designs.

Hence the form of a work of art must be significant of the underlying nature, and we have already seen how this is achieved through imitation or representation (pages 256 f.). A work of art is superior to nature itself in this respect, since the imitation tells us

more than the original about the interior nature; an actor shows the character of the man he imitates more clearly than the man would reveal himself in real life. The artist by intelligent selection and emphasis of the significant details or properties of a thing helps us to see what is essential and unique in it (see page 252). It would seem, then, that imitation is the specific difference of a work of fine art, and it is by imitation that the artist leads us to contemplation, which would thus be the final cause of the work.

The Imitation of Art

This is indeed true, but it is still not sufficiently precise. Not every sort of imitation achieves the effect on us found in a work of art. It might be possible to draw a clever diagram of a plant, for example, which would be highly instructive as to its inner nature and function, without that diagram seeming to be a work of fine art. We expect the work of art to appeal to our emotions, to arouse our sympathy.

We can well understand why this is necessary if we consider that contemplation is hindered, not only by an unclear, confused, or obscure object, but also by dryness, distraction, weariness on the part of our feelings. If the artist is to help us contemplate, he must not only show us an object by a clear imitation, but he must also dispose us to gaze at it by arousing our interests and winning our sympathy. Works of fine art usually have some element of surprise, of the puzzling, of the dazzling, or of the fascinating, that wins our attention. We might say, therefore, that the work of fine art is an *imitation arousing emotional sympathy*, or something of that sort.

But again this does not seem sufficiently precise. What we have just described sounds like an *advertisement* or piece of *propaganda* which is persuasive just because it arouses our interest, appeals to our feelings, and then conveys its message. A work of fine art is, indeed, very close to advertising, and yet it is utterly different. The difference is that the advertisement wins our attention and conveys its message in order to get us to do something, to buy the product. A work of fine art, on the other hand, wins our attention in order that we might repose in contemplating its beauty, desiring for the time to do nothing else.

Imitation and Catharsis

This is indicated by the classical term *catharsis*, or purifying of the emotions. The advertisement channels our emotions to action, but it cannot be said to purify them. The work of fine art, after arousing the emotions of interest and sympathy, goes on to bring them to a repose in the beautiful object so that our vision becomes crystal clear. The emotions are said to be "purified" because they now aid us to contemplate, rather than hinder us.

When our divine Lord said, "Blessed are the pure of heart, for they shall see God" (Matt. 5:8), he was telling us that contemplation requires the purity and harmony of the appetites (the heart) as its indispensable condition. If our appetites are disorderly, they will never permit the mind to rest in the vision of beauty and truth. Permanent purity of heart can be achieved only by the virtues which are acquired by grace and patient effort, but the work of fine art gives to us a transient experience of this purity of heart. The sinful man hearing a great poem experiences, for the moment, something of the wonderful calm and clarity of soul which is the permanent possession of the saint.

Thus the work of fine art has imitation as its **formal cause**; yet this imitation must be such as to produce a catharsis of the emotions, ending in the contemplation of what is imitated. This is possible because the chief object of imitation in art is human action, and with **human action** we feel a natural sympathy. In watching a play, we witness the story (imitation) of the life of a man like ourself. This bond of similarity arouses our emotions. As the story by its significance begins to show us the order and beauty in human life, our aroused emotions are harmonized and begin to come to repose in the delight which we feel, and as they come to repose they are purified, so that our mind is free to delight in the beauty of the object without distraction.

THIS CONTEMPLATION IS RECREATIVE

At this point we seem to have discovered the specific difference which distinguishes the work of fine art both from things of natural beauty and from other works that have a merely persuasive value. But a problem remains. If it is true that the end of fine art is con-

templative, and that this requires a purification of the emotions, and that permanent purity of the emotions is achieved only by virtue, then it seems that a work of fine art is only a cheap substitute for being a saint or a man of wisdom. While we are being charmed by a work of art, we can look at life with vision and delight in it—but only for a few moments, and then the spell passes. The wise man and saint, however, have this vision and joy in life as their permanent possession.

In answering this objection we must first admit that works of fine art do often serve such **secondary** purposes:

1. They have an *educational* value for the young person. Such a person does not have the virtue or wisdom or power of concentration to be able of himself to enjoy a contemplative view of the world. When reading a fine novel, a great play, or listening to beautiful music, he is awakened, perhaps for the first time, to the wonder of contemplation. It is for him a foretaste or pledge of what he may achieve by a life of effort to find wisdom. That is why Plato so wisely told us that philosophy or the pursuit of wisdom begins when the soul is awakened by the beauty of poetry and art. Without this foretaste of the joy of contemplation we would never make the effort to attain it. This value of fine art is very great; but if it were the only value, then once wisdom were attained works of fine art would become unnecessary; they would be only for beginners.
2. They also have *therapeutic* (healing) value for the person who is emotionally ill. Aristotle's term "catharsis" is a medical term, and many have emphasized the fact that art has a calming effect on the emotionally disturbed. By reading a novel or watching a play, or particularly by listening to music, these morbid emotions are released and calmed, and balance is restored within the soul. There is no doubt that works of fine art have this healing power and that occasionally—in times of intense sorrow, of illness, or simply of moodiness—the enjoyment of art is an effective cure. However, this again is only a substitutional value, since it makes art useful only to a few and in exceptional situations.

But there is a primary value in the fine arts even for the wise and healthy man. We have already said (page 277) that for us human beings beauty and truth are not always proportional. Some rather unimportant or merely probable truths are very beautiful, while some very great truths are so far above us that we achieve them only with great effort. We must rise, so to speak, above the human level to the divine. This is true of the deepest truths of philosophy, but it is even truer of the supernatural truths which we find so difficult to consider in prayer without distractions. Hence even for the wise man contemplation is an effort in this life. In the next it will be a bright vision and perfect repose; here it is a dark and hard way.

Consequently, even the wise man grows weary of the effort, and requires rest and recreation. Yet because he loves the truth which he seeks to contemplate, he does not wish utterly to put it aside. It is here that the work of fine art is so great a gift. The work of fine art recreates us contemplatively. It recreates us because it gives the pleasure of looking at something beautiful in a way that is effortless—or at least relatively easy compared with contemplation—and yet it is itself a continuation of contemplation. Such recreation is *inspirational*, since it both rests us and elevates our soul.

We may therefore conclude that the purpose of a work of fine arts is primarily to give us a recreative form of contemplation, although secondarily it serves educational and therapeutic purposes.

CHAPTER IV

The Efficient Cause of Works of Fine Art

ART AS VIRTUE

INTRODUCTION

Artist and Tools

It is obvious that works of fine art are made by men and women who are artists; they are **principal** efficient causes. They also employ various tools, the paint-brush, the chisel, the musical instrument. These latter are the **instrumental** efficient causes of a work of art. The study of such tools is quite interesting and should not be neglected in trying to understand the arts. We cannot fully appreciate a symphony or a concerto, for example, unless we have at least some awareness of the way in which the composer has skillfully employed the tools of his art.

Here, however, we are going to pass over the instrumental causes of the arts, and consider only the artist himself and the art which makes him an artist.

Art as Expression

No one doubts that every work of art bears the individual stamp of the man who made it, since an effect must resemble its cause. Hence we say that a man *expresses* himself in his art. This is true of anything that a man makes, but undoubtedly it is especially true of the fine arts since their content and style depend so much on the individual experience of the artist.

But it is important to remember the difference between an **accidental** and a **proper** cause. A doctor may be a musician as well, but if he sets a broken leg he is acting precisely as a doctor, not as a musician. As doctor he is the **proper** cause of healing, but as a musician he would be a proper cause of music, and only an **accidental** cause of healing. Similarly, an artist may be a good man or a bad man, he may have many abilities and peculiarities. All of these are accidental to his work as an artist, which is good or bad because of his art, and not because of the kind of man he is. Of course no one doubts that his other characteristics may hinder or help his work as an artist, but they only indirectly affect the work of art itself.

Hence if we say that fine art is an *expression*, we either mean that it is an expression of a man as he is an artist, or that it is an expression of him in his other, non-artistic traits. If the latter, then we must admit that this is a real defect in a work of art, just as if the doctor while operating paused to express himself as a musician by singing a song. The artist who intrudes his personality or his autobiography into a work of art is a poor artist.

On the other hand, it is perfectly true that the work of art is an expression of *the man's art*. This art is greater than any single work which it produces, and it is legitimate for us to admire the various ways in which the vision of a supreme artist is reflected in his different works. There is little doubt that the different works of an artist cast light on each other, so that we understand each play of Shakespeare better by comparison with his other works. Nevertheless, if we concern ourselves with the greatness of Shakespeare rather than with the greatness of each work, we are moving outside the realm of art into the realm of moral philosophy.

THE HABIT OF FINE ART

Is an artist "born" or "made"? Experience shows that whether he requires great gifts at birth or not (we will discuss that below), he cannot become a great artist without acquiring a habit or virtue of art. Some artists have produced remarkable works when still very young, but the first works of an artist are never masterpieces, and most artists do not do their best work until after a number of years of constant effort and practice. That the habit they acquire is truly a habit and not merely a disposition is proved by the ability of the mature artist to do consistently fine work.

There have been artists who have produced one or two fine works and never been able to succeed again. In such cases, it is not clear that the quality of these works is more than accidental; but when the great artists turn out a flood of fine works, even the poorest of which have distinctive quality, we can be sure that they possess a true habit. Since this is a habit of producing a work of genuine value for human life (as we showed in the last chapter), it is a *virtue*. Since it is the power to plan and direct something in a rational way, selecting the appropriate means to achieve a definite purpose, it is an *intellectual virtue*.

LOCATION IN CLASSIFICATION OF VIRTUES

The fine arts thus belong among the intellectual rather than the moral virtues, because they give a special power to our reason, rather than to our appetites. There are five kinds of intellectual virtue: insight, science, wisdom, prudence, and art. Restraining the immediate impulse to place the fine arts under "art," we must consider each of these possibilities.

The habit of the fine arts cannot be *insight*, because insight deals with immediately known truths. To be sure, there is a strong element of intuition or insight in the fine arts, and the contemplation of the beautiful is a kind of immediate vision of truth. Nevertheless, the artist cannot produce a work of art merely by insight. He may have an intuitive view of the ultimate effect he wishes to produce, but he must choose the means to the goal. This requires deliberation and reasoning, and we may define art in general as "right *reason* about making."

Neither can the habit of the fine arts be wisdom, although many have exalted poets as seers, prophets, and the wisest of men. True wisdom is a knowledge of the ultimate causes of things, and these ultimate causes are not anything that man can make or control, or even adequately represent. The habit of the fine arts certainly deals with a work of art which man himself produces, and hence can be "wisdom" only in a wide sense. An artist may, indeed, be a wise man, but his wisdom is not his art, nor his art his wisdom.

Could fine art be science? Most people today would immediately reject this suggestion, on the grounds that art is emotional and intuitive, while science is cold and abstract. Yet it can hardly be doubted that every art is based on a real *theory* which establishes certain principles and rules of artistic construction. Such a theory is science, since science is reasoned knowledge. Some, it is true, have denied the possibility of an artistic theory or artistic rules, but this is contrary to the fact that many great artists have expounded such a theory, and many great critics have shown that such a theory is implicit in all art.

A stronger objection would be to say that the virtue of science, strictly speaking, is a *theoretical* and not a practical virtue; it is concerned with knowing, rather than doing or making. Yet the ancients pointed out that certain theoretical sciences are also liberal arts, because they make a product which is *internal* to the mind, namely, the sciences of logic and mathematics.

LIBERAL OR SERVILE?

Poetics and music were considered by the ancients to be liberal arts. How can this be correct? Do they not seem to produce something *external* to the mind? The poet or composer must first hear his composition in his *imagination*, which is outside the intellect, and then produce it in physical sounds.

This objection is not fatal to the ancient classification. All human thinking makes use of images. Since, however, poetics and music are pure instruments of thought, formed spontaneously and without any deliberate manipulation of physical matter, their use does not require a servile art. As for the external sounds, these need not be

produced by the poet or composer; their work ends when they write down their piece in words or musical notation.

A skillful reader can recreate the work in his imagination without any physical production whatsoever, and when a poem is recited or a piece of music performed this can be the work of some one with a quite different sort of skill than that possessed by the poet or composer. Hence the arts of *composing* poetic or musical works do not involve matter external to the mind, and they remain truly liberal.

LOGIC OR MATHEMATICS?

Granted that poetics and music are liberal arts, should they be classified as logical or mathematical, or should they be placed in some third division? A third division is not possible for the following reason: To make something in our mind we must have some kind of "matter" capable of existing in our mind from which to construct it. This "matter" is either real physical matter or not. If it is real physical matter, then we can make something out of it mentally only in the sense that we mentally divide it into parts and figures. This is the work of mathematics (see pages 303 ff.). If it is not physical matter, then it is "matter" only in the sense of the multitude of concepts which exist in our mind and which may be combined or ordered in various ways by mental relations. This is the work of logic.

POETICS AND LOGIC

If we ask whether a work of poetics or of music is logical or mathematical, it is apparent at once that the poetic work is more like the things which logic produces, and the musical work like the things mathematics produces. A poem is made out of words and consists in a certain order of concepts. A piece of music is made out of tones arranged in some kind of quantitative pattern.

1. Art as a kind of logic. Nor is it too difficult to discover the position of poetics among the various kinds of logic. It certainly is not the same as **theoretical logic** (*logica docens*), which is concerned with proving the validity of logical forms, or establishing the logical requirements of proof. Rather it pertains to **applied logic** (*logica utens*), which considers the employment of these forms in particular

usages. (See pages 18 f.). It is not, however, a *demonstrative* use of logic, since this pertains to the diverse special sciences, and poetry can treat of any subject whatsoever. Nor is it the *dialectical* use of logic, since the dialectician makes no appeal to the emotions. Nor is it the *rhetorical* use of logic, since the rhetorician, although he appeals to the emotions, does not produce a catharsis leading to contemplation. Thus poetics is a *special* use of logic having this last purpose: to produce a catharsis which leads to contemplation.

2. **The logical form of art.** What forms of logic does it use? A logical form is an *argument*, made up of *statements*, and these statements are made up of *terms*. The two basic kinds of argument are the syllogism and induction (see pages 140 f.). The syllogism uses universal premises, so that in a poetic work which must be an *imitation* (and hence the representation of something singular,) such an argument is not feasible. An induction, however, proceeds from the singular to the universal (or sometimes from singular to singular). The abbreviated form of the induction called an **example** is a singular *typical* case from which we pass to a universal (or to a similar singular).

This is exactly what a poetic imitation does: the imitation presents a singular in a way which renders it *typical* (see page 257). Hence in reading the story of Macbeth, we see embodied in his example a universal human experience. Rhetoric too uses examples, but in order to lead us to action (singular to singular), while a poem presents an example in order to reveal the universal. Thus Aristotle says: "Poetry is something more philosophical and serious than history, because poetry rather gives the general and history the particular" (*Poetics*, IX, 1451b, 3).

3. **Poetic statements and terms.** The *statements* out of which the story (the example or argument) is composed must seem plausible. They are things that could or should happen (*ibid.*, 1451b, 1). Such statements are presented as true; although in themselves they may not be true, yet they are not lies, because they are intended only to exemplify some universal truth. It is only when what they exemplify is false that the author may be judged a liar.

The *terms* of which these statements are made are frequently *metaphorical* (see page 50). Aristotle pointed out that both poet and rhetorician use all sorts of figures of speech, but that a poet

especially excels in metaphors: "The greatest thing by far is to be master of metaphor. That alone cannot be learned, but is the sign of genius, since the right use of the metaphor means an ability to notice similarities" (*ibid.*, XXII, 1459a, 5).

The reason that metaphors are especially suited as terms in an argument through example is that by means of metaphors a poet can represent even very abstract truths in a concrete and sensible fashion. Today some critics are inclined to define poetry as the use of metaphorical language, but this is a mistake, since it is not impossible to compose a poetic imitation of human action in words which are purely literal.

Music and Mathematics

Since music and all the fine arts also make imitations just as poetics does, they too might be considered as parts of logic, differing from poetics only in that they use natural rather than conventional signs. Yet their logical character is much less evident, since, as we have seen (page 264), they imitate emotion and character, and only remotely imitate human thought and deliberate action from which examples can best be drawn. On the other hand, their mathematical character is quite evident, since they produce musical and visual patterns (see pages 249 ff.). Thus the ancients were right in regarding music as a mathematical liberal art, rather than as a logical liberal art, classifying it according to that in which it excelled.

The Other Fine Arts Are Servile

The ancients did not consider the other arts to be liberal, but to pertain to the virtue of art taken in the strict sense as servile art, producing an external work. Thus the arts of *performing* poetry and music (elocution and musical performance) and all the visual arts (dancing, architecture, the crafts, painting, and sculpture) were considered servile, and were generally grouped together as **theatrical art** and **architecture** (including crafts, painting, and sculpture).

1. **Painting and sculpture.** Today this seems rather curious, for we honor these arts as liberal professions. Yet again the ancients had a good reason. None of these arts can produce a work merely in the imagination nor commit it to notation. A painter must himself

execute his own painting, the sculptor his own statue—or at least he must put the finishing touches to his work, if the result is to be perfect. This is not accidental. It is due both to the fact that the material of these arts is more unpredictable than the material of poetics and music, and also to the fact that these arts do not have so exact a formal theory as does music. The painter and sculptor must constantly work by trial and error, constantly readjusting the form to the matter. Until they actually see the result they are not sure whether their idea is good or not.

2. **Architecture.** The same is true of the actor and dancer, but we might wonder if it is true of the architect. Certainly the architect can draw up a blueprint and entrust it to a builder. Yet most building plans are also adjusted by trial and error in the process of the actual building, and the architect prefers to have control of this adjustment. In any case, there is a second reason which makes architecture and the crafts servile, namely, that they essentially involve *usefulness* as well as imitative value, and all the useful arts are servile.

3. **Conductors and directors.** An objection might be raised that besides the composer and performer there are such people as the *conductors* of music, and the *directors* of plays. Their art is a mean between the art of the composer and the art of the performer, since they have to interpret and complete the score of the composer or the script of the poet. Solo performers have the same character, since they interpret as well as perform, acting, so to speak, as their own conductors. We must admit that such an art *participates* in liberal art. But it ought to be classified as servile, nonetheless, since its chief concern is with the guidance of the actual execution of the work of art in external matter.

ART AND PRUDENCE

We have seen that the arts of composing poetry and music pertain to the kind of intellectual virtue called *science*, while the other fine arts pertain to servile art. What about their relation to the other type of intellectual virtue, namely, *prudence*? Prudence directs human acts to the goal of happiness. The artist need not be a prudent man. His task is complete when he has produced a good

work of art, and some great works of art have been produced by men who seemed quite imprudent.

THE PRUDENT USE OF ART

Nevertheless there is an intimate relation between fine art and prudence. First of all, because the artist not only must have the virtue of art, but make good use of it, and this requires prudence. The history of art shows not a few artists who have wasted their abilities, or used them for distorted purposes. It is not possible for a man to misuse a moral virtue, but he can misuse an intellectual virtue. Eventually this misuse of an art destroys the habit in the artist himself.

What is the prudent use of fine art? It must be used for the true end of the art, namely, for contemplative recreation (page 281). When an artist uses his art merely to make money, or for rhetorical purposes (even good ones), or as a pseudo-religion, or to tempt others to sin, he misuses it. Granted even that he uses it for the right purpose, he must also consider other circumstances. Recreation can be excessive, and must be sacrificed to greater and more important goods. Sometimes an artist must sacrifice his art to become a soldier, or a teacher, or a priest, or a mystic. Sometimes, too, he must consider that his pictures will be shown in theaters to all kinds of audiences, some of whom are very young and some very weak or ignorant. A work that is itself good for a mature audience might be an occasion of sin to such an audience as this.

Furthermore, the Christian artist will be guided by a higher supernatural prudence which will suggest to him that he must take into consideration the great weakness of men which results from original sin, their materialism, their discouragement, and he will strive to make works that quiet the passions, raise the soul to a spiritual point of view, and instil a sane hope and a firm courage. Yet he will also not fail to humble human pride and expose hypocrisy and smugness.

A second reason that prudence affects art is that an artist must make use of his own experience in imitating human life. Hence an imprudent artist will have great difficulty in imitating life in a convincing fashion.

ART AND EXPERIENCE

If he is a great man, then as an artist he might choose himself as an object of imitation and produce self-portraits or autobiography. This would have the advantage that he might know himself and his own experiences very well and be able to render them better than less familiar objects. Hence there is no doubt that all artists are somewhat limited in their material by their own personal experiences. Italian painters will paint Italian landscapes, and a Dickens will choose his characters from the streets of London, and from among his own friends and the incidents of his own life. Of course, the wider the power of the artist the less this personal limitation will appear. On the other hand, the artist who makes the mistake of dealing with subjects utterly remote from his experience can hardly produce a living result.

But there is also a disadvantage to autobiographical imitation: it is difficult to be objective about oneself, and the artist needs to produce a work which conveys its subject without the need of our being acquainted with the author, etc. Many defects in art are due to the incapacity of the artist to disentangle his preoccupations as a man from his work as an artist. The greatest writers, like Homer and Shakespeare, often remain utterly shadowy, because we cannot find them in the wonderful objectivity they achieve. On the other hand, a supreme artist like Dante is able to see and paint himself with marvelous objectivity and yet with the intimacy of personal knowledge.

QUALITIES OF THE ARTIST

DISPOSITIONS OF THE ARTIST

We have seen that the artist must have the intellectual virtue of art, and he will use this well only if he also has prudence and experience. All these are acquired. Must an artist also have native abilities and a certain kind of temperament in order to acquire the virtue of art?

Necessary Native Capacities

Any normal human being can acquire any of the intellectual virtues with sufficient training and effort, since they are the proper perfection of the intellect which is essentially the same in all men. Consequently, anyone can learn to paint, or to compose, or to write a poem reasonably well. Nevertheless, for some people this would require long effort and very careful guidance, and only a few persons in the whole population are ever able to produce works of art which have great or permanent value. It is a false notion, however, that sees the virtue of art as possible only for a few experts. In a healthy society all liberally educated people have at least one or two of these arts, so that they can recreate themselves and others.

For the great artist, however, certain native capacities are required. He must have an excellent imagination and other internal senses, as well as acute exterior senses. All the great composers, for example, had an extraordinarily good sense of hearing and a strong memory. In the musical and visual arts the capacity for "space-thinking," or ability to form designs and patterns, is essential. The combination of mathematical and artistic ability is not uncommon for this reason. With this, however, there must also go emotional sensitivity. Mathematicians, for example, may have a wonderful capacity for forming patterns, but if they tend to be abstract and cold, remote from human feelings and sympathies, they will not be able to be good artists. The artist needs this emotional sensitivity in order to be observant of the human actions and feelings which he is to imitate. To this must be added a long experience of human life and of various types of characters of mankind, especially of great and good men, if he is ever to be able to portray such people.

Personal Problems

These very characteristics of acute imagination and feeling give the artist difficult personal problems. Too often artists become prey to their passions and live a life of misery and enslavement to lust, drink, or discouragement. So often is this true that the public frequently thinks of artists as "bohemians" and degenerates. Indeed, the Christian considering the vocation of the artist must seriously

face the moral dangers that beset such a vocation. The actor and dancer face particular dangers because of the personal vanity to which they are liable and the irregularity of theatrical life, but the other arts also have perils which are very real. It is for this reason that fine art so often tends to portray life in its darkest and most degraded aspects, and is seldom successful in portraying what is really good and noble. This is because often the artist himself is not noble and neither are the people he knows.

Consequently, the great artist, in order to keep this sensitive and passionate nature in control, must also be a man of strong intellect and will. He must have an integrity of character and a deep prudence. Contrary to popular impression, such elements are found in the greatest artists; although few of them were perfect men, they had a nobility, courage, and wisdom which were admirable. It is only the lesser artists who lacked these qualities, and they were only able to succeed in those arts where the imitation of subjective personal emotion is all that is aimed at.

INSPIRATION OF THE ARTIST

Dependence on Others

It has generally been admitted, however, that even when a man has great natural capacities, and has acquired the virtue of art, and the prudence to use it well, that he may still not actually produce great works of art. In addition to the foregoing he requires *inspiration*. Inspiration is not peculiar to the artist. No great human work can be accomplished by an individual alone. First of all, he needs the help of the society in which he lives, which provides him with the education and the materials and skills of his art. Great artists have usually lived in great cultural ages. The magnificent flowering of art in Greece in the fifth century before Christ and in the cities of Italy in the fourteenth and fifteenth centuries of our era is evidence of this.

Furthermore, an artist needs to receive the truths that he expresses from wiser men than himself. The virtue of art is directed more to expressing truth than to discovering it. Hence the artist normally receives from the philosopher and theologian the truths

which he expresses. It is the tragedy of modern art that the artist has no one to teach him great truths to express in the form of his art. For this reason, artists without the Christian faith, or even a deep philosophy of life, have nothing to express in art except their own limited personal experience. This is why today art is so introverted, psychological, and emotional. Our best novels are largely psychological studies, and our best painting and music are "abstract" (that is, they imitate emotion).

The Need of Inspiration

When the artist has been inspired with some great truth, he has still the problem of rendering this truth concrete and imitable. This requires a wonderful harmony between his feelings, his experience, his imagination, his intellect, and his will. It is probably because artists particularly need this harmony of all their faculties that they most keenly feel the need of inspiration. In the other professions it is possible to produce a work at will, but the artist often finds himself unable to work as he would like because of factors beyond his control. He has to "feel right."

This fusion and harmony of the artist's faculties is often produced by a strong esthetic and emotional experience which fills him with a desire to produce a beautiful work. Such inspiration comes from friendship, from romantic love, from patriotism, from religion, sometimes from the beauty of nature about him. The artist who is to give us a foretaste of contemplation must himself be encouraged by the sight of great beauty. Hence in the lives of artists we often find that some factor of this sort has "inspired" their art. The disciplined artist, however, does not require constant inspiration of this sort; he is able to revive in himself the vision of beauty which first awakened him to his vocation. Dante lived all his life under the inspiration of his boyhood love for Beatrice, whom he did not see for years and who died long before his greatest work.

Finally, the inspiration of the artist, like all inspiration, must come from God, without whom nothing excellent can be done. No doubt God often helps artists through the ministry of the angels, who not only protect men from evil but assist them in their nobler works. When the ancient poets prayed to their "Muse," we may well believe

that their angels heard them and assisted them in their good purposes to make virtue lovable to men.

THE "CREATIVITY" OF THE ARTIST

This brings us back to the point at which we started (see page 281), a consideration of the artist's likeness to God the Creator. Today it is common to speak of the artist as "creative." This usage reflects the atheistic atmosphere in which we live, in which there is always a desire to attribute God's attributes to creatures. Properly speaking, only God is the Creator, and this power, unlike many of his other powers, he cannot share with his creatures. St. Thomas teaches (*Summa Theologiae*, I, q. 45, a. 5) that God cannot give the power to create to any creature, not even the highest angel, although he can give such tremendous powers as absolving sins or celebrating Holy Mass to man.

It would be more reverent, therefore, not to speak of artists as "creative." To create is to make something from nothing. The artist makes out of matter which he did not make, but which is the creature of God. Furthermore, in making a work of fine art, he *imitates* some natural object from which the beauty of his own work is derived.

The Originality of the Artist

We would fall far short of the truth, however, if we did not admit that, even if the artist cannot create, nevertheless he can *originate*, he can make something really new which has never existed before, and in this power to originate he manifests his likeness to God the Creator.

Certainly we are all struck by the originality of art. The fancy of the artist seems to create new beings, strange animals, undiscovered lands, unique characters. Art seems to take us into a fairy land, a different order of reality. Moreover, every artist seems to create his own new style and a new subject matter. There are no really fixed species of art; for every work is unique, and in the hands of a great artist old forms are completely transformed. This is confirmed by the fact that it seems impossible for one artist to reproduce the work of another, or the style and subject of another age. If he attempts this, his work is always inferior, not only to the original, but even to the less ambitious but more original works of his own contemporaries.

A gas-station done by a good architect today in the contemporary style is usually better architecture than an attempt to build a Gothic cathedral in the twentieth century. Hence originality seems an essential characteristic of fine art.

Yet if the artist does not make his matter, and if he takes the form he puts into this matter from an imitation of nature, then what does he make that is new?

How Man Can Make New Things

Man's thought and art are essentially imitative of nature and God. Man can, however, co-operate with God, not in creating, but in perfecting the universe, and indeed God wills that he should. God has left nature unfinished, so to speak, and wishes man to assist him in finishing it. Since the fall, nature has been disfigured, so that God also wishes man to assist him in restoring it, and elevating it to a supernatural perfection.

Nature has two purposes with respect to man. First, it furnishes him with his material needs, and through the artful use of these materials man further perfects nature. In doing this he imitates nature, learning its processes and then co-operating with them. The doctor imitates the healing processes of nature, but also perfects them. The other purpose of nature is to be known by man, both because it is wonderful in itself and because through it man knows himself, but above all because through it man comes to know God. This purpose is the more important of the two, and man also imitates and perfects nature in this second regard. Nature is made to teach man because it exhibits properties, actions, and order through which man comes to know the essence of natural things and the God who made them. But these signs are obscured by the potentiality, materiality, and chance of the natural world. Man, by ordering and beautifying the world, makes it more intelligible.

Making Nature Reveal Itself

It is in this way that the landscape gardener works with nature, but by his cultivation of the plants he causes nature to become more beautiful and orderly. The work of the experimental scientist is

really the same sort of thing, because his carefully planned experiment and the instruments which he has devised to extend the power of his senses cause nature to reveal itself more clearly to the mind. Thus man perfects the intelligibility of nature, first of all by simplifying it, removing the confusion produced by chance, allowing it to develop fully without hindrance. We have already seen that the fine artist also does this by simplification and idealization of his object of imitation.

In this respect the artist is the cultivator, the midwife of nature, helping her to reveal herself. Furthermore, he is a parent, since he produces individuals within a species. A father does not create a new species but he produces a new human being which is his likeness and yet a unique person. Similarly, the artist does not create man, nor human life, and yet he can individualize them in unique characters and stories in a particular work. He does this by adding individualizing characteristics in a new combination, and signifying them through the unique design of his work.

Producing Original Combinations

In mathematical designs there can be real origination, because quantity contains a potential infinity of parts and figures, and we can divide a plane or a solid in ever new ways. These new parts can then be ordered. This order must already be known by the artist, but in applying it to new parts he discovers new relations which he did not previously know and which indeed did not exist. Moreover, he can embody these designs in different materials.

Again, the artist deals with signs, and signs are connected with what they signify by associations, by cause and effect, and by similarity. All of these connections are indefinite in number, and the artist is free to discover and use new connections and new signs. Indeed, as Aristotle says, it is the mark of the poet to notice unsuspected similarities and metaphors which can be used in this way.

Originating New Species

We may ask finally whether an artist can originate new species of things? He certainly can originate new species of works of art in the ways we have already described, but can he originate new objects

of imitation? What of the figures of mythology or science fiction which were never seen on land or sea? Such fictions are made by comparing one creature with another. Within the genera of creatures (animals, plants, etc.), there are unlimited species which God could create. Many have actually existed during the course of time. Man can conjecture to such possibilities, although he cannot be sure that the thing he imagines is really possible until it is produced by guiding natural processes, as we do in synthesizing new chemicals or breeding new varieties or hybrids of animals.

THE VOCATION OF THE CHRISTIAN ARTIST

THE DEFINITION OF FINE ART

By collecting the different elements which we have treated in the previous chapters we can now give a definition of fine art:

A *fine art* is a liberal or servile art by which is produced a work composed of words, colors, or sounds, so ordered as to imitate human action and thus provide man with virtuous recreation by purifying his emotions, so that he may enjoy the contemplation of the beauty in the work.

In this definition the genus is "liberal or servile art". The difference is provided by a definition of the work of art itself, since a virtue is specified by its object. The work of art has the following four causes:

1. **Efficient cause:** A man having the art.
2. **Material cause:** "word, colors, sounds."
3. **Formal cause:** "imitation of human action."
4. **Final cause:** "to provide man with a virtuous recreation by purifying his emotions so that he may enjoy the contemplation of the (work's) beauty."

In order to make this a definition of Christian art, we could add to the final cause the phrase "in a manner that will assist him to attain to the vision of the divine Beauty."

THE NOBILITY OF THE ARTISTIC VOCATION

This definition should make plain that the vocation of an artist is a noble one, although not the greatest of vocations. The artist

shares with the priest, the teacher, and the statesman the work of raising man from merely practical and everyday problems to a consideration of the contemplative goal of human life. He does not teach with the certainty and the authority of the priest, teacher, or statesman, but he brings truth to men under the form of beauty, which is so appealing. The work of art often gains a hearing where other forms of presenting the truth are ignored. After our Lord's first sermons were rejected by men, he then began to teach in parables.

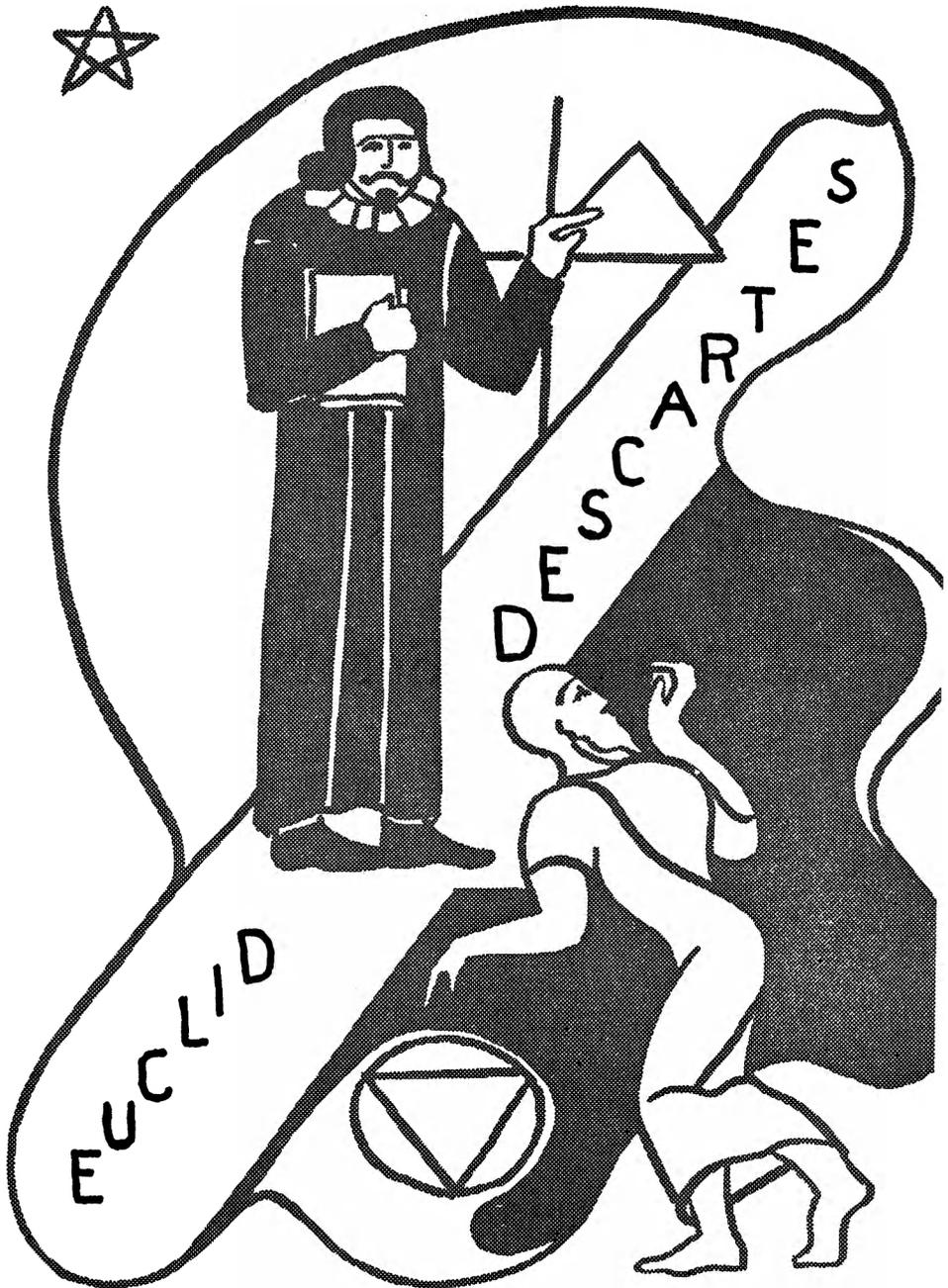
Hence the Christian ought to regard the vocation of the artist as one which is especially fruitful in helping souls, since it is directed more to the spiritual than the corporal works of mercy, and the spiritual works of mercy are the greater. At the same time he must be fully aware of the moral dangers for the artist of which we have spoken, and not place himself in these dangers without providing the proper safeguards of prudence, prayer, and penance.

If he undertakes his work to help man and to honor God, with the counsel of wise men, and in a way which is approved by the Church and civil society, he has an assurance that God will provide him with the graces needed to make his work good. At the same time he has to realize that in this world evil and falsehood are permitted by God to try all those who seek what is good and true. Hence the Christian artist will often find his work misunderstood, undervalued in comparison to work that is cheap or dishonest, and often neglected even by those in positions of authority. With humility and courage he must persevere in producing work that he knows to be according to right principles and the laws of God, the Church, and sound civil culture, not being tempted by human respect, by money, or by a spirit of bitter independence.

All this is hard, but it is what is expected in every vocation if we are to follow Christ.

PART THREE

**Mathematics as a
Liberal Art**



EUCLID

DESCARTES

CHAPTER I

The Science of Numbers

WHY MATHEMATICS IS A LIBERAL ART

NUMBERS IN THE BIBLE

In the Old Testament the God-inspired authors gave us a summary of the way in which men of ancient times had come to understand the world about them. In those days men were fascinated by the numbers and measures of things. Even the most primitive of men counted and measured things for practical purposes, using their fingers as their standard, so that even today most systems of counting are based on 10's. In the Old Testament we find the patriarchs counting their sheep, measuring out their plots of land, weighing grain and money. Many people still do not see anything more to numbers and measures than their practical use in keeping accounts or working out engineering problems.

Yet ancient men saw something in measures and numbers which was more important than these practical values. They saw them as a reflection of God's wisdom in making and ordering the world. The wise man says to God the Creator, "You have disposed all things by

measure, number, and weight." (Wisdom 11:20). That is why in the poetic account of Creation given in the first chapter of Genesis the inspired writer arranges the works of creation according to 7, the perfect number.

Why did they regard 7 as a perfect number? We are not sure, but it is probably because they had observed that in the heavens, besides the fixed stars, there are seven luminaries that change their position: the Sun, the Moon, Venus, Mercury, Mars, Jupiter, Saturn, and after these they named the days of the week (as we still do, using the Germanic names).

As we read both the Old and New Testament, we are struck with how often numbers are carefully mentioned, and if we study these we will find that many are used as symbols. 1 stands for God as the source of all things. 3 stands for God also as he is the Blessed Trinity and the One who contains in his Unity many perfections. 5 stands for a list of duties or obligations, as in the 5 Books of the Law (Genesis, Exodus, Leviticus, Numbers, Deuteronomy) and 5 books of the Psalms, and 10 Commandments (which include duties to God and neighbor). 7 is the number of perfect time, of a complete week, and a complete cycle of years. 9 is 3^2 and therefore an *emphatic* three (as in our *Kyrie Eleison*). Thus the odd numbers are thought of as indicating perfection, because they are unified and cannot be divided.

The even numbers have a different significance. 2 indicates war or opposition, but it also indicates friendship, love, marriage, and also the confirmation of a testimony by a witness, since at least 2 witnesses are required at law. 4 is the number of the corners of a square, and was thought to symbolize the solid earth, or a solid building. Hence the universe was also thought of as having 4 corners, 4 winds, 4 quarters, 4 elements, and to be presided over by the 4 Cherubim who had faces like a man, an eagle, a bull, and a lion (the four most powerful living things: the eagle among birds, the bull among domestic animals, the lion among wild animals, man above all) with which we are familiar as symbols of the Four Evangelists.

6 was considered the number of evil, because it comes one short of 7 and is like the universe without God (the six days of Creation

without the seventh on which God approved his work). Hence St. John the Evangelist in the Apocalypse uses 7×7 to stand for the Church and 666 (3 6's) to stand for Antichrist, the evil one who pretends to be God (3). 8 is considered the number of eternity because it is $7+1$, the eternal day that follows on the week of time. Hence our divine Lord lists 8 beatitudes, and 7 petitions to the Lord's Prayer, because we pray for the coming of his kingdom, but the beatitudes are the rewards of those who will enjoy his kingdom forever. 12 is the number of the Twelve Tribes of Israel and of the Twelve Apostles, because as 3×4 it represents a nation (a four-square city) blessed by God (3), and the apostles are the foundation of the New Israel, the New City of the Church. 144,000 which is $12^2 \times 1000$ stands for all the elect who will enter heaven, namely, a vast multitude who have belonged to the Church.

The ages of the world are sometimes 7, and sometimes 12 (for the number of hours in the day), and we live at the 11th hour. Finally the number 14 (7×2), which is the sum of the letters in the name of David (using the letters as numerals, as the Jews sometimes did), symbolizes the Messiah, the descendant and heir of David, so that in the genealogy of our Lord in the Gospel according to St. Matthew the generations from Adam to Christ are listed as 3×14 .

This symbolism could be superstitious. It becomes so when it is used today in the pseudo-science called numerology, because numbers can be merely accidental things without any meaning at all. But as used in the Scriptures it is a beautiful metaphor to express profound ideas, and a recognition of God's order in the world. We find it not only in the Books of Moses, but especially in the prophecies of Ezechiel and Daniel, in our Lord's own sermons, and in the writings of St. John, climaxing in the wonderful symbols of the Apocalypse.

MESOPOTAMIA AND EGYPT

The love of numerical symbolism found in the Bible reflects the culture of the great archaic civilizations of Mesopotamia and Egypt in the midst of which the Jews dwelt. As the pyramids, towers, and other great buildings of Egypt and Mesopotamia have been uncovered, we have come to read their records kept on stone or clay

tablets, and we begin to see what a great part number and measure played in the lives of the men of these ancient cities.

The proportions, shapes, and arrangements of the buildings show how much men then appreciated beautiful geometrical forms in the universe and tried to copy these in their own works, so that their monuments would fit into the plan of God's own mighty creation. The clay tablets record not only accounts of business transactions, but the patient observation of the stars. The Wise Men who came to worship our Lord in the manger were star-gazers who learned to look for the True Light, through many long nights in the desert marking the paths of the planets.

A permanent reminder of these days is our occasional use of the *sexagesimal system* (based on 60 rather than 10^2), which was often used in Mesopotamia. It is probable that this originated in the symbol of the year as a *circle*. Since the year has approximately 360 days, and these people knew that if we take the radius of a circle and use it as a chord it will form within the circle a regular hexagon (six-sided figure), they divided this year-circle into 360 degrees, as we still do. Each hour of the day also was given 60 minutes, and each minute 60 seconds.

This interest in numbers as at once practical and symbolic spread from Mesopotamia and Egypt to all the lands which derived their civilization from them. In Europe in southern Italy it found a special student in Pythagoras. We do not know much about Pythagoras (although he has given his name to a famous theorem in geometry), but we do know that he founded a sort of religious order devoted to a strict life based on the idea of number and measure in all things. Perhaps their most important discovery was the *theory of music*, which shows that the relation of musical tones to each other is due to a ratio between tones (see pages 349 ff.).

THE GREEKS

The discoveries of Pythagoras stimulated a still greater Greek, namely, Plato, to make mathematics the basic study in his great school, called the Academy. Many of his pupils made basic advances in mathematics and in the application of mathematics to astronomy, but it was Aristotle whose invention of logic made it possible to

turn mathematics into a true science. Science means not only to know that something is true, but to show *why* it must be true. The Babylonians and Egyptians had discovered many mathematical truths, but they had never *demonstrated* them, nor was this possible until Aristotle's discovery of logic.

This scientific approach to mathematics, based on principles, definitions, and proofs, made it possible to distinguish very clearly between three kinds of quantities:

1. **Concrete quantity:** 5 fingers, 5 horses, 6 bushels of wheat—the accountant's view of mathematics.
2. **Abstract quantity:** 5, 6, x , y , a plane, a solid. This is the pure mathematician's way of thinking of quantity.
3. **Applied quantity:** 5, 6, a circle, or square, used to count and measure less abstract quantities. This is the way we use mathematics in other sciences, for example, physics.

Following Aristotle, mathematics was first organized and formulated in ancient times in the *Elements* of Euclid. Modern achievements in mathematics have been very great and are progressing rapidly today, but they are secure only when they rest on this ancient foundation.

WHY IS MATHEMATICS VALUABLE TODAY?

We have seen why the ancients valued mathematics so highly. Is it still of value? We may formulate the value of mathematics in the following outline:

A. Mathematics is valuable as a liberal art.

The liberal arts are tools used by other subjects. Mathematics is a tool subject in two ways:

1. It is a necessary *exercise* in logical thinking.

The great tool of all thought is logic (critical analysis). Logic teaches us four kinds of argument: poetic, rhetorical, dialectical, and demonstrative (see Introduction pp. 18 f.).

The first three kinds of argument can be exercised by the student on any kind of material, but demonstration must be exact and hence it can only be practiced on material which the student understands perfectly. But a beginning student cannot understand perfectly the material of the

other sciences. Only mathematics has material which is simple enough (the numbers and figures) that a beginner can see and understand it clearly. This is because mathematics is abstract, that is, it leaves out the complicated characteristics of real substances and considers only the pure quantity of things. That is why there have been great mathematical geniuses who were very young (e.g., Galois), but few very young men who have been masters in other sciences.

Hence a student will never master the art of logical demonstration except by practicing it in mathematics.

2. It is an important *instrument* of the other sciences.
 - a. Natural science constantly uses mathematics, since the relations between the quantities of natural things are easiest for us to discover. We know little about astronomy or physics without mathematics.
 - b. The fine arts use mathematics because the beauty of things is found especially in their proportions. Thus the theory of music, of poetic rhythm, of painting, sculpture, and architecture, all make use of mathematical principles.
 - c. The social sciences use mathematics (statistics) because the complexities of social facts cannot be reduced to order without mathematics.
 - d. All forms of engineering use mathematics for the same reason as the above sciences and arts.

B. Mathematics is valuable as a science.

Mathematics is inferior to other pure sciences in the subject which it studies. Quantity is little compared with God whom theology studies, or with the physical universe which natural science studies. But it is better than logic, since logic studies relations that do not exist in reality. Yet mathematics is better than all other sciences in its **certitude** and **clearness**. For this reason it is valuable as a pure science, which it is delightful and enjoyable to know for its own sake.

WHY MATHEMATICS IS A LIBERAL ART

We have said that mathematics is a liberal art, but this raises a problem. A servile art is one which makes some external, material product. A liberal art is one which makes something in our mind. How can mathematics make anything in our mind?

We make things in our mind by comparing, contrasting, combining, and separating the different things we know (objective concepts) in some kind of mental order by means of **mental relations** (see pages 454 f.). In this way we can *construct* a number in our minds. If I ask you to make a number greater than 10^{91} , you can easily make $10^{91}+1$, although you have never experienced and could never live long enough to count so great a multitude of things. You can also **construct figures**. If I ask you to think of a line and then divide it into two parts which have the relation to each other of $10^{91}: 1$, you can do that, although you have never seen such a line.

We must understand, however, in what sense we “make” a number or magnitude. We can make in our mind a “dragon” or a “shmoo,” even though such things do not exist anywhere, and, as far as we know, could not exist. We can also make in our mind the notion of a “square-circle,” although we know positively that such a thing could not exist outside our mind. But the numbers and figures which we make do exist in reality in some way, namely, in the **potentiality of matter**.

There really are quantities in the world which we have experienced, and when we divide them mentally into any number of parts which we wish, or into any sort of figure, we are merely marking out mentally the parts which they really (but in a potential way) contain. Furthermore, we mark out these parts by using **points** to divide lines, and these lines to divide planes, and these planes to divide solids; and we produce numbers by counting these parts by the *unit*. The point and the unit which we use to mark out parts exist in real things, and the quantity which we divide is real and really contains these parts, although in a potential fashion. Hence although mathematics makes something in our mind, it does this only in order to study something which is real, and which we did not make, namely, quantity.

To be sure, in mathematics we do not consider quantity as it exists physically in this or that particular material thing. We consider it *abstractly* and as something which we imagine, but this abstraction is based on reality and is used to know reality.

Hence mathematics is different from logic, because logic studies mental relations which cannot exist outside our mind (for example: genus, difference, subject, predicate), while mathematics studies quantity which can really exist outside our mind, even though for purposes of study we construct it in our minds.*

LOGICAL THINKING IN MATHEMATICS

Since mathematics as a liberal art is a perfect example and exercise in logical thinking, and as science is the clearest and most perfect of all, it must be taught and studied according to the laws of logic, as Aristotle and Euclid saw in establishing it as a science.

Logic teaches us three processes of thinking (see page 19).

1. **Exact definition.** We make an exact definition by classifying a thing. To classify a thing we compare it to the class of things which are most like it. This is called its *genus*. Then we contrast it to these other things by stating how it differs from them. This is the *difference*.

An exact definition, therefore, must be in terms of *genus* and *difference* by which the thing defined is located in a *category*. For example: a triangle is a *polygon* (*genus*) having three sides (*difference*) in the category of *quality*.

It must also be noted that a definition may either explain the usage of some term (*nominal definition*), or the nature of something which is known to *exist* actually or possibly (*real definition*).

2. **Exact statement:** We must begin our mathematical reasoning with principles that are seen to be true from the quantities which we have experienced or can imagine. These principles are either:

* Some thinkers do not agree with this statement. We will explain their opinion below, page 395.

- a. **Axioms:** principles which are common to more than one science, for example, a whole is greater than any of its parts.
 - b. **Postulates:** principles which are special or proper to one single science, for example, the definition of a straight line is proper to geometry, and the definition of the number 2 is proper to arithmetic.
3. **Precise reasoning:** We must prove our conclusions (theorems or answers to problems) by showing that they follow logically from our principles. Mathematical reasoning consists in being able to show that every conclusion is based on the axioms and the postulates. Mere ability to work problems does not prove that we are thinking mathematically; a machine can work problems, but it cannot tell why the answer is true.

During the study of elementary algebra all these processes are used, but the first of them, exact definition, is usually stressed. In the remainder of this chapter we are going to develop some of the basic definitions used in algebra.

ACCURATE DEFINITIONS IN ALGEBRA

WHAT IS ALGEBRA?

Arithmetic has been familiar to you from your first years in school. Algebra is something new, but not a new science. The name is from the Arabian, *al-jabr*; it is derived from the title of a book, *Al-jabr w'al-muqābalah*, written by Mohammed, son of Moses of Kohwarezm (Al-Khowārizmī), in the city of Bagdad about 825 A.D. This book was very often used as a textbook in the Middle Ages. We are not sure exactly how the title should be translated. Some say that it means "restoration and equation," and others that both terms mean "equation," but that the first is an Arabic and the second a Persian term. In any case, it refers to the science of equations and their solution ("restoration"). The Arabians derived their knowledge of mathematics from Greek works preserved by the Christian peoples whom the armies of Islam had conquered.

Thus the actual knowledge of algebra goes clear back to the time of Euclid (about 350-300 B.C.), although by the Greeks it was simply called **arithmetic**, or the science of numbers. Arithmetic deals with equalities and inequalities between numbers (equations), but today we commonly use the term to refer to the elementary study of the subject, while we use the terms **number theory** and algebra to refer to a more advanced study of the same subject.

SOME BASIC NOTIONS IN ALGEBRA

In arithmetic you have become familiar with the use of **equations** and of the familiar operations of **addition, subtraction, multiplication, and division**. These are also basic to the more advanced study which we call algebra, and to these we must add a less familiar notion, that of a class or *set* of numbers.

Definition: A *set* of numbers is a collection of numbers having some common property that distinguishes them from other numbers.*

For example, all *odd* numbers have the property of not being divisible into equal halves, and this makes them different from all other numbers, and all *squares* have the property of having equal numbers as their two factors; hence each collection is a *set* of numbers. In arithmetic we are used to dealing only with specific numbers—5, 21, 101, etc.—but at the level of algebra we go on to consider such classes or sets of numbers. In order to have a notation for such sets of numbers, mathematicians in the 17th century invented *literal numbers*, just as the Hindus at an earlier period had invented our numbers 1, 2, 3, 4, etc., to stand for *specific* numbers. Thus we might use the letter *a* to stand for all even numbers, and the letter *b* to stand for all odd numbers, and the letter *n* to stand for *some* number, and we could write:

$$a = n + n, \text{ or } a = 2n$$

$$b = n + n + 1, \text{ or } b = 2n + 1$$

* Note that we speak here of a set of numbers, using "set" in a restricted sense. Ordinarily "set" means a collection of any kind of objects, called its "elements," whether these are numbers or not; the same restricted sense holds for the following definitions.

The first equation would mean: "Every even number equals the sum of two equal parts"; and the second: "Every odd number when divided into its two greatest equal parts has a remainder of 1."

Many students are puzzled by this very logical system of notation. To understand it, they should remember that just as the word "man" stands not just for Peter, or for Paul, but for any and every man, so a literal number stands for any and every number of a certain set of numbers: it is a **distributive universal** term and not a singular term (see page 21). Used in this way, a literal number is said to stand for a **variable**, because it might mean any one of the set of numbers.

Frequently, however, we deal in algebra with two sets of numbers which have definite relations to each other, so that if we choose a number from set A, then we will find in set B another number which bears this relation to it. For example if we select any odd number from the set of odd numbers, we can find in the set of even numbers a number which is related to it by the relation "greater by 1." We call any such relation a **function**, and we say that the second number is a function of the first, and that it is a *dependent* variable, since it depends on our selection of the first number. The first number, since it is freely selected, is called the *independent* variable. Notice the following diagram:

| | A | B | |
|---|--------|---------|---|
| | 1..... |1 | |
| | 2..... |4 | |
| x | 3..... |9 | y |
| | 4..... |16 | |
| | 5..... |25 | |

Here are two sets of numbers. If we symbolize set A by the literal number x , and set B by the literal number y , then x and y are **variables**, because we may select any of the numbers in set A as the meaning of x , or in B, as the meaning of y . But if we consider the two sets as related to each other by a **function**, and consider x the *independent*

variable, then if we select 3 as the meaning of x , we must select 9 as the meaning of y . y is said to be dependent on x , and to be its function. This can be expressed in the following equation:

$$x = \sqrt{y}$$

which means that *any* x is related to *some* y as its square root. Thus we can state the following definition:

Definition: A *function* is a set of ordered pairs of numbers such that no two pairs in the set can have the same first element and different second elements.

This means that we can consider **A** and **B** as a single set of numbers grouped in pairs having a definite relation to each other, so that once we have chosen one number we can be in no doubt as to its partner. Thus in algebra we are concerned not with specific numbers (3, 10, 21), but with sets of numbers, and our **equations** state relations or functions connecting two such sets:

$$\begin{aligned} a &= b^2 \\ x + y &= z^2 \\ x^2 + y^2 &= 0 \end{aligned}$$

In each case the two sides of the equation represent two sets of numbers related to each other by a definite function.

NUMBER AND ITS CHARACTERISTICS

Need of a Univocal Definition of Number

We have now seen that arithmetic treats of specific numbers, while algebra goes on to deal with classes of numbers and the relations between them. But what is a **number**? In algebra we will find that "number" is used today in a great many very different senses, that is, it is an *analogical* term (see page 50). Analogical terms are perfectly legitimate, but they are very dangerous if we begin confusing the different senses in which a term is used. Aristotle long ago took great care to remove the vague analogies used in mathematics before his time, especially by his fellow pupils in the school of Plato, and to replace them by careful distinctions of the senses of a term, and by *univocal* definitions. Since number is the very subject-matter

of algebra, we must begin algebra with a very clear notion of what a number is.

Some say that "number" is an "undefined term," but this need not be the case. A term can be defined if it can be located in a **category** (see page 59). If we ask the ten questions which mark out the categories (see page 45) we will see at once that numbers (5, 10, 21) answer the question, "How much or how many?" which is the characteristic of the category of quantity.

The Mystery of Quantity

All the things that exist in the world which God has made from angels down to water and stones are in the category of substance. Each of these substances has many different characteristics, which we call its **accidents** (see page 44). Of these accidents the most basic one in the world of *material* substances is **quantity**.

Quantity, like all the names of the categories, really is an "undefined term," because it is only the things inside the categories which can *properly* be defined (see pp. 128 f.), but we can give a descriptive definition of it:

Definition (descriptive): *Quantity* is the accident by which a substance has parts, each of which, if separated, would be another substance.

For example, a man has a definite quantity by which he has such parts as his head, trunk, arms, legs, hands, and feet. Each of these parts if cut off would still exist as separate (although non-living) substances. Similarly, if we pour fifteen glasses of milk from a full pitcher, we separate the original quantity (a "pitcher-full") into fifteen parts, each of which is a separate quantity of milk.

This is something very strange about quantity—namely, that it can be divided over and over again, and yet, no matter how small the parts, it is possible (in thought, at least) to imagine these as further divisible. We may say that quantity as quantity is *potentially* divisible to infinity, although it never is actually so divided, since at any moment it actually has a definite number of parts.

Two Kinds of Quantity

There are two kinds of quantity, **magnitude** and **number**.

Definition: A *magnitude*, or continuous quantity, is a whole whose parts have position so that each part has a common boundary with another part.

Thus in a line one part has position after another, and each part is joined to the next by a **point**. In a plane each part lies in order and is joined to the next by a line. In a solid each part is in order and is joined to the next by a plane. Thus there are three **species** of magnitude: the line, the surface, and the solid. The **point** is not a quantity (since it has no parts), but is the boundary or principle of a line or its parts.

Definition: A *point* is the principle of magnitude, having position but no parts.

The second kind of quantity comes from considering the parts of magnitude but *abstracting* from their position, and is called **number** or discrete (from Latin for "separated") quantity.

Definition: A *number*, or discrete quantity, is a whole whose parts have no position or common boundary.

Below we will explain how we arrive at numbers.

As the point is the principle of a magnitude but is not a magnitude, so the **unit** (symbolized by 1) is not a number (since it has no parts) but is a principle of number:

Definition: A *unit* (1) is the principle of number, itself having no parts.

Today we frequently speak of the "number one" and include the unit among the numbers. This is an example of analogical use of the term "number"; we call the unit a number because it is the cause of numbers, just as we call a cigarette "a smoke" because it is the cause of smoke when burnt. This is permissible, if we remember that the word is used in a loose sense only.

Numbers Not in the Category of Quantity

We have already said (page 307) that numbers can be concrete, abstract, or applied. Ordinarily when we apply an abstract number,

we apply it to count the concrete things from which it was abstracted, but we can also use it to count spiritual things which in reality have no quantity since they have no matter. Thus we can speak of the existence of seven angels or of the three divine Persons, and these statements are true. Number used to count things without regard to whether they are material or immaterial is used in an analogical sense which *transcends* the categories.*

Constructing Numbers

We have already noticed that we arrive at numbers by counting the parts of a magnitude. A magnitude is one quantity (a line, plane, or solid) and a number is one quantity. The magnitude has parts, each with a position and a boundary, and potentially divisible, and the number derived from this has corresponding parts without position and indivisible. To make a bigger number we can divide one of the parts of the magnitude by a point, line, or plane. This gives us a new number greater than the former number by a unit corresponding to the new part which has been marked off. All units in number are equal, since they are indivisible. Thus the species of numbers are determined by the ultimate unit. 2 is the discrete quantity or number formed by counting the parts of a magnitude which is once divided. 3 is the discrete quantity formed by counting the parts of a magnitude which is twice divided. This last definition is not circular, because we have already defined the notion of "twice" when we defined the number 2. Thus we are able to define any desired positive integer (the *natural* numbers) and to prove that it exists since it can be constructed.

Number Systems

The system of natural numbers is *potentially* infinite, that is, we can always construct a number greater than any given number. We could invent a new name and symbol or notation for every new number, but this would soon fill a dictionary. Hence men have invented different ways of naming and noting numbers by a small number of names and signs. Here are some of the systems that have been devised:

* Do not confuse this with the term "transcendental number" now used in mathematics to refer to π and other similar quantities.

1. Simple grouping systems.

A simple grouping system is a number system that consists of tally marks which are replaced by a group symbol when the tallies become too numerous. The Roman numerals form a simple grouping system of numbers.

2. Multiplicative grouping systems.

This is an outgrowth of the simple system. There are special ciphers for the numbers in the basic group, e.g., 1, 2, ... 9, and a special class of symbols for the higher groups, e.g., t for 10, h for 100, th for 1000, etc.

The ciphers are then used multiplicatively to show how many of the higher groups should be indicated. This leads to representations of the type: 3,297 equals 3 th and 2 h plus 9 t plus 7. The traditional Chinese-Japanese numeral system is a multiplicative grouping system.

3. Ciphred number systems.

A third method of number writing may be called a ciphred numeral system. In the case of a decadic system one would denote the numbers from 1 to 9 by special symbols; similarly the multiples of 10 up to 90, the hundreds up to 900, and so on, would have their individual signs. All numbers can then be represented as a combination of such symbols in a very compact form. Egyptian and Greek number systems are usually ciphred.

4. Positional number systems.

Positional number systems are based on the principle of *local value*, by which a symbol designates a value or class which depends on the place it takes in the numeral representation. Our decimal numeral system is a system of this type. For instance, in the three numbers 352, 325, and 235, the digit 2 signifies respectively 2, 2×10 , and 2×100 .

Positional number systems are closely related to the multiplicative grouping systems, and one obtains a positional system from a multiplicative grouping system simply by omitting the special symbols designating the higher class groups.

The only complication which the positional notation involves lies in the necessity of introducing a *zero symbol* to

express a void or missing class; for instance, it has to be shown that 204 is different from 24. The essential discovery in the positional system may be considered to lie in the invention of this symbol.

The many advantages of the positional system are not difficult to perceive. First, the numeral notation is very compact and readable. Next, it is possible to express arbitrarily large numbers simply by the digits in the basic group. Finally, and most important, it is possible to invent simple rules for performing calculations (addition, multiplication, division) that can only be performed laboriously in other systems. Although our positional system uses 10 signs and is said to be "to the base ten," it is just as easy to have systems to other bases, let us say 2, or 12.

Kinds of Numbers

Every number is a species within the genus of number. The difference by which each number is specified and defined is its last unit which makes it different from the number less than it (because greater by one part) and also different from the number greater than it (because this last unit is last). Thus 9 is greater than 8 by a unit, and less than 10, because that unit is its last, while 10 has still another unit.

There are many sub-genera or classes of numbers. Of these we can list the following interesting classes:

1. An even number is that which can be divided into two equal parts without a unit intervening in the middle.
 - a. Evenly even is a number which is capable of being divided into two equal parts and with each of its parts similarly capable of division and so on until the unit is reached. E.g.: 2, 4, 8, 16, 32, 64, 128, 256, 512.
 - b. Oddly even is an even number, the halves of which are not immediately divisible into two equals. E.g.: 6, 10, 14, 18, 22, 26.

- c. Evenly odd is an even number which can be divided into two equal parts whose parts also can be so divided and sometimes even the parts of its parts, but it cannot carry the division of its parts as far as the unit. E.g.: 12, 24, 48, 96 etc; 20, 40, 80, 160, etc; 28, 56, 112, 224, etc.
- 2. Odd numbers cannot be divided into two equal parts because a unit always occurs in between.
 - a. Prime numbers (2 is an exception, the only even prime number, why?).
A prime is one that has no other factors than itself and the unit. (It is called prime because it is measured only by the unit or prime). E.g.: 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, etc.
 - b. A composite number is a odd number that is factorable, or that is composed of parts other than the unit. E.g.: 9, 15, 21, 25, 27, 33, 35, 39, etc.

There are many other less fundamental classifications of numbers.

ARTIFICIAL OR OPERATIONAL NUMBERS

The natural numbers or positive integers are the only numbers in a strict and univocal sense. We have seen already that the unit and zero are sometimes called numbers in a wider sense. Besides these, in arithmetic we are familiar with the signs of operations by which we construct numbers: +, -, \times , \div , \leq , \times^2 , etc. In algebra and higher branches of mathematics many other signs of operation are introduced. Furthermore, combinations of numbers and signs of operations are used and referred to as "numbers." These we may call *artificial* (in contrast to natural numbers) or *operational* numbers, understanding again that the word "number" applies to them only by analogy that is, by an extension or generalization of the concept. We may list them as follows:

1. **Zero.** This stands for the operation of *not taking* a part in constructing a number. Thus 100 means that we take 1 one-hundred, but no ten's, and no units in constructing the number.
2. **Negative numbers.** These stand for the operation of counting in the *reverse* order, that is, in the direction of lesser num-

bers. Thus -4 means four units which would have to be added in order to complete a given number. These were introduced in order to be able to perform the operation of subtraction when the number to be subtracted is greater than that from which it is subtracted.

3. **Fractions.** A fraction is not part of a unit, since a unit has no parts. It is a *ratio* between two numbers. Thus $\frac{3}{4}$ is the ratio of 3 compared to 4. These were introduced in order to be able to perform operations of division when the divisor is not a factor of the dividend.

The foregoing "numbers" along with the natural numbers form a collection, all of which can be added, subtracted, multiplied, and divided by each other (excluding division by zero however). Such a collection is called a **field**, and this field is named "the field of *rational* numbers," the term "rational" indicating that it includes fractions (ratios).

Definition: A "set of numbers" is a *field* if it is possible to add, subtract, multiply, and divide any of these "numbers" by any other, excluding division by zero, without going outside the "set."

Notice that in this definition we have widened or generalized the notion of number and hence also of "set."

There remain, however, many equations which cannot be solved only with these "numbers", for example, the equation $x = \sqrt{2}$. Hence we add the following definition:

4. **Irrational numbers.** An irrational number is the limit of two converging series of fractions (rational numbers). For example, in taking the square root of 2 (approximately 1.41421) we get closer and closer but never reach a value without a remainder. The limit is greater than 1.41421, but less than 1.41422, etc.

If we add irrational numbers to the field of rational numbers we get the field called "the real numbers." But still another type of "number" is necessary in order to solve all equations. If, in the equation $x^2 = -2$, we attempt to take the square root of -2 , we find ourselves in the difficulty that a negative number x gives a positive

number; hence -2 cannot be the square of any number in the real number system. Therefore we add:

5. **Imaginary numbers.** An *imaginary number* indicates the process of taking an even root of a negative number. It is really no more “imaginary” than are negative numbers themselves.

The Definition of Algebraic Number

This “set” of “numbers” is now sufficient to solve algebraic equations of any degree. How may we now give a *univocal* definition of the word “number” as we are now using it in such a wide sense? This is done by defining “number” as follows:

Definition: “*Number*” (complex number) as used in algebra refers to a quantity which can be constructed according to the following formula: $a+b\sqrt{-1}$, where a and b are real numbers.

For example, the number 3 can then be written as $3+0\sqrt{-1}$, while the “imaginary number” $\sqrt{-1}$ can be written as $0+1\sqrt{-1}$. Since we can give a single meaning to “number” taken in this sense, it is a univocal definition. The system of all these “numbers” is called the “complex number system” and it forms a single field. This field of natural and artificial numbers forms the subject matter of ordinary algebra, which seeks to study the different relations between such complex numbers.

THE PROBLEMS OF ALGEBRA

In elementary algebra the order of study is usually approximately as follows:

- A. Learning to translate arithmetical problems into literal numbers, and a review of the basic operations of addition, subtraction, multiplication, and division.
 1. The idea of number is clarified (as above) and the student learns to distinguish between numbers and the system of notation of numbers. Then the use of literal numbers, the nature of a variable, and of algebraic expressions (polynomials) are discussed. This pertains to the logical process of **definition**.

2. The student learns how to perform the basic operations with algebraic numbers. This has to do with the logical process of **statement**, since the student is learning to translate one statement (equation) into another.

B. The solution of equations:

The foregoing has been introductory, since up to this point nothing has actually been *proved* or demonstrated, but the tools of demonstration have been prepared. The real science consists in demonstrations, the third logical process.

1. Number theory: At this point it would be logical first of all to demonstrate the various properties of sets of numbers, odd, even, prime, etc. Today this is ordinarily omitted from elementary algebra courses, although among the Greeks it formed the main part of arithmetic. It is a very beautiful part of the science, but less practical in application.
2. Equations: Most of the time is devoted to studying the relations between sets of numbers, that is, algebraic functions. This study is ordered according to the complexity of the equations:
 - a. Linear equations
 - b. Quadratic equations
 - c. Equations of higher degree.

In this study of equations in elementary algebra, operations are stressed as in arithmetic. The main problem is construction of a number which satisfies a given equation. Actually this is not the main concern of mathematics as a science, which rather seeks to demonstrate that such a solution is valid according to the laws of the number system. This demonstrative study of mathematics is usually taken up only in the study of geometry; hence we will discuss algebra as strict science in the next chapter along with geometry.

CHAPTER II

The Science of Magnitudes

THE BEGINNINGS

THE GREEKS, SCIENTISTS AND ARTISTS

In the last chapter we indicated that, while mathematical calculation was developed in a practical way by the people of Mesopotamia and Egypt, and carried still further by the Hindus and Chinese, it was the Greeks who made it a theoretical study. They transformed it into a true science, rigorously logical in structure, and a model for all other sciences.

It was these same scientifically minded Greeks who first arrived at a perfect conception of the fine arts. The art of Mesopotamia was strong and grandiose, but without grace or subtlety. The art of Egypt was subtle and mysterious, but strangely static and without inner thought or feeling. Only in the art of Greece is there achieved a living balance of all the elements of beauty. Their art was **classical** (from Latin *classicus*, meaning "first class"), and became a standard for all later art. Not, indeed, that art of later ages need confine itself to copying the style and subject-matter of Greek art, as some people have

thought; but that we can learn from Greek literature, sculpture, and architecture a true conception of the elements that go into a work of art and of the harmony with which they should be united.

Today we are inclined to think of science and art as unrelated fields. The artist seems to be all imagination and emotion, living in a subjective world of free fancy. The scientist seems to be all facts and abstract theories, living in the objective world of experiment and measurement. Yet the Greeks excelled both in art and science. In order to learn something of this lesson from the Greeks in this chapter we are going to try to get clearer notions of two questions:

1. Why is mathematics a science?
2. Why is beauty mathematical?

PLATO AND ARISTOTLE

Plato (429-347 B.C.) had learned to love the pursuit of scientific knowledge from the great Socrates. When Socrates was put to death by the Athenians as a "corrupter of youth" because he had aroused this love of truth in the young men of the city, Plato left Athens and journeyed far and wide in search of a teacher. In Cyrene, in Africa, he studied mathematics with an important teacher named Theodorus. In Italy he met two famous men, Archytas of Tarentum and Timaeus of Locri, who belonged to the ancient tradition of the Pythagoreans and who also were fascinated by mathematics. On returning to Athens, Plato opened his school, the Academy, and engraved over its portal the famous inscription:

LET NO ONE IGNORANT OF GEOMETRY ENTER HERE

Around him he gathered a number of pupils, some of them especially brilliant in mathematics. We know from Plato's work, *The Republic*, Book VII, that arithmetic, geometry, astronomy were considered by him to be the indispensable foundations for the study of philosophy. Although he himself was occupied principally with philosophy, he encouraged his followers to develop these preliminary branches of science. Menaechmus, Dinostratus, Athenaeus, Helicon,

and especially Eudoxus made very important mathematical discoveries. Their names today seem strange to us, and yet the very mathematical theorems which they first worked out are still taught in our study of mathematics.

Among these pupils of Plato, Aristotle had the most universal mind. He did not give special attention to mathematics because it was by then the best developed of the sciences, and he was anxious to extend the scientific method to wider fields, especially to physics, chemistry, and biology. But he did make a fundamental contribution to mathematics: he explained and defended the *axiomatic* or logical method in mathematics without which it cannot be a true science.

It was not until about 300 B.C. (some twenty years after Aristotle's death) that the first great mathematical work employing this axiomatic method was written in Egypt, in the city of Alexandria where the followers of Plato and Aristotle had founded new schools. This was the book called the *Elements*, the work of an obscure teacher named Euclid.

THE WORK OF EUCLID

THE MAN AND HIS INFLUENCE

We know little about Euclid except this book and a few lesser ones, but a story is told about him which well illustrates his attitude. A pupil who had just learned the first theorem in geometry turned to his teacher and asked: "What do I get by learning such things?" Euclid did not answer, but calling for a slave said to him: "Give this fellow threepence [a slave's wages] since he must be paid for what he learns." For Euclid, mathematics is a theoretical subject to be learned because it is true and not because it is useful. He called his book the *Elements* because it contains the foundations of both branches of mathematics, arithmetic and geometry.

This book has been more widely used than any other book we know of, except the Bible. Not only was it a basic textbook for Greek, Roman, and medieval schoolboys, but also for the students of the Mohammedan countries. It was used in schools until about fifty years

ago, when it began to be replaced by easier books. Is this the reason that we find such a deficiency in mathematics among students today? Can it be that modern youth is incapable of thinking as clearly as young people did in past times? We are accustomed to think of our age as much more scientific than days of old, and yet we find it too hard to master the book which has been the foundation of the whole history of science.

Let us take a look at this great book.

THE SCIENTIFIC IDEAL

Aristotle had stated the scientific ideal as follows:

We suppose that we possess perfect scientific knowledge of a subject, as contrasted to knowing it in the haphazard way that a sophist knows it, when we think that we know the cause on which the fact depends as the cause of that fact and no other, and further, that the fact could not be other than it is. (*Posterior Analytics*, I, c. 2, 71b 8.)

Aristotle knew perfectly well that such a high ideal of knowledge is not easy to obtain and is rarely actually achieved, but we must measure our knowledge by the most perfect type of knowledge possible. Euclid hoped to achieve such knowledge at least in the relatively easy field of mathematics.

You will notice that the difference between science and opinion does not consist in the fact that science is obtained by experiments or the use of some complicated instrument (like a microscope or Geiger counter), while opinion is not. Nor is the difference that science uses measurement, and opinion does not. Nor is it that science is objective, opinion subjective; nor that science is certain, opinion probable. We can have opinions that are certain, objective, acquired by measurement, instruments, and experiment—and they still remain only opinions. We can have science, on the other hand, which involves no instruments, nor experiments, nor measurements (although it must be certain and objective). What makes science to be true science is that it gives us the proper reason for a *certainly established fact*. Until we have discovered such a proper reason we do not have perfect science, and are still at the level of opinion.

Consequently, mathematicians before Euclid were mainly at the level of opinion, because they had not carefully built up the science

of mathematics in such a logical and orderly way that they could see the **proper** reasons for their conclusions.

In order to correct this, Euclid kept before his mind the four questions which Aristotle had outlined as the basic questions that must be asked in every science:

1. *Does the thing we are trying to study really exist?* For example:
Is there really such a thing as a circle?

Until we can answer this question there is no use going any further. It is impossible to have scientific knowledge of something that does not exist, or at least which has not existed at some time. "Scientific" guesses about the future are opinions, not science.

2. *What is its definition?* For example: What is a circle?

It might seem that we must first have the definition of a circle before we can even ask if it exists. This is true of the **nominal definition** (see page 129), which tells us the usage of the word "circle." But the **real definition** cannot be given until we have answered Question 1, since there is no way to find out *what* a thing is, *unless* it is (exists).

3. *What are its properties?* For example: Can a circle be drawn inside a square so as to touch all sides of the square?

Here, also, we first need a **nominal** definition of the property. In the case of a property this is sufficient, since in answering the next question we will also settle whether the property exists or not.

4. *What is the proper reason that this thing* (real definition required) *has this property* (nominal definition)? For example:
Why can a circle be drawn inside a square?

When we know the answer to Question 4, at the same time we know the answer to Question 3. When we know the proper reason that a property is necessarily connected with its subject, we know that property must exist.

In setting up his *Elements*, Euclid tries to answer these questions in the correct order.

OUTLINE OF EUCLID'S ELEMENTS

If we open the *Elements* we find that it is divided into thirteen books as follows:

- Plane Geometry:** Book I: Lines, triangles, parallelograms.
(The next to the last theorem is the famous Pythagorean theorem.)
Book II: Areas of triangles and parallelograms.
Book III: Circles.
Book IV: Figures circumscribing or circumscribed by circles.
- Proportion:** Book V: Ratio and proportion.
Book VI: Similar figures and proportional lines.
- Arithmetic:** Book VII: Numbers and their properties.
Book VIII: Ratio and proportion in numbers.
Book IX. Ratio and proportion in numbers, continued.
- Incommensurables:** Book X: Commensurable and incommensurable magnitudes.
- Solid Geometry:** Book XI: Intersections of planes, parallelipeds.
Book XII: Pyramids, cylinders, cones, spheres.
Book XIII: The five regular Pythagorean solids.

DEFINITIONS, AXIOMS, POSTULATES

Euclid's Definitions

At the beginning of the first book there is a long list of **definitions** (23 of them), and at the beginning of most of the subsequent books there are further definitions. These definitions are **nominal** ones, merely telling us the meaning of the words Euclid is going to use. A study of these definitions is very valuable in clarifying our thinking, and we will discover that some of Euclid's definitions are not perfect. For example, his first definition is: "A point is that which has no part." It would be better to define a point as "that which is indivisible but which has position," as Aristotle defined it. Why is Aristotle's definition more exact?

The Postulates Assumed by Euclid

Next Euclid had to answer the first of the scientific questions: Do these things which have been nominally defined really exist? He does this by stating the following postulates:

1. A straight line may be drawn from any point to any point.
2. A straight line may be extended in a straight line.
3. A circle can be drawn around any point as center and with any radius.
4. All right angles are equal to one another.
5. If a straight line falling on two straight lines makes the interior angles on the same side less than two right angles, the two straight lines, if produced indefinitely, meet on that side on which the angles are less than the two right angles.

The first two of these amount to asserting the existence of points and straight lines of any desired length (*potentially* infinite lines). The last three assert the existence of a plane which is perfectly homogeneous (all parts exactly the same) and perfectly flat; the last of these is the famous **parallel line postulate** which has played a very important role in modern mathematics (see Chapter IV, page 382). Euclid gives these postulates in this form because they are conveniently stated for use in the construction theorems he is going to give.

Actually, Aristotle had already indicated that it would be sufficient to postulate only two things:

1. The existence of points.
2. The existence of lines.

These are both needed because a magnitude (**continuous quantity**, see page 316) can only be defined in terms of the simplest continuous quantity, namely, a line, while lines must be differentiated by their position (given by points). Planes, solids, and any kind of figure in them can be constructed by means of lines and points, as Euclid actually proceeds to do.

How do we know that these postulates are true? Euclid does not attempt to prove them, because then they would not be first principles. On the other hand, he does not merely assume them. He takes them as *immediately evident* to us from our experience of physical quantity, or rather from our images of physical quantity as derived from such experience.

Common Principles or Axioms

These postulates are the **proper principles** belonging to the science of magnitude. Indeed, they amount to a definition of the subject of

that science, since when we define a line and a point we really define magnitude (continuous quantity). In addition to these, we also make use of common principles or axioms which the student must know even before he begins to study this science and without which he would not be able to understand the teacher. There are many such axioms (see, for example, pp. 354 f.), but the *Elements* gives only five, and some authorities believe that the last two of these were added by writers after Euclid:

1. Things which are equal to the same thing are also equal to each other.
2. If equals be added to equals, the wholes are equal.
3. If equals be subtracted from equals, the remainders are equal.
4. Things which coincide with one another are equal to one another.
5. The whole is greater than the part.

These are axioms and not postulates, since they apply (but in an *analogous sense*) both to numbers (discrete quantity) and to things that are not quantities at all. For example, a happy life (which is not a quantity) is greater (better) than pleasure (which is a part of a happy life).

Euclid actually used other axioms, such as the principle of contradiction (see page 575), but these are the ones most directly needed in his proofs.

The First Principles of Science

Thus Euclid began his science of magnitude with a secure foundation, as Aristotle had required. Every science must rest on first principles which are immediately evident from experience. These first principles are:

1. Axioms, or common principles, required even before we begin to study the subject.
2. Postulates (*hypotheses*, as Aristotle calls them) which give us the real definition of the subject to be studied by asserting its existence.
3. Definitions (*theses* in Aristotle's terminology) of the terms (nominal definitions) or properties which are to be demonstrated.

4. **Middle terms** which can connect the subject with its properties.

Given these principles we can form a demonstrative syllogism (see page 75) as follows:

Every M (a middle term
which gives the cause
of the Property) is P (name of the property to
be proved)

And: every S (name of the
subject to be studied) is M (middle term which gives a
real definition of the subject
as cause of the property)

Therefore: every S (sub-
ject) is P (property).

In this syllogism we will notice that the middle term is identical in both premises (otherwise it would not be a middle term), but that it has two different functions. In the major premise it states the cause of the property, while in the minor premise it is the real definition of the subject. How can this be? A property is an accident (see page 44), and to define an accident we must include the subject in which it exists. Hence the causal definition of a property includes a reference to its subject as the cause of its existence. For example, if I ask, "What is a smile?" you must answer with the nominal definition: "The word 'smile' means a curving of a man's lips." In this definition you have mentioned the subject in which the smile exists, namely, "a man's lips."

Thus the middle term of a demonstration is: 1) The term used in both premises (and not in the conclusion) of the syllogism; and 2) at the same time a real definition of the subject, and a causal definition of the property as it exists in the subject which is the cause of its being. The smile exists in a man's lips, and it is caused to exist by the man, who exists in himself.

AN EXAMPLE OF A EUCLIDEAN DEMONSTRATION

Euclid's first demonstration is the following proposition or theorem: *On a given finite straight line to construct an equilateral triangle.*

| Steps of Proof | Reason |
|--|--|
| 1. Let AB be a given finite straight line. | <i>Postulate 1.</i> |
| 2. With point A as center, and radius AB, let a circle be described; again, with point B as center, and radius BA, let another circle be described. | <i>Postulate 3.</i> |
| 3. From the point C, in which the circles cut one another*, to the points A and B, let the straight lines CA and CB be drawn. | <i>Postulate 1.</i> |
| 4. But: AC is equal to AB, and BC is equal to BA | <i>Definition</i> of a circle, namely, that every point of its circumference is equidistant from the center, plus <i>postulate 3</i> (that there exist such circles of any radius around any point). |
| 5. And: CA is equal to AB | CA and AC is same line (step 4). |
| 6. Therefore: each of the straight lines CA and CB is equal to AB | Summary of foregoing (steps 4 and 5). |
| 7. And: things which are equal to the same thing are equal to one another. | <i>Axiom 1.</i> |
| 8. Therefore: the three straight lines CA, AB, and BC are equal to one another. | Step 7. |
| 9. Therefore: the triangle ABC is equilateral, and it has been constructed on the given finite straight line AB. This was what the proposition required us to do. | Step 8. |

* It is well known that it is a fault in this proof that Euclid does not prove that the circles will cut each other in a point, although this can be proved. See *The Thirteen Books of Euclid's Elements*, translated with introduction and commentary by Sir Thomas L. Heath (second edition, unabridged; Dover: 1956), Vol. I, pp. 242 ff.

4. **And:** Triangle ABC on a finite straight line AB is a triangle formed by two lines CA and CB equal to its third side AB
2. **Therefore:** triangle ABC on a finite straight line AB is a closed plane figure formed by three straight lines CA, AB, BC equal to one another.

Proof of 3: Axiom 1: Things equal to same thing are equal to each other.

Proof of 4:

5. A triangle whose one side AB is the common radius of two circles, and whose other two sides CA and CB are radii of same two circles is a triangle formed by two lines CA and CB equal to its third side AB.
6. Triangle ABC on a finite straight line AB is a triangle whose one side AB is the common radius of two circles, and whose other two sides CA and CB are radii of the same two circles.
4. **Therefore:** Triangle ABC on a finite straight line AB is a triangle formed by two lines CA and CB equal to its third side AB.

Proof of 5: Postulate 3.

Proof of 6: The lines AB, CA, and CB can be drawn—**Postulate 1**. The two circles can be drawn—**Postulate 3**. That they have a common point C is not proved, which is a defect (see note on page 334).

Every theorem in Euclid can be put into this strict syllogistic form.* A student ought to assure himself of this by working out several of the demonstrations, after which the abbreviated method of Euclid himself should be followed. In this method the steps (conclusions) are stated with their respective reasons (middle terms), but without the explicit statement of both premises. The reason that it is important to be sure that these proofs can be stated syllogistically is that *only then are we certain that the proof is logically rigorous*. If an argument cannot be reduced to the syllogism, the simplest of all forms of reasoning, it cannot be proved that it is logically valid (see page 568 ff.).

THE ORDER OF THE SCIENCE

Aristotelian Principles

According to Aristotle, a science is well ordered when it begins with the evident and indemonstrable axioms, postulates, and definitions, and proceeds to problems and theorems arranged in the following way:

1. We should first prove the properties that belong to the whole subject. For example, the properties common to all triangles should be proved before we discuss the properties of equilateral or scalene triangles.
2. We should then divide (classify) the subject into its various species or genera and prove the theorems, giving the properties of each species. For example, we should divide triangle into equilateral, isosceles, and scalene, and then prove the properties belonging to each.
3. We should then subdivide and continue until we get to the ultimate species which are divided only into like individuals. Thus triangle is completely divided into the three species just given, but polygon would be first divided into regular and

*The proof just given is a construction theorem and does not constitute the clearest example of demonstrating a property of a subject. Rather it demonstrates the form (equilateral) from its parts (three straight lines), which are like a material cause. In such demonstration the parts are treated as the subject, and their form is treated as a property. This is common in construction theorems, which aim at establishing the real definition. More typical would be Theorem 5 of this First Book of the *Elements*, in which it is proved that every isosceles triangle (subject) has the base angles equal (property).

irregular, and regular would be subdivided into square, pentagon, hexagon, etc.

The reason for this order is to avoid repetition (since what is proved of the genus need not be repeated for each species) but also, and more importantly, in order to discover gradually the properties of things. If we first proved that an equilateral triangle has its interior angles equal to the sum of two angles (180°), then we would have to prove it again for all other types of triangles, until at last we discovered that it is not a property of this or that kind of triangle but of all triangles. On the other hand, if we have proved that this is a property of all triangles, then we can use this as a premise in proving some property which an equilateral triangle alone has. This orderly procedure corresponds to the nature of our minds, which most clearly perceive what is general and simple, and which come to a knowledge of details only step by step.

The Procedure of Euclid

If we look at the outline of the *Elements* on page 330, we will see that, in general, Euclid has followed this order. He begins with the geometry of lines (not very fully treated) and continues with plane geometry (first four books), working up from triangles to parallelograms, then to circles, and finally to combinations of circles and other figures. Thus he is moving from the simpler and more general elements to the more complex. Books V to X deal with problems of arithmetic and of the application of arithmetic to geometry; we will discuss them in Chapter III (see below, page 353). The last three books, XI to XIII, deal with solid geometry and again build up from what is simpler and more general to what is more complex.

Euclid's order taken as a whole is *synthetic* (from the Greek for "put together"), that is, he begins with simple things and then puts them together into more complex wholes. Thus he begins with the simplest truths (definitions, postulates, axioms) and works in the direction of more and more complicated theorems. He also works from lines to planes to solids, and from simple figures to complex figures. On the other hand, some of his proofs are *analytic* (from the Greek for "take apart"), that is, they begin with the conclusion and work backward to the simple principles on which it is based. The syllogistic

arrangement which we give above (pp. 335 f.) is *analytic*, since we began with the conclusion and worked backward to the premises.* The analytic method is really more fundamental, since even when we proceed synthetically we must always keep connecting each new conclusion with the axioms and postulates.

Euclid uses both synthetic and analytic proofs. An interesting type of analytic proof is the **reduction to absurdity** (*reductio ad absurdum*), also called proof through impossibility (*per impossibile*). In such a proof we *assume* that the **contradictory** of what we wish to prove is true, and then by argument we deduce an obviously false conclusion from this assumption (see page 143). Because the contradictory of a false statement must be true (see page 138), we are then sure that the original theorem is true.

MATHEMATICS AND BEAUTY

THE BEAUTIFUL FITS THE KNOWER

A thing is beautiful when it pleases us just to look at it, hear it, or know it. We are pleased by well-cooked, well-flavored food, because it *fits* our appetite for food. We are pleased by a comfortable bed, because it *fits* our need for rest. We are pleased by a pay-check, because it *fits* our need for purchasing power. We also have an appetite or need for knowledge and experience. We human beings are creatures full of curiosity, hungry for knowledge, although in some this appetite has grown dull because of laziness or discouragement. Therefore, when we meet an object which *fits* our need for knowledge, we are filled with pleasure.

Such an object which is adapted or fitted for knowledge, as food is cooked and savored for eating, is a **beautiful object**. It fills our eyes, or ears, or mind with *vivid* truth. Thus whatever is beautiful must be true, but not everything which is true is beautiful; it may be a truth which is not *fitted* to our minds, which is dim, obscure, confused, rather than vivid and pleasing. Just as tasty food is usually also nourishing, but not all nourishing food is tasty, so, even more truly, beautiful things are true, but truth may not appear beautiful

* The terms "analytic" and "synthetic" are used in still another sense to refer to propositions in which the truth is evident from the meaning of the terms (analytic) or only as a matter of fact (synthetic).

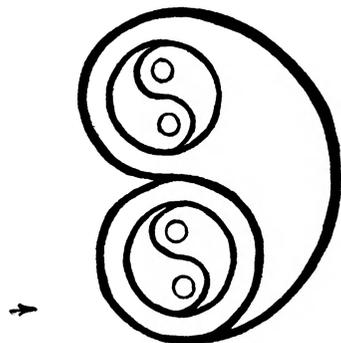
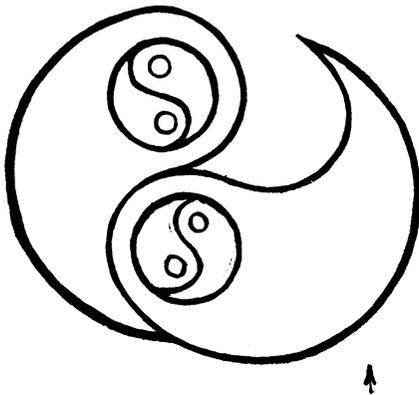
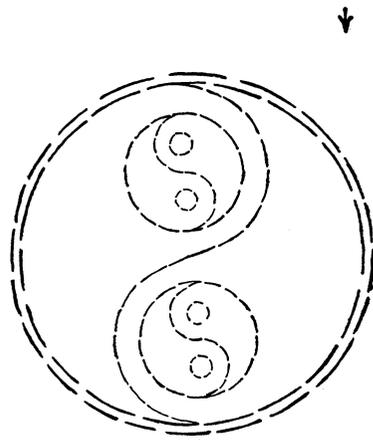
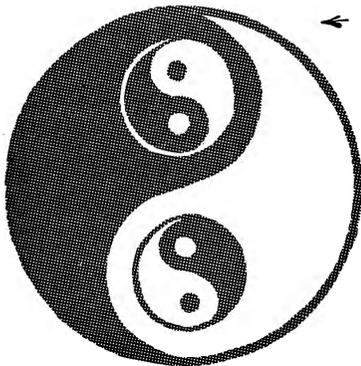
to us, because it is not fitted to our capacity. It follows, then, that the chief thing in beauty is **clarity** (vividness, brilliancy, splendor, charm).

THE THREE CHARACTERISTICS OF A DESIGN

The clearest and simplest example of something beautiful is a pattern or design, like Design A on this page. Why is it beautiful? St. Thomas tells us that beauty consists *formally* in clarity, and *ma-*

A. Clarity, integrity, proportion.

B. Lack of clarity.



C. Lack of proportion.

D. Lack of integrity.

terially in **proportion** and **integrity**. Design A has more clarity than B, because the contrast in color between the black and white parts of the design makes the pattern *clear*. If it were also in bright hue (for example, blue and yellow), it would be still clearer and more beautiful. Thus clarity makes the design stand out, so that it strikes our eye. This is simply another way of saying that it is *fitted* to the appetite of our eye for seeing. When we look at Design B it appears confused, and the eye finds it unpleasant. But Design A strikes the eye at once as clear and definite, and hence is pleasant.

This clarity, however, must be the clearness of a pattern. And what is a pattern or design? It is an arrangement or **order** of parts to form a whole. Thus C has the same parts as A and B, but they are not in any order. Order is defined as a *multitude related to one*. An army is ordered because it is made up of many soldiers all related to one general; an orchestra is ordered because there are many players all related to one conductor. Hence a design is a multitude of parts, all of which are related to some one part (in this case to the *center*).

Often this is expressed by saying that beauty is "unity in variety." St. Thomas expresses it more accurately by saying that it must have **integrity** and **proportion**. "Proportion" means that every part has a definite relation to the chief part and thus to the whole. "Integrity" means that all the parts needed to establish this relation are present. C lacks proportion because one of the parts is unrelated to the center. D lacks integrity because a part needed to complete this relation is lacking. Thus a good design must have enough parts (variety), i.e., **integrity**, and all of these parts must be properly arranged (**proportion** or unity), and this arrangement must be fitted to the knower so that he is able to grasp it vividly (**clarity**).

MUSICAL PATTERNS

In music, in a similar way, there is a definite pattern of sounds. The basic pattern in music is what we call the *scale*. The range of sounds from very low to very high is continuous, as we hear in a siren, or when the violinist slides his finger along a vibrating string. If all these possible sounds were to be used in music it would be difficult both for the player and the audience to follow a pattern. Hence from this continuum of sounds we select certain tones bearing defi-

nite relations to each other, which we call the *scale*. Between any tone of the scale and any other tone there is some simple relation based on the relation between the number of vibrations required to produce each tone. The most important tones of the scale have the simplest relations to each other, as will be seen in the diagram (page 349). In writing a melody the composer selects tones of the scale in such a way that the most important tones of the scale form the skeleton of his melody, and the less important tones fill in this skeleton. When we hear such a melody it has **integrity** because all the important tones of the scale are used. It has **proportion** because the important tones are in the important positions, so that we hear them as having definite relations. Finally, the melody has **clarity** because the composer emphasizes these relations. He emphasizes them by giving them the longest tones or accented tones (rhythm), by making them louder, by repeating them, by reinforcing them by harmony, or by giving them the most brilliant quality (by using the right quality of voice or the right instrument). In this way the proportions or relations in the melody stand out with clarity and are beautiful.

THREE KINDS OF BEAUTY

From this we see that, in producing a beautiful object, pattern or design is extremely important. This does not mean, of course, that beauty (integrity, proportion, clarity) is found only in such patterns. If we take a pure color or tone as seen or heard by our external senses, our eyes or ears, it may be called beautiful too. Its integrity consists in the fact that the color fills a considerable surface, or the tone endures for a sufficient time. Its proportion consists in the fact that the color or tone is pure, uniform. Its clarity consists in the fact that the color is brilliant, or the tone brilliant and sufficiently loud. Here integrity, proportion, clarity are *analogous* to those found in a pattern, and the beauty is of a different sort.

Similarly, in our intelligence there can also be beauty, for example, in the clear explanation of a mathematical proof or a proof in Christian doctrine. Here the integrity consists in the completeness of the explanation, the proportion in the way in which every part of the proof is perfectly fitted together, and the clarity in the way that the

conclusion and the proper reason for it (the principles) stand out distinctly, so that we are freed of all confusion. Again, this beauty is analogous to the beauty of a pattern, but not quite the same.

Which of these three kinds of beauty—sensible beauty (color, tone), imaginative beauty (designs perceived by our internal senses), or intellectual beauty (abstract truth clearly understood)—is the most perfect? To answer this, we must realize that, in itself, the deepest, truest beauty is intellectual beauty, since only our intellects can penetrate the very nature and essence of reality. Furthermore, it is only the intellect that can know relations. Since beauty is a kind of relation (the *fit* of the object to the knower), only our intellect understands what beauty is. When we see a beautiful color, our eye is pleased, but only the intellect sees that it is precisely the beauty of the color which is so pleasing. Hence animals, who have no intellect, do not really appreciate beauty as such. For the bee the beauty of the flower is only a signal that honey is to be found there.

Nevertheless, for us human beings intellectual beauty is not completely satisfying. If we were angels such beauty would be so perfect that it would satisfy us, but we have very weak intelligences that can know perfectly only by using our senses. Consequently, when we think of purely abstract truth it seems cold and dead; it does not wholly fit us, unless we can make it concrete somehow by *imagining* it. The result is that when we think of a man as a "rational animal," our knowledge seems remote and lacking in beauty. When we think of a man with a clear image of a perfect man to illustrate the abstract idea, then it becomes much more satisfying. That is why we like illustrations in a book. Such pictures in our imagination are the kind of patterns we have been speaking of.

On the other hand, a pure pattern without quality, color, or sound also seems cold and diagrammatic. To make a design perfectly beautiful we want it colored and exhibited in a bright light. We want a musical score actually performed and in a sufficiently loud tone. While, therefore, intellectual beauty is most perfect in itself, for us human beings the most perfect beauty is intellectual truth *embodied* in a visible and audible pattern. God in himself is most beautiful, but his beauty appeared to us best when he became a man and dwelt amongst us, where we could see and hear him.

PERFECT BEAUTY

Thus perfect beauty for us is intellectual, but intellectual truth exemplified in something concrete and visible. If we compare the three types of beauty we get the following scheme:

1. Intellectual beauty is most beautiful in itself, but less fitted to us.
2. Sensible beauty (external senses) is less beautiful in itself, but most fitted to us.
3. Imaginative beauty is a mean between these. On the one hand, it is sensible, we can picture it; yet in a way it is abstract, a pure design.

We see, then, that the most perfect beauty requires all three together, but of the three it is imaginative beauty which is most truly beauty for us, since without it the others would not be beautiful. Unless external beauty is somewhat refined by our internal senses, we can never understand its beauty with our intellect; and unless intellectual beauty were made concrete, at least in the imagination, it would not be beautiful for us. Thus it is in the designs or patterns in our internal senses that beauty is found in the plainest way. The other kinds of beauty are understood as analogous to it.

DESIGN AND QUANTITY

Now a design or pattern in the imagination is something *quantitative*. If we think of a pattern of color or tone, and then remove the color and tone, we will still have a pattern. It will be a unity made up of parts, one outside the other, and that is exactly what we mean by a quantity. This is because quantity is the first of all the accidents of a thing, and hence we can remove the other accidents (abstract from them) without taking away the quantity. If we took quantity away too, we would have only substance, and we cannot imagine, but only know with our intellect, a substance which has no quantity (a spiritual substance). If the pattern we imagine still has **figure**, then it will still have a minimum of quantity, since figure is the quality limiting a quantity. In a pattern (see p. 340) we still have a magnitude with a figure (circles, curves). But if we take this away, then we have **number**, and in music we have patterns whose parts are related to

each other like numbers. The scale can thus be imagined as a series of *ratios*.

From these facts we can see why mathematics, which deals with quantities, magnitudes, and numbers, is so very important in understanding beauty. It is just at this point that the most obvious kind of beauty is found, in geometrical patterns and in numerical relations.

It will be astonishing to some people to think of mathematics being beautiful, to hear that artists are concerned with mathematics. Of course, mathematics is not beautiful to those who do not understand it, because what is obscure is not clear. But to those who study it, mathematics is the clearest of all subjects. It is also true that many artists do not know mathematics, and work out their designs or compositions by the mere feeling that the design "looks right." Nevertheless, if we study the history of art and music we will see that all the great new advances in art and music were made possible by artists who studied mathematics and learned from it how to make new and more beautiful patterns. Thus the great achievements in art by the Greeks and by the artists of the Renaissance were due to men like Leonardo da Vinci who studied the use of mathematics in art. Similarly, the advance of music from simple unison singing to harmony was made possible only by mathematical studies. Today modern art is making great use of such mathematical ideas.

CONTRIBUTIONS OF MATHEMATICS TO ART

Mathematics helps art both materially and formally. *Materially* it gives to the visual artist all sorts of new figures to use in art, and to the musician new scales, harmonies, and instruments. If we look at Greek art we see that the circle, the cube, the triangle, the rectangle, the cylinder, the pyramid made up almost the whole "vocabulary" of Greek architecture. But in baroque art, and now very much in modern art, all sorts of new figures are common; shapes like eggs, like guitars, like the forms of the amoeba, parabolas, hyperbolas, saddle-shapes, etc., are used very effectively. These were originated or explained by mathematics. In like manner there has been a steady growth in the musical vocabulary from simple melodies to harmony, and then to various degrees of harmonic complexity. Thus the artist

has more variety (integrity) to work with, and understands more complex relations (unity, proportion).

The *formal* contribution of mathematics to art, however, is in showing how the artist can make his proportions *clear*, since it is in this that beauty consists. If we compare Greek art at its best with its less developed or later degenerate forms, or with other types of less perfect art, such as that developed by the Babylonians, we see that the reason the Greeks excelled was not because they had different materials to work with (either physical materials, or figures and quantities), but that they knew how to *emphasize* these designs so as to make them clear as crystal. This was due to the Greek insight into mathematical relations. Similarly, in listening to music we realize that the development of music in the classical period (say from Bach to Mozart) was one of increasing understanding of pure form. In modern art the effort of some of our greatest artists is to take the rich but confused material provided by romanticism and again give to it a clarity of formal structure.

THE PRINCIPLE OF PROPORTION

Example of Mathematical Contribution

We cannot here go into the details of how mathematics can do this. We can give a simple example, and then show the basic principle on which this theory must be based. If we look at the human body, we see that it is very complicated and that in no two human beings are the proportions the same. An artist, wishing to make a picture of a man and to make it as beautiful as possible, seeks to find in the body some kind of clear order. To do this he can simplify the pattern of the body by thinking of the head as a sphere, the neck as a cylinder, the trunk as two cubes, one for the chest, one for the abdomen, etc. But to find unity in the whole body he looks for a common unit to which all others can be related and by which they are measured, since order means relation to a principle or unit. This unit is called mathematically a *modulus*. Generally speaking, in the human body the length of the head is such a natural modulus, so that the proportion of the rest of the body can be calculated from it. Here is Leonardo da Vinci's calculus:

The architect Vitruvius states in his work on architecture that the measurements of a man are arranged by Nature thus:—that is, that four fingers make one palm, and four palms make one foot, six palms make one cubit, four cubits make once a man's height, and four cubits make a pace, and twenty-four palms make a man's height, and these measurements are in his buildings.

If you set your legs so far apart as to take a fourteenth part from your height, and you open and raise your arms until you touch the line of the crown of the head with your middle fingers, you must know that the centre of the circle formed by the extremities of the outstretched limbs will be the navel, and the space between the legs will form an equilateral triangle.

The span of a man's outstretched arms is equal to his height.

From the beginning of the hair to the end of the bottom of the chin is the tenth part of a man's height; from the top of the breast to the crown of the head is the sixth of the man; from the top of the breast to where the hair commences is the seventh part of the whole man; from the nipples to the crown of the head is a fourth part of the man. The maximum width of the shoulders is in itself the fourth part of a man; from the elbow to the tip of the middle finger is the fifth part; from this elbow to the end of the shoulder is the eighth part. The complete hand will be the tenth part. The center of a man is at the crotch. The foot is the seventh part of the man. From the sole of the foot to just below the knee is the fourth part of a man. From below the knee to the crotch is the fourth part of the man.

The parts that find themselves between the chin and the nose and between the places where the hair and the eyebrow start, each of itself compares with that of the ear, and is a third of the face.*

The same thing can be applied in architecture, where a building can be fashioned so as to have all its parts related to one modulus or standard unity.

Mathematical Proportion

What is the principle behind this? It is the principle of mathematical **proportion**. In arithmetic we learn that if we compare any two numbers they are said to have a certain ratio (relation) to each other, which we call a "fraction." Thus $1/2$, $2/4$, $4/8$, $25/50$ are pairs of numbers having the same ratio to each other, that is the *relation of half*, while $2/1$, $4/2$, $8/4$, $50/25$ have the ratio or relation of *double*.

* *The Notebooks of Leonardo Da Vinci*, arranged, rendered into English and introduced by Edward MacCurdy (London: Jonathan Cape, 1938) Vol. I, pp. 225 f.

All of arithmetic really deals with such numerical relations or ratios; in a musical or visual pattern all the relations are ratios. But if we are to make each relation *clear* (and this is required for beauty), we must somehow make it as *determinate* as possible. We must *define* it. We have already learned in logic that, in order to define something and to make it clear, we *compare* one thing with another. Hence to define a ratio very exactly we may compare it to another ratio, and such a comparison of one ratio with another is called a **proportion** (we have already met this notion in studying analogy; see page 50). If we state the ratio 2:4, for example, it might have two meanings: either that 4 is *double* 2, or that it is the *square* of 2; but when we write $2:4 :: 3:9$, then we determine this relation to mean that of *square*, and in this way make it clear.* It is in this way that **proportions** enable us to specify, clarify, or emphasize ratios or relations. Hence we can understand that when we say a design must have **proportion**, we mean that it must have similar ratios between each part and some principal part or the whole; it must have order. For example, in a circle divided into four quarters, each quarter has the same ratio to the center and to the whole circle as does each of the other quarters; hence they are in proportion.

A simple proportion must have *four terms*. Any proportion with more than these is compound and can be divided into a series of simple proportions. It cannot have less than four terms, because it must be a comparison of two relations, and each relation (ratio) must have two terms. However, it is possible to repeat one or two of the terms in a proportion. Thus we can have $2:4 :: 4:8$, or $a:b :: b:c$.

In a proportion, the first and fourth terms are called *extremes*, the second and third, the *means*. The various kinds of proportions and the rules of operation which govern them are studied in algebra. Continuous quantities, or magnitudes, lines, and areas, can also be compared so as to form proportions.

The artist who studies such proportions will be able in his paintings or music to produce wonderful new designs having integrity, proportion, and clarity—and hence beauty.

* Ordinarily such proportions are not written in arithmetic, every proportion being taken in the sense of a fraction, i.e., of simple multiplication.

Thus our scale has chosen the tones **do**, **mi**, **sol** because they stand in a simple natural ratio to each other as its most important tones. **Re** also is an overtone, but **fa**, **ti**, **la** are not. These other tones are chosen by what is called the "circle of fifths" (a major fifth being the interval between **do** and **sol**) which gives the following proportion:

fa:do::do:sol::sol:re::re:la::la:mi::mi:ti

We cannot go further because the distance from **ti** to **fa** is shorter than the other intervals. The resulting scale, called the **major diatonic scale**, is as follows:

| | | | |
|-------|------------|------------|------|
| 16/15 | half-step | do | 2/1 |
| 9/8 | whole-step | ti | 15/8 |
| 10/9 | whole-step | la | 5/3 |
| 9/8 | whole-step | sol | 3/2 |
| 16/15 | half-step | fa | 4/3 |
| 10/9 | whole-step | mi | 5/4 |
| 9/8 | whole-step | re | 9/8 |
| | | do | 1 |

The ratios are between the number of vibrations per second of the tone compared with those for **do**. In the second column they are ratios of the vibrations of the succeeding note to the previous note, i.e., the ratio of the interval. Note that the whole steps are actually of two sizes, but in practice this is ignored. Such a scale gives the following intervals, which are mainly simple:

| | | | |
|--------------|-----|---------------------------------|-------|
| Unison: | 1:1 | Major sixth: | 5:3 |
| Octave: | 2:1 | Minor sixth: | 8:5 |
| Fifth: | 3:2 | Major tone (larger whole step): | 9:8 |
| Fourth: | 4:3 | Minor tone (smaller): | 10:9 |
| Major third: | 5:4 | Semitone: | 16:15 |
| Minor third: | 6:5 | | |

If we determine the frequency ratios of all the intervals in the scale larger than a whole-tone and less than a seventh in the scale, we find that there are 29, of which 23 are perfect because they can be formed as simple ratios. Four others are quite close to other intervals that are perfect. Only the tritones are without definite proportion. Thus the superiority of the just or Ptolemaic scale is apparent because it contains so many consonances.*

* See a longer discussion in H. B. Lemon and M. Ference, Jr., *Analytical Experimental Physics* (Chicago: University of Chicago Press, 1943) p. 464.

The scale can be constructed by taking the pattern of the most important tones *do*, *mi*, *sol*, which form a chord or major triad (the I Chord). If this is then constructed with *sol* as the root or *bottom tone*, we get *sol*, *ti*, *re* (the V Chord). Finally, if we construct a chord so that *do* is the *upper tone*, we get *fa*, *la*, *do* (the IV Chord). This gives a complete scale arranged in the following pattern:

DO RE MI FA SOL LA TI DO

The diagram shows a musical staff with a treble clef. The notes are placed on the lines and spaces: DO (bottom line), RE (first space), MI (second line), FA (second space), SOL (third line), LA (third space), TI (fourth line), and DO (top line). Below the staff, a series of frequency ratios are listed, with brackets indicating the intervals between adjacent notes:

| | | | | | | | |
|---------------|---------------|----------------|-----------------|---------------|----------------|----------------|-----------------|
| $\frac{1}{1}$ | $\frac{9}{8}$ | $\frac{5}{4}$ | $\frac{4}{3}$ | $\frac{3}{2}$ | $\frac{5}{3}$ | $\frac{15}{8}$ | $\frac{2}{1}$ |
| └──┘ | | └──┘ | | └──┘ | | └──┘ | |
| | $\frac{9}{8}$ | $\frac{10}{9}$ | $\frac{16}{15}$ | $\frac{9}{8}$ | $\frac{10}{9}$ | $\frac{9}{8}$ | $\frac{16}{15}$ |

It will be noticed that there are intervals of three sizes, but for practical purposes the *whole* steps are all counted as equal. Thus the scale has the pattern (naming the steps):

whole, whole, half, (whole), whole, whole, half

Thus harmony is based on the I Chord (*do*, *mi*, *sol*) as the most perfect (indicating the whole scale), on the V Chord (*sol*, *ti*, *re*) and the IV Chord (*fa*, *la*, *do*) which tend to move or resolve to it, and on any other chords tending to it through the V and IV.

The integrity of the scale, therefore, is due to the fact that it has only those tones required for these three chords. Its **proportion** comes from the fact that the same pattern (the major triad) is found in each of these chords, but that one of them (the I Chord) is primary, and the other chords are ordered to it. The **clarity** comes from the fact that I Chord is made up of the strongest overtones, standing in simplest relation to the basic tone (tonic) of the scale, so that we clearly feel these tones as the most concordant (similar or blending) possible.

We may ask, however, why the pattern **do, mi, sol** is clearly proportioned? It is because it suggests the complete scale made of two proportions:

do:re::mi:fa :: sol:la::ti:do

In this pattern, the two halves of the scale are alike and the *alternate* tones are concordant with each other, since they suggest this pattern. It is not necessary, however, to play **ti**, because the first proportion gives us the pattern, and **sol** indicates that the pattern will be repeated using **sol** as the base instead of **do**. It is this **principle of proportion** which is the **proper** reason for the concords and discords in the scale.

We might also ask whether some other selection of tones would not be preferable, and we may answer:

1. Any number of tones other than a multiple of 4 would not form perfect proportions.
2. 4 tones would be too few, because we need to be able to imitate a *motion* which must have a beginning, middle, and end.
3. 12, 24, etc., would be divided into 3 parts, but then they could not form *larger* proportions having 4 terms.
4. Therefore, 16 or 8 tones are best, and 8 is more practical.
5. The intervals should not be all the same for the sake of variety (*integrity*).
6. The small intervals should be at the end of ascending motion because the effort increases with rising pitch.

The other possible scales are inferior to the major diatonic scale in the above respects.

CHAPTER III

Mathematics Pure and Applied

PURE MATHEMATICS

ALGEBRA AS A SCIENCE

We have studied Euclid's *Elements* as an example of a pure science, the science of geometry, but we saw also that Books VII, VIII, and IX deal with the science of arithmetic, or (as we would now call it) with the science of algebra. If we wish to see such a pure science of number developed even at great length, we should examine the work which became standard among the Greeks, Romans, and medievals, both Mohammedan and Christian, the *Introduction to Arithmetic* of Nicomachus of Gerasa, who lived about one hundred years after the birth of Our Lord. It deals with that basic study of numbers which we today call Number Theory.

The term "algebra" was introduced to indicate a growing interest in the art of calculation, rather than a demonstrative study of the properties of numbers. Just as there is a science of logic which seeks to prove the rules of logic (see page 568 ff.) and an art of logic which is concerned with using these rules, so the science of number is concerned with proving the properties of numbers, while the art of cal-

ulation is concerned with applying a knowledge of these properties to the solution of particular problems.

Today, however, algebra includes both the art of numerical problem-solving and the science of numbers, but the elementary study of algebra usually lays emphasis on its problem-solving aspect. Now that we have analyzed geometry as a science, we need to review algebra from the same point of view and see how it might be set up as a pure science.

THE AXIOMS, DEFINITIONS, AND POSTULATES OF ALGEBRA

The axioms of algebra and geometry are the same, since an axiom is a principle common to several sciences. Algebra and geometry are very closely related; but they are, nevertheless, distinct sciences and hence they have different definitions and postulates.

The definitions of algebra we have already discussed in Chapter I of this Part. We must have at least nominal definitions of the unit, of every natural number, of all the operations of algebra, of the operational numbers, and of the various properties and combinations of numbers, such as "odd," "even," "sum," "ratio," etc.

It is not so easy, however, to decide on the postulates of algebra. Each postulate will state the existence of one of the things which we have nominally defined (in other words, it will be a real definition), or it will be a truth immediately evident from these definitions. One of the first mathematicians to attempt to state the postulates of algebra in a rigorous form in accordance with modern methods was the Italian mathematician, Giuseppe Peano (1858-1932), who proposed the following five postulates:

1. 0 is a number.
2. The successor of any number is a number.
3. No two numbers have the same successor.
4. 0 is not the successor of any number.
5. If s is a class to which 0 belongs and also the successor of every number belonging to s , then every number belongs to s . (This is called the principle of mathematical induction.)

This list raises many difficulties, particularly because it uses zero to define number, instead of the other way around (see page 320). A

more satisfactory statement of essentially the same principles is as follows:

1. Every integer has a successor.
2. Every integer has, at most, one successor.
3. There is an integer, which we shall call the unit, which has no predecessor.
4. The only class of integers which contains the unit and each of its successors is the complete class of positive integers.

The weakness of these postulates is that they leave "integer" as an "undefined term," whose meaning is determined only by the postulates and their application. Rather the meaning of the postulates should be derived from the meaning of integer.

Preferable to these are the postulates proposed by Aristotle:

1. There exist mathematical units.

Definition: A *mathematical unit* is a corporeal thing capable of existing as a substance, which is abstractly considered as indivisible and without position. (See page 315).

2. There exist mathematical numbers.

Definition: A *mathematical number* is a discrete quantity, that is, a whole divisible into units.

The two definitions are nominal, but they are made real by the postulates, which assert the existence of the thing defined. These two postulates are sufficient because all the theorems of algebra can be proved to follow from the definition of numbers, and, as we have already shown (pp. 317 ff.), all the numbers can be constructed by means of the unit.

THE THEOREMS OF ALGEBRA

The Fundamental Theorems

In arithmetic or algebra the fundamental theorems are to prove the following:

1. That addition is valid, and both commutative and associative.
2. That subtraction is valid, but only if a lesser number is taken from a greater.

3. That multiplication is valid, both commutative and associative, and also distributive with respect to addition and subtraction.
4. That division is valid, when the divisor is smaller than the dividend and commensurate with it.

By *commutative* we mean that if we perform an operation with numbers taken in one order, the same operation with the same numbers taken in the reverse order will give the same result. Thus $6 + 4 + 2 = 2 + 4 + 6$ and $6 \times 4 \times 2 = 2 \times 4 \times 6$, but $6 - 4 - 2 \neq 2 - 4 - 6$ and $6 \div 2 \neq 2 \div 6$. By *associative* we mean that if an operation is performed on three or more numbers, the result is independent of the manner in which they are grouped. Thus $6 + (4 + 2) = (6 + 4) + 2$ and $6(4 \times 2) = (6 \times 4) \times 2$; but $6 - (4 - 2) \neq (6 - 4) - 2$ and $12 \div (6 \div 2) \neq (12 \div 6) \div 2$. By *distributive with respect to addition and subtraction*, we mean that $a(b + c - d) = ab + ac - ad$. By *commensurate* we mean that the divisor will "go into" the dividend an integral number of times without a remainder.

The commutative, associative, and distributive laws are of fundamental importance in calculation, as is obvious, but they are not of fundamental scientific importance, since they have more to do with notation than with the properties of numbers themselves. But the validity of addition, subtraction, multiplication, and division is fundamental scientifically, since only if these laws are valid can we demonstrate the existence of *constructed* numbers.

The Validity of the Number System

We will not prove these theorems here formally, but it is obvious that we can prove the result of any operation of addition to be a number by showing that it is equivalent to a collection of units. Thus $3 + 4 = (1 + 1 + 1) + (1 + 1 + 1 + 1)$. Since our Postulate 2 tells us that a whole composed of units is a number, and since we can recognize a unit by Postulate 1, this proof is valid. Since addition is valid, its *converse* (subtraction) can be shown to be valid in the same way. Multiplication and its *converse* (division) can be shown to be abbreviations of addition, since $4 \times 3 = 3 + 3 + 3 + 3$.

Inasmuch as we have shown in Chapter I that all the *artificial* numbers (0, negative numbers, fractions, irrationals, imaginary, and

complex numbers) can be defined as natural numbers with some operation, and these operations are fundamentally reducible to the above four, there is no difficulty about proving the validity of the entire **complex number system**.

The addition of these operational numbers makes it possible to prove that the four laws of operation may be extended to all elements in the complex number system. For example, if we admit negative numbers, we can subtract any number from any other number. If we also admit fractions and irrationals, we can divide any number by any other, etc.

Since all of ordinary algebra is limited to the complex number system, it is evident that we can reduce every problem in this algebra to our two postulates, just as in geometry every theorem can be reduced to a small set of postulates.

The Nature of Algebraic Theorems

Students often do not realize that every solution to an equation is a **theorem**, since the answer is correct only when it can be proved to have been obtained by operations which are valid according to the postulates. If these laws of operation are violated, then the result is not proved to be true, although by accident it may be true.

Thus when we write $3 \times 4 - 2 = 10$, we are asserting the theorem that "three fours minus a two are equal to ten, *because* of the laws of multiplication and subtraction." Thus we are giving a reason, or *middle term*, for our conclusion. When we write " $a - 2 = 6$, therefore $a = 8$," we are saying: "If a number minus 2 is equal to 6, then that number is 8 *because* of the law of subtraction." If we have simultaneous equations such as " $a \times b = 6$ and $a - b = 1$, therefore $a = 3$, and $b = 2$," we are saying: "If two numbers multiplied equal 6, and if the lesser subtracted from the greater equals 1, then the numbers are respectively 3 and 2 *because* of the laws of multiplication and subtraction."

It will be noticed that many algebraic theorems are *conditional*. They state that if a certain relation (function) holds between two quantities, then these quantities are such and such, or belong to such and such classes. This means that we begin with a definition of the number in terms of its **properties**, and then seek to discover what

number has these properties. For example, if I say, " $4x^2 = 36$," I am saying: "What number has the property of equaling 36 when squared and multiplied by 4?"

But in number theory, which is the more fundamental part of the science of number, we may begin with the number and seek to prove its properties. For example, we might ask whether 65,537 is a prime number (which it is).

ALGEBRA APPLIED TO GEOMETRY

RATIO AND PROPORTION

The Pythagoreans were fond of the saying, "The essences of all things are numbers." Hence they liked to show the close connection between magnitudes and numbers. They spoke of "triangular," "square," and "cubic" numbers, and they were fascinated with the problems of both incommensurable magnitudes and irrational numbers. Finally, they took a special delight in the study of the five regular or Pythagorean solids, because there seemed to be some mysterious connection between them and the integers.

Plato and his followers were very Pythagorean in this respect. Since number is more abstract than magnitude, they considered arithmetic a science superior to geometry, and wondered if perhaps the lower might not be replaced by the higher science. In opposition to this, Aristotle argued that the science of number and the science of magnitude are not merely a perfect and an imperfect form of the same knowledge, but are specifically distinct, although related, sciences which cannot be reduced to one science.

In general the Greek mathematicians adhered to Aristotle's teaching and kept geometry and arithmetic unmixed. Nevertheless, in Euclid's *Elements* we see that they very well perceived how close the relation between the two disciplines is. The *Elements* is devoted principally to geometry, and yet it culminates in the last book in a discussion of the Pythagorean solids as if this were the supreme geometrical study. Furthermore, Book V is devoted to the topic of ratio and proportion because this is a topic common to both arithmetic and geometry. Then after Books VII-IX which are devoted to pure arithmetic, Euclid deals in Book X with the problem of incom-

mensurables, so closely related to the problem of irrational numbers. Thus Euclid seems always to be about to combine the two sciences, without ever actually doing so. If he had been thoroughly Aristotelian he would have divided his work into two distinct parts. The first would have been devoted to arithmetic, since Aristotle agrees with Plato in holding that this science is more perfect and abstract, but the second would have been a geometry independent of arithmetic.

TRIGONOMETRY

The mixture of the two sciences went further in **trigonometry** (the science of measuring triangles). Ptolemy, the astronomer of Alexandria in Egypt, who lived in the second century after our Lord, introduced the use of a numerical measurement of angles into degrees, derived from the Babylonian division of the circle into 360° (see page 306). Then mathematicians began to make tables showing the sine, cosine, tangent, and co-tangent ratios between the sides of triangles in terms of numbers.

Thus trigonometry is a mixed science, developed from the study of ratio and proportion common to both geometry and arithmetic, but making the study of geometry easier by reducing proportions between lines to proportions between numbers which are precise and easy to manipulate.

ANALYTIC GEOMETRY

The real step was not taken, however, until René Descartes (1596-1650), whose discovery of **analytical, co-ordinate, or cartesian geometry*** was one of the most important factors in producing our modern culture. When we think of "modern times" and contrast them with "medieval times," we are usually thinking about two aspects of modern life. On the one hand, we see the immense growth of modern science and engineering which has transformed our way of traveling, communicating, and producing our food and shelter. On the oth-

* It is called "cartesian" from Descartes' name (*Des Cartes*). It is called "co-ordinate" because it is based on the use of co-ordinates by which positions in space are measured numerically. It is called "analytic" because it analyzes magnitudes into numbered parts which are easier to manipulate. The student should not confuse the terms "analytic geometry" and "synthetic geometry" (i.e., Euclid's pure geometry) with the terms "analytic proof" and "synthetic proof," which are used in all types of mathematics (see page 338).

er hand, we think of the lack of unity in thought and religion and the widespread sense of uncertainty which makes today's world so different from the unified world of the middle ages. Strangely, this single mathematician, Descartes, is largely responsible for both results, although he certainly did not anticipate any such outcome. His discovery made possible the rapid advance of mathematics and the whole system of modern technology based on it, but his confusion of the two sciences also led men to doubt the possibility of certain truth. The last outcome was especially ironical, because Descartes thought that his methods would make mathematics and all branches of knowledge much more certain than they had been. He did not realize that long ago Aristotle had pointed out that those who confuse the branches of mathematics are sure to end by casting doubt on the possibility of a certain knowledge of the material world. Aristotle was keenly aware of this danger because some of his fellow-students in the school of Plato had already fallen into this error, and were teaching that truth is to be found only in some other world.

The Consequences of Descartes' Discovery

The essential feature of Descartes' discovery was this: It is possible to represent a point or position on a surface by two numbers, or in a space by three numbers, by means of two or three measurements made on arbitrary scales, showing the distances between that point and other arbitrarily chosen lines called **co-ordinates**. From this it seems that every geometrical magnitude can be perfectly described in terms of numbers, and the relations between these magnitudes can then be reduced to relations between numbers. In this way the science of geometry which deals with the relations of magnitudes can be reduced to the science of algebra which deals with the relations of numbers.

Since numbers are so much easier to manipulate and use in calculation than magnitudes are, this opened the way to the marvelous modern advance in mathematics and the engineering sciences based on them. On the other hand, since it seemed to show that the principles of geometry, formerly considered to be immediately evident, are only a kind of approximation, it casts doubts on all human knowledge. If we cannot trust our senses which show us that magnitudes are not

numbers, then we must correct our senses by our reason. This was what Descartes was inclined to do. But then if our reasoning does not rest on the evidence of our senses, where does it get its certitude? From "innate ideas" given by God, said Descartes. This had been Plato's answer, and, as in Plato's time, men quickly pointed out that there is no proof that we have innate ideas. Hence the modern world has drawn the conclusion, which Descartes would have viewed with horror, that since we can have certitude neither from the evidence of our senses nor from the unsupported assumptions of our reason, therefore certitude is impossible.

The Validity of Analytic Geometry

Both Descartes and the sceptics went too far and fell into error. Descartes' discovery is a perfectly valid one, if we do not claim too much for it; nor does it destroy the independence of geometry and the certitude of the first principles of geometry.

We have seen in Chapter I that number, or discrete quantity, is derived from an abstract consideration of magnitude (the *continuum*). Physical reality is made up of magnitudes, or things whose parts can be divided again and again *ad infinitum*. The parts of magnitude have both divisibility and position, since one part is joined to the next. Yet these parts are numberable in an abstract way. By leaving out of consideration the divisibility of the parts and their position, we can consider each actual part as a unit, and taken together they form a number.

Nevertheless, this divisibility of a magnitude is *potentially* infinite, so that no matter how small we make the unit of magnitude, that unit is still divisible. Since the unit of number is indivisible, *we can never reduce magnitude to number*. The error has been repeatedly made in history of supposing that a magnitude is made up of *infinitesimals*, that is, of parts so small that they cannot be further divided. Others have made even a worse mistake by holding that a magnitude is made up of *points*. If an infinitesimal could not be divided, then it would be of a different nature than a magnitude, which is divisible; but a whole and its parts must have the same nature if they are uniform. A mathematical line or solid is conceived by us as something perfectly uniform. Hence just as a whole line or solid is divisi-

ble, so must its parts be ever divisible. If a magnitude were made up of points, the same difficulty would follow, since even an infinity of points could not fill the smallest space.

The proper solution is not to make contradictory guesses like those which introduce such unknown entities as infinitesimals and actual infinities, but to stick to the known facts. The fact is that the world is made up of physical magnitudes which can be divided beyond any limit we know of. Furthermore, the abstract quantities which we can imagine are potentially divisible *ad infinitum*. We can mentally divide any quantity into units as small as we wish, but we can never exhaust its divisibility. Hence the numbering of magnitude is only approximate, but it can be made as accurate as we wish. Thus it is a *limit*, which we can approach but never reach, just as the circle is the limit of an inscribed polygon of n sides. The polygon can never be made into a circle, but it can be made to approximate it as closely as we like.

Hence Descartes' method is of very great importance for two reasons:

1. It permits us to reduce cumbersome geometrical problems to approximate algebraic problems which are much easier to manipulate, and this approximation can be made as perfect as we wish to make it.
2. It permits us to represent algebraic problems *graphically*, that is, by a diagram which helps our imagination.

Thus by elevating geometry to algebra we get greater *intellectual* precision; by lowering algebra to geometry, we get greater *imaginative* vividness.

We make an error in this matter only when we claim that the approximation is more than an approximation.

Analytic Geometry and Analogy

Another way of saying that analytical geometry is an approximation is to say that it is an *analogy*. Magnitudes and numbers are simply two different species of quantity, just as a man and a dog are two different species of animals. Nevertheless, there is some *similarity* between a man and a dog, and between magnitudes and numbers. We have learned (page 49 f.) that when two things are essentially

different but have some similarity, then they can be called *analogous*, and that we can apply the same name to them by *analogy*, (see page 59). Although magnitudes and numbers are essentially different (since magnitudes have divisible parts and numbers have indivisible parts), nevertheless there is a similarity between them. We can compare a point to a number on a scale, and we can graph an equation by a curve, because of a similarity of relations. In effect, we are stating a **proportion**, or comparison of relations (see pp. 347 f.) as follows:

Point A: Point B :: Number a: Number b

In the first ratio, the relation is one of *distance*: A is a certain distance from B. In the second ratio, the relation is one of *order*: a and b occupy a certain position in a number series. Obviously the distance of A from B is an essentially different kind of "distance" than that from 3 to 10.

If such comparisons are mistaken for identities, so that we think that a point is a number, then we are *equivocating* and thinking in a confused fashion, just as if we were to make the following analogy:

Chicago: Timbuctoo :: Intelligence: Stupidity

and conclude that the kind of "distance" between intelligence and stupidity is the same kind of distance as between Chicago and Timbuctoo.

This is the reason why the Greeks were fearful of mixing geometry and arithmetic. They realized that reasoning which rests on equivocation cannot be scientific demonstration, but only **dialectic** (see page 162). Euclid's geometry was a true science, but in the eyes of Aristotle this analytic geometry of Descartes would have appeared to be only dialectic.

This is certainly the case unless we take great pains in the presentation of analytic geometry to remove equivocation. This can be done in two ways:

1. We may use analytic geometry merely for the purposes of giving a graphic representation to our algebraic reasoning. In this case the diagram is merely a help to our imagination and does not actually enter into the algebraic argument, any

more than a diagram of a syllogism enters into syllogistic reasoning itself.

Actually this is the chief function of analytic geometry today. In this case our advance in knowledge has been a development of pure algebra, and analytic geometry has merely served as a convenient instrument. On this score Descartes' discovery was not really of much *theoretical* importance; rather it was a *technical* help, like the improvement of mathematical notation when Roman numerals were replaced by Arabic numerals.

2. We may use the methods of analytic geometry to give us *approximate* solutions of geometry problems. The results in this case are still dialectical, since they do not give us the proper reasons for our conclusions; but equivocation is removed because we make explicit the fact that our conclusion is approximate. Furthermore, so clear are the objects of mathematics that in this case we can make our approximation as close as we please, approaching the limit to any degree of accuracy required.

Thus analytic geometry can be understood in two ways: 1) as pure geometry algebraically expressed; 2) as pure algebra graphically expressed. In both cases the expression is approximate and dialectical. Descartes, we may conclude, gave to mathematics a very powerful technical instrument, but he did not really disprove the separate and irreducible character of the two sciences of geometry and arithmetic.

MATHEMATICAL QUANTITY APPLIED TO PHYSICAL QUANTITY

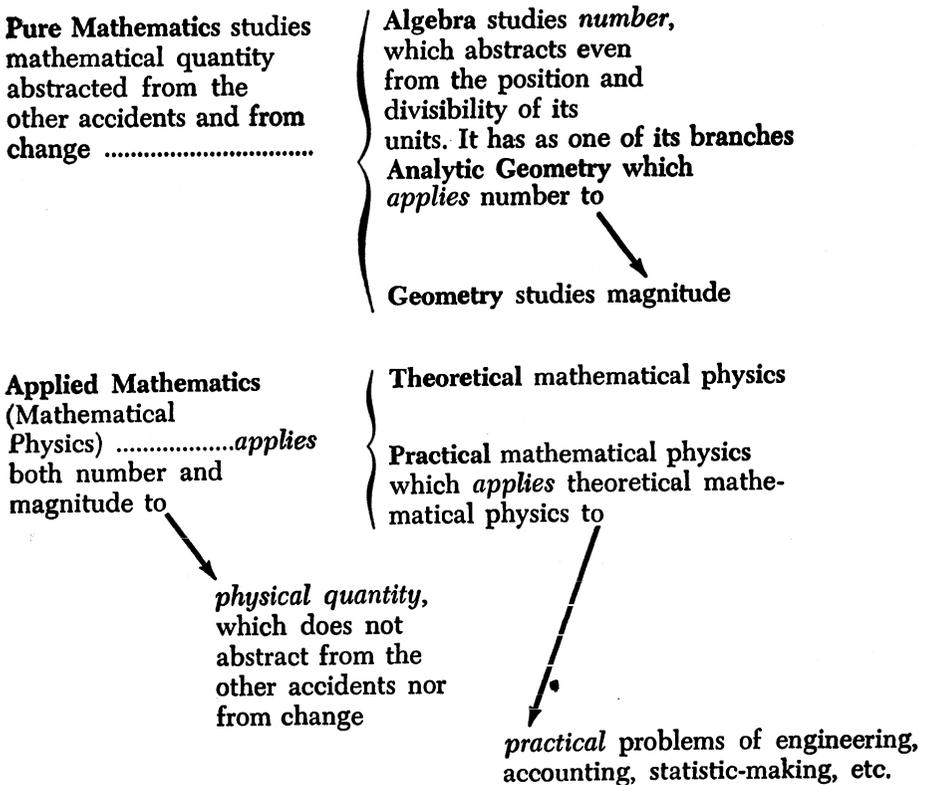
ANOTHER KIND OF APPLIED MATHEMATICS

Analytic geometry is an application of one branch of pure mathematics to another. We apply algebra which is more abstract to assist us in understanding geometry which is less abstract, and we illustrate algebra by geometrical figures to assist us in picturing more abstract numerical relations.

There is another and very different way in which mathematics is *applied*.

This is produced when mathematical quantities are used to assist us in understanding physical quantities, which are not abstract at all. This procedure most properly deserves the name **applied mathematics**, since in this case we apply the abstract to the concrete. It is also properly called **mathematical physics**, that is, the application of mathematics to physics or natural science. This in turn can have two branches, *theoretical* mathematical physics, and *practical* mathematical physics which has many branches (all types of engineering, of accounting, and of statistic-making). We may illustrate this by means of the diagram below. Notice that the word “applied” is used in three different senses, indicated by the three arrows in the diagram.

Thus “application” can mean: 1) the application of algebra to geometry; 2) the application of any type of mathematics to natural science; 3) the application of theoretical mathematical science to



practical problems. It is the second sense which particularly concerns us in the rest of this chapter .

ORIGIN OF THEORETICAL MATHEMATICAL PHYSICS

Applied mathematics as a theoretical study was developed by the same group of scholars in Plato's Academy who first developed pure mathematics. Plato pointed out to his pupils that the movements of those heavenly bodies we call the "planets" is very mysterious. The other stars move across the sky with a regular motion every 24 hours without ever changing their relative positions. The Big Dipper, for example (the Greeks called it the Great Bear), turns about the pole star every 24 hours, but never alters its pattern. The planets, on the other hand, seem to wander across the sky from week to week in a strange fashion, gradually working their way eastward but not without frequently reversing their movements. Hence the very name "planet" means a "wanderer."

Plato said that a celestial being could not be moving aimlessly. There must be a pattern to these movements that could be reduced to a definite law. Therefore he suggested to his followers that they seek to find an order in these seemingly confused movements and express it by a mathematical diagram. Just as an artist looking at nature disentangles its beautiful patterns from apparent confusion, so the astronomer should detect the mathematical order of the heavens.

Astronomy

Hence it was that the first important application of the geometry of the Greeks was a mathematical theory of the motion of the planets which would agree with careful observations which had been kept for a long time by the priests of Babylon and to which the Greeks added still better measurements. This theory was worked out by Eudoxus and gradually improved by a long series of astronomers. They suggested many possible theories, some of them placing the sun at the center with the earth and planets moving about it, others placing the earth at the center with the sun and planets moving about it, some supposing that the center is hidden from us.

According to the facts which they were able to gather without the aid of a telescope, the theory that the planets and sun move about

the earth was found to be the most satisfying for two reasons: 1) It best accounted for the known facts; 2) it could be given the most simple and clear mathematical diagram. It was Ptolemy (page 359) who gave the most perfect mathematical theory based on this arrangement. He knew that it might not really be true (as it is not, since the earth moves about the sun), but he showed that according to the known facts it was more probable than the other theories.

Optics and Acoustics

This study of astronomy also led to the use of mathematics in the study of light and its reflection from mirrors and its refraction by water and glass. Euclid himself wrote an *Optics*, showing some of the mathematical laws which determine the path of a ray of light. This science was also sometimes called **perspective**, and it made it possible for painters to represent three dimensions on a flat surface, so that some Greek and Roman paintings had the appearance of great depth and roundness.

We have already seen that Pythagoras applied numbers to explain the musical scale, and the later Greeks and Romans made further progress in this branch of science called **acoustics**.

Mechanics

Still more interesting was the application of mathematics to building *machines*, some using water power (*hydraulics*), some using steam power (*pneumatics*). This study in all its branches is called **mechanics**. It was originally a practical application of mathematics, but it soon led to interesting theoretical applications in natural science. The great name in this field was Archimedes who lived about a generation after Euclid (about 287-212 B.C.). It is said that he claimed, "I could move the earth if I had a fulcrum on which to put the lever." It was he who showed how mathematics could be made to apply to all sorts of physical problems if it were only used with ingenuity and imagination, so that all who read his work could clearly see that mathematics is an indispensable tool for natural science.

WHY NATURAL SCIENCE NEEDS MATHEMATICS

Why is this the case? Students beginning their study of science often wonder why it is necessary to use so much mathematics. It

appears to make the subject very complicated, difficult, and abstract, while a more popular, descriptive approach to science would be much more easy and pleasant. It is because of the use of mathematics that so many people fear to study science, and find its reasoning meaningless and remote from daily experience.

There is some real sense in this objection. The physical world in reality is not a set of mathematical formulae or geometrical diagrams. It is a colorful, moving, tangible collection of things, each of which has its own inner nature and way of behaving. The richness and the unity of the real world can never be reduced to a mere formula. Natural science is not all mathematics, nor is it even basically mathematics. Mathematics deals with something abstract and idealized, figures and numbers which we construct in our imagination, while natural science deals with something very concrete which we do not imagine but bump into all around us. Aristotle at the very beginning of natural science protested against the inclination of his fellow pupils in the Academy of Plato to treat the world as if it were only a mathematician's diagram. He insisted that natural science must keep close to sense observation of the material world, and explain that world in its own terms.

Yet Plato, Aristotle, and Archimedes all agreed that we cannot understand the material world if we neglect its quantities. Quantity, according to Aristotle, is the first of all the accidents (see page 344), so that every other accident has a quantitative aspect. Furthermore, the quantity of a substance is one of its **properties**; hence if we know the quantity that naturally belongs to a thing, we can define it in terms of quantity, and we can come to an understanding of its essential nature. **Figure**, the kind of quality intimately connected with quantity (see page 249), is one of the best indications we have of the nature of a thing, since it shows us the proper quantity in its connection with proper quality, and from this all the other properties of the thing are explicable.

Hence natural science must give special attention to the proper quantities of things if it is to discover their inner natures. We may take as an example the experiment of Pythagoras with the musical string. Tones are **qualities**, not quantities. Yet when we discover that a certain quality of sound or tone is produced by a certain length

or quantity of a string, and that another tone is produced by a different quantity, and that the relations between one quality and another resemble the relations between one quantity and another, we are beginning to understand the nature of sound. When we understand the nature of sound we also come to understand the nature of the vibrating body (a substance) in which this accident exists.

NATURAL SCIENCE AND MATHEMATICAL PHYSICS

It was an obvious step, therefore, but a very important one, which the Greeks took when they developed mathematical physics, that is, an application of mathematics to natural science. Unfortunately, not all of them kept clearly in mind the warning of Aristotle that we must not confuse mathematical quantity (which is *abstract*) with physical quantity (which is *concrete*). The number 2, and 2 apples, are very different things. When we say that a pair of apples are 2, we say something very true and very important, but we are far from telling the *whole* truth about the apples. It is an *equivocation* (see page 59) to use the word "two" of apples and of the number 2, unless we carefully distinguish the different senses of the word.

This means that mathematics and natural science are distinct and separate sciences, although both treat of quantity. Natural science treats of concrete quantity as it actually exists as a property of changing things. Mathematics treats of abstract quantity considered apart from the nature and other accidents of the thing which has quantity. The triangle which we study in mathematics is considered without deciding whether it is of paper, or wood, or metal, or what produced it, or what it is to be used for.

Mathematical physics is a combination of these two distinct sciences. How can we combine two sciences which are distinct without running into confusion? We can do this in two ways:

1. We know that if we prove something is *impossible* in abstract quantity, then it will also be impossible in concrete quantity.

For example, if we know that it is impossible to construct a regular polygon with 11 sides in geometry, then we will never find a crystal in nature that has this shape. Thus mathematics will eliminate for us many guesses about the natural world, because it will prove their impossibility.

2. If we know that a natural object has a certain definite figure or number, then by mathematics we can show that it must have certain other quantitative properties that belong to such a figure.

For example, if we know that a drop of water is round, we know at once that it is exposing the least possible area per unit of volume to the air, since a sphere has the least possible surface per unit of volume.

It may be objected, however, that natural figures are never perfect, and that even in counting natural units it is often very difficult to be accurate. Hence it would follow that in applying the conclusions of mathematics drawn from perfect figures and numbers we cannot be sure that our application is anything more than approximate, and hence our conclusion will be probable and not certain.

This objection is a very good one. A very slight change in a measurement in science may lead to an entirely different mathematical figure. After all, the difference between a polygon of many sides and a circle is very small in measurement, and yet these two figures have completely different definitions in mathematics. The result is that when we apply mathematics in science we become **more exact** in one sense, and **less exact** in another.

1. We are **more exact** in that mathematical relations are perfectly definite and clear (6 is *exactly* twice 3).
2. We are **less exact** in that we are substituting a mathematical quantity for the physical quantity which actually exists, although they are only *approximately* equivalent.

CERTITUDE AND PROBABILITY

It is not surprising, therefore, that a very large part of mathematical physics is only probable and not certain, since an improvement of measurement may greatly change the theory. Thus if we consider what parts of Greek science still remain valid today, we see that:

1. Greek pure mathematics still remains valid, with only minor corrections.
2. Greek natural science of the non-mathematical sort (e.g., biology) still remains essentially sound, although many corrections (some quite important) are needed.

3. Greek astronomy, which was mathematical physics, has had to be completely revised, although some parts of it are still valid (theory of eclipses, method of measuring the earth).

Mathematical physics is thus the most shifting part of science and is constantly undergoing revisions. Does this mean that mathematical physics never gives certain conclusions? It can give certitude if we can be certain of the *range* of the physical measurements to which it is applied. For example, if we know that the earth is approximately a sphere and that its flattening at the poles is not greater than a certain maximum nor less than a certain minimum, then we can treat it mathematically as if it were a sphere, and be sure that our conclusions as to its properties are valid *within that range*. If we extend our argumentation beyond this range, then, of course, it becomes merely probable. If, moreover, we do not know the range of validity with certitude, then our whole theory will be only probable.

Consequently, the astronomy of Ptolemy which put the earth at the center of the universe was never more than a probable theory, because there was no way to be certain of the range of accuracy of the measurements used. Ptolemy assumed that the fixed stars were close enough to the earth that, if the earth moved, at least a small displacement of these stars should be observed. Since such a displacement was not observed, he concluded that the earth did not move. As a matter of fact, the stars are very remote, and consequently their displacement is very small, too small to be measured without very fine instruments. Since Ptolemy could not estimate the distance of the stars, he had no way of being sure that his argument was conclusive. Hence his whole theory was probable. On the other hand, the theory much later devised by Newton was known to be certain *within a given range*, although, as we now know, it is not accurate beyond this.

Hence it is a mistake to believe that in science new theories are constantly overthrowing all previous belief. Some theories which were always regarded as being merely probable are being replaced by more probable theories, or finally by ones which are genuinely certain within a given range of accuracy.

MEASUREMENT

Since the application of mathematics depends on measurement, we must perform these measurements carefully:

1. There must be a **standard** of measurement which is as invariable as possible, and whose range of variation is known within limits. The best standards are those which are *natural* (for example, the rotation of the earth as a standard for the day), because their variation is held within a definite range by natural causes.
2. We must try to isolate the thing to be measured from as many disturbing factors as possible. For example, if we wish to measure a metal rod we must keep its temperature constant.
3. We must perform the measurement repeatedly. This shows us the range or *limit of error* within which our measurement is accurate.

In every case we are not merely looking for the measurement of an individual quantity but of a **natural regularity**. For example, the height of John Jones or the temperature of this sick man is not itself a scientific fact. Rather the range of height for any human being, or the normal temperature of a man, or the maximum temperature of a sick man who will survive are scientific facts, because they regularly recur in nature and are **properties** of some natural thing.

The Certitude of Measurement

Often our measurements are **statistical** in character, that is, they are expressed in terms of a *ratio* between quantities. For example, we may discover that the height of 3 men out of 4 falls within a certain range, or that 7 out of 10 times a certain chemical reaction occurs. We speak then of the **statistical probability**. Actually there is true **certitude** in these measurements, since the existence of the *ratio* is certain. The probability lies in the individual cases, since if we are asked whether in a given case the chemical reaction will occur, we may say, "It is more probable that it will, since it occurs in 7 out of every 10 cases."

Indeed, we may admit that *all* measurement has a statistical character; for whatever quantity we find to be a property of natural things admits of some variation, and the operation of measurement which we perform on it is also of varying accuracy. This does not destroy the certitude of our knowledge, because science is not concerned with individual cases but with what is *true in most cases*.

The Need of Statistics

Natural laws are not infallible; they are subject to interference from the carrying out of other natural laws or of the action of free wills not compelled to obey or to limit themselves to these laws (the wills of men, angels, and of God.) The interference of one natural force with another we call **chance**. Chance is possible because the universe is made up of a multitude of different substances, each following the end of its own nature, and because in the material world things by reason of their matter are constantly subject to outside influences. In his wisdom God rules over this whole multitude of natural things and through his angels keeps this conflict of natural forces from destroying the general order of the universe. Yet since he rules things according to their natures, he permits chance events as part of the pattern of the world, although he keeps them within limits.

Furthermore, God permits free creatures, the angels and men, to share in guiding their own lives. Because of the sin of the angels and of men there is more chance and disorder in the world than God intended in the beginning, and he wills to remove this undesirable disorder through his Son and the Church and man's intelligent and right use of his own power over lower things.

In studying the world of nature, therefore, and also the world of human society, we need to lay bare the order often obscured by chance and by moral evil. Because quantity is the basic accident, natural order is very clearly manifested in quantitative order. Hence mathematics can play a great role in helping us to sort out regularities.

The branch of applied mathematics called statistics (from late Latin for "a statesman," because statistics were first used by government officials) deals with this attempt to discover regularities in quantitative data (measurements).

Statistical Methods

Statistics is concerned (1) with *describing* in a clear fashion the actual results of measurement, and (2) with *induction* of some generalization from this data. In carrying out the first of these tasks, the statistician arranges his data in an array from the smallest to the largest item. He then attempts to fit an equation or *curve* (using

analytic geometry) to this array so as to show a **frequency distribution**. It will commonly be found that the items fit a normal curve in which most of the items have a **central tendency**. For example, if he has repeatedly measured the weight of a quantity of material, the actual measurements will spread out over a considerable range, but most of the results will cluster around one value, and this value, therefore, is probably the true one.

Various types of averages (mode, median, arithmetical mean, geometrical mean, etc.) can be calculated which serve as a convenient approximation to this true value. It is necessary also to indicate how the deviant values are "scattered" around this center; hence the statistician attempts to measure this **variability**, to estimate the lack of balance or *skewness* in the curve, and to estimate the bunching of cases around the average (the *flatness* of the curve). Mathematical formulae and indices have been developed which express this central tendency and variability in different ways, each of which gives a better approximation for different types of data.

Besides a simple curve showing such a frequency distribution, descriptive statistics also deals with complex curves that show, for example, the variation of a quantity through a series of time periods, as in the familiar business chart.

The problem of arriving at a generalization or *induction* is principally that of discovering a **correlation** between two arrays of measurement, especially when these arrays indicate an actual change of the quantity in time. If quantities bear a constant relation to each other, and especially if this relation continues throughout a series of changing conditions, then we have a sign that there is a **cause and effect** connection between them. It will be noticed that such a correlation does not tell us which is cause and which is effect, for these can only be known by a study of the natures of the two things involved; but it does indicate to us which things may be causally connected.

In actual fact, however, correlations are not perfect, so that again it is necessary to resort to a statistical procedure to determine whether the deviation between the expected values and the actual values is so great as to render the correlation meaningless.

Basic to all these statistical processes is the theory of **probability**. A mathematician knowing, for example, that in throwing dice only a certain number of results are possible, and that they are independent of each other and due to so many different factors that the individual result is pure chance, can predict an ideal pattern to which the successive throws will approximate as a **limit**. If this pattern is not actually realized, then we must suppose that, besides chance, some special cause (loaded dice) is operating. Hence the knowledge or probability makes it possible both to perceive order in data, and to eliminate what is pure chance.

Finally we may mention that mathematics can help to sort out the operation of several independent causes (*factor analysis*). For example, in testing human intelligence by a variety of tests we may get very complex data. The mathematician determines whether this complexity could be explained by the fact that human beings have several relatively independent abilities, some being superior in memory, others in the use of words, etc. Once these factors have been hypothetically isolated, special tests may be designed to test each.

All use of statistics is only instrumental to a genuine physical or sociological understanding of the realities which are being measured. If we have some understanding of the natures of things, we can devise measurements which will help us detect regularities in their behavior, and these in turn will lead us to a better insight into their natures. But without this understanding the collection of data is aimless and meaningless. Hence statistical methods are only a preparation for a process of analysis and reasoning.

REASONING IN MATHEMATICAL PHYSICS

Once we have established by measurement that a certain quantity regularly occurs in a natural thing and hence is its property, we can draw further conclusions by syllogistic reasoning. In a mathematical-physical argument the middle term must be a **measurement** which is known to be a physical fact, but which can be treated as an abstract mathematical quantity. Take, for example, the demonstration given

by Aristotle from biology:

A wound whose area
compared to its circum-
ference is large

is slow to heal

And: a round wound

is a wound whose area compared
to its circumference is large.

Therefore: a round wound is slow to heal.

Major: Is proved *biologically* from the fact that a wound heals from its edges.

Minor: If we consider this abstractly we get:

A circle is the figure whose area compared to its circumference is greatest—a fact which can be proved to be true from *mathematical* principles.

Thus in the demonstration the middle term can be considered concretely and physically (a *wound* whose area, etc.), or abstractly and mathematically (a *figure* whose area compared to its circumference is greatest). Considered abstractly, it can be treated as a part of mathematics, and its various properties and relations can be demonstrated mathematically. The conclusion of the syllogism, however, is not a mathematical truth, but a physical truth: *Round wounds heal slowly.*

THE DECLINE AND REVIVAL OF MATHEMATICAL PHYSICS

Early Success—and Stagnation

The Greeks had a very clear picture of these three types of science: 1) mathematics; 2) natural science; 3) mathematical natural science (physics); and of their mutual relationships. During the five hundred years after Aristotle had proposed the program of research in these fields, the Greeks made a remarkable advancement in them all. Then a strange decline set in, and scientific progress became very slow.

Many factors played their part in this decline, but the most obvious one is that the Greeks had already exhausted the possibilities of advance without the introduction of better *instruments* for gathering facts. The Greeks had no telescope or microscope. They did not know much about the various methods of purifying and combining

chemicals. They made only a meager use of dissection in studying living things. It was not that they were totally ignorant of the advantages of such methods, but that they never carried any of them very far.

Why was it that such a brilliant people did not develop the technology which would have helped them extend their science? Most historians believe it was because Greek and Roman civilization was built on the institution of slave-labor. A slave is not much interested in inventing new methods of doing things, because he does not own what he produces. On the other hand, those who own slaves are likely to feel that such problems are beneath them. At any rate, Greek and Roman civilization were weakest in just this technological aspect of culture, so that when Roman civilization was at its height, the interest in science was in decline.

From Darkness to Light

Then came the terrible period of the civil wars in the Roman Empire, the invasions by barbarians, and the disruption of transportation and city life. There were few places that men had the leisure or the opportunity to study, although men like the Roman senator Boethius (who died a martyr at the hands of a barbarian king in 525) labored earnestly to try to restore education. Yet during these Dark Ages the Christian Church was able to check the downward course of civilization which had resulted from the corruption of paganism, and to begin to build a firmer Christian civilization. The basis of this new civilization was an education which combined the study of the Sacred Scriptures with the study of the liberal arts which had come down from the schools of Plato and Aristotle.

By the thirteenth century the Church was able to revive these schools in Christian form in her great universities in western and southern Europe. Fortunately, in eastern Europe (the Byzantine Empire) the learning of Greece had been preserved, if not greatly advanced, while the Mohammedans who had overrun the rest of the Byzantine Empire in the East and in Africa had taken over this learning from the Christians. Hence the West was able to obtain the works of the great Greeks—either in Greek manuscripts from the Byzantines or in Arabian translations from the Mohammedans—and

have them translated into Latin. In this way Aristotle, Euclid, Ptolemy, and finally Archimedes were studied diligently; mathematics, natural science, and mathematical physics began to revive and to develop once more. At the new University of Oxford the great Bishop of Lincoln, Robert Grosseteste, especially awakened interest in science, and he was soon followed in other places by St. Albert the Great, Roger Bacon, and St. Thomas Aquinas, who all promoted these studies.

What was even more significant was that this time real advances in the technological side of the sciences were being made. The Mohammedans had already made advances in astronomical measurement and in chemistry (alchemy), and now the Christians added to this the mechanical clock, the use of lenses, new metallurgical processes, etc. The time was ripe for an immense flowering of science. During the 14th and 15th centuries, however, this progress was slowed down by the social upheavals of the period and the decline of the universities under the influence of the type of philosophy called Nominalism.

Galileo

In the 16th century, however, and especially in the 17th, very rapid scientific progress was made, the great University of Padua being especially influential. This University was strongly Aristotelian, and it fostered the great interest in natural science and the direct observation of nature which is to be found in Aristotle's works. Among the men whom it produced was the great Galileo (1564-1642), who took the final steps in establishing the method of mathematical physics. Galileo was the first to make effective use of the telescope, and at the same time, through his study of Archimedes, he was able to apply mathematics in a brilliant fashion to the new facts he was discovering. Thus it became clear to all that the way for the advance in mathematical physics would be through an improvement of methods of observation and measurement, combined with the analytic geometry of Descartes and the subsequent development of higher mathematics. The method of Galileo and Descartes remains dominant in science today, and Newton and Einstein were happy to follow in their path.

THE LIMITATIONS OF MATHEMATICAL PHYSICS

The career of Galileo, however, well illustrates a danger to which mathematical physics is subject. Aristotle had made clear that physics of this kind is not the whole study of nature. Not all aspects of nature can be known by a quantitative procedure, and even those which are known in this way have to be interpreted in the light of the nature of a thing which underlies its quantity. This was well understood by the great biologist, William Harvey (1578-1657), who had also studied at Padua and who discovered the circulation of the blood.

This discovery was as great an advance over the knowledge possessed by Aristotle as were Galileo's discoveries about falling bodies, but it was not arrived at by mathematical methods (see the proof on page 586). Galileo, however, was a genius of a very impetuous sort, and he wished to forget the whole past and to rush forward with his mathematical methods without attempting to control these methods by other types of investigation. He claimed to have proved things that actually he had not proved (for example, his claim to have shown that the tides were due to rotation of the earth). He lacked the critical and conservative thinking which are required for a perfect scientist.

It is little wonder that such a man eventually went too far. Although a Catholic, he was led by his enthusiasm for his own scientific guesswork to reinterpret the meaning of the Bible. The interpretation of the Bible belongs only to the Church to whom God has given that right, and a scientist is stepping outside the limits of his science when he attempts to do so. As a result, Galileo was required by the authorities of the Church to retract his teachings, if he was to remain a Catholic, and as a penance he was required to remain the rest of his life in house-confinement, although he was allowed to continue his studies. This penalty today seems to us severe, but the Church well understood how important it is for scientists to remain within the field of science, and within that field to proceed by the scientific method of carefully testing their discoveries. If later scientists had submitted to this guidance as Galileo finally did, the world would be further advanced along the road of sound science

than it is today. The theologians who condemned Galileo were wrong in some of their own scientific ideas, where he (genius that he was) was right in some guesses; but they were right about the strict standards of the scientific method, and he was wrong.

The period from Galileo to our own has seen a marvelous development of mathematical physics, but it has also seen the weaknesses of Galileo multiplied a thousandfold. The philosophical bases of science which Galileo treated so lightly have been ignored by many scientists, until today science has broken up into a thousand specialties which cannot be put back together again. What is worse, it is often at odds with religion, philosophy, art, and morality, because the common foundation which united them all has been shattered.

Before us lies a new age of science in which the advance will probably include a return once more to a sounder foundation for modern science. On the part of the students, this requires that they learn mathematics as a pure science, and also mathematical physics as an independent science and a tool for natural science. At the collegiate level they should begin their study of natural science itself with a consideration of its fundamental principles, through which all the different branches of science can be integrated.

CHAPTER IV

Wider Vistas in Mathematics

THE RICHES OF MODERN MATHEMATICS

The *Elements* of Euclid did not exhaust the mathematics known in his day, but they gave a good survey of the principal topics which had then been studied in pure mathematics. A look at a modern library of mathematical works gives at once a bewildering impression of the immense growth in the number and the complexity of topics in mathematics. One of the sources of this complexity is that each time some new idea in mathematics is discovered, mathematicians then make haste to apply it to all the topics previously known, so as to give to each of them a new treatment. It is like walking into a hall of mirrors in which we see in one mirror reflections of other mirrors and in each of them also reflections of others and so on. Thus in every field and branch of mathematics all the other fields are reflected.

This makes it very difficult to give the beginner a map of mathematics in the way that we might outline, for example, the branches of natural science. Yet it is important that a student who has become acquainted with elementary geometry and algebra should have seen that these fundamental mathematical studies are the door to a whole world of mathematics.

ADVANCES IN GEOMETRY

EUCLIDEAN GEOMETRY

In ancient times many interesting theorems were added to those contained in Euclid's *Elements*. A student can get an idea of this achievement by examining the *Conic Sections* of Apollonius of Perga (260-170 B.C., a generation after Archimedes), in which a beautiful theory is given of the figures and curves produced by a plane intersecting a cone at various angles.

The middle ages did very little to advance geometrical studies because the mathematicians of that period were more concerned with algebra, and this tendency continued even in modern times because of the invention of analytic geometry, which is algebraic in character. Nevertheless, the extension of algebra to new theorems continued.

More significant, however, is the effort to give the Euclidean geometry a more *rigorous* logical structure. The Greeks themselves made many criticisms of Euclid's definitions, axioms, postulates, and proofs, and showed that many of them could be made more exact. In particular, they attempted to show that the complicated parallel line postulate (see page 331) was not a postulate, but a theorem, although they never succeeded in this attempt.

Modern geometers also have been chiefly interested in this problem of making geometry rigorously exact. To do this it is necessary to admit nothing in geometry that is not entirely justified by the *explicit* postulates. Furthermore, these postulates must be exactly stated, and be *independent* of each other. By "*independent*" is meant that one cannot be proved from another. The clearest proof of such independence, of course, is had when it can be shown that one postulate can be contradicted without contradicting the others.

In applying these strict standards to Euclid, numerous defects were found. In listing only five postulates, Euclid had *implicitly* included others which needed to be stated. Once this point had been cleared up it was also necessary to show the mutual independence of the postulates. Once again suspicion centered on the parallel line postulate. Was the statement that *through a point outside a given*

*line one and only one parallel can be drawn** a theorem or a postulate? The only way to settle this question was either to prove it as a theorem, using the other postulates, or at least to show that it was *dependent* on the other postulates by showing that to assume its contradictory would lead to a contradiction of the other postulates. If this last proved impossible, then Euclid would have been vindicated, and it would be evident that this statement is not a theorem but a true postulate independent of the others.

Since after hundreds of years of effort no positive proof had been found that it was a theorem, Father Geronimo Saccheri, S.J. (1667-1733), attempted the negative approach of assuming the contradictory of the postulate and seeking to show its dependence on the other postulates in this way.

NON-EUCLIDEAN GEOMETRY

The importance of this new approach was not recognized until the 19th century. The Russian, Nicholas Lobachevski, and the Hungarian, John Bolyai, assumed that in fact there are *many* lines parallel to a given line passing through a point outside the line. The German, Bernhard Riemann, took the opposite assumption, that there are *no* parallel lines. In both cases the geometers were able to show that geometries of this sort are self-consistent. Hence Euclid was quite right in holding that his postulate was not a theorem, but a statement independent of the others.

This proof of the independence of the parallel line postulate did not, of course, prove that Euclid's postulate was false, nor that it was a mere assumption. Nor did it prove that either the assumption of Lobachevski-Bolyai, or that of Riemann, was true. What it showed was that if this postulate is not taken as a first principle, then the complete Euclidean system with its use of similar figures cannot be demonstrated.

On the other hand, besides the geometry of Euclid there now existed a group of Non-Euclidean systems (other sub-varieties besides the two we have mentioned were soon added), which as self-consistent systems of propositions were quite marvelous and as rich

* This is equivalent to Euclid's own statement of the postulate, given on page 331.

in arguments as the Euclidean geometry. How were these to be understood? It was soon seen that all these geometries, including that of Euclid, could be considered as forming a more *general* type of geometry. This more general geometry shows the *analogy* between various different figures.

Thus in Euclidean geometry distances are measured by **straight lines**. On the surface of a sphere, however, distance is measured by a **curved line** (called a *geodesic*, "earth-line"). Hence there is an analogy between a straight and a curved line in this respect. Not every curved line on a sphere, however, is the shortest distance between two points, but only a certain type of line depending on the curvature of the sphere itself. Even on a sphere, therefore, it is possible to distinguish between two classes of lines, and we may consider the geodesic as straight, and the other as curved. Since this is only an analogy, however, the properties of a geodesic are not altogether the same as the properties of a straight line—for example, all geodesics on a sphere *intersect*.

Hence "straight lines" on a sphere cannot be parallel, and in this sense the assumption of Riemann is valid for the surface of a sphere. Similarly, concave solids can be constructed on whose surfaces the geodesics are such that many never meet (at least on the limited surface of such solids). For such surfaces, then, the assumption of Lobachevski and Bolyai holds.

So the Euclidean and Non-Euclidean geometries are not contradictory, but apply to surfaces or spaces in which the measurement of distance is made by lines which have zero curvature (Euclidean geometry), positive curvature (Lobachevski-Bolyai), or negative curvature (Riemann). Between figures of these three sorts there is thus revealed a beautiful *analogy*, since in each of the geometries there are **similar theorems** which can be translated into each other by an appropriate change in the definition of the terms. For example, the figures on the surface of a sphere do not have the same definition as figures drawn on a flat surface, and yet for every figure on a flat surface there is a corresponding figure on the sphere and corresponding theorems can be proved of it.

In this way a greater unity is given to the whole of geometry. For it becomes apparent that once we have proved a theorem for a

figure on a flat surface, we will be able to prove many analogous theorems which apply to a great variety of curved surfaces.

PROJECTIVE GEOMETRY

The Euclidean and Non-Euclidean geometries are often called **metric** (Greek *metron* means "measure") geometries since in them the measurement of distance is of fundamental importance, and they differ as to the way in which this measurement is made by a straight or curved line. It was discovered even by the Greeks that it is possible to compare one figure with another, abstracting from considerations of measurement.

This discovery was made in the applied mathematics called **perspective**, in which a painter tries to solve the problem of representing a three-dimensional object on a two-dimensional surface. As we all know, in such a representation parallel lines (a railroad track, for example) must be shown as converging to a distant point, and all objects appear as foreshortened. Again, the circular top of a vase or cup appears as an ellipse in a painting, although in reality the edge of the cup is at all points equidistant from the center. Thus in the painting the distances of the parts are greatly altered, and yet a very exact *analogy* between the real figures and their representation is maintained; otherwise they would not look alike.

We have no practical difficulty in interpreting a picture, but the history of art shows us that it was no mean feat for painters to learn this trick of perspective. Geometers attempting to develop an exact theory of such perspective soon realized that it had important implications for pure geometry. This development began in modern times with the Frenchmen, Girard Desargues (1593-1662), and the great Blaise Pascal (1623-1662), who was noted alike as a physicist, mathematician, and Christian apologist.

Projective geometry considers the relations between figures which correspond to each other point for point, although their shape, size, and proportions may be quite different. The name is derived from the fact that one figure is thought of as being altered into the other by a process of projection on a different surface or a different part of surface. We can, for example, cause a movie camera to cast its picture on a flat surface facing the camera, or on the ceiling or walls

which are perpendicular to the camera, or on the curved surface of a pillar. The picture undergoes all sorts of stretching and shrinking, and still every point of the picture as it appears on the flat surface appears also in its other projections.

Obviously the properties which are common to classes of figures related to each other in this way are very fundamental ones, and projective geometry is therefore a very penetrating and profound study. The postulates which are required to prove its theorems are of a very general type relating to the order of points in space. As Non-Euclidean geometry omits the **similarity** of figures, so projective geometry abstracts from the **congruence** of figures.

TOPOLOGY

It is possible, however, to abstract still further, leaving out not only the similarity and congruence of figures, but even the point-to-point correspondence which still remains in projective geometry. Just as we imagined a figure projected on another surface so that the distances between its points is stretched or shrunken, so now we may imagine it as twisted, bent, knotted, or deformed in any fashion, provided it is not torn or divided. Even when treated in this fashion a physical figure retains certain properties. A circle of wire, for example, can be twisted and crushed into a ball, yet this does not alter the fact that it is a single line which is endless. A rubber balloon could be forced into the shape of an egg, of a dumbbell, or made to fill the interior of a square box; it remains a closed surface.

Topology (Greek *topos*, a place) is the study, only recently developed to any extent, of the properties of figures which are of this fundamental character and which imply only the **connectedness** or continuity of the parts. With it we reach the limits of pure geometry, since if we go a step further and remove **continuity** we cannot properly be said to be in the science of geometry. Actually, this further abstraction is made, as we will see below.

THE SCIENCE OF NUMBERS

NUMBER THEORY

We have seen how the science of magnitudes has been pushed to deeper and deeper depths of analysis. What of the development of

the science of number? The problems of number theory raised by Euclid and Nicomachus (see page 353) have continued to occupy mathematicians, and are still of very great interest. For example, the following two problems dealing with prime numbers have never been solved:

1. Is it true that any even number (except 2, which is itself a prime) can be represented as the sum of two primes? If you try it with 4, 6, 8, 48, 100, etc., you will see that it is true in these cases. Is it always true? *No one knows*. This is called **Goldbach's conjecture** after an obscure mathematician in the 18th century who first suggested it.
2. Are there infinitely many pairs of primes which differ by 2? There are many such pairs—for example, 3 and 5, 11 and 13, 29 and 31. Is this a regular recurrence throughout the series of natural numbers?

Thus it is apparent that the study of the properties of natural numbers is far from exhausted. Indeed, as we shall see below, all modern mathematics ultimately rests on the theory of numbers.

ALGEBRA

We have seen in Chapter I of this part (see page 311) that algebra arose from the emphasis on the construction of whole classes of numbers bearing certain relations or *functions* with respect to one another. Thus for algebra the fundamental concept is that of **function**.

We have also seen that, in order to construct such classes of numbers, it was convenient to enlarge the concept of number so as to include various types of operational or artificial numbers which signify not a quantity (as do the natural numbers) but the construction of a quantity by a certain operation. Each of these artificial numbers can be defined as a certain process involving the fundamental operations of addition, subtraction, multiplication, and division, performed on specified natural numbers or classes of natural numbers. In this way, zero, negative and positive numbers, fractions, irrational numbers, and complex numbers were all devised and proved to form a **number field** which is closed under the four fundamental operations. This means that any process of addition, subtraction, multiplication, or division (with the sole exception of division by zero) on numbers

in this field will construct another number pertaining to this same field (see page 321).

This does not mean, however, that “numbers” cannot be found which cannot be constructed in this fashion. **Transcendental numbers** have been discovered, such as π (3.1415 . . .), which are not algebraic numbers and which cannot be constructed by algebraic processes (that is, they cannot be roots of an algebraic equation with rational coefficients). Furthermore, George Cantor (1845-1918) introduced **transfinite numbers**, concerning which there has always been much mathematical controversy, but which certainly have some mathematical meaning. Cantor pointed out that it is possible to distinguish different *infinite* sets of numbers, and to give arguments to show that one infinity is greater than another, while some infinities are equal. It then becomes possible to assign a cardinal number to these infinities by ordering them according to smaller and greater, and then perform some of the ordinary mathematical operations upon them. The results are very curious. For example, we must admit that the set of odd and the set of even numbers are both infinite, as well as the set of all natural numbers. Yet we must also admit all three sets are equal to each other, since we can find an odd and even number for every natural number as follows:

| | | | | | | | | | | | |
|-----------------|---|---|---|---|----|----|----|----|----|----|----|
| natural number: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| odd number: | | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 |
| even number: | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | |

From this it would appear that axioms such as “the whole is greater than the part” do not apply to such sets.

In order to introduce numbers other than the integers, the concepts of a **series** of numbers and of a **limit** were required. Thus an irrational number can be defined as the limit of a series of fractions, a limit which is approached more and more closely the further this series is constructed, but which is never reached.

Given these numbers all constructed by means of fundamental operations which are justified by **postulates**, the work of algebra is to study **functions**, or the relations between classes of numbers. Such a relation is expressed by an equation which indicates that certain operations on certain classes of numbers (variables) will yield a number which can also be constructed in a different (or sometimes

identical) fashion. So $3^2+4^2=5^2$ means that the same number, 25, can be constructed by two different operations. $a^2+b^2=c^2$ means that there are classes of numbers for which this same relation holds.

In elementary algebra the student is taught to solve many such equations of the simplest types, generally simultaneous equations (equations of first degree) and quadratic equations (equations of second degree), named from the coefficients which occur in the equation. The Greeks by the time of Diophantus (who died about 330 A.D.) had advanced this far in algebra. The general equations of the third and fourth degree were solved by the Italians, Nicholas Tartaglia and Ludovico Ferrari, and first published by Girolamo Cardano in 1545.

For a long time mathematicians attempted to find general solutions for equations of higher degree; such efforts were unsuccessful, although they advanced rapidly in solving particular types of equations. Finally, a Norwegian, Niels Abel (1802-1829), showed that this search was hopeless, since equations of the fifth degree and higher have no general solution. Henceforth it became necessary to deal rather with the immense array of particular types of equations, and the brilliant Evariste Galois (who died in the year 1832 when he was only 21) laid a general foundation for this higher algebra by showing a way to classify the various types of equations, so that each group could be dealt with as a whole.

ANALYTIC GEOMETRY

In the meantime, the development of algebra was being strongly influenced by the great effort to reduce geometry to algebra. We have already seen (page 359) how the basis of such a reduction had been provided by Descartes (1596-1650) in his system of **analytic geometry**. This completed the work of **trigonometry** (see page 359), which had already provided a method of expressing the ratios of lines and the size of angles in numerical terms. By an extension of Descartes' method of co-ordinates, any geometrical figure—whether plane or solid, even those in the Non-Euclidean and projective geometries—could be expressed algebraically. Each point in space could be specified by three numbers, each line and plane by an equation, and thus geometry seemed to be immensely simplified.

Even more surprising was the fact that by pursuing this method it became possible to speak of geometries of more than three dimensions. Since in algebra a point in space is defined by 3 numbers giving the distance of that point from certain fixed lines (co-ordinates), there is no algebraic reason why it should not be possible to speak of points which require 4 such numbers, or any set n of numbers to determine its location. Each such number required to determine a position may be called a "dimension," and any number of such dimensions can be dealt with in algebra. The fourth dimension could even be pictured graphically by projecting it upon a solid or a plane, just as it is possible in perspective to project a solid figure of three dimensions on a plane of one less dimension.

THE CALCULUS

When an equation can be graphically represented as a straight line (a simultaneous equation), it is quite easy to see how it behaves for every value of the independent variable. The slope of the line shows how, as we increase the independent variable, the dependent variable increases. If the line slopes upward sharply, this increase is rapid; if it slopes slowly, the increase of the dependent variable for each unit of increase in the independent variable is small. But equations of more than the first degree are found to be curves. Since a curve varies its direction *continuously*, the slope of the curve is also constantly changing. How, then, can we reduce this to a convenient geometrical expression? Or to put it algebraically, how can we determine the value of a function for any value whatsoever of its independent variable?

Many mathematicians contributed to the development of a method of answering this question—which obviously is fundamental to algebra, since on it depends the solution of many types of equations which cannot be solved by the more elementary methods. The ultimate solution, however, was proposed by Leibnitz and Newton in the 17th century. Newton was concerned with the problem principally because without such a mathematical method it becomes well nigh impossible to deal with natural motions in which there is acceleration of change (for example, a falling body whose speed is constantly increasing).

The method found is called the **calculus** (method of calculating), which is spoken of as **differential** when it is used to determine the slope of a line for a given difference of the variable, and **integral** when it is used to determine the area bounded by the line (i.e., to determine the rate of change in a function, or the accumulated change). It consists essentially in the use of the concept of limit.

We can convert a continuous line into a series of numbers by dividing the line into units as small as we please, so that the series approximates to a description of the line as closely as we wish to make it. So also we can convert a curved line into a series of straight lines (tangents to successive points in it) of varying slopes, with as perfect an approximation as we wish, by considering as small a segment of the curve as we wish. For each such small segment the slope of the curve is roughly the same as a certain tangent straight line. The smaller we make this segment the more accurate our description, although the exact description is a limit which cannot be attained.

Such a study of the approach of a series to a limit can also be applied to many types of problems other than those of geometrical curves. For example, when we speak of the velocity of a moving body we are considering a relation between a change in time and a change in distance, so that if we speak of the velocity of a body at an *instant* of time, we are speaking of a limit, namely the change in distance during a smaller and smaller interval of time.

It is possible, therefore, to generalize the calculus so that it becomes the branch of algebra which considers any type of problem dealing with the ratio between the difference of a dependent variable required when the independent variable is made to differ by a smaller and smaller amount (**differential calculus**), or problems dealing with the sum of a series of such difference (**integral calculus**).

Of particular interest in studying functions in this way is the determination of whether they are *continuous* or not, and also the determination of their maximum and minimum values.

GROUP AND SET THEORY

This reduction of geometry to more and more general systems such as topology (which we have described), then its reduction to

algebra, and the advance of algebra to methods of studying every type of function by a general method of calculating every possible value of a variable—this could not but lead on to a still more general study of mathematics.

We have already mentioned Galois, who showed that an approach could be made to the solution of equations of higher degree by classifying them. This idea was soon extended to all of geometry and of algebra, so that mathematicians became interested, not merely in particular equations, but in whole classes of **transformations**. By this is meant that we can find very general classes of mathematical objects which have some properties in common, so that they could be transformed into each other by a finite number of specified mathematical operations. Thus in our survey of geometry we saw, as we advanced from Euclid's geometry to topology, that we were dealing with more and more basic properties which applied to wider and wider groups of figures. In topology a circle could be classed with a vast number of other closed figures, into which it could be transformed by a series of operations of twisting and bending and re-arrangement. Similarly, as we advanced in algebra we saw that mathematicians were ever seeking to group equations into great classes, each of which could be solved by a series of defined operations.

In order to reach this generality, it is necessary first to find *analogies* between unlike things. Thus projective geometry finds an analogy between a solid figure and its projection on a plane. In somewhat the same way analytic geometry finds an analogy between a line and an equation, and algebra finds an analogy between a rational and irrational number, or a number and an infinite collection. Such analogies, however, can lead to all sorts of confused and paradoxical thinking. Hence the tendency of mathematics has been to try and reduce these to univocal definitions, which are extremely generalized. When this is carried to a limit, the result is called **set theory**.

In set theory the mathematician begins with definitions and postulates which abstract from all geometric notions and which reduce numbers to sets of collections of unspecified objects. These objects might be interpreted as points, as lines, as spheres, as in-

tegers, as real numbers, as irrational numbers, or in any other fashion, just so long as they form a collection or set which can be defined by some common property. It then remains possible to perform operations on these abstract sets according to operational laws which are taken as postulates. In this way we may add sets, divide them, consider the part they have or do not have in common, etc.

Such a theory seems to satisfy the famous definition of mathematics by Bertrand Russell: "Mathematics is a science in which we do not know what we are talking about, or if what we are saying about it is true." Yet it is extremely powerful. In set theory it is possible to prove theorems so general that they will apply to any part of geometry or algebra. These theorems make it apparent that most of the theorems previously proved in these sciences are only special cases of more general theorems, in which the basic relations involved are much more evident. In consequence, set theory casts light on the whole of mathematics and gives it an orderliness never before suspected.

MATHEMATICAL OR SYMBOLIC LOGIC

We have still not reached the end of our survey. As soon as the ideal of rigor in mathematics began to be prominent in modern mathematics, it was evident that a mathematician in making a demonstration must not only list his mathematical postulates, but also must state his logical rules of reasoning as well. We saw in Chapter II that Euclid's proofs are not convincing unless we can show that he also observed the rules of syllogistic reasoning. Hence arose the attention to **mathematical logic**, or the methodology required in mathematics, and attempts were made to make very explicit the logical rules which were being followed.

As soon as this was done, mathematicians were rather horrified to discover that "traditional logic"—that is, the logic current in the schools of the 19th century—was itself not a very rigorous science. They attempted, therefore, to improve logic by the same methods of explicit postulation and careful definition as they were using in mathematics, and to facilitate this they introduced a mathematical type of notation. This new rigorous system of logic using a mathe-

mathematical type of notation is what we call **symbolic logic**. Again, this was only reviving an idea which Aristotle had glimpsed, and which was later considered by the medieval thinker, Blessed Ramon Lull, in the 13th century, and again by Leibnitz in the 17th. But in our times this new logic has been developed with amazing perfection.

We will not describe this system of logic here in detail, but only mention the following features:

1. It has a notation, similar to that used in mathematics, by which all logical relations found in **formal logic** can be expressed. This notation includes

- a. Letters which stand for *variables*, just as in mathematics, except that in this case the variables are classes of **statements** or **terms**. For instance, the letters p and q may each stand for any statement belonging to a particular set of statements.
- b. Symbols which indicate logical relations. For example, the symbol \sim placed before a propositional variable (one standing for a set of statements) *negates* it, so that $\sim p$ is the denial of the statement p . Again, the symbol \supset connecting two variables indicates their *conditional* relation, so that $p \supset q$ means "If the statement p is true, *then* the statement q is true."

2. It begins with a small number of **axioms** expressing such basic relations. If it introduces symbols other than the *primitive* ones, it defines these new symbols in terms of the primitive symbols. Furthermore, it has **rules of inference** which are similar to the rules of operation in mathematics, and which permit theorems to be proved by reduction to the axioms. Finally, it may have **formation rules** which regulate the formation of statements from terms, and combinations of statements from simple statements. All these axioms, definitions, and rules are assumed without proof. It has been shown that, just as a number of geometries or algebras are possible depending on the axioms assumed, so many **logistic systems** are possible in the same way.

3. From these axioms theorems are deduced according to the assumed rules of inference. These theorems are of two sorts:

- a. Theorems which are the various laws of logic; for example, the moods of the syllogism, etc.
- b. Meta-theorems which deal with the completeness and order of logic as a science. For example, if we prove our list of the moods of the syllogism to be complete, this conclusion is a meta-theorem. These meta-theorems are, so to speak, the logic of logic itself. (See page 568 ff.).

Once this logistic system is complete we have a full set of logical rules which can be used to regulate the development of some particular science. The particular sciences themselves can then be formulated in the same fashion, by adding new symbols which stand for their special terms, and axioms containing these terms. It may also be necessary to provide some special logical rules for a given science, but these can be either postulated or proved in the logistic system.

To date it has been found too complicated to formalize in this rigorous way any of the sciences except mathematics, and here a curious result has been achieved. It is the contention of Alfred North Whitehead and Bertrand Russell, who at the beginning of this century were leaders in the revival of logic, that when mathematics is formalized it becomes possible to reduce it to logic, because the postulates required for mathematics all relate to numbers, and numbers can be defined in purely logical terms. Russell defines number as "the set of all those classes whose members have a one-to-one correspondence." Thus the set of all couples is the number 2, the set of all trios the number 3, etc. Since in this definition no terms except logical terms ("set," "class," "correspondence") are used, it is argued that number can be defined as a purely logical entity.

If this attempt had succeeded, then the final outcome would be that mathematics would turn out to be pure logic. However this result has not been universally accepted, so that at present there are four well-known opinions about the ultimate nature of mathematics:

1. The Logistic Theory of Whitehead and Russell, which holds that pure mathematics is a branch of logic, expressed in their famous book *Principia Mathematica* (1913).
2. The Formalistic Theory, of which David Hilbert (1862-1943) was the leader, according to which mathematics is the science

of the formal structure of symbols. This school admits that mathematics is not logic since it concerns the structure of real objects, but they contend that it is possible to replace this structure by *symbols* which represent this structure. Once a correct symbolization has been achieved, then mathematics consists in the study of the structure of these symbols and only indirectly in the study of the real things.

3. The **Theory of Intuitionism**, of which L. E. J. Brouwer is the leader, holds that mathematics must be based on the natural numbers which we are *intuitively* sure we can construct.
4. The **Aristotelian Theory**, which prevailed in mathematics before Descartes, according to which geometry and algebra are essentially distinct sciences of real quantity.

THE PROBLEM OF MODERN MATHEMATICS

Some Difficulties about Modern Mathematics

This survey makes clear that in mathematics as in every other science there is progress, but at the same time there is often an increase in confusion and error. As every field of learning advances, brilliant ideas are proposed which often rapidly develop and become the fashion. Some of these eventually prove to be false, but their exposure usually brings to light some new truth or at least makes us understand an old truth better. In the history of mathematics, the many "proofs" of the parallel line postulate are an example of how errors may be made even by great thinkers, errors, however, which eventually are profitable.

Other new ideas prove to be true, but even in this case they are often proposed at first in an inaccurate and paradoxical fashion. Expressed in this incorrect and exaggerated fashion they often seem to overthrow the truths which have already been achieved, and there are always enthusiasts who claim that a new discovery has destroyed all that men previously thought to be true. Thus the success of the calculus led some (including one of its discoverers, the great Leibnitz) to suppose that at last it had been shown that a line is made up of points. But this conclusion was due to inaccurate definitions of

terms; it has been removed by a better understanding of the notion of a **limit**.

The lesson which this must teach us, and which the history of mathematics so well illustrates, is that we must constantly analyze and criticize each new theory until we are sure that it is correctly expressed and basically sound. In the elementary study of a subject (and this is specially true of mathematics) textbooks and teachers often find it convenient to define terms in a loose and *metaphorical* way. If the student takes this illustrative language literally he will fall into many errors.

For example, many terms used in mathematics seem to imply *motion* or *change*. We define a circle as "a line described by a point moving at a constant distance from another point." We speak of "constructing" a geometrical figure or a number, of a "variable" and a "function," of "approaching a limit," of a series "converging," etc. Quantities as they are abstractly considered in mathematics have no motion or change whatsoever. We do not really "project" a figure in projective geometry, nor do we move and superimpose a figure in proving congruence. All such expressions are only figures of speech derived from *physical* quantity. Hence in giving accurate definitions in mathematics we should seek to eliminate all implication of motion. Even the term "operation" must be understood very accurately, since we do not really make anything in mathematics (see pages 309 f.).

Another sort of confusion which we have pointed out several times is to be found in the *analogical* use of terms. The term **number**, for example, strictly applies only to the natural numbers, beginning with 2. Zero, the unit, negative numbers, fractions, irrational numbers, imaginary numbers, complex numbers, transfinite numbers, all are numbers only in an analogical sense. Similarly, the term "dimension" and the term "space" have many meanings. Nothing could be more absurd than the idea of some people that modern mathematics has proved the existence of a fourth dimension in the sense that length, breadth, and depth are dimensions.

Fortunately the last fifty years has seen mathematicians become very careful about distinguishing these different senses of terms, but the student will find them still often misused in mathematical writing and reasoning.

The Chief Difficulty about Modern Mathematics

Yet even when these confusions in the use of terms is cleared up, a basic weakness in modern mathematics remains. It is the same weakness which Aristotle criticized in the mathematics which he learned in Plato's Academy, namely, the failure to distinguish between **science** and **dialectics**. Aristotle showed that no matter how beautifully constructed and how logical a system of thought might appear, it remained only *dialectical* unless it could be shown to rest on first principles (axioms and postulates) which are *immediately evident*. A building is only as firm as its foundations and a house built on sand will fall. The problem about modern mathematics, therefore, must be whether it is built on immediately evident first principles.

Modern mathematicians generally concede that it is *not*. Indeed many deny that any such principles are possible. The modern view is that mathematics begins with "axioms" which are pure *assumptions* and which do not have to be known to be true or false. They concede then that mathematics is not a science in the Aristotelian sense, but only a **dialectical system**, and they deny that it can ever become a science.

What is the cause of this strangely pessimistic attitude? Mathematicians generally give two reasons:

1. The use of this method of basing mathematics on assumptions has proved wonderfully fruitful. If we compare the mathematics of Euclid with modern mathematics, we see that modern mathematics is incomparably richer and more powerful.
2. The classical example of immediately evident first principles—namely, the axioms and postulates of Euclid—has been shown to be a set of assumptions whose contradictories can just as well be assumed as a base for mathematics.

The consequences of this position are serious. If all of mathematics is only probable, and mathematics is the most certain of all sciences, then all knowledge is only probable. Since it is contradictory to hold that all knowledge is probable (see page 79), this leads to the admission of contradiction or absurdity in the real world, and hence to complete scepticism and to atheism. The Catholic Faith tells us very plainly that the human reason *is* capable by its own power of ar-

riving at certain truth, and this is also evident from our own daily experience in which everyone is aware of many truths which cannot be reasonably doubted.

How This Difficulty Can Be Solved

Pessimism and scepticism in this matter, as in many others, is the result of failure to analyze conflicting views in a critical way. Confusion leads to a despair of finding the truth. Let us consider the two main difficulties:

1. It is not surprising that the use of assumptions is fruitful in mathematics. We have seen (page 187) that in every science **dialectics** is required in opening up new problems. In mathematics also new discoveries have been made by beginning with an assumption and drawing out of it a series of conclusions. If paradoxes were then encountered the assumptions had to be abandoned. If the results seemed self-consistent, then the investigation was continued until it became possible to connect the system with the evident axioms and postulates of mathematics. In this manner the calculus was developed quite extensively before it was possible to show in a precise way how it could be given a secure foundation by the concept of the limit. Hence it is not necessary that a particular mathematical system be abandoned merely because it is dialectical. We need only acknowledge that it is tentative and imperfect, and so open to further research.
2. It is not true to say that the development of the Non-Euclidean geometries proved that the parallel line postulate is not immediately evident. They only proved that it is a true postulate independent of the other Euclidean postulates. The Non-Euclidean geometries as originally posed were based on an arbitrary assumption of a substitute for this postulate. As such they were merely dialectical. Eventually it was shown that these geometries could be verified in Euclidean space if **geodesics** of positive or negative curvature were taken as *analogous* to a straight line. Thus in Euclidean space it is possible to have Non-Euclidean figures. That Euclidean space is the true space of geometry is by no means disproved. In

it alone are there *similar* figures and zero curvature. Other spaces have to be constructed by us as modifications of this space. Furthermore, it is a three-dimensional space, since it cannot be proved that any other space can be constructed, except in an analytical geometry in which "dimension" is only used in an analogical sense.

The same thing is true of arguments drawn from Cantor's **transfinite** numbers (see page 388), for which the whole is not greater than the part, etc. These are supposed by some to disprove the very axioms of Euclid. If we consider such arguments carefully we will find them riddled with equivocation. Can we see that an infinite multitude is a whole with parts? The term "whole" implies some kind of unity, but we cannot conceive how an infinite multitude could have any kind of unity of itself, and it certainly cannot have unity from our counting its elements in a series, since we cannot count to infinity. In mathematics we have the *potentially* infinite; for example, a line or any magnitude can be divided and subdivided as often as we please. Similarly, the series of natural numbers or the length of a line can be made as great as we please. But we can never construct an *actually* infinite magnitude or number. As the criticisms made by mathematicians of the Intuitionist school (see page 396) have shown, the assumption of actually infinite quantities is only dialectical. We cannot prove that such quantities are not contradictory, although conversely (as St. Thomas Aquinas pointed out in the 13th century) it seems difficult to prove them impossible.

The Test of Mathematical Truth

Some have tried to argue that the only test of mathematical truth is the self-consistency of a system based on a set of assumptions—a defense given by many for the Non-Euclidean geometries. If only this test is met, however, a system is *dialectical* and not scientific. A poem can be self-consistent, to all appearances, and still be a mere fiction. But as a matter of fact even this test is not possible in a mathematics based on assumptions.

It has been proved by Goedel and other modern mathematicians that it is not possible to prove the self-consistency of a system from *within* the system. The mere fact that a contradiction has not yet been discovered in a system does not prove it consistent, since in a science it is usually possible to draw an unlimited number of conclusions, and therefore such a contradiction may appear in the next theorem. Furthermore, since it is possible for contradictory conclusions to be deduced from a false premise, two systems contradictory to each other but each consistent with itself might both be deduced from the same false assumptions.

Hence in *actual practice* mathematicians have never been content with resting a theory on self-consistency. Ordinarily they justify it by an **existence theorem** in which it is shown that the theory is valid in a particular case, or that it is strictly analogous to something which is known to be valid. This is the way in which the Non-Euclidean geometries, and in general any system of this type, is validated, by showing that it is analogous in a strict way with Euclidean geometry, or with the series of natural numbers. Indeed, as we have seen, all modern mathematics has been developed in such a way that it is ultimately tested by reference to the natural numbers.

Quantity

Since this is the case, it also appears why it is not true to say that modern mathematics is no longer about quantity, but merely about relations. Relations (see page 60) cannot exist of themselves. They must be relations between things, and they must have a foundation in things. The relations with which modern mathematics deals are those studied in set theory. What is a set? It is defined as "a collection of any kind of objects having some common property." If we examine the word "collection" we see that it means "a multitude having some type of unity." Thus none of the relations studied in modern mathematics of the most advanced type can be considered or defined except in terms of "unified multitudes."

A "unified multitude" is either made up of substances or accidents. Of the accidents, **quantity** is the first, and it is only through it that other accidents can be multiplied. Substance is either material or

immaterial, and material substances are multiplied only by means of quantity. From this it follows that, since set theory treats of a multitude, it must either treat of quantity, or it must treat of immaterial objects. These immaterial objects, however, (such as the angels) can be understood by us only by analogy to material objects, so that when we speak of a "multitude" of angels we make use of **transcendental quantity** conceived analogously to the quantity which is in the categories (categorical or predicamental quantity). There must be, therefore, a science of quantity before there can be any set theory. If set theory is considered as embracing spiritual beings, it properly belongs to metaphysics and it *presupposes* another distinct science of mathematics which treats of the quantity of material objects. This objection holds also for Russell's definition of number, which is supposed to eliminate quantity but which still makes use of the notion of a "collection," or "class" in the sense of a collection, and which is therefore a circular definition.

The only alternative to this is to say, with Russell, that mathematics is not about real things, but about logical beings, and that the relations in question are purely logical. However, if this is the case, then the things studied by mathematics cannot exist in physical reality, since a mental being is one which cannot exist outside the mind. Since mathematicians know very well that they deal with many things which do have an extra-mental existence, and which are not merely creations of the mind, this view of mathematics would destroy almost the entire existing body of mathematical doctrine.

We may conclude that modern mathematics is still about quantity when it is accurately developed, although it often deals with extremely general quantitative relations.

CONCLUSION

GEOMETRY AND ARITHMETIC

In surveying mathematics we cannot help but be struck by the way in which the two branches of geometry and arithmetic have survived in spite of all the attempts to reduce them to a single science. The fact is that modern mathematicians in general grant that there

is a genuine and irreducible distinction between continuous and discrete quantity, between lines and numbers.

Of course numbers are more abstract and clear than are magnitudes. Hence it will always be highly useful to use analytic geometry and other methods to approximate geometry by means of algebra; but this approximation of numbers to magnitudes is an approach to a limit, it can never be realized. The reason has already been given by Aristotle. Geometrical objects are *infinitely divisible*, while arithmetical objects are made up of units which are *indivisible*. Thus the two sciences remain essentially distinct, with different sets of definitions and postulates which are only analogous to each other.

INTUITION

Our knowledge of immediately evident principles comes from the power of our intelligence, which moderns call "intuition" or "insight." We must not be scandalized at the many attacks made on "intuition" by formalists in mathematics and logic. They usually disparage intuition by pointing out the fact that very frequently in mathematics and logic we discover surprising conclusions which "at first sight" we would have thought unlikely, for example, the possibility of Non-Euclidean Geometries, the irrationality of relations like π , etc.

If by "intuition" is meant our rough, uncritical impressions of reality, then of course "intuition" has to be eliminated from scientific knowledge—and replaced by precise and accurate knowledge. This is just what Euclid was trying to do when he produced his *Elements*; in this work the rough "intuitive" guesses and imperfect demonstrations of earlier mathematicians were given critical and scientific form. His efforts were imperfect, but in recent years the efforts of every logician and mathematician to construct perfect systems have also been shown by critics to contain many weak spots. The great *Principia Mathematica* of Russell and Whitehead has been found to be riddled with difficulties more fundamental than any in Euclid's *Elements*.

But if by "intuition" we mean critical intelligence, then all mathematics must rest on the power of the human mind to abstract from experience certain things which it sees to be certain and evident. Those selected by Euclid have never been shown to be false, and

must be used today as the basis of all mathematics, although we can formulate them more precisely than he did. They are true because they are not assumed arbitrarily, but abstracted from experience by a clear intelligence.

The efforts of modern thinkers to turn mathematics into a strictly formal system in which the conclusions can be deduced by purely mechanical methods and without thinking is not to be rejected. Mathematics at all times needs a system of calculation. As we have seen, arithmetic in our ordinary modern sense, and much of algebra and calculus, is a method of calculating; it is only an instrument of the science of mathematics, whose business is not the working of problems but the demonstration of truths. Such calculations can be very well carried out by electric-brains, but an electric-brain cannot see *why* its results are true. Only the human intelligence can see truth.

In learning mathematics, therefore, the student must constantly seek to understand why an answer is true. This means that he must trace it back to fundamental axioms and postulates, which he is certain are true from his own experience. Only then does he have scientific knowledge. If he cannot base a conclusion on these truths, but only on *assumptions*, then he must regard it as tentative or dialectical reasoning, which may or may not turn out to be true on further examination. The fact that such dialectical reasoning appears at the same time both highly plausible and yet in contradiction to the axioms or postulates should not surprise him in the least; on the contrary, it should be a stimulant for him to reconcile it with these axioms and postulates, or to discover its inherent fallacy.

This is the straight road which Euclid gave to mathematics, and it is only by traveling it that mathematics has advanced.

PART FOUR

Examples and Analyses



SECTION I

Some Standard Examples of the Kinds of Discourse

The following are the five examples of the kinds of discourse to which reference is made throughout the text of Part One. Examples I and II are *poetic*, the first in prose and the second in verse. Example III is rhetorical. Example IV is dialectical, although it makes use of many rhetorical devices, because its principal purpose seems not to be merely to persuade us, but to help us arrive at a correct definition of a commonly confused idea. Example V is scientific in mode. These particular examples have been chosen because they are very brief, and because they aim at essentially the same conclusion, namely, that *patriotism is honorable*.

I

THE LAST LESSON

A Little Alsatian's Story

ALPHONSE DAUDET

(Note: This is a translation by Blanche Colton Williams of a story by a French author.* It refers to the occupation of the formerly French province of Alsace-Lorraine by the Prussians at the end of the Franco-Prussian War in 1870.)

That morning I was very late in going to school, and was much afraid of being scolded; all the more so, as M. Hamel had told us he

*From *A Book of Short Stories*, by Blanche Colton Williams, copyright 1918, by D. Appleton and Co. Reprinted by permission of Appleton-Century-Crofts, Inc.

would question us upon the participles, and I did not know the first word. For a moment I thought of playing truant and setting off across the country.

The weather was so warm and clear.

One heard the blackbirds whistling at the edge of the wood, and in the Rippert meadow, behind the sawmill, the Prussians who were drilling. All that tempted me much more than the rule of participles; but I had the strength to resist and I ran fast to school.

In passing by the mayor's office, I saw that a group of people had stopped at the little bulletin board. For two years all the bad news had come to us from there, lost battles, requisitions, orders from headquarters; and without pausing I said:

"What is it this time?"

Then, as I crossed the square on the run, the blacksmith Wachter, who was there with his apprentice engaged in reading the notice, cried out to me:

"Do not hurry so, youngster; you will arrive soon enough at your school!"

I thought he was making fun of me, and out of breath I went into M. Hamel's little yard.

Usually at the beginning of a class, there was a great uproar which could be heard in the street—desks opening and closing, lessons being repeated all together at the top of the voice, the pupils stopping their ears with their fingers the better to learn them, and the big rule of the master tapping upon the table.

"A little silence!"

I counted on all this din to reach my seat without notice, but as luck would have it, on this day everything was quiet, as on Sunday morning. Through the open window I saw my schoolmates already in their places, and M. Hamel pacing back and forth with the terrible iron-tipped rule under his arm. I had to open the door and enter in the midst of the great stillness. Well you may think I blushed and was afraid.

But nothing happened. M. Hamel looked at me without anger and said to me very gently:

"Go quickly to your place, my little Franz; we were going to begin without you."

I stepped over the bench and sat down at once at my desk. Then only, a little recovered from my fright, I noticed that our master had on his beautiful green frock coat, his carefully plaited shirt-frill, and the skull-cap of embroidered black silk which he wore only on the days of inspection and distribution of prizes. Besides, there was something unusual and solemn about the whole class. But what surprised me most was to see at the end of the room, on the benches that were usually vacant, the men of the village seated and silent like us; old Hauser with his three-cornered hat, the ex-mayor, the former postman, and others. They all seemed sad; and Hauser had brought an old dog-eared spelling book, which he held wide open on his knees, with his big spectacles placed across the pages.

While I was marvelling at all this, M. Hamel had gone up into his chair, and in the same gentle and serious voice with which he had greeted me, he said to us:

“My children, it is the last time I take the class. The order has come from Berlin to teach only German in the schools of Alsace and Lorraine. . . . The new teacher comes tomorrow. Today’s is your last French lesson. I beg you to be very attentive.”

These few words overwhelmed me, Ah, the villains, that was what they had posted at the “mairie!”

My last lesson in French!

And I who hardly knew how to write. . . . I should never learn. I should have to stop there! How I blamed myself for the time lost, for cutting classes, to hunt bird’s eggs or to practice sliding on the Saar. My books, which only a moment ago I found so tiresome, so heavy to carry, my Grammar, my Scripture History, seemed to me old friends from whom I should find it hard to part. It was the same with M. Hamel. The idea that he was going to leave, that I should never see him again, made me forget punishments, blows from the ruler.

Poor man!

It was in honor of this last lesson that he had put on his handsome Sunday clothes; and now I understood why the old men of the village had come to sit at the end of the room. It was as if to say they were sorry they had not come more often to this school of theirs. It was also a way of thanking our master for his forty years of good service, and of paying their respects to the departing fatherland.

Such was the course of my thoughts, when I heard my name called. It was my turn to recite. What would I not have given to be able to say from the beginning to end the famous rule of the participles, in a loud, clear voice, without a mistake! But I got tangled up in the first words, and I stood swaying against my bench, with a bursting heart, not daring to raise my head. I heard M. Hamel speaking to me:

"I shall not scold you, my little Franz; you should be punished enough. That's the way of it. Every day one says to oneself, 'Bah! I have time enough. I will learn tomorrow.' And then you see what happens. . . . Ah, it has been the great misfortune of our Alsace always to put off learning until tomorrow. Now these people have the right to say to us: 'What! you pretend to be French, and you do not know how to speak or write your own language?' In all that, my poor Franz, it is not you who are most guilty. We have all a good share of reproaches for ourselves.

"Your parents have not sufficiently cared to see you instructed. They liked better to send you to till the fields or to work at the spinning mills, for the sake of a few extra sous. As for myself, have I nothing with which to reproach myself? Have I not often made you water my garden instead of working? And when I wished to go fishing for trout, did I hesitate to give you a holiday . . . ?"

Then, from one thing to another, M. Hamel began to talk to us about the French language, saying that it was the most beautiful language in the world, the clearest, the most solid, that it should be kept among us and never forgotten; because when a people falls into slavery, so long as it holds fast its language it holds the key of its prison. Then he took a grammar and read us our lesson. I was astonished to see how well I understood. Everything he said seemed to me easy, easy. I believed also that I had never listened so well, and that as for him he had never put so much patience into his explanations.

One would have said that before going away the poor man wished to give us all his knowledge, to make it enter our heads at a single blow.

When the lesson was over, we went on to writing. For that day, M. Hamel had prepared for us entirely new examples, on which he

had written in a beautiful round hand: "France," "Alsace," "France," "Alsace." They looked like little flags waving all around the class, hung to the rods of our desks. It was something to see how each one applied himself, and in what silence. There was nothing to be heard but the scratching of the pens on the paper. Once some beetles flew in, but nobody paid any attention, not even the very little ones, who were busy tracing their strokes with a courage and conscience, as if even the pot-hooks were in French. Upon the roof of the schoolhouse pigeons cooed low, and listening, I said to myself:

"Will they not make them sing in German, too?"

From time to time when I lifted my eyes from my page, I saw M. Hamel motionless in his chair, taking a long look at the objects around him, as if he wished to carry off in his mind's eye all the little schoolhouse. . . . Think! Forty years he had been there in the same place, with his yard in front of him and his class just the same. Only the seats and the desks had been polished, rubbed by use, the walnut trees in the yard had grown taller, and the hop-vine which he had himself planted wreathed about the windows and up to the roof. What a heart-break it must have been to the poor man to leave these things, and to hear his sister as she went and came in the room overhead, packing their trunks. For they were to go on the morrow, to leave the country forever.

All the same he had the courage to go on with the recitation to the end. After the writing, we had our history lesson; and then the little ones sang the BA, BE, BI, BO, BU. Away at the end of the room old Hauser had put on his spectacles, and holding his A, B, C book in both hands, he spelled out the letters with them. He, too, was visibly applying himself; his voice trembled with emotion, and it was so funny to hear him that we all wanted to laugh and to cry. Ah! I shall remember that last lesson!

Suddenly the church clock struck noon, then the Angelus. At the same moment the trumpets of the Prussians who were returning from drill blared under our windows. . . . M. Hamel rose, very pale, from his chair. Never had he appeared to me so tall.

"My friends," he said, "My friends, I . . . I . . ."

But something stifled him. He could not finish his sentence.

Then he turned to the blackboard, took a piece of chalk, and bearing on it with all his strength, he wrote as large as he could:

“VIVE LA FRANCE!”

Then he came to a stop; his head pressed against the wall, and without speaking he signed to us with his hand:

“That is all. . . . Go.”

II

THE CONCORD HYMN

RALPH WALDO EMERSON

Emerson was asked to write this poem for the dedication of the Battle Monument erected at Concord, Massachusetts, in 1837, in honor of the minutemen who died there in the American Revolution.

By the rude bridge that arched the flood,
 Their flag to April's breeze unfurled,
 Here once the embattled farmers stood
 And fired the shot heard round the world.

The foe long since in silence slept;
 Alike the conqueror silent sleeps;
 And Time the ruined bridge has swept
 Down the dark stream which seaward creeps.

On this green bank, by this soft stream,
 We set today a votive stone,
 That memory may their deed redeem,
 When, like our sires, our sons are gone.

Spirit, that made those heroes dare
 To die and leave their children free,
 Bid Time and Nature gently spare
 The shaft we raise to them and thee.

III

GETTYSBURG ADDRESS

(November 19, 1863)

ABRAHAM LINCOLN

Four-score and seven years ago, our fathers brought forth upon this continent a new nation, conceived in liberty and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation—or any nation, so conceived and so dedicated—can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But, in a larger sense, we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here have consecrated it far above our poor power to add or detract.

The world will little note, nor long remember what we say here; but it can never forget what they did here.

It is for us, the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us; that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion; that we here highly resolve that these dead shall not have died in vain; that this nation, under God, shall have a new birth of freedom, and that government of the people, by the people, and for the people, shall not perish from the earth.

IV

A DEFENCE OF PATRIOTISM*

G. K. CHESTERTON

G. K. Chesterton wrote this essay during the period of growing ultra-nationalism in Europe which eventually led to the First World War. He was especially concerned about the attitudes in England which had led to the South African or Boer War (1899-1902) and which identified patriotism with imperialism.

* From *The Defendant*, 1907, reprinted by the kind permission of Miss Dorothy E. Collins and of Messrs. A. P. Watt & Sons, Hastings House, London.

The decay of patriotism in England during the last year or two is a serious and distressing matter. Only in consequence of such a decay could the current lust of territory be confounded with the ancient love of country. We may imagine that if there were no such thing as a pair of lovers left in the world, all the vocabulary of love might without rebuke be transferred to the lowest and most automatic desire. If no type of chivalrous and purifying passion remained, there would be no one left to say that lust bore none of the marks of love, that lust was rapacious and love pitiful, that lust was blind and love vigilant, that lust sated itself and love was insatiable. So it is with the "love of the city," that high and ancient intellectual passion which has been written in red blood on the same table with the primal passions of our being. On all sides we hear today of the love of our country, and yet anyone who has literally such a love must be bewildered at the talk, like a man hearing all men say that the moon shines by day and the sun by night. The conviction must come to him at last that these men do not realize what the word "love" means, that they mean by the love of country, not what a mystic might mean by the love of God, but something of what a child might mean by the love of jam. To one who loves his fatherland, for instance, our boasted indifference to the ethics of a national war is mere mysterious gibberism. It is like telling a man that a boy has committed murder, but that he need not mind because it is only his son. Here clearly the word "love" is used unmeaningly. It is the essence of love to be sensitive, it is a part of its doom; and anyone who objects to the one must certainly get rid of the other. This sensitiveness, rising sometimes to an almost morbid sensitiveness, was the mark of all great lovers like Dante and all great patriots like Chatham. "My country, right or wrong," is a thing that no patriot would think of saying except in a desperate case. It is like saying, "My mother, drunk or sober." No doubt if a decent man's mother took to drink he would share her troubles to the last; but to talk as if he would be in a state of gay indifference as to whether his mother took to drink or not is certainly not the language of men who know the great mystery.

What we really need for the frustration and overthrow of a deaf and raucous jingoism is a renaissance of the love of the native land. When that comes, all the shrill cries will cease suddenly. For the first of all the marks of love is seriousness: love will not accept sham bulletins or the empty victory of words. It will always esteem the most candid counsellor the best. Love is drawn to truth by the unerring magnetism of agony; it gives no pleasure to the lover to see ten doctors dancing with vociferous optimism around a death-bed.

We have to ask, then, Why is it that this recent movement in England, which has honestly appeared to many a renaissance of patriotism, seems to us to have none of the marks of patriotism—at least of patriotism in its highest form? Why has the adoration of our patriots been given wholly to qualities and circumstances good in themselves, but comparatively material and trivial:—trade, physical force, a skirmish at a remote frontier, a squabble in a remote continent? Colonies are things to be proud of, but for a country to be only proud of its extremities is like a man being only proud of his legs. Why is there not a high central intellectual patriotism, a patriotism of the head and heart of the Empire, and not merely of its fists and its boots? A rude Athenian sailor may very likely have thought that the glory of Athens lay in rowing with the right kind of oars, or having a good supply of garlic; but Pericles did not think that this was the glory of Athens. With us, on the other hand, there is no difference at all between the patriotism preached by Mr. Chamberlain, and that preached by Mr. Pat Rafferty who sings “What do you think of the Irish now?” They are both honest, simple-minded, vulgar eulogies upon trivialities and truisms.

I have, rightly or wrongly, a notion of the chief cause of this pettiness in English patriotism of today, and I will attempt to expound it. It may be taken generally that a man loves his own stock and environment, and that he will find something to praise in it; but whether it is the most praiseworthy thing or no will depend upon the man’s enlightenment as to the facts. If the son of Thackeray, let us say, were brought up in ignorance of his father’s fame and genius, it is not improbable that he would be proud of the fact that his father was over six feet high. It seems to me that we, as a nation, are precisely in the position of this hypothetical child of Thackeray’s. We fall back upon gross and frivolous things for our patriotism, for a simple reason. We are the only people in the world who are not taught in childhood our own literature and our own history.

We are, as a nation, in the truly extraordinary condition of not knowing our own merits. We have played a great and splendid part in the history of universal thought and sentiment; we have been among the foremost in that eternal and bloodless battle in which the blows do not slay, but create. In painting and music we are inferior to many other nations; but in literature, science, philosophy, and political eloquence we can hold our own with any. But all this vast heritage of intellectual glory is kept from our schoolboys like a heresy; and they are left to live and die in the dull and infantile type of patriotism which they learnt from a box of tin soldiers. There is no harm in the box of tin soldiers; we do not expect children to be equally delighted with a beautiful box of tin philanthropists. But there

is great harm in the fact that the subtler and more civilized honour of England is not presented so as to keep pace with the expanding mind. A French boy is taught the glory of Molière as well as that of Turenne; a German boy is taught his own great national philosophy before he learns the philosophy of antiquity. The result is that, though French patriotism is often crazy and boastful, though German patriotism is often isolated and pedantic, they are neither of them merely dull, common, and brutal, as is so often the strange fate of the nation of Bacon and Locke. It is natural enough, and even righteous enough, under the circumstances. An Englishman must love England for something; consequently he tends to exalt commerce or prize-fighting, just as a German might tend to exalt music, or a Flammand to exalt painting, because he really believes it is the chief merit of his fatherland. It would not be in the least extraordinary if a claim of eating up provinces and pulling down princes were the chief boast of a Zulu. The extraordinary thing is, that it is the chief boast of a people who have Shakespeare, Newton, Burke, and Darwin to boast of.

The peculiar lack of any generosity or delicacy in the current English nationalism appears to have no other possible origin but in this fact of our unique neglect in education of the study of the national literature. An Englishman could not be silly enough to despise other nations if once he knew how much England had done for them. Great men of letters cannot avoid being humane and universal. The absence of the teaching of English literature in our schools is, when we come to think of it, an almost amazing phenomenon. It is even more amazing when we listen to the arguments urged by headmasters and other educational conservatives against the direct teaching of English. It is said, for example, that a vast amount of English grammar and literature is picked up in the course of learning Latin and Greek. This is perfectly true, but the topsy-turviness of the idea never seems to strike them. It is like saying that a baby picks up the art of walking in the course of learning to hop, or that a Frenchman may successfully be taught German by helping a Prussian to learn Ashanti. Surely the obvious foundation of all education is the language in which that education is conveyed; if a boy has only time to learn one thing, he had better learn that.

We have deliberately neglected this great heritage of high national sentiment. We have made our public schools the strongest wall against a whisper of the honour of England. And we have had our punishment in this strange and perverted fact that, while a unifying vision of patriotism can ennoble bands of brutal savages or dingy burghers, and be the best thing in their lives, we, who are—the world being judge—humane, honest, and serious individually, have a

patriotism that is the worst thing in ours. What have we done, and where have we wandered, we that have produced sages who could have spoken with Socrates and poets who could walk with Dante, that we should talk as if we have never done anything more intelligent than found colonies and kick "niggers"? We are the children of light, and it is we that sit in darkness. If we are judged, it will not be for the merely intellectual transgression of failing to appreciate other nations, but for the supreme spiritual transgression of failing to appreciate ourselves.

V

WHETHER PIETY IS A SPECIAL VIRTUE
DISTINCT FROM OTHER VIRTUES?

ST. THOMAS AQUINAS

(from the *Summa Theologiae*, II-II, q. 101, a. 3)

We proceed as follows to the Third Article:

Objection 1. It would seem that piety is not a special virtue distinct from other virtues. For the rendering of services and honor to other persons proceeds from love. And this pertains to piety. Therefore piety is not a distinct virtue from charity.

Objection 2. Furthermore, to render worship to God properly belongs to religion. But piety also renders worship to God, as St. Augustine says in *The City of God*, Book X, Chapter 1. Therefore piety is not distinguished from religion.

Objection 3. Moreover, since piety renders honor and duty to the fatherland, it seems to be the same as legal justice, which relates to the common good. And legal justice is a general virtue, as is evident from what the Philosopher says in his *Ethics*, Book V, Chapters 1 and 2. Therefore piety is not a special virtue.

On the contrary is the statement of Cicero that it is a part of justice, as he says in his *On Invention* at the end of Book II.

I answer that a virtue is special when it relates to some object under some special aspect. Since, then, the definition of justice consists in rendering another person his due, whenever a special aspect of something is due to a person, there must be a special virtue. But a thing is indebted to its connatural principle of being and government in a special way, and piety relates to this principle insofar as it pays duty and honor to parents and country, and to whatever is related to them. Therefore piety is a special virtue.

Reply to Objection 1: Just as religion is a kind of testimony of our faith, hope, and charity by which man is first of all ordered to God,

so also piety is a kind of testimony of the love which a man has to his parents and country.

Reply to Objection 2: God is the principle of our existence and governance in a manner far more excellent than our father or fatherland. And therefore the virtue of religion by which honor is rendered to God is a distinct virtue from piety, which renders honor to parents and fatherland. But things relating to creatures are predicated of God according to excellence and causality, as Dionysius says in his *On the Divine Names*, Chapter 1, Lesson 3; whence the worship of God is called "piety" of a more excellent sort, just as God is also called more excellently "our Father."

Reply to Objection 3: Piety is extended to our fatherland insofar as it is a principle of our existence; but legal justice regards the good of the fatherland as it is the common good: and therefore legal justice is more a general virtue than piety.

SECTION II

The Study of Words

The following examples are especially pertinent to Part One, Chapter I. Some of the figures of speech, however, are treated in Chapter II.

I. THE SOUND OF WORDS

A. Onomatopoeia:

1. For the night-wind has a dismal trick of wandering round and round an old church, and moaning as it goes; and of trying, with its unseen hand, the windows and the doors; and seeking out some crevices by which to enter. And when it has got in, as one not finding what it seeks, whatever that may be, it wails and howls to issue forth again: and not content with stalking through the aisles, and gliding round and round the pillars, and tempting the deep organ, soars up to the roof, and strives to rend the rafters: then flings itself despairingly upon the stones below, and passes, muttering, into the vaults. Anon, it comes up stealthily, and creeps along the walls, seeming to read, in whispers, the inscriptions sacred to the Dead. At some of these, it breaks out shrilly, as with laughter; and at others, moans and cries as if it were lamenting. It has a ghostly sound too, lingering within the altar; where it seems to chaunt, in its wild way, of Wrong and Murder done and false Gods worshipped, in defiance of the Tables of the Law, which look so fair and smooth, but are so flawed and broken. Ugh! Heaven preserve us, sitting

snugly round the fire! It has an awful voice, that wind at Mid-night, singing in a church!

But, high up in the steeple! There the foul blast roars and whistles! High up in the steeple, where it is free to come and go through many an airy arch and loophole, and to twist and twine itself about the giddy stair, and twirl the groaning weathercock, and make the very tower shake and shiver! High up in the steeple, where the belfry is, and iron rails are ragged with rust, and sheets of lead and copper, shrivelled by the changing weather, crackle and heave beneath the unaccustomed tread; and birds stuff shabby nests into corners of old oaken joists and beams; and dust grows old and gray; and speckled spiders, indolent and fat with long security, swing idly to and fro in the vibration of the bells, and never loose their hold upon their thread-spun castles in the air, or climb up sailor-like in quick alarm, or drop upon the ground and ply a score of nimble legs to save one life! High up in the steeple of an old church, far above the light and murmur of the town and far below the flying clouds that shadow it, is the wild and dreary place at night: and high up in the steeple of an old church, dwelt the Chimes I tell of.

—Charles Dickens, *The Chimes*

2. Only from the long line of spray
Where the ebb meets the moon-blanch'd land,
Listen! you hear the grating roar
Of pebbles which the waves draw back, and fling
At their return, up the high strand,
Begin, and cease, and then again begin
With tremulous cadence slow, and bring
The eternal note of sadness in.

—Matthew Arnold, "Dover Beach"

B. Other sound effects:

The musical suggestiveness of poetry is often more subtle than obvious onomatopoeia. Study the emotional effect of various sound devices in the following:

1. Notice the joyful or cheerful effect in this poem:

Burly, dozing humble-bee,
Where thou art is clime for me.
Let them sail for Porto Rique,
Far-off heats through seas to seek;
I will follow thee along,
Thou animated torrid-zone!

Zigzag steerer, desert cheerer,
 Let me chase thy waving lines;
 Keep me nearer, me thy hearer,
 Singing over shrubs and vines.

—Ralph Waldo Emerson, "The Humble Bee." Study the whole poem in the *Oxford Book of American Verse*, n. 29

2. And the contrasted emotions of the following stanzas:

The trumpet's loud clangor
 Excites us to arms
 With shrill notes of anger
 And mortal alarms.

The double double double beat
 Of the thundering drum
 Cries: Hark! The foes come;
 Charge, charge, 'tis too late to retreat!

The soft complaining flute
 In dying notes discovers
 The woes of hopeless lovers,
 Whose dirge is whispered by the warbling lute.

Sharp violins proclaim
 Their jealous pangs and desperation,
 Fury, frantic indignation,
 Depth of pains and height of passion
 For the fair, disdainful dame.

—from John Dryden, "A Song for St. Cecilia's Day."

Study the whole poem for many such effects.

3. Notice the sorrowful sound of the following:

The skies they were ashen and sober;
 The leaves they were crisped and sere—
 The leaves they were withering and sere:

It was night, in the lonesome October
 Of my most immemorial year:

It was hard by the dim lake of Auber,
 In the misty mid region of Weir—

It was down by the dank tarn of Auber,
 In the ghoul-haunted woodland of Weir.

—from Edgar Allen Poe, "Ulalume—A Ballad"

II. THE ORIGIN OF WORDS

The following are some examples of the history hidden in words:

1. The word *mystery* commonly today brings to mind a "mystery story" which concerns the discovery of a murderer, but we are also familiar with its use in the Catechism in the phrase "a mystery of faith." From this latter use we speak of the "mysteries of the Rosary." Similar to this last use is the term in medieval literature "a mystery play," which was not about a murder, but a play based on some biblical incident or an incident in the life of some saint. The Latin word *mysterium* is from the Greek *mysterion* referring to one of the secret religious societies into which Greeks were initiated. The word comes from *muein*, "to initiate." This in turn is from *muō* which means "to keep closed," that is, to close the mouth (or eyes), obviously because the initiate was required to keep secret the ceremonies of the initiation. Our word *mute* has the same origin. Very possibly this word has an onomatopoeic origin, since *muō* is like a murmuring sound made with closed lips.
2. The word *heresy* which means the upholding of some false teaching contrary to the Catholic faith comes through French and Latin from the Greek *hairesis* and this from *haireo*, which means "to take or choose" (notice the same root in such words as "adhere" or "coherent"). This is because at the time heresies first arose in early Christianity when Greek was still widely spoken, they were seen to originate in the desire of some people to *select* or *choose* something from Christian teaching which pleased them and to reject other teachings which they found hard or unpleasant.
3. *Lady*, now used to mean any woman referred to in a respectful manner, meant in the older English a noblewoman who was head of a large household. Hence it still remains a title in England for the wife of a Lord, and it is used of Our Lady, because she is Queen of Heaven. Originally, however, it came from the old Anglo-Saxon *hlaef-dige* which meant a "bread-kneader" because the woman of the household in early times was the one who baked the bread.

4. *Senior* and *junior* are Latin words meaning respectively "elder" and "younger." *Sophomore* is from the Greek words *sophos*, "wise" (see "philosophy," "sophistry," "sophisticated") and *moros*, "foolish," because a sophomore is half-wise, half-foolish. *Freshman* is from a Germanic root, and means a "new man." It is equivalent to another word derived from Latin, "novice," which also means a "new man." *Veteran* is from Latin and means "an old man."
5. *Anatomy*, now used in English to mean the human or animal body and the study of this body, comes from the Greek words *ana* and *temno*, "up" and "cut," because we study the human body by cutting it up, or dissecting it. The same root is found in *atom*, for an atom is something that is "non-cuttable," which cannot be divided. This is because what we now call an atom was originally thought to be the smallest possible particle, although now we know that it is made up of still smaller ones.
6. *Lethal*, familiar to us in the phrases "a lethal gas" or a "lethal weapon," meaning something which kills, comes from a Latin word for death (see also the Greek "River of Lethe," the river of forgetfulness that flowed through the regions of the dead) and ultimately from a word still found in Sanskrit, meaning "to dissolve," because death is a kind of dissolution.
7. *Panic* comes from a Greek word derived from the name of the god Pan, the god of the woods, because it was thought that by making strange noises in the forest or at night he was the cause of sudden fear.
8. *World* comes from Anglo-Saxon for a "generation of men," *wer* meaning man, and *uld* an age. (See *wer-wolf*, a "man-wolf," and *elder*, "an aged one"). *Earth* comes from a very ancient word meaning "the ground." *Universe* comes from Latin *unus*, "one," and *versus* "turned," and indicates all created things "turned into one." *Cosmos* is from a Greek word meaning "harmony" or "order" and indicates the universe as an orderly whole.

9. *Matter* comes from the Latin *materia* and this from *mater* "mother," because things are made out of matter as a child is from its mother. *Form* is from the Latin *forma*, which originally meant "face," and this from *fero*, "to carry," because a man wears his face like a mask. *Efficient cause* is from Latin *ex*, "out," and *facere*, "to make," since an efficient cause produces something out of the matter. *Cause* is from Latin *causa*, and this from *cadere*, "to fall" or "to happen," because a cause results in a happening. *Final cause* is from Latin *finis*, which is from *findo*, "to strike," because we "put an end" to something by striking or cutting it.
10. *Sacrament* and *sacrifice*, and *sacred* and *consecrated*, are all from the Latin *sacer* meaning something "set apart." It is also connected with our word *sane* (from Latin for "healthy") and *safe*, which all go back to an original word *sa* meaning "whole." The word *holy* and *whole* are related and also go back to this same word *sa* through a series of language changes which turned the sound *s* into the sound *h*. The words *heal* and *hale* are also connected with it. Thus in the word *sacrament* is contained both the notion of something set apart, and of something which heals us spiritually.
11. *Religion* is from the Latin *re*, "back," and *ligo*, "bind." It has the meaning both of "restrain" from sin, and "bind back" again or unite to God.
12. *Month* is from Anglo-Saxon for *moon*, because a month is measured by the change of the moon from full-moon to full-moon. But the word *moon* itself comes from the root *ma* meaning "to measure," from which "measure" itself is derived, because the moon is the measurer of time.

III. WORD MEANINGS

A. The following are examples of *pure equivocation*:

1. *bark*:

- a. A sound like that made by a dog (from Anglo-Saxon *beorcan*, obviously onomatopoeic).

- b. The rind or covering of a tree or other plant (from Scandinavian word *bark*).
- c. A three-masted square-rigged sea-vessel, also spelled *barque* (from French and Latin for a boat).

2. *sound*:

- a. The sensation received by the organ of hearing (from Latin *sonus*, a sound).
- b. Normal, or healthy (from Anglo-Saxon *gesund*, "healthy").
- c. A long and narrow body of water (Anglo-Saxon *sund* from *swimman*, "swim").

3. *wax*:

- a. As a verb it means to grow or increase.
- b. As a noun it means the substance produced by bees.

B. The following are examples of *analogy of connection or attribution*:

1. *stone*:

- a. Properly it means a piece of rock.
- b. It is transferred as a verb to mean "to line with stone," or "to hurl stones at," or "to remove stones from." Thus the actions are named from the thing to which they are applied; the name of the effect is applied to its *efficient* cause.
- c. It is transferred to something made out of stone, thus we speak of a "memorial stone," and "stone-work."
- d. It is transferred to the *effect* or *final cause* when we say that "St. Stephen was stoned," meaning that he was dead because he had been stoned.
- e. It is transferred to *formal cause* when we make the adjective "stony" to indicate things which are hard like stone. Also in England it is applied to a weight or measure equal to about 14 pounds, because things are sometimes weighed with stones as a measure.

2. *show*:

- a. Originally the word for "see," it was transferred to something to be seen, "a show or spectacle." Thus it was moved from its effect (seeing) to the thing which produced sight.
- b. Then it was transferred to the act of showing what was to be seen.

- c. Then it is frequently transferred to other things connected in various ways with this act of showing: a *show-place* (sometimes simply called "a show" or theater), a *show-bill* (a poster indicating the time and title of a show), a *show-girl* (one who acts in a show), *showy*, the quality that attracts the eye, etc.

3. *light*:

- a. Properly the luminous quality which our eyes detect.
 b. Transferred to mean the action of lighting a fire, or the fire used to light another.
 c. Also to the state produced by light as when we say "It is light now."
 d. Also it is transferred to the thing which is lighted as an "electric-light," meaning the bulb which is illuminated.
 e. Also said of a quality such as a "light color."

Notice that the word *light* when used to mean something without weight is purely equivocal with this word, although perhaps in the remote past there was a connection.

C. The following are examples of *analogy of improper similarity* (see also below under *metaphor* as a figure of speech):

1. "I love you, O Lord, my strength,
 O Lord, my rock, my fortress, my deliverer.
 My God, my rock of refuge,
 my shield, the horn of my salvation, my stronghold!"
 —Psalm 17.
2. "I am the true vine, and my Father is the vine-dresser. Every branch in me that bears no fruit he will take away; and every branch that bears fruit he will cleanse, that it may bear more fruit."
 —Jn. 10:7-9.
3. She dwelt among the untrodden ways
 Beside the springs of Dove
 A maid whom there were none to praise
 And very few to love:
 A violet by a mossy stone
 Half hidden from the eye!
 —Fair as a star, when only one
 Is shining in the sky. . . .

—from William Wordsworth, "Lucy."

4. Here at the fountain's sliding foot,
Or at some fruit-tree's mossy root,
Casting the body's vest aside,
My soul into the boughs does glide:
There, like a bird, it sits and sings,
Then whets and combs its silver wings,
And, till prepared for longer flight,
Waves in its plumes the various light.

—from Andrew Marvell, "The Garden."

D. The following are examples of *analogy of proper similarity*:

1. "Beloved, let us love one another, for love is from God. And everyone who loves is born of God, and knows God. He who does not love does not know God; for God is love."

—I Jn. 4:7-8.

2. "Let wives be subject to their husbands as to the Lord; because a husband is head of the wife, just as Christ is head of the Church, being himself savior of the body. But just as the Church is subject to Christ, so also let wives be to their husbands in all things."

—Eph. 5:21-24.

3. "Therefore, if you, evil as you are, know how to give good gifts to your children, how much more will your Father in heaven give good things to those who ask him!"

—Matt:7:11.

4. All the world's a stage,
And all the men and women merely players:
They have their exits and their entrances;
And one man in his time plays many parts,
His acts being seven ages. . . .

—William Shakespeare, *As You Like It*

IV. FIGURES OF SPEECH

A. Metaphor and Simile.

1. The following are similes used to convey a single truth in the form of a proverb. Notice how the comparison makes the abstract moral truth concrete and easily remembered.

"Like a golden ring in a swine's snout
is a beautiful woman with a rebellious disposition.

As vinegar to the teeth, and smoke to the eyes,
is the sluggard to those who use him as a messenger.

Like the coolness of snow in the heat of the harvest
 is a faithful messenger for the one who sends him.
 Like clouds and wind when no rain follows
 is the man who boastfully promises what he never gives.
 Like a moth in clothing, or a maggot in wood,
 sorrow gnaws at the human heart.
 Like cool water to one faint from thirst
 is good news from a far country.
 As the dog returns to his vomit,
 so the fool repeats his folly.
 Like a bird that is far from its nest
 is a man who is far from home."

—*Proverbs of Solomon, selected.*

2. Samuel Johnson, the great literary critic, considered the following comparison "perhaps the best that English poetry can show" because "it has no useless parts, yet affords a striking picture by itself; it makes the foregoing position better understood, and enables it to take faster hold on the attention; it assists the apprehension, and elevates the fancy."

Fired at first sight with what the Muse imparts,
 In fearless youth we tempt the heights of Arts,
 While from the bounded level of our mind
 Short views we take, nor see the lengths behind;
 But more advanced, behold with strange surprise
 New distant scenes of endless science rise!
 So pleased at first the tow'ring Alps we try,
 Mount o'er the vales, and seem to tread the sky,
 Th' eternal snows appear already past,
 And the first clouds and mountains seem the last;
 But, those attained, we tremble to survey
 The growing labors of the lengthened way,
 Th' increasing prospect tires our wand'ring eyes,
 Hills peep o'er hills, and Alps on Alps arise!

—Alexander Pope, "An Essay on Criticism."

3. The following shows a series of metaphors all explaining the same thing, but so arranged as to give us a progressively deeper and fuller understanding of it:

That time of year thou mayst in me behold
 When yellow leaves, or none, or few do hang
 Upon those boughs which shake against the cold,

Bare ruined choirs, where late the sweet birds sang.
 In me thou see'st the twilight of such day
 As after sunset fadeth in the west;
 Which by and by black night doth take away,
 Death's second self, that seals up all in rest.
 In me thou see'st the glowing of such fire
 That on the ashes of his youth doth lie,
 As the death-bed whereon it must expire,
 Consumed with that which it was nourished by.
 This thou perceiv'st, which makes thy love more strong,
 To love that well which thou must leave ere long.

—William Shakespeare, "Sonnet 73."

4. The following lyric is an example of the type of metaphor (often called a "conceit") which attempts to awaken our imagination by comparisons which are "far-fetched," that is, a comparison of things which at first sight seem very unlike. Such metaphors are similar to humor; if they are very light and to the point, they are very effective; but if they miss fire, they are disastrous.

Sweet day, so cool, so calm, so bright,
 The bridal of the earth and sky,
 The dew shall weep thy fall to-night;
 For thou must die.

Sweet rose, whose hue, angry and brave,
 Bids the rash gazer wipe his eye,
 Thy root is ever in its grave,
 And thou must die.

Sweet spring, full of sweet days and roses,
 A box where sweets compacted lie,
 My music shows ye have your closes,
 And all must die.

Only a sweet and virtuous soul,
 Like seasoned timber, never gives;
 But though the whole world turn to coal,
 Then chiefly lives.

—George Herbert, "Virtue."

5. The following is an example of metaphor used in a rhetorical fashion, to give us a sense of the need for action:

"And this do, understanding the time, for it is now the hour for us to rise from sleep, because our salvation is nearer than when we came to believe. The night is far advanced; the

day is at hand. Let us therefore lay aside the works of darkness, and put on the armor of light. Let us walk becomingly as in the day, not in revelry and drunkenness, not in debauchery and wantonness, not in strife and jealousy. But put on the Lord Jesus Christ, and as for the flesh, take no thought of its lusts."

—St. Paul, Rom. 13:11-14.

6. The following is also a rhetorical simile used by Socrates in his defense of himself before the Athenians. He was on trial for his life on the charge of irreligion and of corrupting the youth. He wishes to make his audience understand the meaning of his mission, which was to awaken the Athenians to the need to seek for spiritual rather than material goods:

And now, Athenians, I am not going to argue for my own sake, as you may think, but for yours, that you may not sin against God by condemning me, who am his gift to you. For if you kill me you will not easily find a successor to me, who, if I may use such a ludicrous figure of speech, am a sort of gadfly, given to the state by God; and the state is a great and noble horse who is tardy in his motions owing to his very size, and requires to be stirred into life. I am that gadfly which God has attached to the state, and all day long and in all places am always fastening upon you, arousing and persuading and reproaching you. You will not easily find another like, and therefore I would advise you to spare me. I dare say that you may feel out of temper (like a person who is suddenly awakened from sleep), and you think that you might easily strike me dead as Anytus advises, and then you would sleep on for the remainder of your lives, unless God in his care of you sent you another gadfly. . . .

—Socrates, *The Apology*.

7. The following is also a rhetorical metaphor. Emerson is exhorting scholars to think for themselves and not to be satisfied with popular opinions and material rewards:

Why should you renounce your right to traverse the starlit deserts of truth, for the premature comforts of an acre, house, and barn? Truth also has its roof, and bed, and board. Make yourself necessary to the world, and mankind will give you bread, and if not store of it, yet such as shall not take away your property in all men's possessions, in all men's affections, in art, in nature, and in hope.

—Ralph Waldo Emerson, *Literary Essays*.

B. Irony

1. I met a traveller from an antique land
 Who said: Two vast and trunkless legs of stone
 Stand in the desert. Near them, on the sand,
 Half sunk, a shattered visage lies, whose frown
 And wrinkled lip, and sneer of cold command,
 Tell that its sculptor well those passions read
 Which yet survive (stamped on these lifeless things)
 The hand that mocked them and the heart that fed:
 And on the pedestal these words appear:
 "My name is Ozymandias, king of kings:
 Look on my works, ye Mighty, and despair!"
 Nothing beside remains. Round the decay
 Of that colossal wreck, boundless and bare
 The lone and level sands stretch far away.

—Percy Bysshe Shelley, "Ozymandias."

2. Jonathan Swift wrote *A Modest Proposal* "for preventing poor people in Ireland from becoming a burden to their parents or country, and for making them beneficial to the public." It is a fierce attack on the indifference of the landlords to the condition of their poor tenants. The whole is written in an apparently calm and factual style, the climax of which is the "modest proposal":

I shall now therefore humbly propose my own thoughts, which I hope will not be liable to the least objection. I have been assured by a very knowing American of my acquaintance in London that a young healthy child well nursed is at a year old a most delicious, nourishing, and wholesome food, whether stewed, roasted, baked, or boiled; and I make no doubt that it will equally serve in a fricassee or ragout. I do therefore humbly offer it to public consideration that of the hundred and twenty thousand children already computed, twenty thousand be reserved for breed, whereof only one-fourth part be males; which is more than we allow to sheep, black cattle, or swine. . . . That the remaining hundred thousand may, at a year old, be offered in sale to persons of quality and fortune through the kingdom; always advising the mother to let them nurse plentifully in the last month, so as to render them plump and fat for a good table. A child will make two dishes at an entertainment for friends; and when the family dines alone, the fore or hind quarter will make a reasonable dish, and seasoned with a little pepper or salt will be very good boiled on the

fourth day, especially in winter. . . . I grant that this food will be somewhat dear, and therefore very proper for landlords, who as they have already devoured most of the parents, seem to have the best title to the children.

C. Parallelism

1. This device is the basis of the poetry of the Hebrews and is found throughout the Bible:

“Relieve the troubles of my heart,
 And bring me out of my distress.
 Put an end to my affliction and my suffering,
 And take away all my sins.
 Behold, my enemies are many,
 And they hate me violently.
 Persevere my life, and rescue me;
 Let me not be put to shame,
 for I take refuge in you.”

—Psalm 26.

2. Ordinarily in English, parallelism is not used in so obvious a way as by the Hebrews. Note, however, its less obvious uses in such a prose passage as the following.

Nature is the incarnation of a thought, and turns to thought again, as ice becomes water and gas. The world is mind precipitated, and the volatile essence is forever escaping again into the state of free thought. Hence the virtue and pungency of the influence on the mind of natural objects, whether inorganic or organized. Man imprisoned, man crystallized, man vegetative, speaks to man impersonated. The power which does not respect quantity, which makes the whole and the particle its equal channel, delegates its smile to the morning, and distills its essence into every drop of rain. Every moment instructs, and every object: for wisdom is infused into every form. It has been poured into us as blood; it convulsed us as pain; it slid into us as pleasure; it enveloped us in dull, melancholy days, or in days of cheerful labor; we did not guess its essence until after a long time.

—Ralph Waldo Emerson, *Nature*

D. Antithesis

The following is from Samuel Johnson's comparison of the English poets Pope and Dryden:

Dryden knew more of man in his general nature, and Pope in his local manners. The notions of Dryden were formed by

comprehensive speculation, and those of Pope by minute attention. There is more dignity in the knowledge of Dryden, and more certainty in that of Pope.

Poetry was not the sole praise of either, for both excelled likewise in prose; but Pope did not borrow his prose from his predecessor. The style of Dryden is capricious and varied, that of Pope is cautious and uniform; Dryden obeys the motions of his own mind, Pope constrains his mind to his own rules of composition. Dryden is sometimes vehement and rapid; Pope is always smooth, uniform, and gentle. Dryden's page is a natural field, rising into inequalities, and diversified by the varied exuberance of abundant vegetation; Pope's is a velvet lawn, shaven by the scythe, and levelled by the roller.

Of genius, that power which constitutes a poet; that quality without which judgment is cold and knowledge is inert; that energy which collects, combines, amplifies, and animates—the superiority must, with some hesitation, be allowed to Dryden. It is not to be inferred that of this poetical vigor Pope had only a little, because Dryden had more; for every other writer since Milton must give place to Pope; and even of Dryden it must be said, that if he has brighter paragraphs, he has not better poems.

E. Climax:

The following passage is from Cardinal Newman's great sermon, *The Second Spring*. Notice how carefully every phrase and word is chosen so as to build up a higher and higher pitch of emotion, and to avoid breaking this wave of feeling:

My Fathers, my Brothers in the priesthood, I speak from my heart when I declare my conviction, that there is no one among you here present but, if God so willed, would readily become a martyr for His sake. I do not say you would wish it; I do not say that the natural will would not pray that the chalice might pass away; I do not speak of what you can do by any strength of yours,—but in the strength of God, in the grace of the Spirit, in the armor of justice, by the consolations and peace of the Church, by the blessing of the Apostles Peter and Paul, and in the name of Christ, you would do what nature cannot do. By the intercession of the saints on high, by the penances and good works and the prayers of the people of God on earth, you would be forcibly borne up as upon the waves of the mighty deep, and carried on out of yourselves by the fulness of grace, whether nature wished it or no. I do not mean violently, or with unseemly struggle, but calmly, grace-

fully, sweetly, joyously, you would mount up and ride forth to the battle, as on the rush of angel's wings, as your fathers did before you and gained the prize. You, who day by day offer up the Immaculate Lamb of God, you who hold in your hands the Incarnate Word under the visible tokens which He has ordained, you who again and again drain the chalice of the Great Victim; who is to make you fear? what is to startle you? what to seduce you? who is to stop you, whether you are to suffer or to do, whether to lay the foundations of the Church in tears, or to put the crown upon the work in jubilation?

F. Anticlimax:

The following is from Thomas De Quincey's humorous essay, *Murder as a Fine Art*. After discussing this art at length he ends by saying that he personally has always refrained from murder, and he gives as his reason the following:

For, if once a man indulges himself in murder, very soon he comes to think little of robbing; and from robbing he comes next to drinking and Sabbath-breaking, and from that to incivility and procrastination. Once begun upon this downward path, you never know where you are to stop. Many a man has dated his ruin from some murder or other that perhaps he thought little of at the time.

H. Hyperbole:

Chesterton is a master of hyperbole as of the paradox. The following is from *A Defence of Humility*:*

Humility is the luxurious art of reducing ourselves to a point, not to a small thing or a large one, but to a thing with no size at all, so that all the cosmic things are what they really are—of immeasurable stature. That the trees are high and grasses short is a mere accident of our own foot-rules and our own stature. But to the spirit which has stripped off for a moment its own idle temporal standards the grass is an everlasting forest, with dragons for denizens; the stones of the road are as incredible mountains piled one upon the other; the dandelions are like gigantic bonfires illuminating the lands around; and the heathbells on their stalks are like planets hung in heaven each higher than the other. Between one stake of a paling and another there are new and terrible landscapes; here a desert, with nothing but one misshapen rock; here a miraculous forest, of which all the trees flower above the head

* From *The Defendant*, 1907, reprinted by the kind permission of Miss Dorothy E. Collins and of Messrs. A. P. Watt & Sons, Hastings House, London.

with the hues of sunset; here, again, a sea full of monsters that Dante would not have dared to dream. These are the visions of him, who, like the child in the fairy tales, is not afraid to be small. Meanwhile, the sage whose faith is in magnitude and ambition is, like a giant, becoming larger and larger, which only means that the stars are becoming smaller and smaller. World after world falls from him into insignificance; the whole passionate and intricate life of common things becomes as lost to him as is the life of the infusoria to a man without a microscope. He rises always through desolate eternities. He may find new systems, and forget them; he may discover fresh universes, and learn to despise them. But the towering and tropical vision of things as they really are—the gigantic daisies, the heaven-consuming dandelions, the great Odyssey of strange-coloured oceans and strange-shaped trees, of dust like the wreck of temples, and thistledown like the ruin of stars—all this colossal vision shall perish with the last of the humble.

I. Litotes

1. In Shakespeare's *Romeo and Juliet* is a scene in which Mercutio has just been fatally wounded in a duel:

Romeo: Courage, man; the hurt cannot be much.

Mercutio: No. 'Tis not so deep as a well, nor so wide as a church-door; but 'tis enough, 'twill serve: ask for me tomorrow, and you shall find me a grave man. . . .

2. Ernest Hemingway has developed a style which is a kind of perpetual understatement, intended to convey a sense of reality without sentimentality or reflection. Actually it expresses intense emotion. The following is the opening of a short story,

*After the Storm:**

It wasn't about anything, something about making punch, and then we started fighting and I slipped and he had me down kneeling on my chest and choking me with both hands like he was trying to kill me and all the time I was trying to get the knife out of my pocket to cut him loose. Everybody was too drunk to pull him off me. He was choking me and hammering my head on the floor and I got the knife out and opened it up; and I cut the muscle right across his arm and he let go of me. He couldn't have held on if he wanted to. Then he

* Reprinted with the kind permission of the author and Charles Scribner's Sons, from *The Short Stories of Ernest Hemingway*.

rolled and hung onto that arm and started to cry and I said:
 "What the hell you want to choke me for?"
 I'd have killed him. I couldn't swallow for a week. He hurt
 my throat bad.

J. Personification:

1. How sleep the brave who sink to rest
 By all their country's wishes blest!
 When Spring, with dewy fingers cold,
 Returns to deck their hallow'd mold,
 She there shall dress a sweeter sod
 Than Fancy's feet have ever trod.

By fairy hands their knell is rung,
 By forms unseen their dirge is sung;
 There Honor comes, a pilgrim grey,
 To bless the turf that wraps their clay;
 And Freedom shall awhile repair,
 To dwell a weeping hermit there!

—William Collins, "Ode Written in 1746"

2. Do you not think that you should leave the city? If I saw that I was even undeservedly so suspected and hated by my fellow citizens, I would rather flee from their sight than be gazed at by the hostile eyes of everyone. And do you, who, from the consciousness of your wickedness, know that the hatred of all men is just and has been long due to you, hesitate to avoid the sight and presence of those men whose minds and senses you offend? If your parents feared and hated you, and if you could by no means pacify them, you would, I think, depart somewhere out of their sight. Now, your Country, which is the common parent of all of us, hates and fears you, and has no other opinion of you than that you are meditating her murder; and will you neither feel awe of her authority, nor deference for her judgment, nor fear of her power?

And she, O Catiline, thus pleads with you, and after a manner silently speaks to you: "There has now for many years been no crime committed but by you; no atrocity has taken place without you; you alone unpunished and unquestioned have murdered the citizens, have harassed and plundered the allies; you alone have had power not only to neglect all laws and investigations, but to overthrow and break through them. Your former actions, though they ought not to have been borne, yet I did bear as well as I could; but now that I shall be wholly occupied with fear of you alone, that at every sound I should

dread Catiline, that no design should seem possible to be entertained against me which does not proceed from your wickedness, this is no longer endurable. Depart, then, and deliver me from this fear; that, if it be a just one, I may not be destroyed; if an imaginary one, that at last I may at least cease to fear."

—Cicero, *First Oration against Catiline*

K. Apostrophe:

1. "Jerusalem, Jerusalem! thou who killest the prophets, and stonest those who are sent to thee! How often would I have gathered thy children together, as a hen gathers her young under wings, but thou wouldst not! Behold, your house is left to you desolate. For I say to you, you shall not see me henceforth until you shall say, 'Blessed is he who comes in the name of the Lord!'"—Matt. 23:27-29.

2. The following is a famous passage of Byron's *Childe Harold's Pilgrimage*:

O Rome! my country! city of the soul!
 The orphans of the heart must turn to thee,
 Lone mother of dead empires! and control
 In their shut breasts their petty misery.
 What are our woes and sufferance? Come and see
 The cypress, hear the owl, and plod your way
 O'er steps of broken thrones and temples—Ye
 Whose agonies are evils of a day—
 A world is at our feet as fragile as our clay."

SECTION III

The Use of the Categories in Grammar and Definition

Throughout Part One the categories are used both to explain grammatical relations and as a help to the correct definition of technical terms. The following materials may be of assistance in the study of the categories.

I. TABLES OF THE TEN CATEGORIES

In using the following tables the student should recall that, strictly speaking, only natural, real entities can be properly classified in the categories. Mental relations and artificial numbers, for example, are included in these tables only *reductively*, as bearing a resemblance to the natural and real entities with which they are grouped, since art imitates nature. These tables are based on the writings of St. Thomas Aquinas and his noted follower John of St. Thomas. The table of artificial things was suggested by the classification given by Hugh of St. Victor and St. Bonaventure.

THE CATEGORIES

(See St. Thomas Aquinas, *Commentary*

which is its definition is its.....

That **Being*** of a subject which is signified by a Predicate

but if it is not its definition but exists in it, it is an **Accident*** which if

P is taken from what is in the S and

but if P is taken from what is not in the S but

***Note:** The terms "being" and 'accident' are analogical terms: the categories contain only univocal terms.

OR PREDICAMENTS

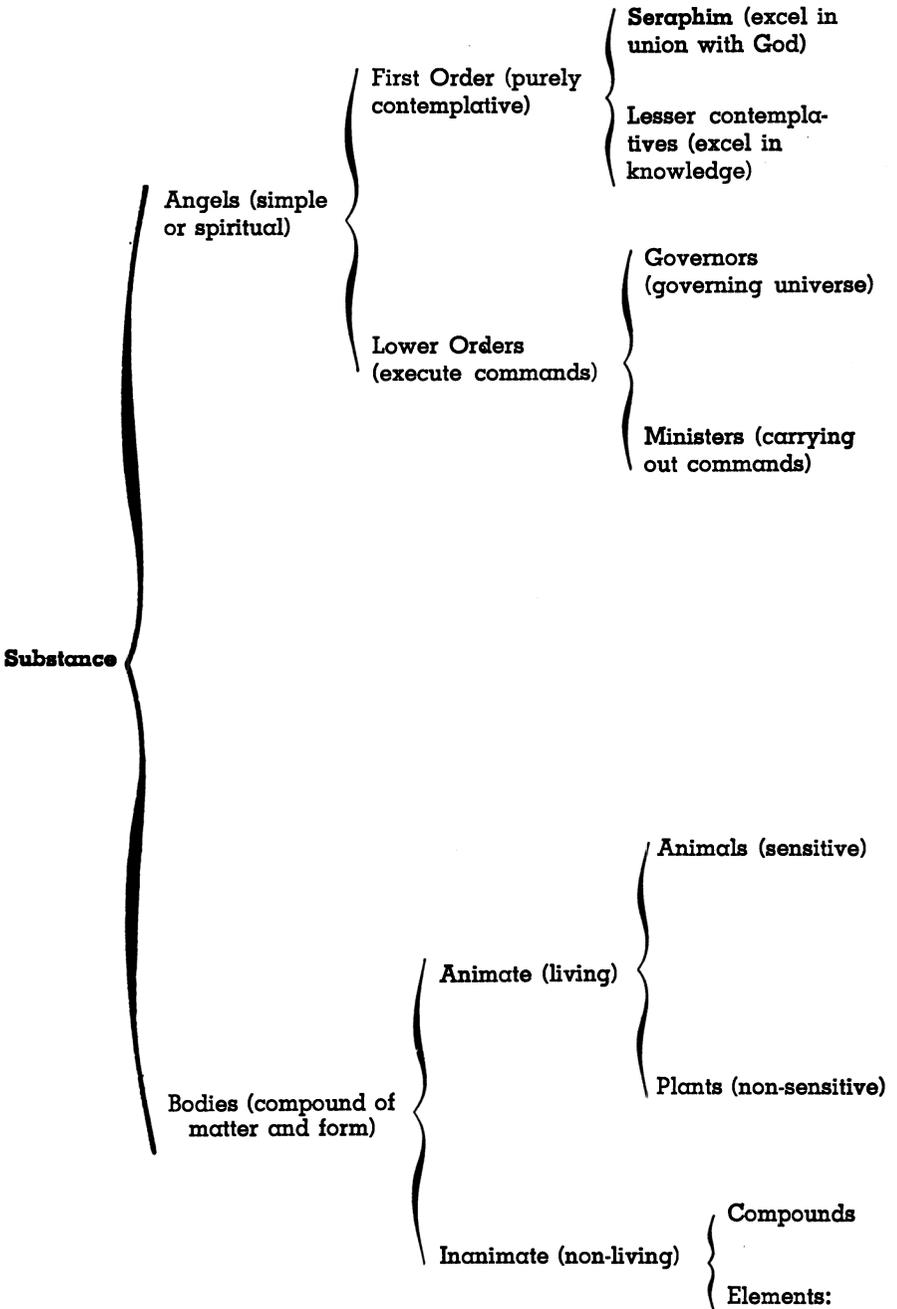
on Aristotle's *Metaphysics*, 5, Lesson 9, n. 891 ff.)

..... **Substance**

| | | | | |
|---|--|---|---|-----------------|
| { | in it <i>absolutely</i> | { | with regard to its matter, it is its..... | Quantity |
| | with regard to its form it is its..... | | Quality | |
| | but if it is in it only <i>relatively</i> to something else it is some..... | | | Relation |

| | | | | |
|---------------------------------------|---|--------------|--|---|
| { | partly in it | { | as to its <i>origin</i> , it is some..... | Action |
| | | | but if as to its <i>term</i> , it is some..... | Reception |
| | or wholly outside but containing the S | as a measure | { | of the S as it is a thing changed |
| or of the change of S, it is its..... | | | | but without regard to order of parts it is its Place |
| | | | | |
| | | | | but if it does not measure it, it is its..... Vestition |

THE CATEGORY



| | | | | | | |
|---|------------------------------------|---|--------------------------------|---|----------------------------|--------------------------|
| { | Cherubim (secret knowledge) | | | } | billions of species | |
| { | Thrones (lesser knowledge) | | | | | |
| { | Dominations (commanding) | { | Virtues (principal commands) | | | |
| { | Transmitters of commands | | Powers (lesser commands) | | | |
| { | Principalities: Michael, etc. | { | Archangels (great missions) | { | Gabriel Raphael etc. | |
| { | Messengers (executing commands) | | | | | Angels (lesser missions) |
| | | | | | | |

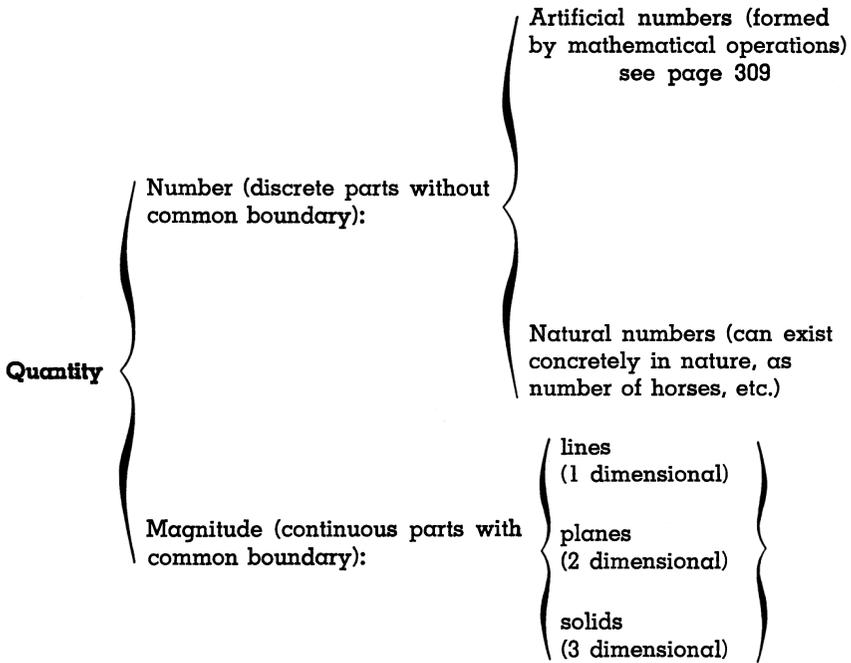
| | | | | | | | | | |
|---|---------------------------------|---|---|-------------------------------|-----------------------|---|-------------------|---|---|
| { | Vertebrates (perfect senses) | { | Mammals (perfect temperament) | { | Primates | { | Man (rational) | } | about a million species |
| | | | | | Apes, etc. (brute) | | | | |
| | | | | Others: at least 12 orders | | | | | |
| { | Invertebrates | { | Non-mammals: Birds, Fish, reptiles, etc.; at least 8 orders. | } | Sponges | } | Worms | } | Insects, etc...at least 12 <i>phyla</i> , many orders |
| | | | | | | | | | |
| | | | | | | | | | |

| | | | | | |
|---|------------------------------|---|-------------|---|-----------------------|
| { | Higher (vascular) | { | Seed-plants | } | over 350,000 species. |
| | | { | Mosses | | |
| | | { | Ferns | | |
| { | Lower: Algae, bacteria, etc. | | | | |

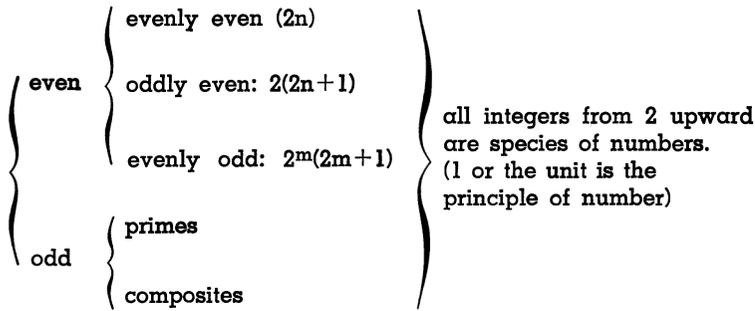
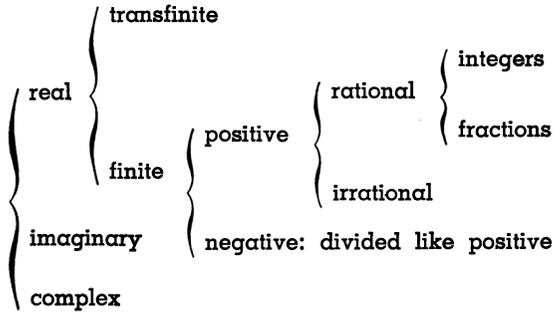
| | | | |
|---|-----------|---|-----------------------|
| { | Organic | } | over 500,000 species. |
| { | Inorganic | | |

The Periodic Table, about 100 species.

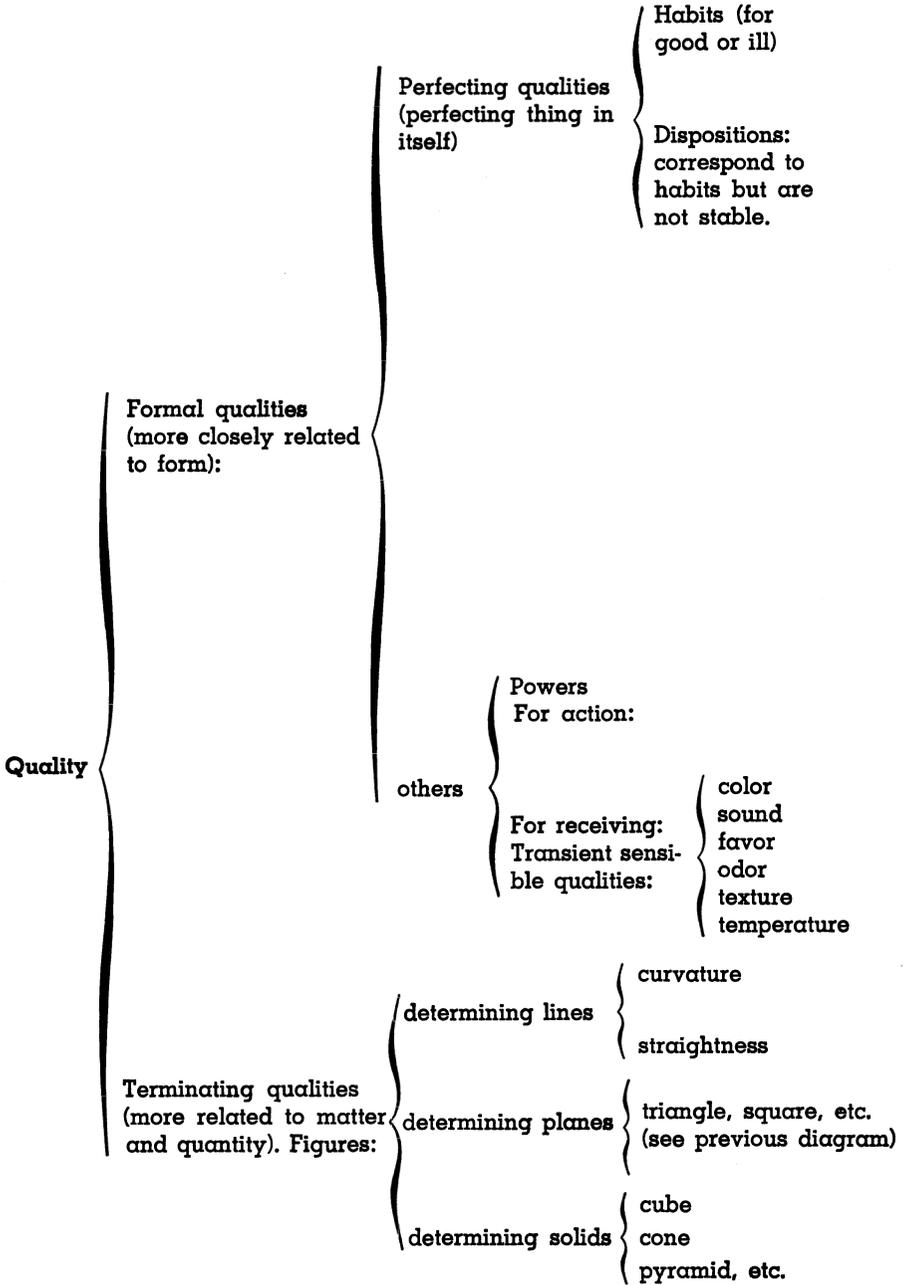
THE CATEGORY



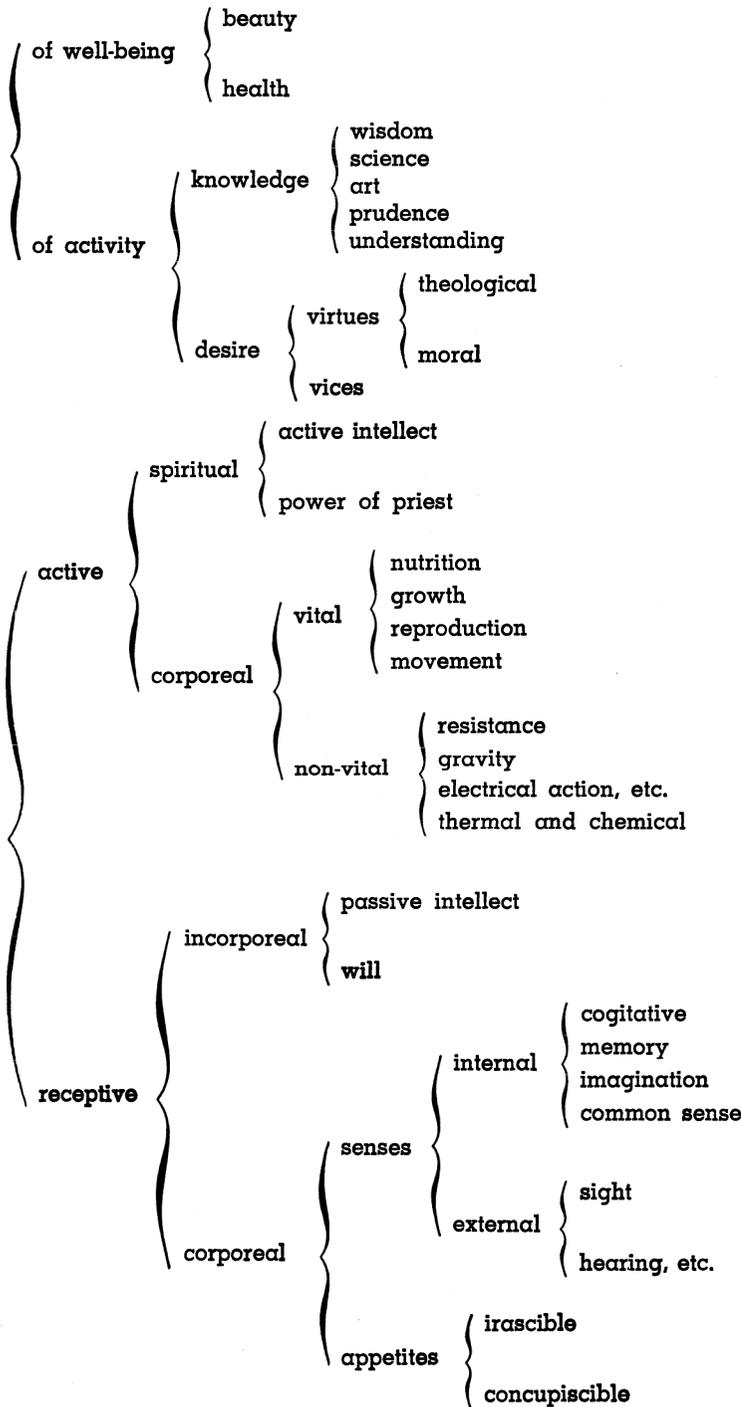
OF QUANTITY



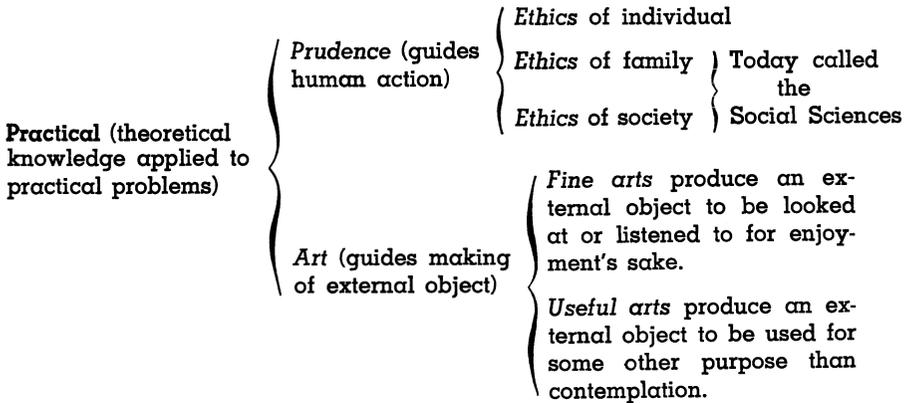
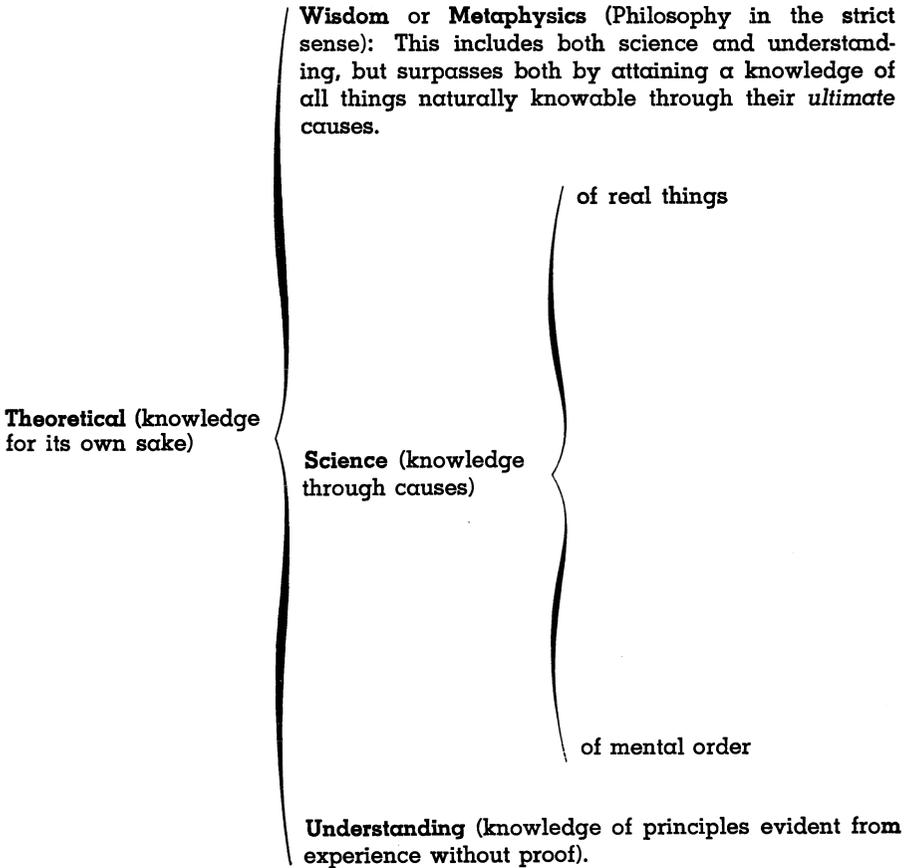
These are ultimate species, but they are further determined by the quality of figure.



OF QUALITY



CLASSIFICATION OF THE



NATURAL INTELLECTUAL VIRTUES

Natural science: studies the world of nature as it is changeable, including "cosmology" or "philosophy of nature," physics, chemistry, biology, psychology, in one *single* virtue.

Mathematics
(studies world of nature abstractly as measurable quantity)

Applied:

Astronomy (example of mathematics applied to natural science)

Music (example of mathematics applied to art)

Pure:

Algebra (studies continuous quantity)

Geometry (studies discrete quantity)

Liberal Arts
(sciences which make some mental order as tools for other sciences)

Demonstrative Logic makes proofs.

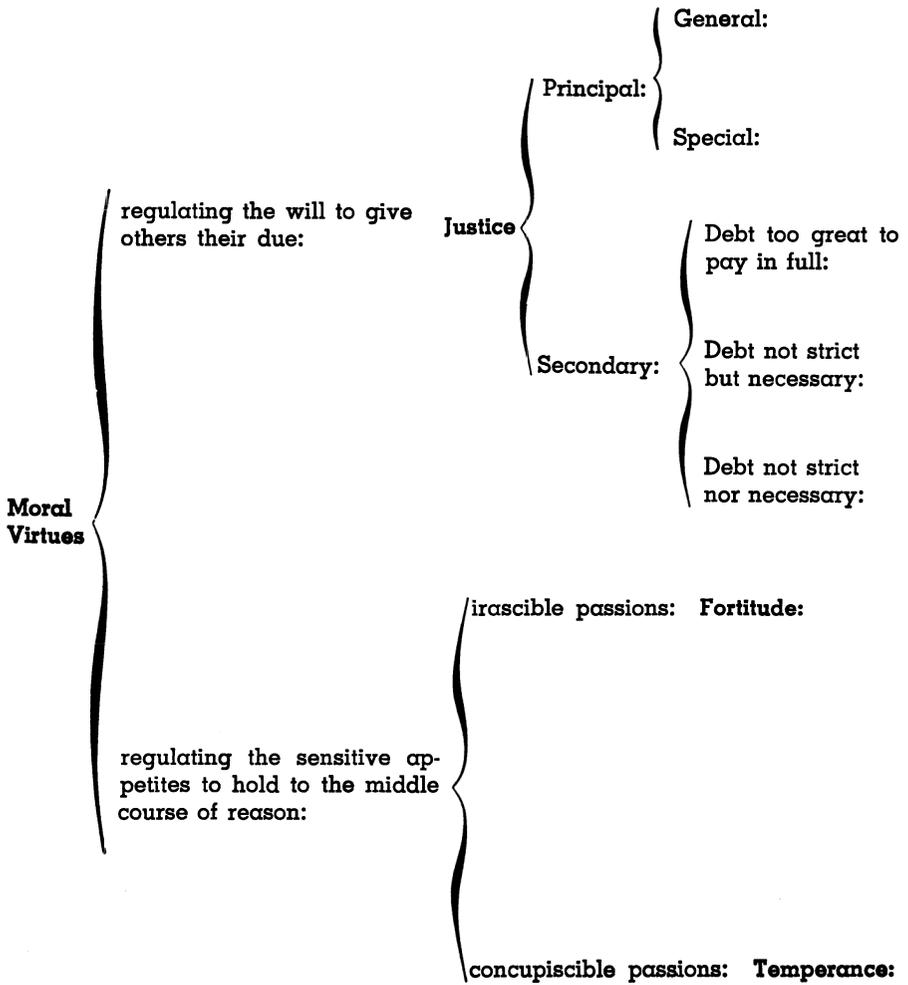
Dialectical Logic investigates.

Logic in traditional terminology

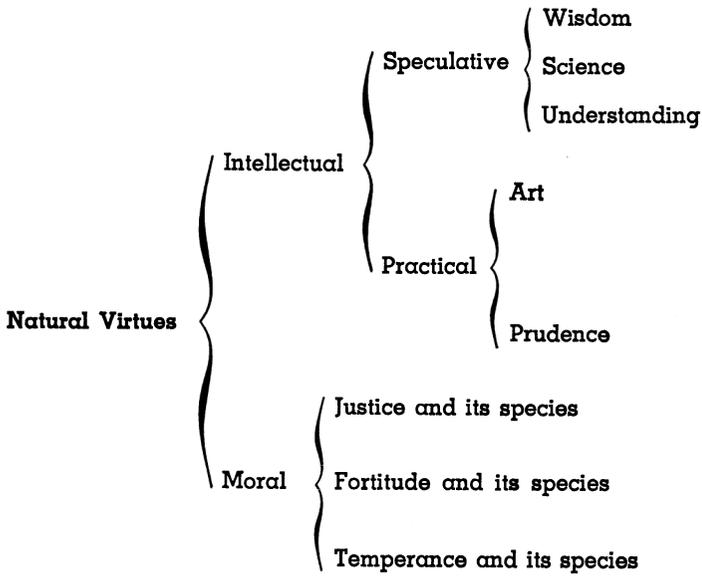
Rhetoric persuades.

Poetics (including *Grammar*) recreates.

CLASSIFICATION OF THE
(subdivision of



A CLASSIFICATION OF THE
AS THEY ELEVATE THE
(Subdivision of



SUPERNATURAL VIRTUES
NATURAL VIRTUES

Category of Quality)

Supernatural Virtues

*Theological
 Virtues*

Charity

Hope

Faith

Sacred Theology
 (acquired, but based
 on Faith)

*Gifts of Holy Ghost,
 assisting other virtues*

Gift of Wisdom

Gift of Science

Gift of Under-
 standing

*Infused
 Moral
 Virtues*

Prudence

Gift of Counsel

Justice and
 its species

Gift of Piety

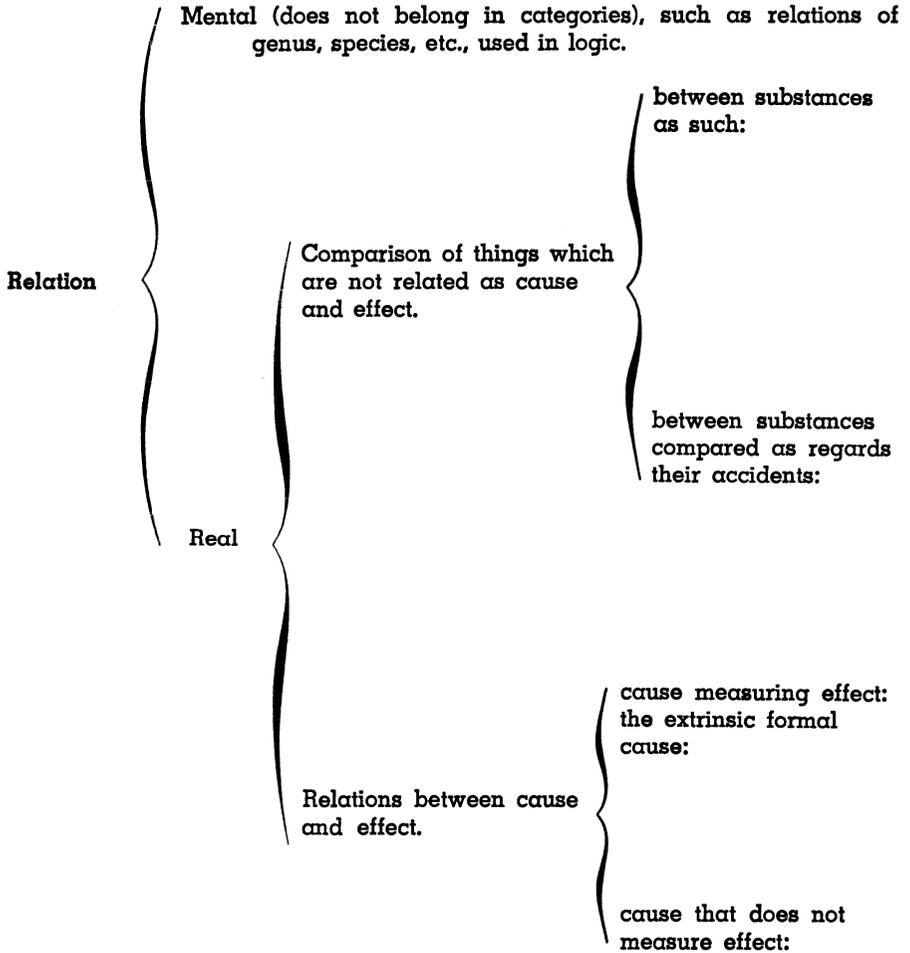
Fortitude &
 its species

Gift of Fortitude

Temperance &
 its species

Gift of Fear (with
 special relation
 to Hope)

THE CATEGORY



OF RELATION

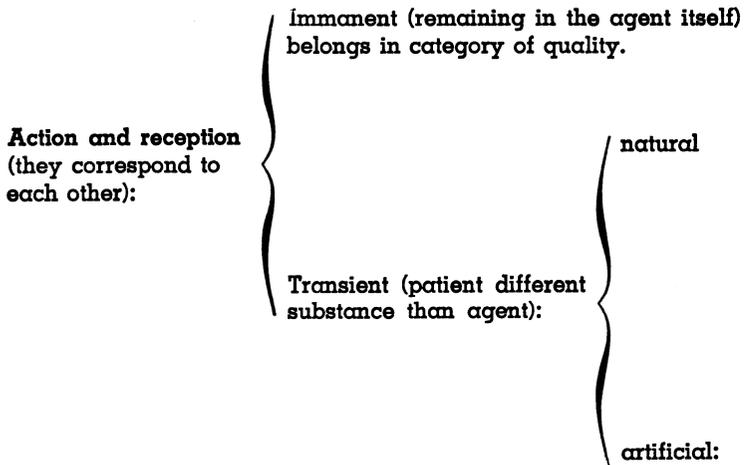
| | | | |
|---|---|---|------------|
| { | identity, e.g., relation of two men as both human. | } | individual |
| | diversity, e.g., relation of man and horse as different species. | | specific |
| | | | generic |

| | | | |
|---|----------------|---|--|
| { | as to quality: | } | similarity, e.g., relation of two white things. |
| | | | dissimilarity, e.g., relation of white and black thing. |

| | | | |
|---|-----------------|---|----------------------------------|
| { | as to quantity: | } | equality, e.g., $2 + 2 = 4$ |
| | | | inequality, e.g., $2 + 3 \neq 4$ |

| | |
|---|---|
| { | relation of powers of soul to their objects: e.g., eye to color, ear to sound. |
| | relation of thing to its pattern or model: e.g., house to blueprint. |

| | |
|---|--|
| { | efficient cause and its effect: e.g., relation of fatherhood. |
| | final cause and its effect: e.g., relation of adult man to himself as a boy. |
| | formal cause and its effect: e.g., relation of body to soul. |
| | material cause and its effect: e.g., relation of soul to body. |

THE CATEGORIES

OF ACTION AND RECEPTION

| | | | | |
|---|--|---|---|---|
| } | substantial generation | | } | |
| | (producing a substance: divided into as many species as there are species of material substance; see Category of Substance). | | | |
| | accidental | { | | alteration of qualities, e.g., "heating," "softening," "coloring," etc., by natural causes. |
| | | } | | growth |
| } | | change of place | | |
| | | Many species according to result of change. | | |

an indefinite number of species according to kinds of artificial things made, e.g., "building," "painting," "cutting," etc.

THE CATEGORIES OF LOCATION,

Location or place { common (not as measure; location in broad sense).
 { proper (strict sense) { natural (place in which
 { body naturally rests).
 { incidental (place occupied
 { other than by nature).

Position { straight { up
 { down
 { oblique
 { bent: an indefinite number of species.

Timing { simultaneity: present } These are again divided into
 { priority: past } periods (eons, years, months,
 { posteriority: future } days, minutes, seconds) meas-
 { } ured by some uniform motion,
 { } such as that of the sun. Each
 { } period is specifically distinct like
 { } the natural numbers.

Vestition: Also has no essential division; { shelter:
 accidentally it can be divided {
 into: { clothing:

POSITION, TIMING, AND VESTITION

This has no species, but it can be accidentally divided as follows:

surface of earth: give longitude and latitude as in geography.

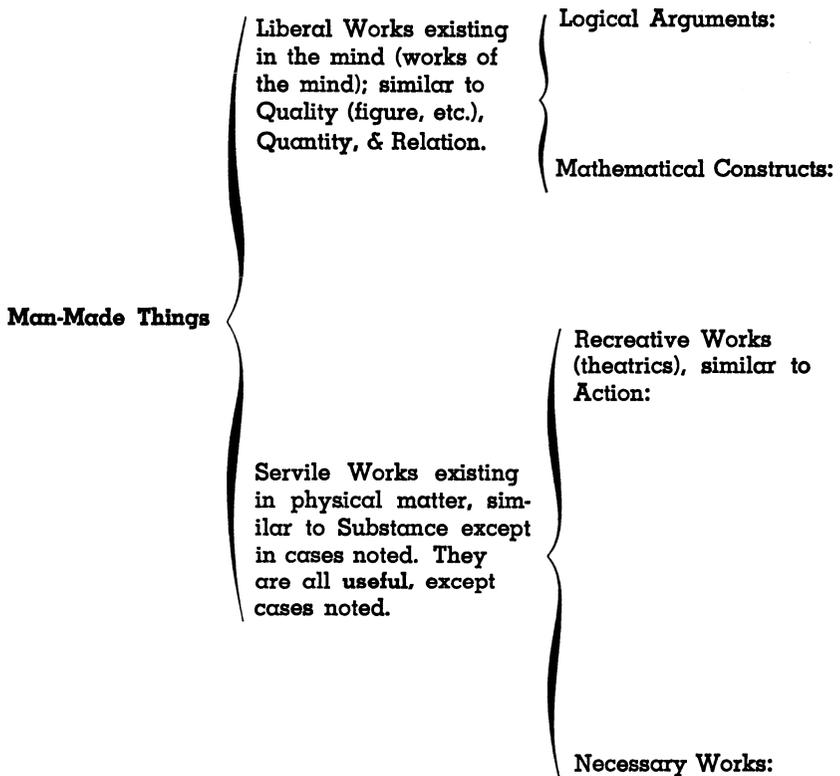
elsewhere: measured by direction and distance from earth, as in astronomy.

then into different types, caves, houses, etc.

{ armor (defensive against man).

{ ordinary clothing (defensive against weather), etc.

A CLASSIFICATION



OF ARTIFICIAL OBJECTS

| | | |
|---|---------------------------|--|
| { | Scientific (proofs) | See Part I, Chapter IV on Literary Forms. |
| | Dialectical (discussions) | |
| | Rhetorical (speeches) | |
| | Poetic (poems, plays) | |

| | |
|---|--|
| { | Models and artificial quantities used in pure mathematics |
| | Mental games (chess, cards, puzzles, etc.) |
| | Musical compositions |

| | | | |
|---|---------------------------|---|---------------------|
| { | Physical sports | { | Acting and Dancing |
| | Fine arts of performance: | | Musical Performance |

| | | | | | |
|---|-----------------------------|---|---|---|---------------|
| { | Works that produce shelter: | { | Works of Architecture (Engineering) | } | Fine* Arts |
| | | | Works of the Crafts, clothing, furniture, etc. | | |

| | | | |
|---|--------------------------|---|--|
| { | Works that produce food: | { | Works of Agriculture |
| | | | Works of Hunting, Fishing and other arts of capturing and preparing food (Cooking, etc.)** |

| | | | |
|---|------------------------------------|---|--|
| { | Works that remove difficulties: | { | Works of Trade (business and all kinds of travel, transportation & communica- tion). |
| | | | Works of Medicine, i.e., the Quality of health. |

*Many works are both useful and fine. Agriculture is included because gardening can be a fine art.

**Cooking comes with hunting, etc., because the art of cooking develops fully only with the preparation of meats.

II. SOME EXAMPLES OF DEFINITIONS

A. DESCRIPTIVE DEFINITIONS

1. Poetic description:

- a. The moon above the eastern wood
 Shone at its full; the hill-range stood
 Transfigured in the silver sheen,
 Its blown snows flashing cold and keen,
 Dead white, save where some sharp ravine
 Took shadow, or the sombre green
 Of hemlocks turned to pitchy black
 Against the whiteness at their back.
 For such a world and such a night
 Most fitting that unwarming light,
 Which only seemed where'er it fell
 To make the coldness visible.

—John Greenleaf Whittier, "Snowbound."
 The whole poem is descriptive in
 character.

- b. The following is Pope's description of the Sylphs, or fairies, whom he pictures fluttering about Belinda, the heroine of "The Rape of the Lock," as she goes boating on the Thames.
- Some to the sun their insect-wings unfold,
 Waft on the breeze, or sink in clouds of gold;
 Transparent forms, too fine for mortal sight,
 Their fluid bodies half dissolved in light,
 Loose to the wind their airy garments flew,
 Thin glitt'ring textures of the filmy dew,
 Dipped in the richest tinctures of the skies,
 Where light disports in ever-mingling dyes,
 While ev'ry beam new transient colors flings,
 Colors that change whene'er they wave their wings.

2. Rhetorical description:

- a. The following is taken from a speech for the prosecution given by Daniel Webster in a well-known murder trial:

An aged man, without an enemy in the world, in his own house and in his own bed, is made the victim of a butcherly murder, for mere pay. Truly, here is a new lesson for painters and poets. Whoever shall hereafter draw the portrait of murder, if he will show it as it has been exhibited in an example, where such example was last to have been looked for, in the very bosom of our New England society, let him not give it the grim visage of Moloch, the brow knitted by revenge, the face

black with settled hate, and the bloodshot eye emitting livid fires of malice. Let him draw, rather, a decorous, smoothfaced, bloodless demon; a picture in repose, rather than in action; not so much an example of human nature in its depravity and in its paroxysms of crime, as an infernal nature, a fiend, in the ordinary display and development of his character.

The deed was executed with a degree of self-possession and steadiness equal to the wickedness with which it was planned. The circumstances, now clearly in evidence, spread out the whole scene before us. Deep sleep has fallen on the destined victim and all beneath his roof. A healthful old man, to whom sleep was sweet, the first sound slumbers of the night held in their soft but strong embrace. The assassin enters, through the window already prepared, into an unoccupied apartment. With noiseless feet he paces the lonely hall, a hall lighted by the moon; he winds up the ascent of stairs and reaches the door of the chamber. Of this, he moves the lock, by soft and continued pressure, till it turns on its hinges without noise; and he enters and beholds his victim before him. The room was uncommonly open to the admission of light. The face of the innocent sleeper was turned from the murderer, and the beams of the moon, resting on the gray locks of his aged temple, showed him where to strike. The fatal blow is given; and the victim passes, without a struggle or a motion, from the repose of sleep to the repose of death! It is the assassin's purpose to make sure work; and he yet plies the dagger, though it was obvious that life had been destroyed by the blow of the bludgeon. He even raises the aged arm, that he may not fail in his aim at the heart, and replaces it over the wounds of the poniard! To finish the picture, he explores the wrist for the pulse! He feels for it and ascertains that it beats no longer! It is accomplished. The deed is done. He retreats, retraces his steps to the window, passes out through it as he came in and escapes. He has done the murder—no eye has seen him, no ear has heard him. The secret is his own, and it is safe!

—Daniel Webster, "Exordium in the Knapp Murder Case."

B. SCIENTIFIC DEFINITIONS

1. Scientific description:*

MOCKINGBIRD: *Mimus polyglottos* (Linnaeus).

Other names: Mock Bird; Mocking Thrush; Mimic Thrush; Mocker.

* From *Birds of America*, edited by T. Gilbert Pearson, with permission of Doubleday and Company, Incorporated, New York City.

General Description.—Length, 10 inches. Upper parts, brownish-gray; under parts, white and gray. Bill, shorter than head; wings, long and rounded; tail, longer than wing, rounded, the feathers moderately broad with rounded tips.

Color.—Above, plain brownish gray; wings and tail, dull blackish-slate with pale slate-gray edgings, these broadest on secondaries (especially the terminal portion, where sometimes inclining to white); middle and greater wing-coverts, narrowly tipped with dull white or grayish-white, forming two narrow bands (these indistinct in worn plumage); primary coverts, white usually with a subterminal spot or streak of dusky; base of primaries, white, this most extended on the two innermost, where occupying at least basal half of both webs, often much more, that on the longer quills sometimes entirely concealed by overlying primary coverts; outermost tail-feather, white, sometimes with a trace of dusky or grayish on outer web; second, with outer web mostly blackish, the inner web mostly white; third, blackish or dusky, with about half of the terminal and basal portions white; a very indistinct stripe over eye of pale grey; eyelids, grayish-white; lores, dusky; sides of head, grayish, indistinctly streaked with whitish; space below the eyes and cheeks, dull white, usually faintly barred or transversely flecked with grayish or dusky; chin and throat, dull white, margined along each side by a dusky streak; chest and sides of breast, pale smoke-gray, passing into a more buffy hue on sides and flanks; the under tail-coverts, pale buff; abdomen and center of breast, white; bill, black.

Nest and Eggs.—Nest: Composed of twigs, grasses and weeds, lined with fine rootlets, moss, and sometimes cotton; placed in many different locations but usually in a deep bramble thicket or hedge; as a rule they are located within ten feet of the ground, never on it, and have been seen built fifty feet above the earth. Eggs: 4 to 6, bluish-green heavily freckled with several shades of brown.

Distribution.—Eastern United States; northward regularly (but locally), to Maryland, southern Ohio, southern half of Indiana and Illinois, Missouri, etc., irregularly to Massachusetts, southeastern New York (Long Island, etc.), New Jersey, Pennsylvania, northern Indiana and Illinois, and Iowa, sporadically to Maine, Ontario, southern Wisconsin (breeding), and southern Minnesota; breeding and resident throughout its range, except where occurring accidentally; southward to southern Florida and along the Gulf to eastern Texas, and to the Bahamas; introduced into Bermuda (1893).

Habits.—The Mockingbird stands unrivaled. He is the king of song. This is a trite saying, but how much it really means can be known only to those who have heard this most gifted singer uncaged

and at his best in the lowlands of the Southern States. He equals and even excels the whole feathered choir. He improves upon most of the notes he reproduces, adding also to his varied repertoire the crowing of chanticleer, the cackling of the hen, the barking of the house dog, the squeaking of the unoiled wheelbarrow, the postman's whistle, the plaints of young chickens and turkeys and those of young wild birds, not neglecting to mimic those of his own offspring. He even imitates man's musical inventions. Elizabeth and John Grinnell assert that a Mockingbird was attracted to a phonograph on the lawn where, apparently, he listened and took mental notes of the performance, giving the next day, a week later, or at midnight an entertainment of his own and then repeating it with the exact phonograph ring. Even the notes of the piano have been reproduced in some cases and the bird's vocalization simulates the lightning changes of the kaleidoscope.

The Mocker is more or less a buffoon, but those who look upon him only as an imitator or clown have much to learn of his wonderful originality. His own song is heard at its best at the height of the love season, when the singer flutters into the air from some tall tree-top and improvises his music, pouring out all the power and energy of his being in such an ecstasy of song that, exhausting his strength in the supreme effort, he slowly floats on quivering, beating pinions down through the bloom-covered branches until, his fervor spent, he sinks to the ground below. His expanded wings and tail flashing white in the sunlight and the buoyancy of his action appeal to the eye as his music captivates the ear. On moonlit nights at this season the inspired singer launches himself far into the air, filling the silvery spaces of the night with the exquisite swells and trills, liquid and sweet, of his unparalleled melody. The song rises and falls as the powers of the singer wax and wane, and so he serenades his mate throughout the livelong night. One such singer wins others to emulation and, as the chorus grows, little birds of the field and orchard wake just enough to join briefly in the swelling tide of avian melody.

The Mockingbird seldom holds himself aloof from mankind, but often makes himself at home in the dooryard, sits on the chimney top and, like the Robin in the North, "knows all the folks." The negroes close the shutters of their cabins at night, but they say that the Mocker "sings down the chimney." Often the nest is placed in shrub or hedge close by the house; as soon as the young are hatched the parents take pains to proclaim their whereabouts that all may know. Therefore, the young, which are in demand as cage birds, frequently are taken and sold into captivity.

The Mockingbird has many traits that endear it to all. It is brave and devoted, attacking birds twice its size, dogs, cats, and even man

himself in defense of its young. Its cries of alarm give warning to all other birds nearby. When kindly treated it may even come in at the door or window. Thus it has won for itself a high place in the regard and affection of the Southern people.

—Edward Howe Forbush in *Birds of America*,
edited by T. G. Pearson.

2. Some technical definitions:

a. *Grammar*:

The following are definitions of a verb given by a number of different grammars. Which is best?

- (1) A verb is a word which signifies to be, to do, or to be acted upon.
- (2) A verb is a word which expresses action or helps to make a statement.
- (3) A verb is a word used to express action or state of being.
- (4) A verb is a word which asserts something.
- (5) A verb is a word denoting actions, states, or happenings.
- (6) A verb is a word which, expressing an act, occurrence, or mode of being, carries the distinctive force of a predicate.
- (7) A verb is a word which affirms or predicates something.
- (8) A verb is a word which predicates something of a subject.
- (9) A verb is a word which by human agreement expresses an attribute of a subject along with time.

See also the definitions given at the end of each chapter in this book.

b. *Geometry*:

- (1) A circle is a line all points of which are equidistant from a fixed point called the center.
- (2) A triangle is a three-sided closed plane figure.
- (3) A parallelogram is a closed plane figure whose sides are straight lines and whose opposite sides are parallel.
- (4) A rectangle is a parallelogram with one right angle.

c. *Algebra*:

- (1) An equation is an algebraic statement that two quantities are equal.
- (2) A proportion is a statement that two ratios are equal.
- (3) If one quantity depends upon another quantity for its value, it is said to be a *function* of that quantity.
- (4) A number is a quantity whose parts have no common boundary.

d. *Biology*:

In the maintenance of its life, every living thing exhibits a phenomenon which consists essentially in the breaking down of

complex substances into simpler ones, with consequent release of energy. This phenomenon has been called "dissimilation" in contrast to "assimilation" in which simple substances are absorbed and built up into the organism in the form of substances of greater complexity and higher energy content. Although this dissimilation affects different materials in different species, it very commonly involves the breaking down, by oxidation, of carbohydrates and fats, the end-products being carbon dioxide and water. The dissimilation process thus involves an exchange of gases between the organism and its environment, oxygen being absorbed and carbon dioxide evolved. This exchange of gases, so characteristic in animals, is equally characteristic of the vast majority of plants. Hence the term "respiration," used to denote this gaseous exchange and the processes of which it forms a part, is equally applicable to animals and plants.

Although the term respiration at first referred to the exchange of gases between the organism and its environment, so that, in the case of animals, it was synonymous with the term breathing, it has for many years now been more usual to regard respiration as involving the whole of the dissimilation process. The leading workers of the second half of the nineteenth century, such as Sachs, Pfeffer and Palladin, who were responsible for the modern conception of respiration, all gave the word respiration this wider meaning, and in this book respiration in plants is taken to include all the phenomena of dissimilation, the characteristics of which are the breaking down of complex substances into simpler ones with a consequent release of energy.

—W. Stiles and W. Leach, *Respiration in Plants**

e. *Physical Science:*

(1) To be strictly accurate, *an element is a substance, all of whose atoms contain the same number of protons.* However, until you study more about the structure of atoms it will be useful and accurate to think of an element *as a simple substance which cannot be broken up into any simpler substances by ordinary chemical means.* When a chemist attempts the analysis of an element such as iron, he finds that it is made up entirely of iron. He has reached the limits of chemical analysis.

—G. M. Raulins and A. H. Struble, *Chemistry in Action* (1940)**

(2) What causes lightning? Scientists do not know certainly what causes lightning. The following theory is as good as any.

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** By permission of the author and D. C. Heath and Company, Boston.

When a liquid is broken up into a spray, friction charges the larger droplets positively and the smaller ones negatively. In a thundercloud there are huge upward winds with velocities as great as 200 miles per hour. These winds break up raindrops and carry the smaller, negatively charged drops to the top of the cloud, while the larger, positively charged ones remain behind. Often the charges jump from one part of the cloud to another in a lightning stroke. Sometimes a wind carries away the minus-charged top of the cloud. Then the positively charged remainder is likely to be discharged to the earth.

What causes thunder? A lightning stroke heats the air through which it passes, and the air expands suddenly, causing thunder.

—O. H. Blackwood, W. B. Herron, and W. C. Kelly, *High School Physics* (1951)*

(3) What is work?

You have learned that a force is a push or pull and that you must exert a force to lift a market basket. You have found also that a force is required to overcome friction when you move an object. Now you will see how a force can do work in lifting a body or in overcoming a friction.

The word work is one of the oldest in the English language. It often means effort, perhaps unpleasant, for which you get paid. Thus we say that a golf caddy “works” when he stands idly by, watching a player hit a ball. A watchman “works” as he sits at a railroad crossing. You “work” a problem in algebra. In physics we try to give only one meaning to every word; it is important that you know just what physicists mean by work.

When you carry a suitcase upstairs, you do work: for you exert an *upward* force on the suitcase, and you lift it *upward*. A horse does work in pulling a plow over a field, for he exerts a *forward* force which moves the plow forward. To do work on a body, you must exert a force on it and must move it in the direction of the force.

We define work as *the product of the force exerted on a body times the distance that the body moves in the direction of the force.*

Work = force x distance moved

$W = f \times d$

f. *Christian Doctrine:*

- (1) A sacrament is an outward sign instituted by Christ to give grace.

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- (2) Baptism is the sacrament that gives our souls the new life of sanctifying grace by which we become children of God and heirs of heaven. The priest is the usual minister of baptism but if there is danger that someone will die without baptism, anyone may and should baptize. It is given by pouring ordinary water on the forehead of the person to be baptized, saying while pouring it: "I baptize thee in the name of the Father, and of the Son, and of the Holy Ghost."
- (3) The Church is the congregation of all baptized persons united in the same true faith, the same sacrifice, and the same sacraments, under the authority of the Sovereign Pontiff and the bishops in communion with him, founded by Jesus Christ to bring all men to eternal salvation.
- (4) A mortal sin is a grievous offense against the law of God, which deprives the sinner of sanctifying grace, consisting in a thought, desire, word, action, or omission which is seriously wrong, of whose evil the sinner is mindful at the time of acting, and to which he fully consents.

III. SUMMARY OF GRAMMATICAL AND LOGICAL RELATIONS

A. How logical relations are expressed by grammatical relations.

1. *Substance* is expressed by a noun.
Its differences are often expressed by adjectives.
2. *Accidents* when thought of as if they were substances are expressed in the same way as substance.
3. *Accidents* when predicated as properties or contingents (modifiers) are expressed as follows:
 - a. *Quantity* is expressed by a noun, adjective, or by a *plural* form. Frequently it is indicated by a relation of greater or smaller.
 - b. *Quality* is expressed by an adjective.
Occasionally it is indicated by a relation.
 - c. *Relation* is expressed by a preposition.
Sometimes it is indicated by a noun connoting a relation.
 - d. *Action, passion, position, vestition* are expressed by verbs or verbals.
 - e. *Place* and *position* are expressed as if they were relations, by prepositions.
They are also expressed by adverbs.
 - f. *Timing* is expressed by the tense of the verb.
It is also indicated by adverbs and, as if they were relations, by prepositions.

4. The relation of *predication* is expressed by the copula, and implicitly by all words used as modifiers.
5. The relations of *argument* are expressed by a (pure) conjunction.

B. How grammatical relations indicate logical relations:

1. *Nouns* primarily indicate substances; secondarily they indicate parts of substances and accidents considered as substances. *Infinitives* are nouns which name an action or reception, but sometimes have adjectival or adverbial uses.
2. *Pronouns* substitute for nouns, and sometimes indicate gender, number, and case for purpose of identifying the noun to which they refer.
3. *Adjectives* primarily express quality, but may express other accidents considered as modifications of substance. The *article* is a particular kind of adjective used before nouns to limit their extension.

The *participle* is an adjective which expresses action or reception. It is determined by objects just like a verb, and may also be used in place of infinitive as a noun (*gerund*).

4. *Verbs*:

The copulative verb expresses the act of judgment.

Other verbs express action or reception along with timing (tense) and show agreement in number and gender with their subject.

Secondarily they may express the manner and other circumstances of the action through mood and by auxiliaries.

5. *Adverbs* primarily express a mode or manner of an action. Secondarily they express timing or location, or the modes of other accidents.
6. *Prepositions* primarily express relation. Secondarily they express location, position, timing, and other categories considered as relations.
7. *Conjunctions*, when pure, express relations between premises of an argument. Adverbial conjunctives also have the functions of adverbs.
8. *Interjections* express a sudden or strong emotion. Sometimes they imply an imperative statement.

IV. OUTLINING

A. Outline of the Lord's Prayer

St. Thomas Aquinas, O.P., in his commentaries gives excellent examples of how to outline a work in preparation to explaining it.

The following explanation of the Lord's Prayer shows how his method proceeds:

The Lord's Prayer is most perfect, because, as Augustine says, "If we pray rightly and fittingly, we can say nothing else but what is contained in this prayer of our Lord." For since prayer interprets our desires, as it were, before God, then alone is it right to ask for something in our prayers when it is right that we should desire it. Now in the Lord's Prayer not only do we ask for all that we may rightly desire, but also in the order wherein we ought to desire them, so that this prayer not only teaches us to ask, but also directs all our affections.

Thus it is evident that the first thing to be the object of our desire is the end, and afterwards whatever is directed to the end. Now our end is God towards whom our affections tend in two ways: first, by our willing the glory of God, secondly, by willing to enjoy his glory. The first belongs to the love whereby we love God in himself, while the second belongs to the love whereby we love ourselves in God. Wherefore the first petition is expressed thus: *Hallowed be thy Name*, and the second thus: *Thy kingdom come*, by which we ask to come to the glory of the kingdom.

To this same end a thing directs us in two ways: in one way, by its very nature; in another way, accidentally. Of its very nature the good which is useful for an end directs us to that end. Now a thing is useful in two ways to that end which is beatitude: in one way, directly and principally, according to the merit whereby we merit beatitude by obeying God, and in this respect we ask: *Thy will be done on earth as it is in heaven*; in another way instrumentally, and, as it were, helping us to merit, and in this respect we say: *Give us this day our daily bread*, whether we understand this of the sacramental Bread, the daily use of which is profitable to man, and in which all the other sacraments are contained, or of the bread of the body, so that it denotes all sufficiency of good, as Augustine says, since the Eucharist is the chief sacrament, and bread is the chief food: thus in the gospel of Matthew we read, *supersubstantial*, i.e., *principal*, as Jerome expounds it.

We are directed to beatitude accidentally by the removal of obstacles. Now there are three obstacles to our attainment of beatitude. First, there is sin, which directly excludes a man from the kingdom, according to I Cor. 6:9-10: "Neither fornicators, nor idolators, etc., shall possess the kingdom of God"; and to this refer the words, *Forgive us our trespasses*. Secondly, there is temptation, which hinders us from keeping God's will, and to this we refer when we say: *And lead us not into temptation*, whereby we do not ask not to be tempted, but not to be conquered by temptation, which is to be led into tem-

tation. Thirdly, there is the present penal state which is a kind of obstacle to a sufficiency of life, and to this we refer in the words, *Deliver us from evil.*"

—*Summa Theologiae*, II-II, q. 83, a. 9*

B. St. Thomas' division in the ordinary outline form:

Thesis: The seven petitions of the Lord's Prayer include all the things we rightly desire and in the right order of importance.

I. The thing which we must desire above all things is God, who is our **end** and our beatitude.

1. We must first desire that God should be glorified *in himself*, and hence we pray: "Our Father who art in heaven, hallowed be thy name."
2. We must desire that God should be glorified *in us*, that is, that we should enjoy his glory; and hence next we pray: "thy Kingdom come."

II. Whatever else we desire we must desire as a **means** useful to achieve our end, which is God, our beatitude.

1. Some means are desired because they are *by their very nature* necessary to attain this end.
 - a. Merit is a means which is *directly and principally* useful to attain our end, and hence next we pray: "Thy will be done on earth as it is in heaven."
 - b. Other things are means which are *instrumentally* useful to attain our end because they assist in gaining merit, and for them we next pray: "Give us this day our daily bread."
2. Other means are desired because they are *accidentally* necessary to attain this end, by removing obstacles to attaining it.
 - a. They may remove obstacles *directly* opposed to our end, namely, sin, and hence next we pray: "Forgive us our trespasses as we forgive those who trespass against us."
 - b. They may remove obstacles *indirectly* opposed to our end.
 - (1) These obstacles are indirectly opposed to our end, because they hinder us from doing God's will, namely, occasions of sin; and hence we next pray: "Lead us not into temptation."
 - (2) These obstacles are indirectly opposed to our end by limiting our full development—such are the effects of sin felt in this life; and hence lastly we pray: "Deliver us from evil."

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SECTION IV

Sample Analyses of Poetic Forms

The following sample analyses are very schematic and are only intended to illustrate how it is possible to approach a literary work from an organic point of view, using the principles discussed in Part One. A complete critical analysis of any work would be much more detailed. In particular, the treatment of the matter of each work is only briefly indicated.

I. A SACRED DRAMA: THE HOLY SACRIFICE OF THE MASS

THE FORM

(Object of imitation)

The Action:

The principal form of a drama which unifies the entire poetic work is its action or plot:

Jesus Christ, the God-man, offers himself to his heavenly Father as a sacrifice for the sins of the whole world to obtain the rebirth and glory of his Church.

This is an action with a tragic catharsis, since joy is achieved only through Christ's heroic sacrifice of himself. It begins with sorrow, yearning, and hope (*Confiteor, Kyrie, Gloria, and Collects*), then passes through the act of supreme sacrifice and victory (*Offertory and Canon*) in which there is a reversal and a discovery, since it is by humbling himself that Christ triumphs and by death that he is proved to be God. Finally, it ends in the perfect joy of victory and reunion. Furthermore, it is an action of the most sublime magnitude, since it

involves the entire universe and is the climax and summary of all history.

In the Holy Sacrifice, however, there is also something of the comic catharsis, since in it there is an ironic exposure of human vanity (see the parable of the supper, Lk. 14:15-24) because all men of every condition are invited to the banquet of the King who has appeared in the form of a slave (Phil. 2:7). The Eucharist is a rejoicing and a festival of common human fellowship as well as a heroic tragedy.

Beginning: Jesus Christ, the God-man, comes into the world and reveals himself as our Redeemer. This is shown in the *Introit*, *Kyrie*, *Gloria*, and *Collects* in which mankind prays for the coming of the Saviour and celebrates his presence.

Middle:

Episode 1: Jesus Christ announces the Truth or Gospel which he has come to witness:

1. The *Lesson*, *Epistle*, *Gradual*, *Alleluia* or *Tract* are a less perfect presentation of truth by the forerunners of Christ (prophets and apostles).
2. *Gospel*, *Sermon*, *Creed* are the perfect teaching of Christ, faithfully received by the Church.

Episode II (climax and reversal): Jesus Christ offers himself on the cross in proof of the Truth, rises and ascends to heaven as King of the Universe.

1. *Offertory*: in which Christ (and we with him) prepares to give himself.
2. *Canon*: in which Christ (and the whole Church militant and triumphant) offers himself on the cross, rises, and ascends to his heavenly throne.

End: Christ in glory invites his Church to share that glory in a heavenly banquet, received here below as a pledge.

1. *Our Father*, *Fraction*, and *Communion Prayers* are a petition for the coming of the Kingdom and for a share in it.
2. The *Communion*, or union of the Church with Christ at the heavenly wedding-feast.
3. *Post-Communion Prayers*, *Blessing*, *Last Gospel* are the thanksgiving and petition for the final eternal fulfillment.

Secondary objects of imitation:

Characters:

1. The *chief figure* is Jesus Christ represented through the priest. He is a divine hero. How then does he have the moral flaw expected in a tragic hero? He has no personal sin or defect, but he has assumed human nature which itself is under the curse of sin,

and hence he *appears* a criminal and suffers in our place. Because of his perfect goodness we *pity* his sufferings, and because we know that he suffers for our sins, we *fear* the punishment which we have deserved, not he. Hence the **tragic catharsis** through pity and fear is achieved. Our Lord's character is perfectly *appropriate* to his role as Redeemer and King. It is *lifelike* because he is so entirely human in his thoughts and feelings, and it is utterly *consistent*, because in the Mass we see him unhesitatingly carry out the will of his Father.

2. The secondary characters are all the members of the Church forming Christ's Mystical Body: the angels, the saints in heaven, the souls in purgatory, and all classes of men, women, and children. They are represented through the ministers of the Mass (deacon, subdeacon, acolytes) and by the congregation itself. The unseen angels and saints and the dead are commemorated in words and also by the statues and paintings, and by the choir which expresses their sentiments.

These secondary characters are *appropriate*, *lifelike*, and *consistent* because they include representatives of the entire range of humanity. Each of us can find some saint, for example, with whom we can identify ourselves, and some sinner who has met the fate which would be ours except for the grace of God. The **function** of these secondary characters is to manifest the greatness of Christ by their special likeness to him, by their proof of his grace and forgiveness, or by the defeat of their opposition to him.

Thus we see that only our Lord is a hero capable of the sublime action of the Redemption.

Thought:

In the text of the Mass we find the thought of God himself expressed through passages of Scripture, less perfectly formulated in the psalms, lessons and epistle, and most perfectly formulated in the Gospel. We also find the responding thought of the Church in the Collects and other Prayers, in the Sermon and Creed, and in the Canon of the Mass itself. This thought of the Church grows out of the Scriptures and is a commentary and answer to it. All of the greatest mysteries of the faith are expressed in the Mass, but most especially the doctrine of the Trinity (*Gloria*, *Creed*, *Canon*, and the ever recurrent doxologies), the Incarnation and Redemption (the conclusion of every prayer, the *Gospel*, the *Canon*, and the constant use of the sign of the cross), and the theological virtues of faith, hope, and charity. Along with this there is constant emphasis on man's duty of contrition, humility, obedience, and profound reverence of his Creator and Redeemer.

The thought of the Latin rite liturgy is characterized by its great simplicity, and its emphasis on the idea of religion, man's debt in justice to worship God and to return all things to him. The Romans, even when still pagans, had a profound sense of justice, piety, religion, and this is reflected in the Latin rite. It may be compared to the Eastern rites which express much more complicated statements of dogma, a reflection of the theological studies and controversies that took place in the East in the earlier days of the Church.

The Latin rite does not impede the action by too much talk. The thought is directly subordinated to what is being done. Read the *Canon* and see how businesslike it is.

THE MATTER
(Means of imitation)

The Mass is presented dramatically (manner) but in a symbolic and sacramental fashion, not literally.

Words:

In studying the diction of the Mass the three following points should be emphasized:

1. *It is in Latin.* What is the purpose of using an ancient and sacred language hallowed by tradition in a sacred drama? What are the arguments for and against the vernacular in the liturgy? Is it not clear from the artistic point of view (but not necessarily from the pastoral point of view) that the use of Latin is superior to any translation?
2. *It is scriptural.* Notice the way in which the phrases, the symbols, and the tone of the Bible is kept throughout the Mass. The text is a mosaic of quotations and psalm verses, each of which has very great meaning because it alludes to a much fuller treatment in the Bible itself. Notice the similarity here between the text of the Mass and Dante, or modern poetry, which at first sight seem obscure and unconnected because of their wealth of allusion and suggestion. Notice also the use of the great biblical symbols of light and darkness, the kingdom, the marriage feast, water, fire, rock, earth and sky, etc.
3. *It is Roman* in its use of great brevity (see the style of the *Collects*), of periodic sentences, and of a certain kind of legal exactitude (especially the *Canon*). The study of the *Collects* is especially helpful in understanding the style.

These three characteristics make the Mass dramatically effective because they are appropriate to the grandeur of the action, to the historical character of Jesus Christ who as a Jew and the Messiah

spoke in the biblical language, to the character of the Church which is centered in Rome, and to the thought which is sublime and yet given to the common people.

Melody and Rhythm:

Under this heading we should study the Gregorian Chant, and also the rhythm of the text of the Mass, especially considering:

1. Why is the Chant especially the music of prayer? Consider its simplicity, freedom from all technical display, or sensual effects; its use of the modes which give to the melody an effect of incompleteness and dependence on the words, its free-rhythm which is less sensual and also dependent on the words; and its spiritual emotion.
2. The text has the rhythm of Hebrew verse and prose based on parallelism and the linkage of one phrase to another, with the use of antiphons and refrains. The Latin text has the rhythm of periodic structure. Notice also the "circular" arrangement of the parts of the *Canon* around the Consecration.

Spectacle:

We should consider the visual beauty both of the human participants and of the place and sacred articles:

1. *Actions*: The Church excludes actual *dancing* from her liturgy as too inclined to the frivolous or sensual, and she permits only men to take part in the action within the sanctuary for the same reason. Three points need to be considered especially:
 - a. The *processions* which express the desire of men to come to God and to bring him as King into the world. The *Introit*, the *Gradual* leading up to the *Gospel*, the *Offertory*, the *Communion*, and the *Last Gospel* at a Solemn Mass each involve a procession. What is the significance of each?
 - b. The *ministering*. In a Solemn Mass, and especially a Pontifical Mass, the celebrant carries out only the principal action. In everything else he is served by the ministers. The purpose of this is to indicate that God makes use of his creatures in carrying out all his works, but he alone can bring them to ultimate success. Notice how this *etiquette* (Emily Post once advised attendance at Mass as a perfect lesson in good manners) is derived from the ritual of a court, in which the king is given honor in all things.
 - c. The *gestures*. Study the use of genuflections, bows, kisses (the kiss of peace, and the kissing of sacred objects), folded hands, the gesture of prayer with arms raised, the sign of the Cross used both as a blessing and as pointing out a sacred object which has been mentioned in word, the incensing, etc. Each of these is marked by humility, dignity, sobriety, and moderation, and by an air of vital joy and recollection.

By a study of these actions we come to see that the action of the Mass is portrayed visually by a wonderfully expressive *dance*, but a dance which is free of a fixed rhythm and all sensuality, just as the music is free of these elements.

2. *Sacred articles:*

a. The *vestments* combine a symbolism taken from the Old Testament (study the descriptions in Exodus, in the prayers for vesting, and in the rites of Ordination and Episcopal Consecration) with the styles of the late Roman Empire. Notice that when properly made they are free of all suggestions of effeminacy or vanity, but are dignified, rich, and noble. They signify the "internal garments of the heart" (see St. Gregory's *Pastoral Rule* for an explanation of their symbolism), that is, the various virtues of Christ which his representatives ought to share.

b. The *sacred vessels, the altar and its fittings, the processional cross*, etc. Each of these has a definite function which it must be made to serve properly. Each also ought to lend dignity, beauty, and symbolism to the action of which it is an instrument. For example, does the *chalice* suggest the Precious Blood of the sacrifice which it is intended to hold? Does the altar fittingly act as the place of sacrifice, the table of the heavenly banquet, and the symbol of Christ all in one?

c. The *church* represents the Church Militant, the Church triumphant (heaven), and the entire universe as the Kingdom of God. We need to study its various parts to see whether each performs its function and carries out its symbolism. Does the entrance suggest the holiness of the place? Does the body of the Church suggest the unity and participation of the faithful? Does the sanctuary suggest a Holy of Holies and the heavenly sanctuary? Is it properly arranged and of sufficient size for the liturgical action? Do the statues and paintings fittingly bring to mind the unseen presences of the saints and angels?

II. A TRAGIC DRAMA: SHAKESPEARE'S *MACBETH*

THE FORM

(Object of Imitation)

The Action: A noble warrior is tempted by the honors given him by his king to kill that king, usurp the throne, and maintain himself by further murders which finally provoke a rebellion and his own destruction.

Beginning: Macbeth, rewarded by King Duncan for his valor in battle, is tempted by ambition, the powers of hell, and his own wife to usurp the throne, and yields to the temptation. ACT I

Scene 1: The witches, the powers of hell, prepare to tempt Macbeth.

Scenes 2-4: Duncan, hearing of Macbeth's valor, sends to give him honors. Macbeth is tempted by the witches, and when news of the honors come, fulfilling the witches' prophecy, he yields to the temptation, and sees his opportunity when Duncan decides to visit him.

Scenes 5-7: Lady Macbeth receives the news, Duncan and Macbeth arrive, and Macbeth and his Lady prepare the plot. It is only at this point that we are sure that Macbeth has really given into the temptation and will carry through his crime.

Middle:

Episode I: The murder of Duncan. ACT II

Scene 1: Banquo tries to check Macbeth. Macbeth's vision of the dagger, a second warning, and foreshadowing of the madness that may follow his crime.

Scene 2: The murder carried out.

Scenes 3-4: Discovery of the murder, flight of Malcolm and Donalbain, Duncan's sons. Macbeth will succeed to the throne.

Episode II: The murder of Banquo. ACT III

Scene 1: Macbeth says goodbye to Banquo and then arranges his murder.

Scenes 2-4: The fear of Macbeth and Lady Macbeth, then the murder with the escape of Fleance (Banquo's son), and the banquet scene in which Macbeth betrays his guilt.

Scenes 5-6: The witches prepare for Macbeth's downfall and talk is going on in the court that Macduff is in England to prepare the return of the rightful heir.

It is in Scenes 2-4 that the climax, discovery, and reversal take place. Fleance's escape insures that Banquo's heirs will succeed to the throne, while Macbeth's betrayal of himself (discovery) at the banquet scene marks the beginning of his public downfall, since now the lords will not hesitate to rebel against him, seeing that he is losing his grip.

Episode III: Macbeth seals his own fate. ACT IV

Scene 1: Macbeth comes again to the witches who drive him to desperation by showing that Banquo's line will succeed and by giving him false assurances that he cannot be killed. Word comes that Macduff has fled, and Macbeth sends to kill Macduff's wife, a final act of cruelty that insures he will receive no mercy from the rebel lords.

Scenes 2-3: The murder of Lady Macduff and son is carried out, while in England Macduff gains the consent of Malcolm, the rightful heir, to head the rebellion, and to become a good king like St. Edward of England. The arrival of news of the murder of his wife and son clinches their resolution.

End: Macbeth, driven on by his illusion of invulnerability, deserted by all and his wife dead, in final impenitence and despair is killed by Macduff, and Malcolm the rightful heir regains the throne which will someday pass to Banquo's line.

Scenes 1-5: While the army of restoration is advancing on the castle with the ruse of carrying the branches of Birnam wood, Lady Macbeth goes mad and dies. Macbeth left alone is in the state of despair, yet relies on the witches' promise of victory, when word comes that the "wood is marching."

Scenes 6-8: Still relying on the last promise of invulnerability Macbeth enters the fight, then learns that Macduff was "not born of woman." He is killed off-stage, and his head brought in as the new king commemorates his victory by creating his generals new Earls of Scotland.

Catharsis: The difficulty of this plot was to make Macbeth seem sympathetic and therefore to make him arouse our *pity*, since he is to die unrepentant and completely guilty. Hence it is made very clear that his yielding to dreadful temptation was something very human, since this temptation is strengthened by the devil (the witches) and by the counsel of his wife. Thus we feel *pity* for a man so blinded, and *fear* when we see how the delusions of sin lead from one crime to another and finally to despair and damnation. Macbeth is not saved, and the serenity we feel at the end of the play comes from our relief to see that tyranny produces inevitable opposition and the rising of the forces of justice to restore order. Our sympathy for Macduff and Malcolm, who are made very human, assists in confirming this effect.

Macbeth is thus different than most tragedies in that it deals with a hero who is finally damned. It would be a mistake to think that his crime is *excused* by the force of temptation. In the play it is in no way excused, but merely made to appear something we might ourselves do without God's grace, that is, something pitiable and fearful.

Characters:

1. Macbeth is shown at the beginning as a noble warrior who would make a good king, who is naturally tempted when he finds himself rising in honor above the other lords. His flaw of ambition, however, blinds him, so as to make him the ready victim

of the delusive temptation from the witches, and the passionate rashness of his wife. On the other hand, his soliloquies show him a man who would ordinarily be very prudent and cautious in action, and his relations both with Banquo and Lady Macbeth show that ordinarily he would have been a man of tender friendship and love.

2. The other characters seem developed to reflect the various aspects of Macbeth's own character:

a. Banquo (prudent, cautious), and Duncan (noble, generous), who have admired Macbeth, show us the kind of man he appeared at his best, like them. St. Edward is referred to as showing the ideal of kingship.

b. The witches and Lady Macbeth show us the evil side of Macbeth's character. Lady Macbeth corresponds to his emotions or passions. She is a driving force at the beginning of the play, but then goes mad, and leaves him in cold despair, just as passion drives man to sin, then torments him by remorse, and finally leaves the sinner in emptiness. The witches are sin itself, which blinds the mind by vain promises which lead the sinner deeper and deeper into damnation.

c. The other characters represent the sanity of the social order. There is the interesting contrast between the high-spirited young Siward, and the hesitating, inexperienced Malcolm, who must become king. Macduff, Ross, and the other generals are presented as manly, human, sympathetic people.

d. The Porter and Old Man give a comic touch, which in this play, however, is kept to a minimum and used only to heighten the unrelieved terror. Lady Macduff and her son are also shown as light, innocent people who might have had their place in a comedy but who are here caught in dreadful tragedy.

Thought: In this play we find two lines of thought:

1. The terrible soliloquies of Macbeth, the promptings of his dreadful Lady, and the vile songs of the witches, all of which show the *sophistry* of temptation, the effort to find reasons for sin.

2. Thought on the duty of a good king (Duncan, Edward) and the spirit of liberty expressed by the lords. The chief thought running through the play turns on the majesty of good kingship and the terrible wickedness of tyranny.

If we consider the relations of Action, Character, and Thought in this play we see that the action is thoroughly probable, since it develops inevitably from Macbeth's initial blind decision to yield to the temptations of ambition. The outcome is inevitable because crime leads to crime, one blind delusion to another. That Macbeth does not repent is also probable, because his blindness is willful and his crimes

increasingly cold-blooded. It is also probable that Lady Macbeth, whose strength is only in emotion, not in real power of will, should in the long run be the first to fail. The revolt is also painted convincingly, since we see the various stages of hesitation, irresolution, and indignant determination by which it proceeds. Some would criticize the witches as mere machinery, but it seems very right that the blindness of sin should be dramatized by this ghastly and unsubstantial trickery. The tragedy gains in stature in that it is not the mere sin of an individual but a picture of *tyranny* and of the restoration of justice and the social order which is painted.

THE MATTER

(not analyzed in detail)

Words: The play can be especially studied for four elements:

1. The weird, insane jumble of the witches' songs.
2. The language of Macbeth and Lady Macbeth which is so tortured, brilliant, lurid, with its themes of the crown, blood, night, sleep, madness.
3. The martial language of the Lords with its military and political figures.
4. The beautiful language put in the mouths of the innocent characters, Duncan, Banquo, Lady Macduff and her boy, and the description of St. Edward.

Such a study will show the consistency of the atmosphere created by the first two types of language and the relief into which it is thrown by the other two.

Melody and Rhythm: Notice the crazy jingle of the witches' songs, the use of prose in the porter's scene and in the sleep-walking scene. Notice, too, the complex rhythm of Macbeth's early soliloquies expressive of his tortured state of mind, and the strange, dead monotony of despair in "Tomorrow and tomorrow and tomorrow, etc."

Spectacle: Everyone recognizes the wonderful stage-effectiveness of the witches' scenes, the dagger and banquet scene, and the sleep-walking scene. Harder to make effective is the final scene of battle, which must be presented so as to give the impression of clear daylight dawning after a nightmare.

Problems: Many problems can be raised about this play, for example:

1. Is it not, after all, the story of a bad man meeting a bad end, which Aristotle says is one of the worst of plots since it arouses no emotion but disgust?
2. Are not Acts IV and V weaker than the preceding acts?
3. Is not Act II, Scene 4 a clumsy transition? Why the Hecate scene (Act III, Scene 5)? Is not Act III, Scene 6 superfluous? Are

not the concluding battle scenes rather weak and confused? Why the passage about St. Edward of England?

The above analysis suggests how most of these problems might be answered.

III. A COMIC DRAMA: SHAKESPEARE'S *THE MERCHANT OF VENICE*

THE FORM (Object of Imitation)

Plot: A Christian merchant in order to assist his dearest friend in his courtship pledges his life to a usurer who secretly hates him so that the merchant seems compelled by misfortune to pay the forfeit, but is rescued through his friend's good fortune in love.

Subplots: The subplots have as their chief purpose to make clear the nature of the true love of the friend (Bassanio) and Portia, since it is to further this love that the merchant Antonio makes his sacrifice and through it that he is rescued. The subplots are:

1. Bassanio wins Portia in a trial required by her father's will by choosing the casket which symbolizes that true love is deeper than appearances.
2. Portia tests the love of Bassanio by giving him a ring and then getting him to give it up by a trick, but only in such a way that he shows he values nothing more than her love except virtue and honor, and hence that his love is true.
3. The wooing of Nerissa, Portia's maid, by Gratiano, Bassanio's companion, *parallels* their love and emphasizes its nobility by contrast.
4. Lorenzo steals away Jessica, the daughter of Antonio's enemy, along with her father's money, has her baptized a Christian, and marries her, obtaining the rest of the father's ill-gotten fortune. This parallels the theme of love overcoming evil; as Antonio by love gains all, his enemy by hate loses all.

The "comic relief" of the servant Launcelot Gobbo, who runs away from Shylock and assists Lorenzo, is a part of this subplot and serves the same purpose at a lower level. Shylock loses the fidelity, not only of his daughter, but even of his servants.

Stages of the Plot:

Beginning (ACT I):

The merchant of Venice, Antonio, put himself in the power of the usurer Shylock (who secretly hates him because he opposes usury) by borrowing money needed by his friend Bassanio to carry on his courtship of the noble lady Portia, on the agreement

to forfeit a pound of his own flesh if he does not pay at the appointed time, which payment depends on the return of his many ships.

Scene 1: The love of Antonio for Bassanio is shown by his willingness to obtain the money required by Bassanio to woo lady Portia.

Scene 2: Beginning of chief subplot, whose purpose is to show that the love between Bassanio and Portia is the truest sort, yet not as noble as Antonio's love. Portia loves Bassanio but by her father's will must give her hand to the suitor who is wise enough to pick the casket with the right motto; in other words he must be not only attractive but a man of true love.

Scene 3: Antonio makes the bargain of the pound of flesh with Shylock to obtain the money Bassanio needs to woo Portia. It is revealed to the audience that Shylock hates Antonio because of his *generosity*, while Antonio despises Shylock because of his *avarice*. We thus see that Antonio's love is one of perfect generosity, and that Shylock provides the contrast and test of this.

The bargain sets the main action in motion.

Middle:

Episode 1: The first episode in the action is the coming of news that *some* of Antonio's ships are lost, and his refusal to recall Bassanio, thus putting himself another step in danger. The rest of the act is occupied with the subplots. Acr II.

Scene 1: The Prince of Morocco arrives at Belmont to make his choice of the casket. The theme of mismating (a Moor of different race and religion) is emphasized.

Scenes 2-6: The two Gobbos, and the intentions of young Launcelot to run away because of Shylock's ill-treatment. Then the love of Lorenzo and Jessica, and the plot for the elopement, with Jessica taking her father's ill-gotten jewels. The elopement is carried out with the help of Gratiano (Bassanio's servant) and masquers, but the masque is stopped by Antonio, who announces that the wind has changed and it is time for Bassanio to leave for Belmont.

The purpose of these scenes is to put forward the daring young love of Lorenzo and Jessica. Here again is the theme of mismating (she is a Jewess and the daughter of the villain), but this time the ardor of young love overcomes evil. Thus suspense is created for Bassanio's choice of the casket; yet we are prepared by this parallel love story, where daring wins all.

Scene 7: The choice of the Prince of Morocco, who chooses the golden casket (symbol of outward worth) and receives a death's-head as reward.

Scene 8: The outcry of Shylock on discovering his daughter's elopement and the loss of his jewels. He runs to the Duke to complain and stop Bassanio, but it is too late. At this moment news arrives that some of Antonio's ships are lost, but Antonio refuses to recall Bassanio.

Scene 9: The Prince of Aragon comes to choose and takes the silver casket (symbol of self-love). He gets a fool's head. This scene is put shortly and directly without the preparation of the Prince of Morocco's scene, in order not to be repetitious, and also to quicken the pace.

At the end Nerissa announces the coming of Bassanio, and reveals her interest in Gratiano.

Episode II: Antonio's ships are lost but he gains the victory for Bassanio; Shylock in a fury of revenge. ACT III.

Scene 1: Antonio's ships are lost, and Shylock sees how to take his revenge. This is a *discovery*. It has no special probability, since the loss of the ships is not due to anything in the plot. Yet Shakespeare has rendered it more probable (1) by showing that Shylock was willing to bet that they might be lost, (2) by giving the news in two stages, since in Act II, Scene 8, we have already heard of the storm.

Scene 2: Bassanio's choice of the leaden casket (symbol of true inner love and humility). He wins Portia. This scene of triumph follows immediately on the previous disaster and thus makes a dramatic contrast. Bassanio's happiness has been purchased by Antonio's sacrifice.

Rings are exchanged by the lovers and by Gratiano and Nerissa. Just then Lorenzo and Jessica (third pair of lovers) arrive with news of Antonio's disaster. Bassanio and Portia agree to marry at once, but postpone their married life until they have rescued Antonio. We thus see Antonio's love inspiring nobility and sacrifice in others.

Episode III: Antonio arrested, and the subplot united to main plot. ACT III.

Scene 3: Antonio taken to jail. He attempts to win mercy from Shylock, who refuses it. This scene shows Antonio come to understand Shylock's real purpose and jealousy, and his resignation to his fate.

Scene 4: The subplot now begins to join the mainplot, since Portia prepares to rescue Antonio.

Scene 5: "Comic relief," banter between Launcelot and Jessica, then love scene of Jessica and Lorenzo, with praise of Portia. This scene is not very effective, but its purpose obviously is to begin to reveal Portia in her role as rescuer, and to play up

the theme that she and Bassanio have delayed their love-making for Antonio's sake.

Episode IV: The Trial. In this we have the climax and *reversal*, since Shylock's villainy is turned on himself by Portia. In this the true grandeur of Antonio is shown, and also the nobility of the love which he has inspired in Bassanio, and the worth of Portia. ACT IV.

Scene 1: The trial. The theme of the trial is the nobility of mercy, generosity, and true love, in contrast to Shylock.

Scene 2: At the end of the trial, the giving of Portia's and Nerissa's rings by Bassanio and Gratiano to the same women in disguise. This links the intense action to the final act.

Conclusion: ACT V.

The beautiful moonlight love scene of Jessica and Lorenzo, awaiting the return of the others, indicates to us Bassanio and Portia's anticipation of their own union.

Portia and Nerissa return. Then comes Bassanio and Antonio with Gratiano. The quarrel over the rings. Antonio pledges himself once more for Bassanio, showing his love never changes. Word arrives that Antonio's ships have returned after all.

Catharsis: At the beginning Antonio is in a state of melancholy because as a man of noble soul he is weary of a world that values only what is material and false. The middle of the plot at first seems to show that he is a fool, since he puts himself in the power of the most avaricious and false of men to help Bassanio, a not too bright young man, risk a fortune on trying to win a capricious woman. But the conclusion shows that his love was very wise. Bassanio, through love, makes the right choice of the casket, and the woman he loves, Portia, turns out to be very wise herself and Antonio's rescuer. Hence at the end Antonio is freed from sorrow and rejoices in serenity at the pure love of his friends. The false values of Shylock and the Princes have been exposed, and even the ships return safe.

This is a true comic plot since there is an exposure of avarice, envy, and false standards of love (social values) without serious consequences to anyone. Even Shylock is better off in that he was prevented from committing a crime and ends a Christian. (The play takes for granted that his forced conversion would in the end prove genuine and permit a reconciliation with his daughter.)

Characters:

1. Antonio is a merchant, and such a character is not usually pictured as noble, since ordinarily he would be too occupied with money. But here this is used to show him by contrast as a man indifferent to the world's standards, and saddened by an inex-

plicable sorrow. It is only through the play that we begin to feel that he is melancholy. It is because he is disillusioned with the world, as is manifested by his world-weary wittiness. Yet in the last scenes he becomes serene and joyful as he sees that he has engendered a true love in Bassanio and Portia. In the end he is still witty, still a spectator of the world rather than a participant, but one who nevertheless is consoled that not all in the world is falsehood.

It is a puzzle of the play that Antonio, the central character, still is in the background. Many interpretations of the play, and many performances of it, treat him as a mere foil to Bassanio. This misses the subtlety of Shakespeare. It is hard to show a noble spirit without making him seem stuffy and unreal. Hence Antonio is revealed to us, not through himself, but through his friends who reflect his nobility.

2. Bassanio is the perfect young lover, and his relative lack of wit compared to his brilliant wife adds a comic note to his love. Yet he shows up very well by his humility in the choice of the casket, his determination to stand by Antonio, his sense of gratitude to the "lawyer." He shows us a man who is capable of great romantic love and yet who will not sacrifice his friendship, nor his duty of gratitude, to it.

3. Portia is a woman whose superior intelligence would make her capable of rivaling any man, and yet who for that reason well understands her role as a woman of modesty, an obedient wife, and a friend to her husband's friends; but she is not above playing a joke on her husband. Her warmth, her chastity, her wit, and her tenderness are beautifully blended.

4. Nerissa, Gratiano, Jessica, Lorenzo are spirited young people, generous, witty, with a good deal of the thoughtlessness and unconscious cruelty of the young. Their comparative shallowness throws into relief the richer characters of Portia and Bassanio.

5. The Prince of Morocco and the Prince of Aragon are properly ceremonious and pompous. At the other extreme, the two Gobbos by their crudity and silliness are foils to the elegance of the other characters and to the malicious cunning of Shylock.

6. Shylock is admitted by all to be a great portrait. He is not sentimentalized, nor justified by the author, as romantic critics supposed. He is truly eaten up by avarice, envy, and malice, but this wickedness is credible because we are shown its root in natural human feelings. Shylock is a genuine human being, but a bad one. Yet he is comic, not a tragic figure, because he is essentially a *dupe*, a man who cannot succeed in his wickedness because he is outwitted by two women, his own daughter and Portia. The scene in

which he bemoans the loss of his daughter and his money-bags is the perfect revelation and exposure of his true character. His function in the play is to be the very reverse of Antonio, and yet to be a plausible human being, not a stock villain.

Thought:

This is a *witty* play in which there is a constant exchange of pointed moral comments. The main themes turn around *fidelity* in love and friendship. The theme of the witty woman and the theme of the apparent conflict of mercy and justice are also aired. Shylock's famous speech (Act III, Scene 1, lines 44-60) is a fine example of rhetoric which is at the same time ironic in its dramatic setting, since Shylock himself is without mercy. It would be a mistake, however, to consider that this play deals with the problem of anti-Semitism as some modern writers seem to think.

MATTER

Diction:

The play sparkles throughout with brilliant descriptions and a witty eloquence. Special study should be given to the colorful talk of the merchants in the first act, the use of biblical phraseology by Shylock, the high-flown courtliness of the two suitor princes, the light banter of the women, the nobility of the trial scene in which the phrases of the New Testament are used against the Old Testament quotations of Shylock and in which the legal language is so cleverly employed, and finally the lyricism of the last act with its moonlight and music. The low language of the Gobbos seems like the earth from which all these flowery phrases grow. Noteworthy is the imagery of the ship with its cargo, and the theme of gold and jewels throughout the entire play. In contrast to this theme of gold are the themes of the "pound of flesh" and of the human heart, which are warm and living.

In studying the diction of each scene it is important to see how this use of several languages (language of business, language of law, language of wit, language of love, Shylock's language) is managed so as to bring out the conflict of the various elements in the plot.

Melody:

A study needs to be made of the use of prose for comic scenes (for example, Shylock's big speech in Act III). There is also a marked contrast between the lyric quality of the speeches in the last act, and the grand music of many of the speeches in the trial scene. This play is notable for its very lively and highly varied rhythms and sounds, from the loud outcries of Shylock to the dulcet music of the last act.

Spectacle:

The great feature of the play is, of course, the trial scene. Second to it is the repetition of the scene with caskets and the concluding night scene. The elopement of Jessica, combined with the masquers, and Shylock's frantic running about the stage, are visually very effective. Striking, too, is the contrast between the colorful quay of Venice, the solemnity of the Duke's court, and the peaceful elegance of the country estate at Belmont. Can you imagine the use of Venetian paintings by a scene designer for this play? Might the rapid alternations of the scene, in the third act, for example, be managed by multiple or revolving stages?

IV. AN EPIC: VERGIL'S AENEID**THE FORM**

(Object of imitation)

The Action:

When Troy is destroyed through the hatred of the goddess Juno, Aeneas, son of the king of the city and the goddess Venus, escapes by his mother's aid, and after enduring many hardships sent by Juno, including the sacrifice of his personal happiness, succeeds in reconciling the gods and founding a new Troy that will become imperial Rome.

This story is tragic, since it involves the greatest consequences, namely, the founding of an empire, and this is achieved only by the suffering of a hero who sacrifices all for the common good, *although he is not put to the test of ultimate failure*. The catharsis is through pity and fear, since we admire Aeneas as a great patriot who suffers for the common good, but we are also filled with fear to see how much the duty to our country requires us to sacrifice of personal happiness.

The parts of this action are as follows:

Beginning: The beginning of the plot is Aeneas' flight from Troy with his household goods and his son and father (symbols of his future destiny), but without his wife (symbol of personal happiness). This is related, however, by a flashback technique in Books II-III. **Middle:** The middle has two larger episodes, divided into many smaller ones. The larger episodes are the journey to Italy (Books I-VI) and the wars in Italy (Books VII-XII).*

A. The voyage to Italy, where the new Troy is to be founded.

Book I: Aeneas is shipwrecked on the shores of Carthage by

* Vergil thus cleverly combines the two themes of Homeric epic: the perilous voyage (*Odyssey*) in Books I-VI, and the fortunes of war (*Iliad*) in Books VII-XIII.

Juno and the god of the sea, but by the help of his mother Venus he regains his crew at the court of Dido, Queen of Carthage, who receives them graciously.

Book II: At a banquet given by the Queen, Aeneas relates the fall of Troy by the trick of the horse, his loss of his wife, and his flight.

Book III: He continues the account of his wanderings (the harpies, the temple of the sun, his meeting with his brother Hector's widow, Andromache, the passage of Scylla and Charybdis, the cave of the Cyclops, and the death of his father Anchises in Italy).

Book IV: The love-story of Aeneas and Dido. Summoned to his mission by the gods, Aeneas leaves, and Dido commits suicide.

These four books form, as it were, a single episode, whose theme is the effort of Juno to entangle Aeneas in the pursuit of his own personal romantic happiness. Carthage and its queen are for this epic a symbol of a merely personal happiness, based on love, riches, and pleasure, in contrast to the nobler ideal of Rome based on patriotism and glory.

Book V: The funeral games for Anchises in Sicily. While these are in progress, Juno inspires the Trojan women to burn the ships. Aeneas escapes with part of the fleet, but loses his steersman Palinurus.

Book VI: Aeneas descends into the Underworld to see the spirit of his father, and there learns the meaning of his mission, the future founding of the Roman Empire.

Book VI marks the climax of the epic, since here Aeneas realizes the meaning of his life. Book V serves as a transition to this climax, completing the previous themes. The burial of Anchises is the final end of Aeneas' duty to the past, and the attempt of the women is a last echo of the Dido episode. Palinurus' death terminates the story of the voyage.

B. The wars in Italy, the founding of the New Troy.

Book VII: Aeneas arrives in Latium and is engaged to Lavinia, daughter of the native king, intended by her mother Amata for the native prince Turnus. Juno inspires this outraged pair to foment a rebellion.

Book VIII: Aeneas, faced with the war, learns in a vision from the god of the river Tiber that Juno is the cause of his dis-

asters. He is advised to placate Juno and seek an alliance with Evander, King of Arcadia. Aeneas goes to the King who relates to him the history and mythology of the land, gives him an army and his own son Pallas, and advises another alliance with the Etruscans. The Etruscans have lately expelled the tyrant Mezentius, who has become an ally of Turnus.

Book IX: Turnus attacks the fleet of Aeneas, which is turned into a band of sea-nymphs by the goddess Cybele. Then occur the fierce battles of Turnus, the first exploits of Ascanius, son of Aeneas, and the sad episode of the friends, Nisus and Euryalus, who die for each other. Turnus is turned back.

These three books constitute a first great episode of the war in which Turnus is defeated, but not decisively. Aeneas' departure serves to heighten the tension and give the lesser warriors their chance, while Evander gives us a picture of the background and primitive times of the land where the new Troy is to rise.

Book X: Quarrel among the gods, but Jupiter resolves to let the battle go on. Aeneas is returning with an Etruscan fleet, and meets his own fleet turned into sea-nymphs. Turnus attempts to prevent the landing and kills Pallas, then is driven back. Aeneas kills Lausus, son of Mezentius, and then Mezentius himself.

Book XI: The funeral of Pallas and the grief of his father Evander. Envoys arrive from Diomed, King of the Argive settlement, with his refusal to assist the rebels. King Latinus is ready to surrender, but Turnus refuses and begins a new attack, sending the warrior maiden Camilla to hold off the troops. She performs great feats but is slain by Arrnus, who is then slain by Diana, protectress of Camilla.

End:

Book XII: Turnus wishes to fight Aeneas alone in spite of the protests of King Latinus and his queen. Juno sends Juturna, nymph of the streams, to assist Turnus, who is her brother. Aeneas and Latinus take an oath to make a treaty if Aeneas wins. Juturna in disguise provokes the Latins to break the truce to save Turnus. In the fighting Aeneas is hit by an arrow, but healed by an herb sent by Venus. Aeneas pursues Turnus, but is deceived by Juturna, so that he turns on the city to attack it. The Queen kills herself thinking Turnus is already dead. Turnus stops Juturna and demands the single combat with Aeneas. Jupiter on Olympus reconciles Juno to Aeneas'

triumph by promising that the new nation will be called Latin and not Trojan. Aeneas defeats Turnus, and, because of his cruelty to young Pallas, puts him to death.

These three books built up to the defeat of Turnus and the reconciliation of Juno. They are arranged to maintain suspense to the end, and Book XI in particular makes us accept the death of Turnus, by showing that in spite of his bravery he is cruel. The death of Camilla and the young men adds to the pathos of the war, since Aeneas sorrows at it all and would have prevented it if he could.

Characters

1. Aeneas is shown as the man of patriotism (piety), who does his duty to his father, to his nation, and to the gods. He is shown as superior to Paris (man of romance), Odysseus (man of adventure), or Achilles and Hector (men of war). He is the father of his people who suffers over them, and is strong both to endure and attack, but is above all a man of justice. Yet he himself suffers because of human weakness and personal attachments, first of love (Dido) and then of affection for his countrymen and allies (Pallas, and others).

2. The many subordinate characters are typical, rather than individual, and yet each is aptly characterized. Ascanius is the youth of promise who has to make good. Anchises, Latinus, and Evander are the wise old men. Dido and Amata are typical women of emotion. Turnus, the hero, and Pallas and Lausus are the young men of fiery courage, but rash rather than prudent. Camilla and Lavinia are two virgins contrasted to each other, one the "tom-boy," the other the retiring maiden. Vergil makes these types real by his power in depicting contrasted types and in showing the struggle of the passions. Thus in Dido we see the struggle between love and hatred of a woman scorned. In Turnus we see the struggle of courage and despair of one who knows he will fail, but cannot submit to failure. Aeneas is not shown as struggling, but rather as suffering with a firm resolve.

3. The gods and goddesses are depicted as grandly noble personifications of the forces of nature and fate that affect human life. Venus is not shown as favoring romance, but rather as the "higher love" who favors Aeneas because he is carrying out the law of progress which requires the creative work of fathering a new nation. Juno is depicted, on the other hand, as a conservative force attempting to defend the established order. When Aeneas succeeds and shows himself respectful of tradition and custom, she finally accepts him. Jupiter shows himself as the mediator and harmonizer of these two forces of progress and conservatism.

Thought:

Throughout the poem there are very many speeches of debate and deliberation, both among the gods and among men (for example, the discussions of whether to yield or continue the war in Book XI). The theme of most of these is the problem of man's submission to destiny. The necessity of leadership, of firmness of purpose, of the spirit of peace and reasonable compromise in order to construct a great nation are all discussed. There is not much of a highly philosophic character, but the thought of the poem is impressive by reason of its sense of the power of political prudence to dominate the raging sea of human passions. Book VI contains a kind of philosophic picture of the world and of human destiny. Vergil was an Epicurean by training, but his philosophy is a sort of pantheism which might just as well be Stoic, and the general tone of the poem is a defense of duty against personal pleasure or gain.

THE MATTER

(not analyzed in detail)

Words:

It is generally admitted that the style of Vergil in this poem is beyond praise (although the poem was never finally polished, and the poet wished it destroyed). Full advantage is taken of the power of Latin (as of Greek) to use a complex word-order to hold ideas suspended until clinched by a final operative word (periodic sentences). The style is highly varied and colored but kept very close to an even, moderate tone, and it rejects complex ornamentation. There is great economy in exposition so that each book has its special and novel interest in description and incident, so that each could stand alone. It is also generally admitted that Vergil is not equal to Homer in dramatic boldness, freshness, and power. However, he probably excels Homer in economy, variety, and clearness of structure. Vergil particularly excels in two elements: 1) description, particularly of landscapes, and of the effect of light; 2) in the pathetic, emotional quality which gives much of his poem the tone of pastoral elegy.

Rhythm and Melody:

Read the well-known tribute of Tennyson to Vergil. The dactylic hexameter is taken over from Greek epic poetry, and is used because it is rapid in movement, and permits a great variety of rhythm by substituted feet and variation in the pauses. Vergil does not have Homer's vigor in the use of this meter, but produces verses of great smoothness and grandeur that often take on a lyric quality. Where Homer is famous for his effects of great sound volume (the sound of the sea and the clamor of battle), Vergil is famous for his effects of moonlit silence and shadowy forests.

V. A COMIC NOVEL: JANE AUSTEN'S
PRIDE AND PREJUDICE

THE FORM
(Objection of imitation)

The Action:

A girl from a financially embarrassed family, although urged to a wealthy marriage by her scheming mother, refuses a wealthy gentleman because of his and her own pride, and because mistakenly she believes him dishonorable, until he proves himself humbled by love, and truly honorable and generous, and wins her apology and her hand.

This plot is of the comic variety because it turns on the failing of vanity and over-sensitive suspicion (pride and prejudice) which are without grave consequences. The chief characters are good, but not heroic, while the other characters are largely absurd in their vanities and pretensions. The catharsis comes through the gradual exposure of the incongruous attitudes, and ends in laughter and joy when true love is found underneath the illusions. The truth which is finally seen is that even noble characters misunderstand each other when they are infected by the vanities and prejudices of those less noble with whom they live.

Beginning: The beginning is the ball at which the Bennet girls make various impressions, while Elizabeth Bennet meets the eligible but haughty Mr. Darcy and overhears his slighting remark about her.

Middle: The chief episodes fall into three groups:

1. Episodes leading up to Darcy's first proposal and Elizabeth's rejection of him.
2. Episodes turning about the disgrace to the family that comes through Lydia's elopement, in which Darcy is proved honorable and generous, but Elizabeth is left stranded.
3. The attempt of Darcy's aunt to get Elizabeth to promise to refuse Darcy; her refusal, and the subsequent second proposal of Darcy.

End: The end is Elizabeth's and Darcy's final recognition of their mistakes and their true love for each other.

As sub-plots to this main action are:

1. The story of Collins and his unwanted proposal.
2. The story of Jane and Bingley.
3. The story of Lydia and Wickham.

These are united to the main plot because they, too, are an effect of Mrs. Bennet's effort to marry off her daughters, and they cause much of the complication in the main story.

Characters:

1. Mr. and Mrs. Bennet set the stage by the sharp opposition between her worldly foolishness and his world-weary wisdom. She judges everything superficially and by the most worldly standards. He is a man who despairs of changing the silly people he finds about him.
2. Elizabeth is the daughter of both. Like her father she has complete personal honesty of character and an ironic sense of humor, but this pure character is somewhat clouded by superficiality and vanity of judgment which have resulted from contact with her mother. Not that she judges as her mother does, but that she has become suspicious of others through seeing her mother's way of acting.
3. The other daughters provide the appropriate contrast to Elizabeth. Jane is simply good and innocent, while Lydia is very much like her own mother. Similarly, Elizabeth's friend Charlotte is a girl without proper self-respect and independence. Miss Bentley is a snob, abetted by Lady Charlotte and Mr. Collins.
4. Darcy is like Elizabeth in that he is truly honorable. He is capable of deep love but infected by the snobbery about him. Not indeed that he is a snob, but his reaction to snobbery is to be suspicious and reserved.
5. Darcy is supported by Bentley, who is simply good, and contrasted to Wickham the cad, Collins the snob, and old Mr. Bennet, who did not find the right wife.

Throughout, the characterization emphasizes the contrast between simple people unaffected by their situation, absurd, superficial people; and Darcy and Elizabeth, who are in the middle, honest but not simple enough to be free of the effects of their environment.

Thought:

The thought stays strictly on the level of a discussion of the social problems of money, marriage, and social position, without any wider implications. Elizabeth, Darcy, Mr. Bennet, and Miss Bingley are all notable for their sharp and witty exchanges. An interesting play is kept up by the contrast between their clear minds and incisive speech and the prejudices which affect them. The depth of the humor, however, is found in the way it is made clear that the best people have a great deal of difficulty in not being trapped by the "climate of opinion" which surrounds them.

THE MATTER**Words:**

A study of the style will show that it is characterized especially by its simplicity (very little elaborate description or ornamentation)

and by its constant but deft employment of irony. The author makes occasional comments on the situation, but they are very brief and dry. Everything that is sensational or exotic is avoided. Even the elopement is treated in an anticlimactic fashion, without moralizing. There is genuine pathos in Mr. Bennet and in the suffering of the two principal characters, but it is treated very quietly.

It is characteristic of the author's method that the action moves ahead chiefly by conversation, in which a considerable number of different characters engage and are played off against each other.

Melody and rhythm:

Austin uses a very pure prose style without poetic ornamentation, but she is very effective in reproducing the rhythm and inflection of conversational speech, and in setting it off against a background of social movement, all of which is suggested in the prose rhythms.

VI. A PASTORAL: *THE BOOK OF RUTH*

THE FORM

The Action:

A foreign woman and a widow, out of loyalty to her widowed mother-in-law who is a member of the Chosen People, returns with her to Bethlehem, and there by her obedience to the counsel of her mother-in-law obtains a rich husband Booz, and thus becomes a member of the Chosen People and ancestress of King David and the Messias.

This is a pastoral whose intention is comic in that it is intended to rebuke the vanity of people who had forgotten that the glory of the Jewish Kingdom rested on humble foundations of piety and virtue. This is, of course, a very quiet kind of comedy, whose effect is ironic and not boisterous. The catharsis ends in joy achieved through a share in the humiliation and anxiety of the two women, and even of Booz, the puzzled bridegroom. In the poem, however, there is something of epic grandeur, by reason of its relation to the Messias.

Beginning:

Chapter I: Fidelity of Ruth to her widowed mother-in-law.

1. The story of the Jewess Noemi, who was left a widow in the land of Moab, and how her sons married Moabite women and finally died.
2. Noemi decides to return to Bethlehem in her own land. One daughter-in-law, Orpha, says farewell, but the other, Ruth, returns with Noemi at the harvest time.

Middle:

First Episode: Chapter II: Ruth goes to reap the field of Noemi's relative, Booz, to help Noemi. Booz sees her and acknowledges

her as a relative, inviting her to reap, protecting her from the young men, and letting her partake of the harvest meal. She tells Noemi of his kindness.

Second Episode: Chapter III: Noemi gives Ruth advice as to how she is to conduct herself so as to attract Booz' attention and modestly indicate to him the possibility of their marriage. Booz treats her with courtesy, gives her barley, and sends her home to Noemi.

Third Episode: Chapter IV: Booz bargains with the nearest kinsman for the right to wed Noemi. This takes place in the presence of the elders who call down blessings on the pair.

End: End of Chapter IV: Booz marries Ruth. Noemi receives congratulations over the birth of her grandson Obed, and the genealogy of the House of David is given.

Characters:

1. Noemi is the type of the widow. We see her many sorrows, her bitterness and shame over her lot, her resolve to return to her people in spite of her shame at her misfortunes, and her dawning hope when she hears of Booz' interest in Ruth. Then we see her experience and prudence in bringing the matter to a successful and proper conclusion.

2. Ruth is contrasted to her sister Orpha. There is something mysterious in Ruth's wonderful fidelity to Noemi. Why did she love her so? Was it not because she recognized the superior virtue of Noemi, born of Noemi's faith in the true God, which made her superior to the women of Moab? Ruth shows her generosity also in her willingness to go to work to support both of them, without being asked. Before Booz she is modest; yet in her suit she shows both her courage and her chastity. Note that after her marriage nothing is said in detail of her, she is only praised as "better to thee (Booz) than seven sons" (4:15).

3. Booz is shown as a man of humanity and kindness. He is an older man, chaste and humble, but very just and resolved to fulfill all his duties to the law. "Thy later kindness has surpassed the former, because thou hast not followed young men, either rich or poor" (3:10) are his words to Ruth, and they show his humility about himself, and his deep joy in her love for him.

4. The kinsman (Chapter IV) is not characterized. The elders form a kind of chorus, and the women who congratulate Noemi another chorus.

Thought:

As always in Scripture, the thought expressed is supernatural and profound. We notice in Ruth's wonderful speech of fidelity that,

although she is still a pagan, there is alive in her a longing for better things. Admiring Noemi, she says, "and thy gods, shall be my gods," not realizing that she will be led by her fidelity to know the One True God. We also admire the justice and prudence of the two older people, Noemi and Booz. Finally, in the two choruses of elders and of women we hear of the justice and mercy of God, who does his work through the humble.

THE MATTER

(Means of imitation)

Words:

Even in translation the beautiful simplicity of the style with its flavor of antiquity is evident. Notice the use of genealogies as an opening and closing of the story. The speeches are couched in a kind of epic style, in which there is a use of the favorite Hebrew device of *parallelism*. Notice the play on the names of Noemi and Mara (1:20), and the blessings and curses (1:16; 2:12; 2:20; 3:10; 4:11; 4:14). Characteristic of the pastoral is the use of rustic details and the description of quaint customs; for example, the gleaning customs, the manner of eating the harvest meal, the sleeping in the fields, and the customs connected with marriage.

Rhythm and Melody:

We can appreciate the rapid movement of the prose, rising to a poetic prose in the speeches, and to actual poetry in the choruses. Notice the use of parallelism in rhythm throughout. Study the sound in the translation of Monsignor Knox. Notice also the effect given by the genealogies with their sonorous and mysterious names.

VII. A PARABLE: OUR LORD'S PARABLE OF THE TWO SONS (Lk. 15:11-32)

THE FORM

(Object of imitation)

The Action:

An elder son who has always seemed a model of virtue reveals his selfish motives when he is angered by his good father's rejoicing over the return of a prodigal younger brother.

This parable has been understood in different ways. Many think that the story concerns the prodigal son (hence it is often called *The Parable of the Prodigal Son*), others think it centers on the father. But the point of the whole story concerns the older brother, since if this is not the case, the ending of the story would be an anticlimax.

The story has a comic catharsis, because its aim is the exposure of the elder brother's vanity and pettiness. It is told with great wit,

which conceals the real point of the story until the last. We suppose that we are hearing a story with the simple, expected moral, "crime does not pay." Then when the story seems to have wound up, we have a surprise ending: it turns out that the real prodigal was the respectable brother who stayed at home. Since we have been identifying ourself with this self-righteous attitude, we feel ourselves suddenly exposed with him.

This work is **rhetorical** as applied to the sinner, for it does move us to repent. Nevertheless, the main point is the exposure of vanity. Hence the sermon ends in a catharsis and is rhetoric which closely approaches the manner of poetry.

Beginning: The young son departs with his inheritance, but the older brother stays (verses 11 and 12).

Middle:

1. The younger son squanders his money in riotous living and is reduced to want (13-16).
2. The younger son repents and decides to return home (17-20).
3. The younger son is met by his father and invited to a banquet (20-24).
4. The older son returns and angrily refuses to enter (25-28).
5. The older son rebukes his indulgent father (28-30).

End: The father by a word exposes the selfishness of the older son. (31-32).

The Characters:

1. The younger son is thoughtless in his first demands. The same thoughtlessness leads him into dissipation and utter destitution. His attitude is always materialistic but straightforward. Like a person with such an attitude he is completely sorry because of the consequences of his foolishness and resolves on abasing himself totally by offering to become his father's servant. The fact that he believes his father would accept such an offer shows how little he really appreciates his father's attitude. When he returns and finds his father forgiving, he confesses his sin, but does not offer to become a servant. We feel that he quickly forgot his troubles and joined gaily in the dancing and the good times, perhaps only a little wiser for his lesson.
2. The father is a marvelous picture of a wise old man. He lets the younger boy go, hiding his grief at the boy's ingratitude, understanding the youth has to learn the hard way. He longs for the boy's return, and when he sees him runs to kiss him without any reproach. He is especially anxious to hide the young man's shame (although, as we have seen, the young man's shame is not really so deep) by giving him the dignity of a robe, a ring, and a party.

No one ever need know the disgraceful tale. Nevertheless, the father is not merely fond and foolish, for when he is rebuked by the older son, he answers him with a marvelous and penetrating reply. Yet he ends on a note of rejoicing ("for thy brother was dead, and has come to life; he was lost, and is found") rather than of reproach.

3. The older brother is built up for us by contrast with the others. We know that he is everything the prodigal was not. Yet as he comes soberly in from the field where he has worked so patiently and hears the music and the dancing, he suddenly flies into a bitter rage and refuses even to see his brother. Then when his father comes to get him, he answers him with a very bitter speech, praising and justifying himself: "I have never transgressed one of thy commandments," and implying that he has worked for his father for *pay*. He calls his brother "thy son," and throws in the nasty detail, "who has devoured his means with harlots."

4. The servant and the friends merely fill in the picture and are not characterized.

Thought:

This is a parable which implies a deeper meaning. It refers to the Pharisees and all self-righteous persons who think themselves just and reject the Gentiles and sinners, while they themselves are even more guilty through their ingratitude and lack of love of God, since they serve him only for *material* benefits. This profound moral truth is brought out through the wit of the story, all summed up in the three speeches in which each man characterizes himself: the speech of the prodigal admitting his sin, the speech of the elder son justifying himself and condemning his brother and father, and the wonderful speech of the father exposing the self-righteousness of the older son. In a parable the details need not have meaning, but there can be little doubt that the "inheritance" symbolizes the heavenly inheritance of grace, the confession of the prodigal symbolizes the sacrament of penance, and the banquet the Holy Eucharist and heaven.

THE MATTER (Means of imitation)

Words:

The story is told with utmost economy and wit. Note the quickness of the beginning, and the delicate passing-over of the details of the "riotous living." A modern author would feel compelled to picture all this in a "realistic" fashion. Then notice the vivid and direct picture of the prodigal with the swine, and the telling detail, "And he longed to fill his belly with the pods that the swine were eating, but no one offered them to him." Note, too, the vividness of the contrast between

the swine-pen and his dream of his father's home, and then the reality of that home which is more perfect than the dream itself. There is drama in the fact that the older son becomes aware of the prodigal's return by the sound of music as he returns from work. The phrase, "The father came out and began to entreat him" is a powerful one, and the last speech of the father is marvelous in its complete simplicity and antithesis of ideas ("death" contrasted to "life").

Rhythm and Melody:

The parable has an oral style, effective in oral delivery. For this reason it uses the device of repetition (the repeated speech of the prodigal, first to himself, then to his father; then the speech of the father to the prodigal and its repetition by the servant to the elder son, and its quotation by the elder son back to his father; and finally the father's repetition of his own speech to the prodigal at the very end of the story. See 18 and 21; 23, 27, 30; 24 and 32). Also notice the constant use of parallelism and antithesis.

VIII. A SHORT STORY: JOSEPH CONRAD'S *THE LAGOON*

THE FORM (Object of imitation)

The Action:

A man is helped by his brother to elope, but in the flight the brother is wounded and the man leaves him to die in order to escape with his bride, who too eventually dies, leaving him with nothing but remorse.

This plot is told by a flashback device: A white traveler stops at nightfall at a native clearing on a jungle lagoon at a haunted house, where lives an exiled Malayan, Arsat, whose wife Diamelen is dying. During the night Arsat explains how he loved her, but could not win her from her jealous mistress, Inchi Midah, wife of a ruler, until he, with his brother's help, escaped. During the flight Arsat saw his brother fall wounded, but did not turn back to save him. Since then he has lived alone on the lagoon, feared by the natives and inwardly eaten with remorse. At dawn Diamelen dies, and Arsat decides to go back to his own land for an empty revenge. As the traveler departs by boat he sees Arsat gazing blindly at the new day.

The story seems tragic, dealing with a man of courage and great love who through his love sins against gratitude to his brother, but comes at last through the loss of his love to see the futility of sin. However, the story falls short of the tragic in that it is a purely personal story without social consequences. We feel pity at the intense suffering of this man because of remorse and death, and we

feel fear because it is implied that this story is typical of the strange tangle of human life.

The method of narrating the story (manner) is chosen to make the feeling of fear and anguish very intense, until the telling of the story and the final death of the woman is a relief from an unbearable strain. It is the catharsis of confession but not of absolution. It might be asked, however, whether there is not something pointless to it all, since it is not clear that this confession brings any ultimate peace. It would appear pointless if represented as tragic in the full sense, but its exotic setting, etc., make it a mysterious personal incident, the sad fate that befalls some individuals and which leaves us *pondering*.

The resolution, therefore, does not really come from the action, but from the satisfaction of our *curiosity*, our desire to understand and experience. It is thus more an **adventure story** than a tragedy, and its catharsis is not in the action, but rather in the traveler who hears the story. This explains why the author chose the form of a short story, and his peculiar method of narration which makes the action an incident or episode, rather than something complete in itself.

Beginning: The traveler arrives and finds the strange man and his dying wife.

Middle: The flashback explaining the action; the story told by Arsat:

1. Arsat's relations with the traveler, and with his own brother.
2. The wooing of Diamelen and the obstacles to their wedding.
3. The flight.
4. The death of his brother, and his remorse.

End: The death of the wife, Arsat's determination to return and seek revenge, and the traveler's departure.

The Characters:

1. The traveler is characterized only by his power as a silent observer, who is objective, touched by the events without being involved in them. The narrator seems to take the same point of view as the traveler.
2. Arsat is an exotic character who speaks a poetic kind of language. His motives are simple and primitive, and we feel that although he expresses himself well it is only with difficulty that he is able to reflect over his experience and formulate it. He is first characterized for us by the fear and dislike of the natives, who sense that he is a man with a secret. Then we see his strange calm at his wife's approaching death. Then at last he reveals himself. As the traveler leaves him at the end, we seem to see him receding from us and once more infolded in mystery.

3. Diamelen does not speak, and we know her only through her husband's description as a woman who responds completely to Arsat's love.

4. The brother of Arsat also is known to us only through Arsat's description, but he stands out very vividly in his desperate courage.

5. The natives form a kind of chorus in the background, not speaking but by their fear making vivid to us the idea that Arsat is a man marked by fate.

The Thought:

The story presents us with three interpretations of the same facts: (1) The interpretation of the natives who regard the man as accursed; (2) the interpretation of the white traveler who pities Arsat and sees him as man whose life has been wasted in delusions of romance, of remorse, and of revenge; (3) Arsat's own interpretation of himself as fated, yet guilty. Back of all seems to be the reflection of the narrator, who is pondering on the mystery of human destiny set against the background of the immense pattern of nature. The author senses the mystery of life and seeks to render this in his story, but without being able to give any key to it. In a larger work this would seem very inconclusive and unsatisfactory, but in a short story we are content with a less complete effect.

THE MATTER (Means of imitation)

Words:

In this story, elaborate, lyrical description is extensively used to produce a *mood*, a feeling of the immense, strange, and pitiless setting of nature in the midst of which human beings live their little lives. Word-painting is used to give us a vivid sense of evening, of the long night, and of the dawn. In contrast to this lyrical description is the narrative of Arsat, which is told in a primitive, but poetic language, that reminds us a little of the kind of narrative we find in a folk ballad. It is also evident that the *lagoon* takes on a symbolic meaning. It seems to stand for the remorse within the soul of Arsat, which is at first mysterious and whose meaning is gradually revealed to us. Study how the rich vocabulary and careful choice of adjectives and verbs helps to create these effects.

Melody and Rhythm:

The rhythm of the evening, night, and dawn, and of the coming and departure of the boat, forms a setting for the story. There is also a suggestion of the tense rhythm of the woman's fever and her husband's hidden anguish, bursting forth at last in the overflow of his confession. The prose rhythm, which is very strong, indicates this

tension and overflow. Notice too how sound-effects (onomatopoeia) are used in the description.

Spectacle:

If this story were made as a movie, the *setting* would play a very large role in its effect. The writer includes this setting in his narrative by use of extensive descriptive effects. We have explained the symbolism of this setting above.

IX. A SHORT STORY: KATHERINE MANSFIELD'S *MISS BRILL*

THE FORM

(Object of imitation)

The Action:

An old maid takes out her precious fox-fur to go for a walk, during which she watches the city life about her and feels herself an actress playing an important role in the drama until a couple of young lovers laugh at her fur and she returns to her lonely flat in tears to put it away.

In this story the action is reduced to a minimum and directed to the revelation of character. The story is comic in that it reveals character through the exposure of the spinster's absurd little pleasures and vanities, but it is a pathetic type of comedy ending in pity. Nevertheless, it does not end in mere pathos, since in exposing Miss Brill's absurdity we also come at the end to see her inner human dignity, which is deep and fine. Thus the *catharsis* is the removal of our own tendency to regard such people as absurd and grotesque, and results in a deeper insight into the real beauty of human character. In this way the sorrowful element is less deep than our new joy in human dignity.

It might be thought that the author is not altogether successful in achieving this positive resolution, and that we are left suspended in a mere sense of "Oh, the pity of it all!" Nevertheless, the effect intended is a very delicate one, and to many it will seem that she hit a very good balance. To be more emphatic about the positive aspect of Miss Brill might have been very heavy-handed. It seems better to let the reader draw his own conclusion.

Beginning: Miss Brill takes out the fur neck-piece.

Middle: She takes her walk and shares the life around her, until she overhears the young couple making fun of her.

End: She returns in tears and puts back the fur.

The Characters:

A single character is portrayed for us. The other characters are types, who merely provide the occasion for Miss Brill's thoughts. Even if the young couple had not laughed, no doubt her story would have ended the same way, since she could never sustain her gay mood of illusion.

Miss Brill is shown to us as a person who by nature had great capacity for sensitivity, for laughter, for human friendship, for beauty. Her reactions are all essentially *refined*, but all this has taken on a grotesqueness and absurdity from the emptiness of her life. We feel that she has not had the courage to enter into more real relations with people, because failure would have been so painful to her. We might question, however, whether the author has not somewhat *sentimentalized* this figure. Would not a Miss Brill in real life have some element of bitterness? Would it not be more evident that the emptiness of her life was also due to real defects of character, which were in her own power to correct? Has not the author "stacked the cards" in favor of Miss Brill by making it appear that her story is wholly pathetic?

The Thought:

The story is told us chiefly through the inner stream of consciousness of Miss Brill herself. She is not a woman who really thinks, but only one who imagines. Yet there is a certain element of thought in the passage in which Miss Brill thinks of herself as an *actress* playing a role. This is as close as she comes to trying to understand her own character. Is there not here an implication that, after all, the pathetic *bystander* actually sees more of the reality of life than the participants, who are so engaged in living that they cannot reflect on it or appreciate it?

THE MATTER
(Means of imitation)

Words:

The effect of the story depends on the mincing, finicky, delicate style in which the most minute things are noticed and mentioned. Typical are the description of the fur piece and the reports of the inane conversations which Miss Brill overhears. This style reflects the point of view of Miss Brill. We feel her delicate, sharply observant, nervous, exclamatory, shy personality in the choice of adjectives and the multiplication of details.

Melody and Rhythm:

The broken, frequently qualified sentences, the light touch of sound bears out the tone of the diction. For example: "Although it was so brilliantly fine—the blue sky powdered with gold and great

spots of light like white wine splashed over the Jardins Publiques—Miss Brill was glad that she had decided on her fur.” Notice how the word “decided” at the end of this sentence makes the whole sentence seem pathetically comic.

X. A LYRIC POEM:
PSALM 125

When the Lord brought back the captives of Sion,
we were like men dreaming.
Then our mouth was filled with laughter,
and our tongue with rejoicing.
Then they said among the nations,
“The Lord has done great things for them!”
The Lord has done great things for us;
we are glad indeed.
Restore our fortunes, O Lord,
like the torrents in the southern desert.
Those that sow in tears
shall reap rejoicing.
Although they go forth weeping,
carrying the seed to be sown,
They shall come back rejoicing,
carrying their sheaves.

THE FORM
(Object of imitation)

The Action:

The Jews returned from exile recall the joy they felt upon their return and in the midst of present hardships in building up the city pray that at last that joy will be renewed when their work is accomplished.

In a lyric poem the action is reduced to a movement of emotion. In this poem the emotion is one of hope and supplication, and it has a heroic (tragic) tone.

Beginning: The Jews recall their joy when they returned from exile (by implication they are now in difficulties), line 1.

Middle:

Stanza 1: How great was their joy at that time!

Stanza 2: Grant, O Lord, a return of that joy as the reward of present labors!

End: The Jews anticipate the joy at harvest (reward of labor), last two lines.

The Characters:

In a lyric poem, since the action is reduced to an emotional ex-

perience, what is chiefly revealed to us is the habitual character of the singer. In this poem we have depicted the ideal character of one who believes in God. In the *first stanza* we see the profound attachment of the Jews to their own land. This attachment is not only one of patriotism, but of religion. They know that God has a special providence over their nation (the symbol of the Catholic Church), and hence, when they returned to the Holy Land, they knew that it was the promises of God that were being fulfilled. In the *second stanza* we see that this religion is not something superficial, but that it has been tested by suffering and labor, and that it is firm in hope. Thus the character depicted to us is one in whom the virtues of patience and hope are very great.

The Thought:

In Sacred Scripture the thought is always profound and supernatural. The thought of this poem is twofold: (1) Great blessings come to us only from divine providence, which has favored the Jewish nation of old and the Church today above every other people and institution. It is noteworthy that Our Lady (who is a type of the Church) uses the last two lines of the first stanza in her own *Magnificat*. (2) God will give the reward to our labors, but we must suffer to obtain it. Thus the answer to the great philosophical problem of the reason for evil in the world is contained in this little poem.

THE MATTER (Means of imitation)

Words:

This poem has in translation (and in the original) a very simple diction, suitable to its brevity, and its direct, strong emotion. This is enriched, however, in several ways:

1. The use of *parallelism* and *antithesis* throughout the poem.
2. The use of grammatical variation. Notice that the first six lines are in the past tense, then the last couplet of the stanza shifts to the present. Notice the climactic effect of the quotation in the first stanza. In the second stanza the first two lines are in the second person, while the rest is again in the third. Finally, the last four lines are an expansion of the second couplet of the second stanza. In the Psalms this rather abrupt shift of person, mood, and the use of repetitions and expansions give life and variety.
3. The use of simile (second line of each stanza) and metaphor (the last six lines).

Rhythm and Melody:

The verse is based on *parallelism*. There are two stanzas, each with four parallel couplets. The other effects present in the Hebrew cannot be carried over into the translation.

XI. A LYRIC POEM: WILLIAM WORDS-
WORTH'S *THE SOLITARY REAPER*

Behold her, single in the field,
Yon solitary Highland Lass!
Reaping and singing by herself;
Stop here, or gently pass!
Alone she cuts and binds the grain,
And sings a melancholy strain;
O listen! for the Vale profound
Is overflowing with the sound.

No nightingale did ever chaunt
More welcome notes to weary bands
Of travellers in some shady haunt,
Among Arabian sands.
A voice so thrilling ne'er was heard
In springtime from the cuckoo-bird,
Breaking the silence of the seas
Among the farthest Hebrides.

Will no one tell me what she sings?—
Perhaps the plaintive numbers flow
For old, unhappy, far-off things,
And battles long ago.
Or is it some more humble lay,
Familiar matter of today?
Some natural sorrow, loss, or pain,
That has been, and may be again?

Whate'er the theme, the maiden sang
As if her song could have no ending;
I saw her singing at her work,
And o'er the sickle bending—
I listened, motionless and still;
And, as I mounted up the hill,
The music in my heart I bore
Long after it was heard no more.

THE FORM

(Objection of imitation)

The Action:

A traveler stops to listen to a Highland girl singing as she works in the harvest, and, musing on the meaning of her song, comes

to realize, as he rides away, that his own sorrow is only a part of the universal sorrow expressed in the songs of humanity.

In this poem we see a catharsis of our narrow personal sorrow which takes place by identification with the sorrows of other men and which ends in the contemplation of the dignity of all men. It belongs to the tragic rather than the comic view of life, since our pride in our own importance is replaced by the sense of the universal or cosmic order.

Beginning: *Stanza 1:* The traveler pauses and is aroused from his own thoughts to listen to the wonderful song of the peasant girl which seems to fill the whole valley.

Middle: The middle consists in the poet's reflection on the meaning of the girl's song.

Stanza 2: This homely song is more beautiful than the most exotic melody:

1. More beautiful than the song of the nightingale in an oasis in the Arabian desert.
2. More beautiful than the song of the cuckoo in the isles of the Hebrides.

Stanza 3: What is the meaning of its words?

1. Are they a story of ancient times and heroic wars?
2. Or are they a story of common human problems?

End: *Stanza 4:* The girl continues working, while the traveler departs carrying the song in his heart.

Notice that the emotion in this poem advances by even steps.

Stanza 1: Traveler awakened from sorrow by a sudden beautiful sound.

Stanza 2: This sound arouses delightful imaginings.

Stanza 3: The images awaken a desire for understanding, which comes at the end of the stanza.

Stanza 4: This understanding is stored in the memory and reflected upon. (Wordsworth's famous "emotion recollected in tranquillity.") Thus there is a movement from the external senses to the imagination, and then to the depths of the intelligence.

The Characters:

In a lyric poem the action is reduced to a movement of emotion, which is of interest chiefly because it reveals the character ("personality") of the singer. The poet here is waking up to his own real self. At the beginning of the poem he is probably absorbed in narrow personal thoughts (this is implied without being actually stated, since he compares himself in the second stanza to someone weary of the desert or the ocean). Meeting the simple peasant girl, he gradually begins to become aware that between them there is a deep bond, the

bond of common humanity. As he departs he has come to realize his deeper inner self which is greater and nobler than he had supposed.

Thus the traveler is revealed to us as a man of sensitivity and sympathy who is, however, often dull and introverted until awakened by beauty to a realization of the deeper more universal things of life.

The peasant girl is not characterized for us except as a type of simplicity.

The Thought:

The thought of the poem is made explicit in Stanza 3, lines 5 to 8. It is the thesis so common in Wordsworth's writings that the deepest things of human life are not necessarily spectacular public actions but the common experiences of all men, which may be found in their clearest forms in the life of the common man.

This is the idea expressed by many writers of the Romantic period and emphasized by Rousseau and other philosophers of the democratic movements of the 18th and 19th centuries. Is it true or false? We may grant that it is true if stated in a moderate form (as in this poem), since it is indeed true that the common consent of mankind is a strong evidence of truth, but if taken in the exaggerated sense that "the people are always right," or that sentiment is better than disciplined reason, it is very false.

THE MATTER

(Means of imitation)

Words:

The diction of this poem is almost perfect and deserves close study. In general it is very simple and harmonizes with the mildness and intellectual serenity of the speaker. Many of the words are monosyllables and of Anglo-Saxon origin, and the last stanza is plainest of all.

Stanza 1: The apostrophes, "Behold her . . .," "Stop here, or gently pass," "O listen!" are intended to show that the poet has been suddenly brought to life by the beautiful sound; yet because they are rather rhetorical, they give us the impression that the poet at first is merely admiring the view and the music, and is not yet deeply affected. In this stanza there are two dominant notes:

1) The notion of *solitude* indicated by "single in the field," "solitary Highland lass," "Reaping and singing by herself," "Alone she cuts and binds the grain." From the visual impression of the girl in the field, we are led to an impression of her movement, then of her song, and finally its echo. Thus the impression sinks into the poet's soul. At first it is distant, then it is closer, and finally it pervades and engulfs him.

2) The second note is that of *melancholy*. This word is the richest and most unusual word in the stanza, and with it we feel that the poet is becoming emotionally involved and is no longer merely a spectator. The melancholy tone of the music strikes some sympathetic chord in his own heart. In keeping with the simplicity of the style, very few adjectives are used (*single, solitary, melancholy, profound*) and these convey the central notions. Much of the picture is given by verbs and participles (*reaping, singing, cuts, binds, sings, overflowing*).

Stanza 2: In this stanza the words become more fanciful and unusual because the imagination of the traveler is now aroused. Again two pictures are presented:

1) The nightingale is heard in Arabia by a caravan coming in from the desert. Here for the first time we get a reference to the traveler himself who is metaphorically compared to such parched desert wayfarers. We guess that the traveler himself is physically weary and spiritually parched with thirst, and that the music suddenly awakens and refreshes him. The words "chaunt" and "Arabian sands" are exotic, distant. The adjectives "welcome," "weary," "shade" are very simple, but adequate to the picture intended.

2) The cuckoo-bird sings to sea-weary travelers (only implicit) who have passed over silent seas to the remote islands of the north. Here the picture is only hinted at, and the emphasis is put on the "thrilling" voice in the silence. The cuckoo is not as romantic as the nightingale, but much more homelike, and we have the sense at once of a deep, springtime freshness, and of the intimacy of the experience. Thus the poet has contrasted for us the extreme south and the extreme north, but the latter is closer to home. The "silence of the seas" is an unusual combination of images, since ordinarily we think of the seas as noisy. It pictures to us at once a calm, northern sea, perhaps in the morning twilight, close to shore, with the cuckoo's voice coming across the water.

Stanza 3: This stanza is more prosaic, indicating that the poet is now trying to formulate and rationalize his feelings. The song is in Gaelic or a dialectic, and the poet (asking himself a rhetorical question) wishes for a translator. He can only guess the meaning for himself. Again there are two distinct ideas:

1) He guesses at first that it is a folk song telling of some ancient historical tragedy or war, the "old, unhappy, far-off things and battles long ago." The vagueness of "things and battles" and the term "unhappy," which is somehow both restless and vague,

indicates the stirring of his memories which do not fully rise to the surface of consciousness.

2) Next he guesses at the idea of personal, domestic troubles which more closely touch the traveler. "Familiar matter of to-day" indicates how humdrum such things ordinarily appear, yet they are profound and universal as we see in the phrase, "That has been, and may be again." This last line of the stanza and the word "natural" in the previous line seem to be the very heart of the poem. They are very quiet, yet penetrating in tone.

Stanza 4: The last stanza suddenly shifts tense to the past, indicating that the action of the poem is reaching its end. The traveler sees the girl move away, becoming a symbol. Her song has "no ending" as she keeps working on, moving into the distance. The last half of the stanza brings the traveler into objective relief and we finally see that he is a traveler who must move on. He stands for a moment, then moves on, but as he goes he find himself changed. The music (i.e., the realization of the universality of human problems) remains in his heart. The words in the last two lines are the simplest of the poem (all monosyllables except *music* and *after*). The last line, "Long after it was heard no more," indicates very plainly the movement of the whole poem, namely, a passage from the mere hearing of a sound to a change of inner attitude of mind and the heart.

Rhythm and Melody:

We have noticed the symmetry of the four stanzas: a beginning, a middle of two episodes, and a conclusion. The first three stanzas form an ascending movement (sensation, imagination, reflection), and the last is a summary balanced against the other three and contrasted to them by its tense. In each stanza there are two quatrains, each of which has its own unity:

1. Sight of lass (solitude).
2. Sound of song (melancholy).
3. Metaphor of the nightingale.
4. Metaphor of the cuckoo.
5. Is it a song of history?
6. Or a song of personal life?
7. She goes on working and singing.
8. I go away changed.

This parallelism is so exact that it gives the poem a classic balance and strength which sustains its delicate mood.

The rhyme scheme is a b a b c c d d, except that in the first and last stanzas the a lines do not rhyme, although they have the very imperfect rhymes *field - self*, and *sang - work*. This imperfection is

hardly a fault, since it mutes the rhyme which might seem too assertive and does not jar us (frequently in quatrains only two lines rhyme). The use of two couplets (c c d d) in the second half of each stanza helps make a more intense ending, and in each case the emotional tension of the words is also greater. The lines are *iambic tetrameter*, which is appropriate because it is the most ordinary rhythm, often used in folk-songs. It is varied by frequent trochaic movements (*reaping, breaking, etc.*). There are frequent breaks in the lines: "Behold her/single in the field," "Stop here/or gently pass," "O listen/ for the vale profound." These seem to indicate the pausing motion of the traveler. In the second stanza each half is grammatically and rhythmically very smooth. The fourth stanza has a rather prosaic, but gentle rhythm. In the last stanza there is a marked antithetical effect, couplet by couplet, which indicates the contrast and separation between singer and traveler who now part.

Throughout the poem there is a very smooth, gentle, melancholy melody. In the first stanza this is indicated by the onomatopoeia of "A melancholy strain," "Oh listen! for the vale profound/Is overflowing with the sound." The last stanza in its last part is filled with *m* sounds which give it a muted, quiet effect. Throughout the poem there is a great use of *l, m, n* sounds which contribute to its smooth flow.

Some additional remarks:

Our interpretation of this poem is confirmed by the fact that Dorothy Wordsworth, the poet's sister, tells us that the poem was "suggested to William by a beautiful sentence in Thomas Wilkinson's *Tour in Scotland*." This sentence contained the thought found in the last two lines of the poem. We thus see that the poet began with this "formative idea" of the change wrought in our attitude by listening to folk-songs and from this his poem took shape, using the Scottish setting.

A number of objections may be raised to this poem. For example: 1. There is an admixture of the 18th century rhetorical style. Notice "Behold," "Yon," "Stop here or gently pass!", "O listen!", "melancholy strain," "vale profound," "chaunt," "Will not someone tell me what she sings?", "plaintive numbers," "humble lay," "What'er the theme." Are not these *clichés*?

Answer: It will be noticed that most of these expressions, except "melancholy" and "vale," appear in parts of the poem which are more reflective and hence properly somewhat more prosaic and conventional. "Chaunt" is appropriate precisely because it is archaic and fits the exotic imagery of the first part of the second stanza. The phrases "melancholy strain" and "vale profound" are justified by the magnificent sound effect which they give.

2. The last stanza is too obvious.

Answer: The poem is not intended to be intellectually intricate. Its subtlety comes, not from the ideas, but from the gradual movement from the exterior sensation to the interior change of attitude. This last stanza does not break the unity of the work, since it is still concrete and experiential. The traveler sees the girl move away, and as he departs is surprised to find the continuance of her song in his changed attitude. It will be especially noticed that the sound of these last lines with their o's are a wonderful echo of the sound given at the end of the first stanza.

3. The catharsis is incomplete, since we still do not understand why men must suffer.

Answer: It is true that this poem remains at a somewhat shallow level, typical of much romantic poetry. Nevertheless, its resolution is not a false one, since such experiences do give us a more universal outlook, and it is proportionate to the brevity and unpretentiousness of the poem.

Conclusion: We have here a very perfect lyric, especially notable for a well-maintained tone, for the way in which its sound sustains the meaning, and for its balance between sensation, imagination, feeling, and reflection. It is somewhat weak in *thought* content, and its emotion is very *passive*.

XII. A LYRIC POEM: HENRY VAUGHN'S *THE RETREAT*

Happy those early days, when I
Shined in my angel-infancy!
Before I understood this place
Appointed for my second race,
Or taught my soul to fancy aught
But a white, celestial thought;
When yet I had not walked above
A mile or two from my first love,
And looking back, at that short space,
Could see a glimpse of His bright face;
When on some gilded cloud or flower
My gazing soul would dwell an hour,
And in those weaker glories spy
Some shadows of eternity;
Before I taught my tongue to wound
My conscience with a sinful sound,
Or had the black art to dispense
A several sin to every sense,

But felt through this fleshy dress
Bright roots of everlastingness.

Oh, how I long to travel back,
And tread again that ancient track!
That I might once more reach that plain
Where first I left my glorious train,
From whence the enlightened spirit sees
That shady city of palm trees.
But, ah! my soul with too much stay
Is drunk, and staggers in the way.
Some men a forward motion love,
But I by backward steps would move,
And when this dust falls in the urn,
In that state I came, return.

THE FORM
(Object of imitation)

The Action:

Plot:

A man meditates on his childhood and is crushed by the thought of his fall from innocence until he realizes he can regain it by a Christian death.

Beginning: He suddenly recalls the innocence of his childhood (lines 1-14).

Middle:

Episode 1: He recalls his fall into sin (lines 15-20).

Episode 2: He now longs to return to innocence (lines 21-26).

Conclusion: Innocence can be regained by a Christian death (lines 27-32).

In this plot the *catharsis* moves from a *joy* recollected in sorrow, through *fear* to *hope*, and ends in a *resigned courage*. Thus the poem as a whole is sorrowful throughout, but the sorrow changes from the intense pain of the contrast between recollected joy and present misery, to patience (resigned courage). There is a resolution or catharsis, but of the imperfect sort found in sorrowful songs and poems. How can we say that this is an end to the poem, when it seems like a return to the beginning? It is an end in that it implies a firm determination of the will to return to innocence. This action belongs to the class of the tragic, but since this is a lyric the poet does not actually show us moral determination and decision but only an attitude which is habitual with him. In other words, a lyric rather emphasizes character (a habitual condition) than action in the full sense.

Character:

Since this is a lyric, character is emphasized. The person speaking is deeply spiritual, early awakened to the reality of spiritual things, but this spiritual clarity has become confused by the trials and failures of life. Yet his sins are not malicious since he continues to realize keenly his spiritual destiny. He is a person who feels himself different from others, a stranger in this world. Others look forward to worldly success. He feels himself to be one who is fortunate to regain what he has lost. He is of a temperament inclined to reflection, a character rather sensitive and timid, yet deep in his faith and firm in his ultimate determination. This is shown us through the intense contrast he feels between his ideal and the actuality of his own character; but it is not confused feeling, it is a feeling which is clear-headed and rational.

Thought:

This poem emphasizes thought rather than emotion. The thought is in the terms of Christian theology. The speaker sees himself in childhood as living in the state of grace through baptism, close to the angelic world, separated from the ways of this world, and with charity toward God. His faith then was enlightened by the gifts of the Holy Spirit so that he could almost see God, and could know his reflection in the beauties of nature. Then sin came to him first by the sins of the tongue (lying, uncharitable speech), then by a yielding to the sins of the five senses. Before his body had something of the purity of the glorified body; now it is wounded.

Thus in the first part of the poem he pictured baptismal innocence in clear terms. In the last part he sees the good life as a straight path through this world to heaven, which lies ahead like an oasis in the desert. He bewails his departure from this plain path. He can conceive his goal ahead only by recalling what he has left behind. Nevertheless, his faith makes him confident that he can regain innocence at death. The last stanza states very clearly the ambiguity of the state of the Christian who falters in his way, who is at once alive and dead, and who waits for death to become fully alive once more. It is not a mere pious platitude which he utters, but the real experience of a man struggling with himself.

Words:

The diction is very simple but achieves a certain richness by a few vivid and surprising touches that are borrowed from the imagery of the liturgy and the technical language of theology.

The first sentence sets the tone of the poem by an exclamation which is like a sigh. "Shined in my angel-infancy" contains a paradoxical idea, since a child is not an angel. "Before I understood this place/Appointed for my second race": Here we have the idea that

the child is placed in a strange home which is unsuited to it, and which it views with surprise and alarm to find that it must run a new race on a new path, so different from the angelic paths which seem natural to it. The notion of the *path* is the basic image of the poem. "Or taught my soul to fancy aught/But a white celestial thought" indicates that the child was in a sense his own teacher, since he learned to sin only by his own free will. "White celestial thought" echoes the angel image, so that throughout the poem the notion of the shining soul caught on a dark path is maintained.

"While yet I had not walked above/A mile or two from my first love" the image of the path continues. Note the simplicity of diction in the following line: "And looking back at that short space/Could see a glimpse of His bright face." The child is pictured as walking away from its father, making its first steps, but turning back to the father for encouragement. Note the mysterious quality of the description of God only as a "bright face." "When on some gilded cloud or flower/My gazing soul would dwell an hour, /And in those weaker glories spy, /Some shadows of eternity." As the child continues in the path he stops to admire a flower, or a cloud in the distance. They are "gilded" because their beauty is not their own, but comes from the sun of God's face. This beauty is now only a shadow.

"Before I taught" recalls the third line, "Before I understood." Again the child teaches himself to sin by lying. The tongue "wounds the conscience with a sinful sound," because the tongue is sharp, lying, and uncharitable. "Sinful sound" suggests the amazement of the child to find himself telling a lie. He hears his own voice with amazement, he had never thought that he would be a liar. "Or had the black art to dispense/A several sin to every sense." "Black art" is diabolic magic, and indicates the strange perverse cleverness of deliberate sin. "Black" contrasts with the image of light and whiteness that has pervaded the first part of the poem. The words "dispense" and "several" indicate the deliberate character of sensuality. The notion of the sin of the five senses recalls the ritual of the sacrament of extreme unction, in which each sense is anointed to remove the sin committed through it. The final lines of the stanza. "But felt through this fleshy dress/Bright roots of everlastingness," very vividly indicate that the body was originally intended as the pilgrim garment underneath which was hidden the inner glory of baptismal innocence destined for eternity. The term "roots" indicates the idea of scholastic theology that the powers of the body, in this case the senses, are *rooted* in the essence of the soul. It also indicates the idea that grace is the "seed of glory," intended to grow up to the full fruition of eternal life.

The second part of the poem is marked by a new exclamation: "Oh, how I long to travel back/And tread again that ancient track." The track or path to heaven is ancient, not merely because he trod it in his own youth, but because it is the path to heaven which all the saints from Adam on have taken. "That I might once more reach that plain/Where first I left my glorious train, /From whence the enlightened spirit sees/The shady city of palm trees." The path passes through a plain, not through mountains, because it is the straight, low way of humility, and on it march the whole caravan of glorious beings who follow the light of spiritual faith to a shady city of palm trees, the place of rest and of victory. Undoubtedly we have here the familiar Old Testament and liturgical image of the Hebrews marching across the plain through the desert to the promised land and the Holy City. Notice the use of the image of light again, of shade as the symbol of rest, and of the fertile oasis city as a new garden of paradise which is like the final flowering of the roots spoken of previously.

The last part of the poem also has a sigh: "But ah! my soul with too much stay/Is drunk, and staggers in the way." This is perhaps the most intense and dramatic couplet of the poem, marking the beginning of the resolution. "Stay" indicates the weariness of the journey, like that of the Hebrews. The intoxication is the dizziness both of weariness and despair through which many stragglers drop out of the caravan and wander from the path. "Some men a forward motion love" is perhaps the strangest line of the poem. It is an abstract scholastic statement, the familiar philosophical principle that motion goes toward a term and that love sets this term. This line prefaces the intellectual paradox which is the conclusion of the poem, and its oddity and abstractness arouse our attention. "But I by backward steps would move,/And when this dust falls in the urn,/In that state I came, return." Notice the complexity of the motion indicated. There is a forward motion, a falling motion of the dust, and a returning motion of the soul set free from the body. The thought is suspended until the last word. To "go back" is ordinarily to fail, but the poet sees this as really a return to his goal, since he has fallen from the way. The dust of the body sifting into the urn is chosen as something utterly sterile and dark, in contrast to the images of growth and light.

Rhythm: The grammar of the poem makes it fall into the following symmetrical arrangement, each major part beginning with an exclamation:

- I. Happy my youthful innocence!
 - a. Before I understood this place. . . .
Or taught my soul to sin

- When I had not walked far. . . .
 When I could still see glimpses of light. . . .
- b. Before I taught my tongue to sin,
 Or had the black art. . . .
 - c. But still felt the bright root of everlastingness.
- II. Oh, how I long to return!
 Would that I might return to the path that leads to the city. . . .
- III. But I seem always to fail!
 a. I stagger in my forward motion.
 b. Unlike other men I would return.

The meter is iambic tetrameter, but with very frequent trochaic beginnings of lines (e.g., first two lines). The use of frequent spondees or heavy endings of lines ("second race," "fancy aught," "first love," "short space," "bright face," "sinful sound," "everlastingness," "Palm trees," etc.) makes the movement of the verse slow and sad in sound, an effect also increased by the constant use of lines loaded with words of one syllable ("When yet I had not walked above/A mile or two from my first love," or "That I might once more reach that plain"). Notice also the effective rhythm of "Is drunk, and staggers by the way," which seems to stagger, and the completeness of the closing line "In that state I came, return."

Melody: Throughout the sound is sombre, but with a contrast between high sounds ("But a white, celestial thought," etc.), symbolic of light, and the prevailing low tones. There is constant modulation of vowel sounds as in "When on some gilded cloud or flower/My gazing soul would dwell an hour,/And in those weaker glories see /Some shadows of eternity," where there is a wonderful variation between faint and deep tones. Notice, for example, the phrase "weaker glories" where the word "glories" is an organ-toned word, while "weaker" is very faint and lifeless. Notice also the hissing in "My conscience with a sinful sound" and ". . . to dispense a several sin to every sense." The use of rhyme throughout contributes both to the sombre and meditative rhythm, and to an emphasis on the thought. Notice how frequently the rhyme word contributes an important element to the thought.

Concluding remarks: This poem is remarkable as a parallel in theme to Wordsworth's famous *Ode on Intimations of Immortality from Recollections of Early Childhood*. If we compare the two we cannot help but be struck by the fact that Vaughn's poem expresses a much keener sense of anguish and shame, and a more telling union between thought and image, than does Wordsworth's. The idea of the marching motion and the surprising turn it is given at the end

unifies the entire poem. The emotion and thought expressed are complex and paradoxical, but reasonable.

Might we not say that there is something unhealthy in the poet's idea that Christian perfection is simply regressing to childhood innocence? Is it not pessimistic and Calvinist in tone? This is undoubtedly a poem in the style of **Mannerism**. Mannerism was an artistic transition movement which liked to picture ambiguous, uneasy effects, in which the catharsis seemed incomplete. Its purpose was to indicate the reality of the other life in contrast to the darkness and confusion of our world. The pictures of El Greco are wonderful examples of this tendency. Vaughn is entirely Christian in his concept that we must become like little children to enter the kingdom of heaven. In order to make us wake up to this too familiar truth, he states it in terms of a personal confession and in a paradoxical style.

**XIII. TWO DESCRIPTIVE POEMS:
JOHN MILTON'S *L'ALLEGRO* AND
*IL PENSEROSO***

**THE FORM
(Object of imitation)**

These two poems really form a single poem, since the second answers the first and shows the superiority of the life of contemplation to the life of pleasure. Hence they can best be analyzed together.

The Action:

In a descriptive poem, the action is reduced to a movement of emotion, as in any lyrical poem, and this emotion is primarily a revelation of character.

A young man delights in thinking of a life of innocent pleasure in the country and the city, then reflects on the higher delights of the life of contemplation in the enjoyment of nature, of reading, of meditation, and of prayer, and judges these as the greater.

Beginning (*L'Allegro*, lines 1-10): The young man dismisses Melancholy (his conception of the contemplative life) and calls upon Mirth.

Middle:

A. The description of the life of pleasure.

1. Invocation of the Goddess of Mirth, accompanied by Jollity, Jest, Sport, and Laughter.

2. Description of a day in the country from dawn to evening.
3. Description of a day and an evening in the city.

Apparent ending: The young man resolves to live always with mirth (last couplet of *L'Allegro*).

New Beginning: (*Il Penseroso*, lines 1-10): The young man now dismisses Mirth and calls on Melancholy.

Middle continued:

B. The Description of the life of contemplation.

1. Invocation to Melancholy, accompanied by Peace, Quiet, Fasting, Leisure, Contemplation, and Silence (lines 11-59).
2. Description of an evening stroll and reading to midnight.
3. Description of a rainy morning, a walk in the wood, a church or a hermitage.

True end: The young man resolves to choose the contemplative life.

The catharsis in this poem comes from the fact that the young man passes from a fear of melancholy at the beginning, and a delight only in more superficial pleasures, to a realization that what he feared can be a higher joy. Thus there is a reversal by which what first appeared sorrowful turns out to be joyful.

The Characters:

There is a single character who has two phases. He is a young man sensitive to all the variety of life and finding it hard to decide what he really wants. He imaginatively enters into both ways of life, and finds both good. The pleasure to which he is attracted is an honorable and temperate pleasure, not a dissipated one. Hence it is natural that a person of this noble temperament would be even more attractive by the higher pleasure of the contemplative life. The special beauty of this poem is the way in which it succeeds in showing two contrasting moods as both very good, although one is better than the other. The poem does not actually say that the character is a young man, but it is manifest from the fact that he is still deliberating on a choice of life. In a mature man such variation of mood would not be appropriate.

In order, however, to make the description more concrete, the device of personification is used. Thus Mirth is pictured as a beautiful young goddess (see the famous picture of Botticelli called *The Allegory of Spring*) accompanied by a gay crew of gods and nymphs, but then dismissed in the second part as a fantastic dream. Melancholy is pictured as a hideous, dark-clad figure with snaky locks accompanied by a raven, but then is transformed in the second poem into a virgin goddess like a Nun, walking with her quiet companions, but preceded by Contemplation who is a winged Cherub that guides

a fiery-chariot by which she (Melancholy) may return to heaven and become Joy.

The Thought:

The poem has little of thought. Since the young speaker has only an imaginative insight into the two lives he depicts, he does not have any real intellectual understanding of their significance, which would be inappropriate to his age. Nevertheless, it is the work of a young man of keen intelligence occupied at the moment with observing the English country and town life about him, and relating it to his studies of the Latin and Greek classics.

THE MATTER

(Means of imitation)

Words:

We have already mentioned the use of personification and of classical allusion. Note that in the first poem the characters are revealed to us through their laughter and their dancing motions, as a crew following their leader in a kind of bacchanal, while in the second poem we seem to see a solemn procession.

After these very formal openings to the poems, the succeeding descriptions are wonderfully fresh and real, although classical allusions and English folklore are mixed with observation to give it greater richness. It will be noted that Milton is rather sparing in the use of purely *visual* words, but uses many *sound* effects (the birds, the cock, the hounds and horn, the echoes, the whistling plowman, the singing milkmaid, the counting shepherd, the bells, the musical instruments, the stories, the flail, the wind, the hum of the city, the sound of revelry, the poetry of plays, etc.). Notice also the constant use of verbals (see lines 64 to 72 of the first poem, for example).

In the first work the general symbol of a lively dance moves through the entire poem in its two cycles and gives the impression of a rapidly shifting, colorful display. In the second poem the grave procession or quiet walk with frequent pauses is felt. In the first poem sunlight and torchlight are emphasized. In the second, moonlight and firelight. A detailed study will bring out a wonderful felicity in almost every word.

Rhythm:

We have already noted that the first poem has a dancing effect, the second the effect of a quiet stroll. The opening of each poem is in alternate trimeter and pentameter lines, which gives each a slow opening and then moves into the very smooth meter of the tetrameters of the rest of each poem. The basic meter is really *iambic* tetrameter, but in order to get a dancing effect in the first poem, Milton makes most of it *trochaic* by starting lines with an accented

syllable. Frequent feminine endings ("offended-descended") give lightness to the movement of both poems. The wonderful variety of meter in both poems is beyond praise. For example:

Or let my lamp, at midnight hour,
 Be seen in some high lonely tower
 Where I may oft outwatch the Bear
 With thrice-great Hermes, or unsphere
 The spirit of Plato, to unfold
 What worlds or what vast regions hold
 The immortal mind that hath forsook
 His mansion in this fleshly nook;
 And of those demons that are found
 In fire, air, flood, or underground,
 Whose power hath a true consent
 With planet or with element.

Notice how here "midnight hour" and "high lonely tower" give the heavy sense of loneliness and elevation. The run-on line, "or unsphere the spirit of Plato," gives an eerie quality by breaking the regular rhythm, while the subsequent three lines run together to give the impression of the soaring spirit. The line, "In fire, air, flood, or underground," is like a magical incantation.

Melody:

The fluidity of sound is wonderful and abounds in special effects (the description of Shakespeare's verse in the first poem, line 134, or of the organ, second poem, line 161 ff.). The use of rhyme is appropriate in poems which have a light, imaginative character, and used here with a mixture of masculine and feminine endings and run-on lines is not at all tedious.

For a fine study of the verse of these poems see Hilaire Belloc, *Milton* (Philadelphia: J. P. Lippencott, 1935) pp. 98 ff. Belloc feels that *Il Penseroso* does not quite sustain the level of the first poem, and contains some weak lines, for example, "Or if the air will not permit" (line 77).

XIV. A DIDACTIC POEM: POPE'S ESSAY ON CRITICISM

THE FORM
(Object of imitation)

The Action:

A poet ponders the relation of writing to criticism, conceding that a poem must meet critical standards, rejecting the unfairness of criticism, and yet submitting his own work to the judgment of any fair critic.

In a didactic poem the action is reduced to a movement of thought, as in a lyric it is reduced to a movement of emotion; yet in every poem, action, emotion (character), and thought must all be present. This poem is comic in character, since it satirizes the pretentious critic and the pretentious poet and exposes their absurdities. Hence its catharsis consists in movement from an apparent conflict between criticism and poetry, through an exposure of false criticism, to a reconciliation of criticism and poetry.

Beginning: The paradox of the poet and the critic; their apparent conflict (I, lines 1-8).

Middle:

- A. The true role of a critic (Part I, lines 9 ff.).
 1. Nature is the true standard of poetry.
 - a. A true critic is as rare as a great poet (9-18).
 - b. Yet taste is natural to men before they are spoiled (10-25).
 - c. Why so many wish to be critics (26-45).
 - d. We ought to know our own limits as critics (46-67).
 - e. But we must form our judgment by nature (68-87).
 - f. And improve it by a knowledge of the rules, which are nature methodized (88).
 2. The classics embody this standard, and are therefore our models.
 - a. The rules of ancient poetry (88-110).
 - b. We must study these models, especially Homer and Vergil (120-138).
 - c. Licenses from the rules (140-180).
 - d. Praise of the ancient poets (181-200).
- B. The obstacles to just criticism (Part II).
 1. Pride (201-214).
 2. Ignorance.
 - a. Little learning (215-232).
 - b. Judging by parts and not the whole (233-288).
 3. Prejudice.
 - a. Singling out one's pet interest (289-383).
 - b. Being too critical or too lavish in praise (384-393).
 - c. Partiality to some sect, ancient or modern (394-407).
 - d. Pure prejudice (408-423).
 - e. Singularity (424-429).
 - f. Inconstancy (430-451).
 - g. Party-spirit (452-455).
 4. Envy.
 - a. Envy (456-507).
 - b. Praise of good nature in a critic (508-525).
 - c. Severity is sometimes necessary (526-558).

- C. The ideal critic (Part III).
1. The qualities of an ideal critic.
 - a. Candor (559-566).
 - b. Modesty (567-571).
 - c. Good-breeding (572-577).
 - d. Sincerity and freedom of advice (578-599).
 2. Types of poets and critics.
 - a. The incorrigible poet (600-609).
 - b. The impertinent critic (610-628).
 - c. The good critic (629-644).
 3. A short history of great critics.
 - a. Aristotle (645-652).
 - b. Horace (653-664).
 - c. Dionysius (665-666).
 - d. Petronius (667-669).
 - e. Quintilian (670-674).
 - f. Longinus (675-680).
 - g. Decay and revival of criticism (681-692).
 - h. Erasmus (693-704).
 - i. Vida (705-713).
 - j. Boileau (714-724).
 - k. Lord Roscommon (725-728).
 - l. Walsh (729-733).

End: The poet's own attitude: He will listen to fair criticism and ignore what is unfair.

The Characters:

The poet reveals himself as sensitive, disturbed by conflict, zealous for his honor as a poet, but resolved to maintain his integrity in the face of unjust criticism by adherence to the rules of his art. He wishes above all to be an artist who is balanced.

In the poem he characterizes many types of good and bad poets and good and bad critics. The method of characterization is that of epigram, that is of brief witty statements that seize on some significant detail. These characterizations are often individual, but are intended to indicate types. See for example the Flattering Critic (416-423), the Hypercritic (610-629) or the Learned Critic (424-429).

Thought:

In a didactic poem the thought is the dominant object of imitation. The poet does not merely present us thought in the abstract, but as a concrete expression of the personal attitude of the character who speaks. The whole poem is like the witty remarks of a character in a play or novel, and is to be judged such as a speech would be judged, more as the clever presentation of a point of view, than as pure doctrine.

The ideas which the speaker presents are not original but are largely derived from Boileau's *L'Art Poétique* (1647), which in turn is based on the *Ars Poetica* of Horace (about 10 B.C.) and were commonplace in Pope's time. This theory of poetry is by no means equal to that of Aristotle, since it chiefly emphasizes style, rather than the imitation of action, as the principal element of poetry, and thus tends to confuse poetics and rhetoric. Although inadequate, it is sound as far as it goes, and Pope illustrates it very aptly from his own personal experience with critics. Throughout, however, we have the narrow-minded rationalism so common in the 18th century (notice the stock criticisms against the scholastic thought of the Middle Ages in lines 440-446, for example). The chief characteristic of this thought is that it is clear, reasonable, balanced, yet vigorous in its concrete human examples drawn from life, and in its brilliant wit.

THE MATTER

(Means of imitation)

Words:

In a poem of this type, elegance of expression is of fundamental importance. Pope strives to achieve a tone which is very urbane, well-bred, correct, witty, yet pungent with occasional touches of the colloquial and topical. The basic figure is **antithesis** (" 'Tis hard to say, if greater want of skill/
Appear in writing or in judging ill;/
But of the two, less dangerous is the offense/
To tire our patience, than mislead our sense"). With this goes the use of the **maxim** or "quotable quote" ("A little learning is a dangerous thing, etc."; "We think our fathers fools, so wise we grow,/
Our wiser sons, no doubt, will think us so"; "Be not the first by whom the new are tried,/
Nor yet the last to lay the old aside").

There is a frequent use of **personification** ("Nature," "Art", "The Church," "Faith," "False Eloquence," etc.), **collectives** ("The Ancients," "The Moderns"), and **apostrophes** to the various famous poets and the Muses. All this is conventional style, but serves the definite purpose of placing before us a series of *types*, each of which is characterized. The famous metaphor in which the pursuit of art is compared to mountain climbing (218-232) should be noted, but there are many felicitous metaphors throughout.

Pope has a remarkable ability to use this conventional diction in order to give subtle effects (as in lines 484-493), or to combine it smoothly with colloquial conversation (as in lines 279-283).

Rhythm:

The heroic rimed couplet is used by Pope because it makes possible a very smooth type of verse, in which the antithesis of ideas is clearly marked by the parallelism of the lines and the rhyme, and which at the same time permits great variety. It is in giving this

constant, shifting variety without destroying the smoothness and balance that Pope excels. Study, for example, the variety found in lines 68-78.

Melody:

The most remarkable example in this poem is, of course, the famous passage on style (lines 337-382) in which Pope himself gives examples of sound effects. Study also lines 626-642, or the highly "rhetorical" passage in lines 181-200, where he so successfully gets a volume of sound.

**XV. AN ESSAY: WILLIAM HAZLITT'S
ON GOING ON A JOURNEY**

**THE FORM
(Object of imitation)**

The Action:

The "essay" may be poetic, rhetorical, dialectical, or scientific. What is often called "the familiar essay" is frequently poetic. It resembles the didactic poem in that it emphasizes thought, and reduces the action to a certain emotional experience. It differs from dialectical or scientific writing in that it is intended to express the thought or attitude of a concrete personality who is revealed to us this way, and it differs from rhetoric in that its principal purpose is to amuse us.

A man expresses his pleasure in traveling alone where he can take in the view without explaining his reactions to anyone, enjoy living at an inn without immediate cares, and escape his ordinary point of view, but he prefers to have company when visiting ruins or ancient buildings, or when abroad, and does not wish to get too far from home.

Beginning: I like to journey alone, not with a companion.

Middle:

1. I can best take in the view without having to express my thoughts and feelings to others.
2. I even prefer to be alone when stopping at an inn, where I can eat, think, imagine, and read by myself.
3. When traveling, one's whole point of view toward things changes.
4. However, I would like companions when visiting ruins, or when abroad.

End: I do not wish my journeys to take me too far from home.

The Characters:

Somewhat in the manner of a lyric poem, the speaker reveals to us a definite personality (which, of course, is an artistic creation; it

need not be the true character of the writer). We see this speaker as a very lively, observant man, who makes little attempt to organize his thoughts systematically, but who would rather absorb as many impressions as possible. He is sociable, but he often finds that he cannot communicate his lively sympathies to others. He is incorrigibly English, devoted to the democratic ideal, and very much attached to home.

In the course of the essay he also paints other incidental characters for us, for example, his friends Coleridge and Lamb, and the guide at Blenheim castle. These serve only to illustrate and enliven his own impressions.

The Thought:

In this essay the thought is very light, and is principally psychological. Hazlitt is telling us about the psychological laws which require us to take in impressions from outside before we have any material to think about, and he shows us how being alone and in a strange place may greatly heighten our receptivity to our surroundings, but that if the place is too strange we are so upset that we are less observant.

THE MATTER

(Means of imitation)

Words:

We notice at once that Hazlitt's style is a very easy and lively one. His sentences are short and varied. In general the vocabulary is simple and direct, a very pure kind of English, but he enlivens it by many devices. Among these are his use of quotations (poetic and prose, and even in foreign languages), his allusions to books, places, events, characters which we need to recognize and which bring to mind a host of associations. He also makes use of vivid little descriptions, and he is constantly speaking of things in terms that display his personal emotional reaction to them. We are made to feel that he reacts to everything about him; nothing is merely stated in an objective fashion. Metaphor is also used with effect.

If studied carefully, this essay will indicate how a prose style can be colorful without becoming poetic.

Rhythm and Melody:

In prose it is necessary to avoid a rhythm that is too pronounced. Hazlitt attempts to keep his prose running along very rapidly, and constantly varies its pace. The student will easily discover some of the methods which he uses to achieve this, if he reads the essay aloud, trying to give it the informality and liveliness of good conversation.

SECTION V

Sample Analyses of Rhetorical Forms

I. A JUDICIAL SPEECH: PLATO'S *THE APOLOGY OF SOCRATES* *

Conclusion: *Follow my example and prefer virtue to life itself.*

Although Socrates is apparently pleading for acquittal, he does not expect to achieve this, and his real purpose is to exhort the Athenians to virtue. He believes that, although in the heat of mob-violence they will condemn him, later they will remember his words, and these words will have their effect. Consequently, he aims above all at leaving an indelible impression on their minds.

OUTLINE

Introduction (17-18):

1. He will plead his case very simply, since he was never on trial before.
2. He will take up the old charges first, because they have had the deepest influence on the jury.

Exposition of the case (narration):

Socrates does not make a separate exposition, because the charges against him have already been stated by other speakers. He merely repeats them in the course of giving arguments to refute them.

* It is not certain whether this great speech was accurately reported by Plato, or composed by him on the basis of the historical facts.

Argumentation or refutation of the charges (18-35):**A. Answer to the older charges, made by the poet Aristophanes (18-23).**

1. Socrates is charged with atheism because he has dabbled in science.

Answer: He denies that since his student days he has had any concern for questions in natural science.

2. He is charged with taking money for his teaching.

Answer:

- a. It is not wrong to take money if you can really sell wisdom.

- b. It was the sophists who made this claim, not Socrates, as he shows by the story of an encounter he had with a sophist.

3. It is charged that there must be some foundation for these old charges, or they would never have become so widespread.

Answer: Socrates tells the story of the answer of the oracle of Delphi, and of his own search for wisdom which has led him to be an annoyance to many people who claimed to be wise, and who consequently have slandered him.

B. Answer to new charges (made by Miletus and Anytus [24-35];

1. Direct refutation of the accusers (24-27):

- a. They charge he has corrupted youth.

Answer: Socrates cross-questions Miletus to show that he is not sincere in his claim to be a protector of youth.

- b. They charge he is an atheist and has introduced new gods.

Answer: Socrates again cross-questions Miletus and reduces him to contradicting himself.

2. Refutation by an explanation of his conduct (28-32):

- a. He has always pursued wisdom in preference to every other good:

- 1) Example of the heroes in poetry who preferred death to dishonor.

- 2) Example from Socrates' own army record.

- 3) Enthymeme: To fear death is to pretend to be wise; therefore I cannot fear death.

- 4) Maxim: God is to be obeyed rather than men.

- b. His mission is to correct the public.

- 1) If they kill him they will need another corrector, and they will get none so disinterested, as is proved by his poverty.

2) He has never meddled with political affairs. He proves this by the story of his *divine signs*, and by the story of his refusal to assist either the democratic or the oligarchical party in their political wrong doing.

3 Refutation by the witness of his long life (33-35):

- a. He has no regular disciples and has never charged for his teaching.
- b. He attracted people only by appealing to their curiosity through his questioning.
- c. He calls on the relatives of the youths he has influenced to say whether he has harmed them or protected them.

Conclusion (36-42):

1. He will never change his way of life, even at the risk of death.
2. He does not wish to offend the crowd, but he cannot plead for mercy:
 - a. Because an old man should not give a bad example.
 - b. Because he should not lead them to break their oaths to judge fairly and not for sentimental reasons.

After he has been condemned, he adds the following:

1. The decision was a close one, and not really significant.
2. Ironically he proposes as his sentence that he be given public honors.

After the death sentence has been passed, he concludes:

1. He is not responsible for his own condemnation, because he has done his duty in not asking for mercy, and they should have done theirs in waiting for an old man to die.
2. He prophesies that the judges will be condemned by posterity.
3. He consoles his friends by reflections on death and immortality.
4. He makes a last request: Correct my son, as I have corrected you.

ANALYSIS

I: What kind of speech? It is judicial since the speaker wishes the audience to pass judgement on a past action; yet its ultimate purpose is *political*, looking to the future.

II: The Arguments:

A. The character of the speaker:

1. In the *introduction* Socrates at once tries to establish his character with his audience.
 - a. He shows his *intelligence* by his ironic wit in pretending that the other speakers have almost convinced him of his own guilt.

b. He shows his *good moral character* by indicating that, although he is an old man, he was never before brought into court on any charge.

c. He shows his *good will* by saying that he is amazed that the other speakers had warned the jury that he was a clever speaker, since his real difficulty is that he is too plain-spoken, and that they will forgive him if he, an old man, continues this habit of plain speech with them.

2. Throughout the rest of the speech Socrates is chiefly concerned, not with obtaining an acquittal, but with convincing them of the fact that he has always acted for a public-spirited motive. He knows that because of their prejudices they may not accept this at once, but that it will sink in and convince them after his death.

B. The analysis of the audience:

Socrates seeks to appeal to the audience and thus:

1. *Render them of good will.* This is very difficult, since they have been prejudiced from youth by the plays of Aristophanes and by other gossip to believe him a sophist. He attempts to drag this unconscious prejudice out into the open, so that they will ask themselves whether it really has any solid basis.

2. *Render them attentive.* He promises to attack his opponents, and makes the jury anticipate an interesting clash of wits.

3. *Render them docile.* He does this by a clear ordering of the charges, and by his interesting explanation of the origin of things they have always heard, but whose foundation they had never known. By appealing to God he also makes them realize their responsibility to listen carefully.

C. The arguments:

It would take too long to analyze each of the arguments. The outline above shows how expertly Socrates makes use of all the methods of argumentation, enthymemes, maxims, examples, signs, etc. It will be seen that he aims at the following:

1. He drags out into broad daylight the old, half-conscious prejudices, and showing their flimsy foundation. This he does in the answer to old charges. (A in outline).

2. He strives to discredit his accusers by direct cross-questioning which reveals their insincerity and stupidity. (B 1).

3. He then explains his own conduct, using a whole series of arguments drawn from literature, history, and commonly accepted moral principles to show that his strange conduct is in accordance with the traditions of Athens. (B 2 a).

4. He then defends this conduct by the history of his mission. (B 2 b).

5. And he concludes by pointing to the history of his life, and calling on the audience to witness to it. (B 3).

Style: The style is of marvelous beauty in every respect. Notice especially the use of:

1. Irony and wit.
2. Stories, some of an allegorical character.
3. The famous metaphor of the gad-fly and the horse.
4. The impressive use of prayer and prophecy.
5. The cross-questioning, making use of dialectics.
6. The use of climax and anti-climax.

He even concludes (as Aristotle later advised) with an *asyndeton* or broken sentence, indicative of solemn emotion. "The hour of departure has arrived, and we go our ways—I to die, and you to live. Which is better, God only knows."

Arrangement: This is shown sufficiently by the outline. Especially noteworthy are the cleverness of the introduction and the very great beauty of the conclusion.

II. A POLITICAL SPEECH: ST. PAUL TO THE GALATIANS

This is, of course, an epistle on a spiritual topic, and nevertheless it is very similar to a political speech. In it St. Paul writes as he would have spoken to the Galatians if he had been present, and seeks to lead them to a definite course of action as a community.

Conclusion: *In the future put your faith in Christ and do not worry about the ceremonies of the Old Law.*

OUTLINE

Introduction:

1. Greetings (1:1-5).
2. Appeal to their attention (1:6-10).

Exposition (narration): Strangers have come in St. Paul's absence and greatly confused the new Christians of Galatia by saying that they must keep the ceremonies of the Jewish Law and that St. Paul was negligent in not requiring them to do this (1:11-2:21).

Argumentation:

- A. Doctrinal arguments:
 1. Justification is from faith in Christ and not from the Old Law.
 - a. Proved by the Galatians' own experience (3:1-6).
 - b. Proved by the example of Abraham (3:7-29).
 2. The Christian life is a life of freedom:
 - a. Proved from the nature of slavery and freedom (4:1-20).
 - b. Proved by the example of Ismael and Isaac (21-31).

B. Practical application:

1. General counsel: Do not depend on the ceremonies of the Law, but on the New Law of Charity (5:1-26).
2. Special counsels:
 - a. Fraternal correction (6:1-5).
 - b. Good works (6:6-10).

Conclusion: Follow me and glory only in the Cross of Christ (6:11-18).

ANALYSIS

I. What kind of speech? It is a *political* speech, since it aims at leading this community to a definite future action, namely, the rejection of Jewish ceremonies and the following of St. Paul's leadership and of his teaching on faith in Christ and the commandments of the New Law.

II. The Arguments:

A. The character of the speaker:

St. Paul in this epistle especially aims at showing his character by a very frank revelation of his feelings:

- a. He shows his *intelligence* (see especially 1:11-24) by showing that he was educated in the Jewish Law, but that his teaching comes from God and not from men, and is approved also by the authorities of the Church.
- b. He shows his *good moral character* by referring to his conversion (1:15), and his acceptance by the apostles (1:18 and 2:6-10), and his courage in rebuking even St. Peter (2:11-14).
- c. He shows his *good will* toward the Galatians by his whole tone of indignation and loving anxiety in chapters 1 and 2. What better proof that a man seeks our welfare than that he is so disturbed and broken-hearted to hear of our difficulties?

The whole narration of Chapter 2 is especially devoted to giving the history of St. Paul and showing what kind of man he was.

B. The analysis of the audience:

The occasion of the epistle was the news that his Galatian converts, mostly Gentiles, were being won over by certain "false brethren" to the doctrine that Gentile converts to Christianity had to keep the Jewish law as Christ and the apostles did. Acceptance of this doctrine would logically have led to the conclusion that faith in Christ and the redemption of the Cross were insufficient for salvation, and would have made the conversion of the Gentiles very difficult. These Judaizers had gone to Antioch (Acts 15:1 ff.) and there, it seems, had wrongly alleged that all the apostles taught their views, hence that St. Paul was no real apostle. Then some of them had come to Galatia and spread the same story.

Their chief argument was that the Law of Moses was everlasting, since Christ had said that he did not intend to destroy the Law but to fulfill it.

St. Paul realized that his audience were sincere people, only too anxious to do the right thing, but they were Gentiles and not yet very well instructed. His method is to make them ashamed that they have been taken in so easily, to arouse in them their rightful pride as Christians in their newly found liberty, and finally to appeal to their generous desire to live a new and perfect life.

Thus he seeks to destroy their fear and anxiety by infusing in them a righteous anger, and a healthy shame of their own timidity, and finally great confidence and hope.

C. The arguments:

The outline sufficiently shows the argumentation. Notice that he first speaks to them theoretically in terms of the Bible, but then hastens to make this very practical by translating doctrine into a way of life.

St. Paul argues both from the Galatians' own experience and from *examples* taken from the Bible. The last is appropriate because this proves his own mastery of the Jewish Law, and refutes the manner of arguing used by his opponents. He also makes use of *analogy*, in comparing civil slavery and freedom to spiritual slavery and freedom.

So impassioned is St. Paul's utterance that at first sight it may not appear very logical; but if analyzed section by section, it will be seen to be based very squarely on principles. St. Paul bases his argument on a *revealed principle* which the Galatians had learned at baptism, namely, that they had been saved by *Christ crucified*. However poorly instructed or ignorant they might be, this truth had been made very clear to them and they had accepted it. Hence St. Paul begins with this principle on which all agree (even his opponents), and argues by means of the following enthymeme, which is stated in various ways:

If justice is from the law, then Christ died in vain (2:21).

This is an abbreviated form of a hypothetical syllogism:

If justice is from the Law, then Christ died in vain.

But: Christ did not die in vain,

Therefore: justice is not from the Law (i.e., you need not keep the ceremonies of the Law).

The minor of this syllogism is the principle which all the Galatians had learned and accepted and which, therefore, St. Paul can implicitly assume.

D. Style:

St. Paul's style is not polished, but fiery, vehement, with one thought tumbling after another. This is appropriate, since it conveys his overwhelming sincerity. His hearers could not help but believe so earnest a man. At the same time he makes very clever and careful use of scriptural quotation and argument, and toward the end of the epistle he quiets down to simple but earnest practical advice, given in a much calmer style.

E. Arrangement:

This is shown by the outline. Note that here St. Paul gives an especially long exposition, because in this case he needs to make the background of the whole matter very clear. Note also that in a letter like this the introduction and conclusion are put in a conventional form common in letters.

III. A CEREMONIAL SPEECH: THOMAS JEFFERSON ON THE CHARACTER OF GEORGE WASHINGTON

The following is taken from a letter written by Jefferson to Walter Jones after Washington's death. It does not have the form of a full ceremonial speech, of course, but it well illustrates the tone of such a speech. Since the text follows, the student may supply his own outline.

I think I knew General Washington intimately and thoroughly; and were I called on to delineate his character, it should be in terms like these.

His mind was great and powerful, without being of the very first order; his penetration strong, though not so acute as that of a Newton, Bacon, or Locke; and as far as he saw, no judgment was ever sounder. It was slow in operation, being little aided by invention or imagination, but sure in conclusion. Hence the common remark of his officers, of the advantage he derived from councils of war, where hearing all suggestions, he selected whatever was best; and certainly no general ever planned his battles more judiciously. But if deranged during the course of the action, if any member of his plan was dislocated by sudden circumstances, he was slow in readjustment. The consequence was, that he often failed in the field, and rarely against an enemy in station as at Boston and York. He was incapable of fear, meeting personal dangers with the calmest unconcern. Perhaps the strongest feature in his character was prudence, never acting until every circumstance, every consideration, was maturely weighed; refraining if he saw a doubt, but, when once

decided, going through with his purpose, whatever obstacles opposed. His integrity was most pure, his justice the most inflexible I have ever known, no motives of interest or consanguinity, of friendship or hatred, being able to bias his decision. He was, indeed, in every sense of the words, a wise, a good, and a great man. His temper was naturally irritable and high toned; but reflection and resolution had obtained a firm and habitual ascendancy over it. If ever, however, it broke its bonds, he was most tremendous in his wrath. In his expenses he was honorable, but exact; liberal in contributions to whatever promised utility; but frowning and unyielding on all visionary projects, and all unworthy calls on his charity. His heart was not warm in its affections; but he exactly calculated every man's value, and gave him a solid esteem proportioned to it. His person, you know, was fine, his stature exactly what one would wish, his deportment easy, erect, and noble, the best horseman of his age, and the most graceful figure that could be seen on horseback. Although in the circle of his friends, where he might be unreserved with safety, he took a free share in conversation, his colloquial talents were not above mediocrity, possessing neither copiousness of ideas, nor fluency of words. In public, when called on for a sudden opinion, he was unready, short, and embarrassed. Yet he wrote readily, rather diffusely, in an easy and correct style. This he had acquired by conversation with the world, for his education was merely reading, writing, and common arithmetic, to which he added surveying at a later day. His time was employed in action chiefly, reading little, and that only in agriculture and English history. His correspondence became necessarily extensive, and, with journalizing his agricultural proceedings, occupied most of his leisure hours within doors. On the whole, his character was, in its mass, perfect, in nothing bad, in few points indifferent; and it may truly be said, that never did nature and fortune combine more perfectly to make a man great, and to place him in the same constellation with whatever worthies have merited from man an everlasting remembrance. For his was the singular destiny and merit, of leading the armies of his country successfully through an arduous war, for the establishment of its independence; of conducting its councils through the birth of a government, new in its forms and principles, until it had settled down into a quiet and orderly train; and of scrupulously obeying the laws through the whole of his career, civil and military, of which the history of the world furnishes no other example.

How, then, can it be perilous for you to take such a man on your shoulders? I am satisfied that the great body of republicans think of him as I do. We were, indeed, dissatisfied with him on his ratification of the British treaty. But this was short lived. We knew his honesty,

the wiles with which he was encompassed, and that age had already begun to relax the firmness of his purposes; and I am convinced he is more deeply seated in the love and gratitude of the republicans, than in the Pharisaical homage of the federal monarchists. For he was no monarchist from preferences of his judgment. The soundness of that gave him correct views of the rights of man, and his severe justice devoted him to them. He has often declared to me that he considered our new Constitution as an experiment on the practicability of republican government, and with what dose of liberty man could be trusted for his own good; that he was determined the experiment should have a fair trial, and would lose the last drop of his blood in support of it. And these declarations he repeated to me the oftener and more pointedly, because he knew my suspicions of Colonel Hamilton's views, and probably had heard from him the same declarations which I had, to wit, "that the British constitution, with its unequal representation, corruption, and other existing abuses, was the most perfect government on earth, and that a reformation of those abuses would make it impracticable government." I do believe that General Washington had not a firm confidence in the durability of our government. He was naturally distrustful of men, and inclined to gloomy apprehensions; and I was ever persuaded that a belief that we must at length end in something like a British constitution, had some weight in his adoption of the ceremonies of levees, birthdays, pompous meetings with Congress, and other forms of the same character, calculated to prepare us gradually for a change which he believed possible, and to let it come on with as little shock as might be to the public mind.

These are my opinions of General Washington, which I would vouch at the judgment seat of God, having been formed on acquaintance of thirty years. I served with him in the Virginia legislature from 1769 to the Revolutionary War, and again, a short time in Congress, until he left us to take command of the army. During the war and after it we corresponded occasionally, and in the four years of my continuance in the office of Secretary of State, our intercourse was daily, confidential, and cordial. After I retired from that office, great and malignant pains were taken by our federal monarchists, and not entirely without effect, to make him view me as a theorist, holding French principles of government, which would lead infallibly to licentiousness and anarchy. And to this he listened the more easily, from my known disapprobation of the British treaty. I never saw him afterwards, or these malignant insinuations should have been dissipated before his judgment, as mist before the sun. I felt on his death, with my countrymen, that 'verily a great man hath fallen this day in Israel.'

More time and recollection would enable me to add many other traits of his character but why add them to you who knew him well? And I cannot justify to myself a longer detention of your paper.

Vale, proprieque tuum, me esse tibi persuadeas.

ANALYSIS

Conclusion: *George Washington was a man of greatest integrity who would have remained Jefferson's friend if he had not been deceived by slanderers.*

I. What kind of rhetoric?

This letter was written when many eulogies of Washington were being made, and people were curious what Jefferson, who had once been close to Washington and then had become his chief political opponent, really thought of him. This was embarrassing, since Jefferson could not denounce a great man admired by all and recently dead, and on the other hand he could not praise the former leader of the other political party. It is therefore a letter similar to a ceremonial speech, but one given in awkward circumstances, demanding considerable tact. Jefferson undoubtedly knew that this letter might very well get into public print.

II. The arguments:

1. Character of the speaker:

Jefferson wishes to appear as one who knew Washington very well and has a right to speak about him (this shows Jefferson's *intelligence*); he also wishes to appear as one who is very fair and objective, able to appreciate the good qualities even of an opponent (this shows Jefferson's *good character*); and he wishes to show that he and the members of his party (called "Republican" but actually the first form of our present Democratic Party) were never opposed to Washington as an individual (this shows their *good will* to the public, i.e., they have only opposed Washington for the public good, and not for personal motives).

He achieves this by his tone of great moderation. He avoids everything that would be undignified or envious, although he makes occasional thrusts at his opponents (e.g., "I am convinced he is more deeply seated in the love and gratitude of the republicans, than in the Pharaical homage of the federal monarchists").

2. Analysis of the audience:

Jefferson knows very well that the public admires Washington's memory and would never endure any attack on it. On the other hand, he also knows that many of them fear a return to strong

one-man government. Hence he takes care to praise Washington, but to imply that he was too favorable to the Federalist Party and filled by the Federalists with pessimistic fears about democracy. By showing these two sides of Washington he hopes to leave the impression in the audience that Washington was a great man, but that his party is dangerous to popular liberties and is only using Washington's prestige to further this aim.

Jefferson realized that "the people" are always afraid that their liberties will be removed by some group of powerful men, and are easily made suspicious of such groups. He also knows that "the people" are likely to be hero-worshippers and hence to accept a party which had so great a leader as Washington.

3. The arguments:

This letter is almost wholly descriptive, but note the following:

1. First he gives a very balanced picture of Washington's great qualities, and his limitations. These limitations make the picture seem realistic and convincing. We are inclined to be sceptical of a eulogy which mentions only good points. His general point is that Washington was a man of very solid character, but somewhat limited in his intellectual capacity. (First paragraph).

2. He then shows that Washington had a rather tentative belief in the republican form of government. He wished to give it a fair trial, but he was really sceptical it would succeed.

3. He then explains that Washington became estranged from him both because of the gossip of the Federalists and because of lack of confidence in republican government.

The conclusion obviously is that Washington was a man of great character, but of very real limitations, which explain his failure to support Jefferson's party. Thus the letter consists in the use of two devices: **amplification** of Washington's moral character, **diminution** of his political judgment in supporting the Federalist Party.

III. Style:

This letter does not have all the polish of some of Jefferson's more famous writings. It shows, however, the carefully balanced and clear sentences common in the prose of the eighteenth and early nineteenth century. It conveys the impression of "good-sense" and moderation.

The student will notice that some of the words would seem strange today in Jefferson's usage. For example, "his colloquial talents," "pompous meetings," etc.

IV. Arrangement:

The arrangement is simple and orderly. Jefferson states his purpose and then devotes a paragraph to each of the three points of the argument given above, although these paragraphs seem somewhat long for present day style.

SECTION VI

Examples of Dialectical Forms

I. A DEBATE: SAMUEL ADAMS AND JOHN ADAMS ON REPUBLICAN GOVERNMENT

Samuel Adams (1722-1803) was one of the chief leaders of the American Revolution, and remained throughout his life a supporter of those who favored more democracy in government, allying himself with Jefferson's party. His second-cousin, John Adams (1735-1826), the second president of the United States, who had been with Jefferson on the committee which drew up the Declaration of Independence, was inclined to an aristocratic form of government, and was a leader of the Federalist Party which opposed that of Jefferson. The following are excerpts from the correspondence between these men in 1790.

This debate is quite rhetorical in tone, but it well illustrates how debates usually involve a dialectic concerning the definition of some key term. Both these men helped to found the American Republic, but they differ sharply as to what a "republic" is.

John Adams to Samuel Adams

. . . you agree that there are undoubtedly principles of political architecture; but, instead of particularizing any of them, you seem to place all your hopes in the universal, or at least more general,

prevalence of knowledge and benevolence. I think, with you, that knowledge and benevolence ought to be promoted as much as possible; but despairing of ever seeing them sufficiently general for the security of society, I am for seeking institutions which may supply in some degree the defect. If there were no ignorance, error, or vice, there would be neither principles nor systems of civil or political government.

I am very willing to agree with you in fancying that, in the greatest improvements in society, government will be in the republican form. It is a fixed principle with me that all good government is and must be republican. But, at the same time, your candor will agree with me, that there is not in lexicography a more fraudulent word. Whenever I use the word *republic* with approbation, I mean a government in which the people have collectively or by representation an essential share in the sovereignty. The republican forms of Poland and Venice are much worse, and those of Holland and Bern very little better, than the monarchical form in France before the late revolution. . . . Are we not, my friend, in danger of rendering the word *republican* unpopular in this country by an indiscreet, indeterminate, and equivocal use of it? . . . If in this country the word *republic* should be generally understood, as it is by some, to mean a form of government inconsistent with a mixture of three powers forming a mutual balance, we may depend upon it that such mischievous effects will be produced by the use of it as will compel the people of America to renounce, detest, and execrate it as the English do. With these explanations, restrictions and limitations, I agree with you in your love of republican governments, but in no other sense. . . .

. . . but, on the other hand, the nobles have been essential parties in the preservation of liberty whenever and wherever it has existed. In Europe they alone have preserved it against kings and people, wherever it has been preserved, or at least with very little assistance from the people. One hideous despotism, as horrid as that of Turkey, would have been the lot of every nation of Europe, if the nobles had not made stands. By nobles, I mean not peculiarly an hereditary nobility, or any particular modification, but the natural and actual aristocracy among mankind. The existence of this you will not deny. You and I have seen four noble families rise up in Boston,—the *Craftses*, *Gores*, *Daweses*, and *Austins*. These are as really a nobility in our town as the Howards, Somersets, Berties, etc., in England. Blind undistinguishing reproaches against the aristocratical part of mankind, a division which nature has made and we cannot abolish, are neither pious nor benevolent. They are as pernicious as they are false. They serve only to foment prejudice,

jealousy, envy, animosity, and malevolence. They serve no ends but those of sophistry, fraud, and the spirit of party. It would not be true, but it would not be more egregiously false, to say that the people have waged everlasting war against the rights of men.

"The love of liberty," you say, "is interwoven in the soul of man." So it is, according to La Fontaine, in that of a wolf; and I doubt whether it be much more rational, generous, or social in one than in the other, until in man it is enlightened by experience, reflection, education, and civil and political institutions, which are at first produced, and constantly supported and improved, by a few, that is, by the nobility. The wolf in the fable, who preferred running in the forest, lean and hungry, to the sleek, plump, and round sides of the dog, because he found the latter was sometimes restrained, had more love of liberty than most men. The numbers of men, in all ages, have preferred ease, slumber, and good cheer to liberty, when they have been in competition. We must not, then, depend alone upon the love of liberty in the soul of man for its preservation. Some political institutions must be prepared to assist this love against its enemies. Without these, the struggle will ever end only in a change of impostors. When the people who have no property feel the power in their own hands to determine all questions by a majority, they ever attack those who have property, till the injured men of property lose all patience, and recur to finesse, trick, and stratagem, to outwit those who have too much strength, because they have too many hands, to be resisted in any other way. Let us be impartial, then, and speak the whole truth. Till we do, we shall never discover all the true principles that are necessary. The multitude, therefore, as well as the nobles, must have a check. . . .

There are a few popular men in Massachusetts, my friend, who have, I fear, less honor, sincerity, and virtue than they ought to have. These, if they are not guarded against, may do another mischief. They may excite a party spirit and a mobbish spirit instead of the spirit of liberty, and produce another Wat Tyler's rebellion. They can do no more. But I really think their party language ought not to be countenanced nor their shibboleths pronounced. The miserable stuff that they utter about the *well born* is as despicable as themselves. The *eugeneis* of the Greeks, the *bien nées* of the French, the *gewellgebornen* [sic] of the Germans and Dutch, the *beloved families* of the Greeks, are but a few samples of national expressions of the same thing, for which every nation on earth has a similar expression. One would think that our scribblers were all the sons of redemptioners or transported convicts. They think, with Tarquin, "*in novo populo, ubi omnis repentina atque ex virtute nobilitas sit, futurum locum forti ac strenuo viro. . . .*"

Let us do justice to the people and to the nobles,—for nobles there are, as I have before proved, in Boston as well as in Madrid. But to do justice to both you must establish an arbitrator between them. . . .

JOHN ADAMS

Samuel Adams to John Adams

. . . a republic, you tell me, is a government in which “the people have an essential *share* in the sovereignty.” Is not the *whole* sovereignty, my friend, essentially in the people? Is not government designed for the welfare and happiness of all the people? And is it not the uncontrollable, essential right of the people to amend and alter or annul their Constitution and frame a new one, whenever they shall think it will better promote their own welfare and happiness to do it? That the sovereignty resides in the people, is a political doctrine which I have never heard an American politician seriously deny. The constitutions of the American States reserve to the people the exercise of the rights of sovereignty by the annual or biennial election of their governors, senators, and representatives, and by empowering their own representatives to impeach the greatest officers of the State before the senators, who are also chosen by themselves. *We the people*, is the style of the Federal Constitution: they adopted it; and, conformably to it, they delegate the exercise of the powers of government to particular persons, who, after short intervals, resign their powers to the people; and they will re-elect them, or appoint others, as they think fit.

The American Legislatures are nicely balanced. They consist of two branches, each having a check upon the determinations of the other. They sit in different chambers, and probably often reason differently in their respective chambers on the same question: if they disagree in their decisions, by a conference their reasons and arguments are mutually communicated to each other; candid explanations tend to bring them to agreement; and then, according to the Massachusetts Constitution, the matter is laid before the First Magistrate for his revision. He states objections, if he has any, with his reasons, and returns them to the legislators, who, by larger majorities, ultimately decide. Here is a mixture of three powers, founded in the nature of man, calculated to call forth the rational faculties, in the great points of legislation, into exertion, to cultivate mutual friendship and good humor, and, finally, to enable them to decide, not by the impulse of passion or party prejudice, but by the calm voice of reason, which is the voice of God. In this mixture you may see your “natural and actual aristocracy among mankind,” operating among the several powers in legislation, and producing

the most happy effects. But the son of an excellent man may never inherit the great qualities of his father; this is a common observation, and there are many instances of its truth. Should we not, therefore, conclude that hereditary nobility is a solecism in government? . . . Much safer is it, and much more does it tend to promote the welfare and happiness of society, to fill up the offices of government, after the mode prescribed in the American Constitutions, by frequent elections of the people. They may, indeed, be deceived in their choice; they sometimes are. But the evil is not incurable, the remedy is always near; they will feel their mistakes and correct them.

I am very willing to agree with you in thinking that improvements in knowledge and benevolence receive much assistance from the principles and systems of good government. But is it not as true that, without knowledge and benevolence, men would neither have been capable nor disposed to search for the principles or form the system? Should we not, my friend, bear a grateful remembrance of our pious and benevolent ancestors, who early laid plans of education, by which means wisdom, knowledge, and virtue have been generally diffused among the body of the people, and they have been enabled to form and establish a civil Constitution calculated for the preservation of their rights and liberties? This Constitution was evidently founded in the expectation of the further progress and *extraordinary* degrees of virtue. . . .

Among the numbers of men, my friend, are to be found not only those who have "preferred ease, slumber, and good cheer to liberty," but others who have eagerly sought after thrones and sceptres, hereditary shares in sovereignty, riches and splendor, titles, stars, garters, crosses, eagles, and many other childish playthings, at the expense of real nobility, without one thought or care for the liberty and happiness of the rest of mankind. . . .

But by "nobles," who have prevented "one hideous despotism as horrid as that of Turkey from falling to the lot of every nation of Europe," you mean, "not peculiarly an hereditary nobility, or any particular modification, but the natural and actual aristocracy among mankind," the existence of which I am not disposed to deny. Where is this aristocracy found? Among men of all ranks and conditions. The cottager may beget a wise son; the noble, a fool. The one is capable of great improvement; the other is not. Education is within the power of men and societies of men; wise and judicious modes of education, patronized and supported by communities, will draw together the sons of the rich and the poor, among whom it makes no distinction; it will cultivate the natural genius, elevate the soul, excite laudable emulation to excel in knowledge, piety, and benevolence; and finally it will reward its patrons and benefactors by

shedding its benign influence on the public mind. Education inures men to thinking and reflection, to reasoning and demonstration. It discovers to them the moral and religious duties they owe to God, their country, and to all mankind. Even savages might, by the means of education, be instructed to frame the best civil and political institutions with as much skill and ingenuity as they now shape their arrows. Education leads youth to "the study of human nature, society, and universal history," from whence they may "draw all the principles" of political architecture which ought to be regarded. All men are "interested in the truth"; education, by showing them "the end of all its consequences," would induce at least the greatest numbers to enlist on its side. The man of good understanding, who has been well educated, and improves these advantages as far as his circumstances will allow, in promoting the happiness of mankind, in my opinion, and I am inclined to think in yours, is indeed "well born." . . . Believe me, your sincere friend,

SAMUEL ADAMS

II. A DIALOGUE: ST. AUGUSTINE'S *THE HAPPY LIFE*

St. Augustine (354-430) was converted to the Catholic faith after a youth passed in heresy and sin. After his baptism by St. Ambrose, he entered into a retreat in the country. Making use of his literary gifts (for he was a teacher of rhetoric), he began the composition of several philosophical dialogues. These were modeled after the dialogues of Cicero, which in turn were imitations of the dialogues of Plato, themselves based on Socrates' method of teaching.

The purpose of these first writings of St. Augustine was to show that reason and philosophy lead man toward the true, supernatural faith, which had just been given him. One of these dialogues is the *De Beata Vita* (The Happy Life)* which is an inquiry about the causes of human happiness. It opens with a sort of dedication to his friend Manlius Theodorus on the importance of philosophy, and then proceeds in dialogue form as follows:

* Translated by Ludwig Schopp in *The Fathers of the Church*, ed. by Ludwig Schopp (Cima Publishing Co., Inc., 1948), with permission of the translator and publishers.

Continuation of CHAPTER 1

On the Ides of November fell my birthday. After breakfast light enough not to impede our powers of thinking, I asked all those of us who, not only that day but every day, were living together to have a congenial session in the bathing quarters, a quiet place fitting for the season. Assembled there—for without hesitation I present them to your kindness, though only by name—were first, our mother, to whose merit, in my opinion, I owe everything that I live; my brother Navigius; Trygetius and Licentius, fellow citizens and my pupils; Lastidianus and Rusticus, relatives of mine, whom I did not wish to be absent, though they are not trained even in grammar, since I believed their common sense was needed for the difficult matter I was undertaking. Also my son, Adeodatus, the youngest of all, was with us, who promises great success, unless my love deceive me. While all these were paying attention, I started in the following manner.

CHAPTER 2

“Is it clear to you that we are composed of soul and body?”

While all gave their assent, Navigius replied that he was not sure about it.

I asked him then: “Do you really know nothing at all, or is this matter just one of the things that you do not know?”

“I do not believe that I know nothing at all,” he answered.

“Can you mention one of the things you know?”

“Certainly,” he said.

“If it is not difficult,” I continued, “let us be told.” When he hesitated a little, I asked him: “Do you at least know that you are alive?”

“Yes,” he answered.

“You know, therefore, that you possess life, since no one can live without having life.”

“This also I know,” he said.

“Do you know also that you possess a body?”

He said: “Yes.”

“Then you know already that you consist of body and life?”

“This I know, but I am not certain whether I consist of something more.”

“You have no doubt, therefore,” I continued, “of the existence of these two, the body and the soul. But you are uncertain whether there is anything else necessary for the filling out and completing of man.”

“Quite right,” he said.

Then I said: "The character of this other element we will examine at another time, if we are able to do so. However, since we all now agree that man cannot exist without body and without soul, I ask all of you: For which of the two do we try to obtain food?"

"For the body," said Licentius.

But the others hesitated and in various ways discussed among themselves how food could appear necessary for the body, since it was obtained for the purpose of life, and life belongs only to the soul.

At this point I asked: "In your opinion, does not food appertain to the part that we see grow and become vigorous?"

All except Trygetius agreed. He said: "Why, then, have I not grown according to my greedy appetite?"

I answered: "All bodies have by nature received a measure that they cannot exceed, although these measures may decrease by lack of food, as we notice more easily in cattle, and nobody has any doubt that through lack of nutrition the bodies of all living things grow lean."

"To grow lean," said Licentius, "does not mean to become smaller."

"This is satisfactory for the purpose I have in mind," I said. "For the question is whether food appertains to the body. It does so appertain, because, if it is withheld, the body becomes lean."

All agreed to this.

"What about the soul?" I asked. "Is there no food proper to the soul? Or do you think that knowledge is its nutrition?"

"Obviously," said our mother. "I believe that the soul is not nourished except by the understanding and knowledge of things."

When Trygetius showed doubt about her statement, she asked: "Did not you yourself today demonstrate from what and where the soul finds its nourishment? For, according to your own statement, you noticed only after a certain part of the breakfast which bowl we were using, since you had been thinking of some other things I do not know, although you helped yourself from that course and ate it. Where, then, was your mind at the time when it did not pay attention to what you were eating? From there, believe me, and by such meals is the soul nourished, that is, by those speculations and thoughts by which it is able to gain knowledge."

When there was a buzz of questioning about this point, I asked: "Do you not concede that the souls of wise men are by far richer and greater, in their way, than the souls of the uneducated?"

"This is obvious," they replied.

"Then we state correctly that the souls of people not scientifically trained and unfamiliar with the liberal arts are, as it were, hungry and famished."

"I believe," said Trygetius, "that their souls also are full, but full of faults and worthlessness."

"There exists, believe me," I said, "a certain real sterility and hunger of the soul. For, as the body when its nutrition is withheld is generally ill and scabious, bodily faults that indicate hunger, so are souls filled with ills through which they betray their impoverishment. Thus, according to the ancients the very word *nequitia* (worthlessness)—the mother of all vices—springs from *nequicquam*, that is, from that which is a nothing. The virtue which is opposite to this vice is called *frugalitas* (frugality), for, as this latter is called after the word *frux* (fruit), i.e., after *fructus* (enjoyment), because of a certain fecundity of the souls, so is *nequitia* (worthlessness) named after this sterility, i.e., after *nihil* (the nothing); *nihil* (nothing) is all that flows, that is dissolved, that melts and steadily perishes (*perit*). Because of this, we consider such men lost (*perditi*).

"But a thing really has being when it remains, stands firmly, and is always the same, as in the case with virtue. The greater and most beautiful part of this is called *temperantia* (restraint) and *frugalitas* (frugality).

"Although this may be too obscure for your understanding at present, you certainly will concede, when the souls of the uneducated are filled, that there are likewise, as for bodies, two kinds of food for souls: one healthful and beneficial; the other unhealthful and harmful.

"On the strength of this, I think that on my birthday I ought to serve a somewhat richer meal, not only for our bodies, but also for our souls, since we all agree that man consists of two things: body and soul. The quality of this meal I will reveal, if you are hungry. For, in case I tried to feed you against your will and taste, my undertaking would be in vain and prayers should be said that you would be more desirous for those meals than for the ones of the body. This will be the case if your souls are healthy, for sick souls, as can be seen in a diseased body, refuse their food and spit it out."

By the expression of their features and by their words of approval, all said they were ready to accept and eat whatever I had prepared.

Then I spoke again: "We wish to be happy, do we not?"

The dialogue now continues with the main question, namely, the search for a happy life.

Notice in the foregoing how the dialogue form makes it possible to present both sides of a question in a vivid, dramatic way. In a Socratic dialogue the questioner states a proposition: "Is it clear that we are composed of body and of soul?" Then one of the

others denies the proposition. Then the questioner proceeds step by step to uncover the difficulty, using the dialectical devices of definition by comparison and difference. When he has finally got the other to admit his proposition to be true in some sense, he then proceeds to raise a new problem. This continues, moving always, however, to the discovery of an answer to one main question, in this case, "What is the happy life?"

III. THE DIALECTIC OF SCIENTIFIC DISCOVERY: THE DISCOVERY OF RADIUM

The following is a selection from the biography, *Madame Curie*,* by Eve Curie, her daughter. It gives us a vivid idea of the process of reasoning and experimentation by which scientific knowledge is extended. An analysis of it is given in this text, pages 190 ff.

CHAPTER XII: THE DISCOVERY OF RADIUM

At this moment she was like a traveler musing on a long voyage. Bent over the globe and pointing out, in some far country, a strange name that excites his imagination, the traveler suddenly decides to go there and nowhere else: so Marie, going through the reports of the latest experimental studies, was attracted by the publication of the French scientist Henri Becquerel of the preceding year. She and Pierre already knew this work; she read it over again and studied it with her usual care.

After Roentgen's discovery of X-rays, Henri Poincaré conceived the idea of determining whether rays like the X-ray were emitted by "fluorescent" bodies under the action of light. Attracted by the same problem, Henri Becquerel examined the salts of a "rare metal," uranium. Instead of finding the phenomenon he had expected, he observed another, altogether different and incomprehensible: he found that uranium salts *spontaneously* emitted, without exposure to light, some rays of unknown nature. A compound of uranium, placed on a photographic plate surrounded by black paper, made an impression on the plate through the paper. And, like the X-ray, these astonishing "uranic" salts discharged an electroscope by rendering the surrounding air a conductor.

* Doubleday, Doran and Co., New York, 1939, with permission of Doubleday Co.

Henri Becquerel made sure that these surprising properties were not caused by a preliminary exposure to the sun and that they persisted when the uranium compound had been maintained in darkness for several months. For the first time, a physicist had observed the phenomenon to which Marie Curie was later to give the name of *radioactivity*. But the nature of the radiation and its origin remained an enigma.

Becquerel's discovery fascinated the Curies. They asked themselves whence came the energy—tiny, to be sure—which uranium compounds constantly disengaged in the form of radiation. And what was the nature of this radiation? Here was an engrossing subject of research, a doctor's thesis. . . !

The candidate for the doctor's degree set her first task to be the measurement of the "power of ionization" of uranium rays—that is to say, their power to render the air a conductor of electricity and so to discharge an electroscope. The excellent method she used, which was to be the key to the success of her experiments, had been invented for the study of other phenomena by two physicists well known to her: Pierre and Jacques Curie. Her technical installation consisted of an "ionization chamber," a Curie electrometer and a piezoelectric quartz.

At the end of several weeks the first result appeared: Marie acquired the certainty that the intensity of this surprising radiation was proportional to the quantity of uranium contained in the samples under examination, and that this radiation, which could be measured with precision, was not affected either by the chemical state of combination of the uranium or by external factors such as lighting or temperature.

These observations were perhaps not very sensational to the uninitiated, but they were of passionate interest to the scientist. It often happens in physics that an inexplicable phenomenon can be subjected, after some investigation, to laws already known, and by this very fact loses its interest for the research worker. Thus, in a badly constructed detective story, if we are told in the third chapter that the woman of sinister appearance who might have committed the crime is in reality only an honest little housewife who leads a life without secrets, we feel discouraged and cease to read.

Nothing of the kind happened here. The more Marie penetrated into intimacy with uranium rays, the more they seemed without precedent, essentially unknown. They were like nothing else. Nothing affected them. In spite of their very feeble power, they had an extraordinary individuality.

Turning this mystery over and over in her head, and pointing toward the truth, Marie felt and could soon affirm that the in-

comprehensible radiation was an *atomic* property. She questioned: Even though the phenomenon had only been observed with uranium, nothing proved that uranium was the only chemical element capable of emitting such radiation. Why should not other bodies possess the same power? Perhaps it was only by chance that this radiation had been observed in uranium first, and had remained attached to uranium in the minds of physicists. Now it must be sought for elsewhere. . . .

No sooner said than done. Abandoning the study of uranium, Marie undertook to examine *all known chemical bodies*, either in the pure state or in compounds. And the result was not long in appearing: compounds of another element, thorium, also emitted spontaneous rays like those of uranium and of similar intensity. The physicist had been right: the surprising phenomenon was by no means the property of uranium alone, and it became necessary to give it a distinct name. Mme. Curie suggested the name of *radio-activity*. Chemical substances like uranium and thorium, endowed with this particular "radiance," were called *radio elements*.

Radioactivity so fascinated the young scientist that she never tired of examining the most diverse forms of matter, always by the same method. Curiosity, a marvelous feminine curiosity, the first virtue of a scientist, was developed in Marie to the highest degree. Instead of limiting her observation to simple compounds, salts and oxides, she had the desire to assemble samples of minerals from the collection at the School of Physics, and of making them undergo almost at hazard, for her own amusement, a kind of customs inspection which is an electrometer test. Pierre approved, and chose with her the veined fragments, hard or crumbly, oddly shaped, which she wanted to examine.

Marie's idea was simple—simple as the stroke of genius. At the crossroads where Marie now stood, hundreds of research workers might have remained, nonplussed, for months or even years. After examining all known chemical substances, and discovering—as Marie had done—the radiation of thorium, they would have continued to ask themselves in vain when came this mysterious radioactivity. Marie, too, questioned and wondered. But her surprise was translated into fruitful acts. She had used up all evident possibilities. Now she turned toward the unplumbed and the unknown.

She knew in advance what she would learn from an examination of the minerals, or rather she thought she knew. The specimens which contained neither uranium nor thorium would be revealed as totally "inactive." The others, containing uranium or thorium, would be radioactive.

Experiment confirmed this prevision. Rejecting the inactive minerals, Marie applied herself to the others and measured their radioactivity. Then came a dramatic revelation: the radioactivity was a *great deal stronger* than could have been normally foreseen by the quantity of uranium or thorium contained in the products examined!

"It must be an error in experiment," the young woman thought; for doubt is the scientist's first response to an unexpected phenomenon.

She started her measurements over again, unmoved, using the same products. She started over again ten times, twenty times. And she was forced to yield to the evidence: the quantities of uranium and of thorium found in these minerals were by no means sufficient to justify the exceptional intensity of the radiation she observed.

Where did this excessive and abnormal radiation come from? Only one explanation was possible: the minerals must contain, in small quantity, a much more powerfully radioactive substance than uranium and thorium.

But what substance? In her preceding experiments, Marie had already examined *all known chemical elements*.

The scientist replied to the question with the sure logic and the magnificent audaciousness of a great mind; the minerals certainly contained a radioactive substance, which was at the same time a chemical element unknown until this day: *a new element*.

A new element! It was a fascinating and alluring hypothesis—but still a hypothesis. For the moment this powerfully radioactive substance existed only in the imagination of Marie and of Pierre. But it did exist there. It existed strongly enough to make the young woman go to see Bronya one day and tell her in a restrained, ardent voice:

"You know, Bronya, the radiation that I couldn't explain comes from a new chemical element. The element is there and I've got to find it. We are sure! The physicists we have spoken to believe we have made an error in experiment and advise us to be careful. But I am convinced that I am not mistaken."

These were unique moments in her unique life. The layman forms a theatrical—and wholly false—idea of the research worker and of his discoveries. "The moment of discovery" does not always exist: The scientist's work is too tenuous, too divided, for the certainty of success to crackle out suddenly in the midst of his laborious toil like a stroke of lightning, dazzling him by its fire. Marie, standing in front of her apparatus, perhaps never experienced the sudden intoxication of triumph. This intoxication was spread over several days of decisive labor, made feverish by a magnificent

hope. But it must have been an exultant moment when, convinced by the rigorous reasoning of her brain that she was on the trail of new matter, she confided the secret to her elder sister, her ally always. . . . Without exchanging one affectionate word, the two sisters must have lived again, in a dizzying breath of memory, their years of waiting, their mutual sacrifices, their bleak lives as students, full of hope and faith. . . .

By the force of her own intuition the physicist had shown to herself that the wonderful substance must exist. She decreed its existence. But its incognito still had to be broken. Now she would have to verify hypothesis by experiment, isolate this material and see it. She must be able to announce with certainty: "It is there!" . . .

Marie and Pierre looked for this "very active" substance in an ore of uranium called pitchblende, which in the crude state had shown itself to be four times more radioactive than the pure oxide of uranium that could be extracted from it. But the composition of this ore had been known for a long time with considerable precision. The new element must therefore be present in very small quantity or it would not have escaped the notice of scientists and their chemical analysis.

According to their calculations—"pessimistic" calculations, like those of true physicists, who always take the less attractive of two probabilities—the collaborators thought the ore should contain the new element to a maximum quantity of one per cent. They decided that this was very little. They would have been in consternation if they had known that the radioactive element they were hunting down did not count for more than a millionth part of pitchblende ore.

They began their prospecting patiently, using a method of chemical research invented by themselves, based on radioactivity: they separated all the elements in pitchblende by ordinary chemical analysis and then measured the radioactivity of each of the bodies thus obtained. By successive eliminations they saw the "abnormal" radioactivity take refuge in certain parts of the ore. As they went on, the field of investigation was narrowed. It was exactly the technique used by the police when they search the houses of a neighborhood, one by one, to isolate and arrest a malefactor.

But there was more than one malefactor here: the radioactivity was concentrated principally in two different chemical fractions of the pitchblende. For M. and Mme. Curie it indicated the existence of two new elements instead of one. By July, 1898, they were able to announce the discovery of one of these substances with certainty.

"You will have to name it," Pierre said to his young wife, in the same tone as if it were a question of choosing a name for little Irène.

The one-time Mlle. Sklodovska reflected in silence for a moment. Then, her heart turning toward her own country which had been erased from the map of the world, she wondered vaguely if the scientific event would be published in Russia, Germany, and Austria—the oppressor countries—and answered timidly:

“Could we call it ‘polonium’?”

In the *Proceedings of the Academy* for July, 1898, we read:

We believe the substance we have extracted from the pitchblende contains a metal not yet observed, related to bismuth by its analytical properties. If the existence of this new metal is confirmed we propose to call it *polonium* from the name of the original country of one of us. . . .

Three months later, on October 17, Marie noted with pride:

Irène can walk very well, and no longer goes on all fours.

On January 5, 1889:

Irène has fifteen teeth!

Between these two notes—that of October 17, 1898, in which Irène no longer goes on all fours, and that of January 5 in which Irène has fifteen teeth—and a few months after the note on the gooseberry preserve, we find another note worthy of remark.

It was drawn up by Marie and Pierre Curie and a collaborator called G. Bémont. Intended for the Academy of Science, and published in the *Proceedings* of the session of December 26, 1898, it announced the existence of a second new chemical element in pitchblende.

Some lines of this communication read as follows:

The various reasons we have just enumerated lead us to believe that the new radioactive substance contains a new element to which we propose to give the name of RADIUM.

The new radioactive substance certainly contains a very strong proportion of barium; in spite of that its radioactivity is considerable. The radioactivity of radium therefore must be enormous.

IV. THE DIALECTICS OF HISTORICAL EVIDENCE: DID WOLSEY KILL BUCKINGHAM?

The following is an appendix in Hilaire Belloc's brilliant biography, *Wolsey*.^{*} Cardinal Wolsey (1475?-1530) was more a politician than a man of God. His ambition led him to sacrifice the interests of religion to the greed and lust of King Henry VIII, and paved the way for the apostasy of the English nation from the Catholic Faith.

^{*} By permission of the publishers, J. B. Lippincott Co., Philadelphia.

One of the charges which has been made against him is that he was secretly responsible for the execution of the Duke of Buckingham as a traitor. Buckingham was an obstacle to Wolsey's ambition and he gained by having him out of the way. Did he conspire to bring this about?

Belloc tries to answer this question in the following passage, which illustrates how a historian frequently must use a dialectical procedure to arrive at the most probable answer to a question of fact.

Tradition took it for granted that the prime mover in the destruction of the Duke of Buckingham was Wolsey. Tradition in these large matters of motive and character, particularly when it comes from the very source and can be traced to contemporaries, is so generally right that any academic case against it must require heavy positive proof in its favour.

It has been the academic fashion since the last third of the 19th century to exonerate Wolsey. This came in part from the general academic contempt for popular opinion, but also from exaggerating the use of documents against tradition; the great flood of documents on this period having been printed for the first time in the later part of the 19th century.

But when I look at those documents, and consider the academic arguments advanced to exonerate Wolsey I can see nothing to support the new conclusion. All seems to me in favour of the old, and Wolsey remains indubitably the author of Buckingham's tragedy.

What are the arguments in favour of Henry's being the true initiator of the business?

The first argument is that Henry, like all the Tudors (and like James the First, for that matter) was in terror of rival claims to the throne. But if that was Henry's motive why had neither he nor his father been affected by that motive during so many years? On the contrary, he and his father heaped honours on Buckingham. One hears nothing of this sudden dread of a rival till Buckingham is 42 years old, and till he has been the intimate companion and friend of the King for many years.

The suspicions against Buckingham did not begin to arise till Wolsey started them in 1518.

Against this it may be urged that Henry may not have suspected Buckingham of any likelihood to press his claims until news came to him thus late. Well, who put forward that news? Undoubtedly Wolsey. It was the anonymous letter which Wolsey had in his hands, some weeks before Henry could make up his mind to move, which is the starting point of the whole affair.

A second argument continually put forward to show that the initiative cannot have been Wolsey's and must therefore have been Henry's is that Polydore Vergil, the contemporary who specifically accuses Wolsey, is a tainted witness because Wolsey had put him in prison and he was Wolsey's enemy. The argument is only of value as against a better argument on the other side. Because a man is prejudiced against another it is probable that he will lie in his disfavour; but it is not probable that in repeating a common opinion and a likely one, and one for which there is no contemporary contradiction, he should be lying. French and English propaganda against William II during the Great War gave rise to many lies. But it did not lie when it accused William II of having made war-like and menacing speeches.

General considerations, which are the best of all in such matters, can I think determine us. Put yourself in the place of Wolsey in that year 1521, remember his character, his power of restraint and calculation, the affronts he had suffered, the hatred felt for him by the class of which Buckingham was the best representative, the Cardinal's dread lest anyone should supplant him or weaken him in the ears of the King, the recent conspicuous role of Buckingham in the splendid feasts of 1520, the Cloth of Gold; remember also the effort Wolsey was at to exclude Buckingham from shining in the tourneys, and the way in which none the less the King continued to befriend him, and you have before you a situation which makes Wolsey's initiative against him not only reasonable but inevitable.

On the other hand, put yourself in the place of Henry, impulsive, readily influenced, readily taken in, acting suddenly upon suggestion, very much attached to the Court traditions he had inherited from his father, receiving unexpected and terrifying notice that his friend and relative was intriguing against him, receiving after two years of suggestions, that anonymous notice from Wolsey, by whom he was completely dominated. Ask yourself whether Henry's action in early 1521 when he was moved to such wrath and fear in the matter of Buckingham looks like a policy thought out by his own brain.

V. DIALECTICAL REASONING IN THE SOCIAL SCIENCES

The student will find a convenient collection of examples of typical studies in the field of the social sciences in *American Social Patterns*, edited by William Petersen, a Doubleday Anchor Book (paperbound). The following brief analyses of three articles con-

tained in this book will give an idea of the kind of dialectical reasoning involved in the social sciences.

ARTICLE A: "Interracial Housing," by Morton Deutsch and Mary Evans Collins.

1. **Problem:** Everyone recognizes that interracial housing conflicts are a crucial issue at the present time in some of our big cities, but actually little is known of what actually occurs. The authors distinguish two situations: (a) where white and Negro families are "integrated" in apartments which are assigned without consideration of race; and (b) where they live in different buildings or sections of the same housing project. The problem is to discover the differences between behaviour in these two situations.
2. **Hypotheses:** On the basis of their general theory of human behaviour in social situations, the authors made six hypotheses:
 - a. There will be more social contact among people the closer they live together.
 - b. The more social contact, the more they will tend to like each other.
 - c. There will be more friendly relations in integrated than segregated projects.
 - d. There will be more serious interest in developing interracial relations in the integrated projects.
 - e. This mutual working together on a problem may even create more friendly relations within the white group.
 - f. White tenants in integrated projects will have less prejudice than those in segregated projects.
3. **Research procedure:**
 - a. The authors tried to select two typical projects, one integrated and one segregated, which would be as alike in all other respects as possible.
 - b. They tried to collect as accurate a social description of the two groups as possible, mainly from white housewives selected at random.
 - c. This was done by interviews (an hour to two hours long) in which they tried to ascertain the housewives' attitudes to living in the project, their attitudes to the other race, the amount of contact they have with the other race, the social support they received for their attitudes, and finally the characteristics of the housewife interviewed.
 - e. They attempted to *control* this data by various means which were designed to distinguish between attitudes acquired by the housewife after she came to live in the project and before.

4. **Results:** The results were then tabulated in a series of charts which showed that in general the hypotheses had been verified. Nevertheless, the result was not certain, because the *controls* used were imperfect, and hence it was not possible to be sure that the situation observed was entirely due to the difference in the housing arrangements.

ARTICLE B.: "Biographies in Popular Magazines," by Leo Lowenthal.

1. **Problem:** Popular biographies have become a very popular type of reading since the beginning of this century. This seems to indicate that there is a *social need* seeking gratification in this type of literature. What is this social need?

2. **Research method:** A "content analysis" was made of material printed in the *Saturday Evening Post* and *Collier's* for the period from April, 1940, to March, 1941. Other studies had already shown that since 1901 the type of biography has shifted from those which idolized business and professional people as examples of success in life to ones which idolize people in the light entertainment world. The present study classified the content of the biographies published in its type magazines according to similar categories. This classification was then put in tabular form to show trends.

3. **Results:** These tables show that:

a. The trend toward the idolization of people in the entertainment world has continued, and particularly for those in the lightest forms of entertainment.

b. In these biographies much time is devoted to the details of the persons' private lives.

c. The biographies neglect to show the subjects' personal development through effort, their personal control over their own success, or any solitary inner life, although at an earlier period these were much stressed.

d. The success of the person is usually pictured in terms of social adjustment and conformity to group standards.

e. The presentation of the personality is in extravagantly superlative terms and strives to give a sense of intimate contact.

4. **Hypothesis:** The author suggests that these facts could be accounted for if we suppose that people in our society feel a great need for a better understanding of human relations, and that they believe that reading such biographies will help them to understanding. The author points out that, in fact, the popular biographies only *apparently* meet this need. They do not actually have much educative value, because those who read them are not prepared for critical thinking about human relations, which they might find too disturbing.

ARTICLE C: "The People's Choice," by Paul F. Lazarfeld, Bernard Berelson, and Hazel Gaudet.

1. **Problem:** How and why did people decide to vote as they did in the presidential campaign of 1940? This may cast light on *general* problems of voting behaviour.

2. **Research Method:** The method was that of interviewing a test group of people at regular intervals about their voting intentions.

a. A staff of 12 to 15 trained interviewers, mostly women, visited every fourth house in Erie County, Ohio, and then selected from these 3000 people interviewed four groups of 600 persons, each of which were matched so as to constitute similar samples.

b. One of these was selected as the test group and was carefully studied so that its members could be classified by their socio-economic status. This group was then interviewed once a month from May to November. The interviewers sought to learn why each person changed his intended vote, if he changed, and what propaganda influences or social pressures might have led to this change.

c. The other three groups were used as *controls*. They were each interviewed only once, one in July, one in August, and one in October. It was hoped that this would give a check against the possibility that the test group was being influenced in its behaviour by the very fact that it was being interviewed so often.

d. The results were tabulated and an attempt made to detect correlations.

3. **Results:**

a. *Class differences:*

1) There was a correlation between socio-economic status and party affiliations, the working class groups being more Democratic. This did not depend so much on actual occupation as on the voter's belief that he belonged to the laboring class.

2) There was a correlation with religion, the Catholics being more Democratic. This was not merely a reflection of a. above, since it held also at every socio-economic level.

3) There was a correlation with age, older people tending to be Republican on the whole, but among Catholics the older people tended to be more Democratic.

4) The rural vote was more Republican, the urban vote more Democratic.

b. *Ideological differences:* It was found that the arguments used by voters for their choice were quite stereotyped. Those for

Roosevelt believed he would be for the laboring man and that he was right about foreign affairs. Those for Wilkie believed he would be better for business, and were not much interested in foreign affairs. Those for Wilkie were against a third term. Those for Roosevelt did not favor third terms, but apologized for it in this case. After the election people were, on the whole, reconciled to the victor.

c. *Political interest and participation*: In general those with better education and higher socio-economic status showed more interest in the election and had more opinions about it. There was little difference in this regard between rural and urban populations. Men showed more interest than women, but older people were more interested than younger people of the same educational level. Actual voting or abstention agreed perfectly with degree of interest, except that fewer women voted than were interested.

d. *Time when final decision was made for whom to vote*: Some 13% changed their minds in the weeks just before the election, and in general the group that was subject to the most cross-pressures was the last to make up its mind. There were "crystal-lizers" who took some time to make up their mind, "waverers" who changed and then went back to original vote, and "party changers" who changed their mind and stuck to it. Many had their mind made up by the European crisis.

e. *Certain special effects could be noticed*:

- 1) Activation effect: It could be predicted how a voter would choose if one knew whether he was Catholic, a laborer, and urban, but it took some time for these influences to lead to a decision in many cases.
- 2) Reinforcement effect: Many who had their minds already made up were kept in line by the campaign.
- 3) Band-wagon effect: Many waverers were effected by their conviction that a certain man would win to whom they were already inclined.

In general the campaign does not convert many people to another party, and few voters make much of an effort to weigh both sides of the question.

f. *Group and individual influences*: In general people vote with their group and their family tradition. Only some 4% of the voters reported that a member of their family voted differently than themselves. People were more influenced by some leader within their own social group who had strong political convictions than by any other source of persuasion.

REMARKS:

The student will notice that in each of these three studies the results are, on the whole, about what would be expected by an experienced person. The purpose of the scientist is not to discover something utterly unexpected, but to clarify the details of the social situation, and to reveal underlying connections. The logical clarity of the reasoning in each case depends:

1. On a clear statement of the problem.
2. On the formation of clear hypotheses which can be tested by the data (notice that the hypothesis can be stated first as in study A, or as a result of an examination of the data as in study B).
3. A careful research plan to gather the facts accurately and significantly.
4. A comparison of the hypothesis with the facts.

This is a dialectical process, since the reasoning rests on hypotheses which have to be reshaped according to the facts, and the results are not more than probable. Two defects are apparent in these studies:

1. The authors do not make clear the *practical* problem they are attempting to solve, although it is apparent that in the background of all these studies are practical social problems which need to be solved, and which give value to the research. Such studies are mere curiosity unless they have practical importance, since none of them lead to fundamental *theoretical* knowledge.
2. The authors do not attempt to connect their dialectic with more basic and solid *psychological* principles. Dialectic is a tool of science, and ought to aim at strict scientific knowledge even when this cannot be obtained.

SECTION VII

Examples of Scientific Demonstrations

I. A SCIENTIFIC DEMONSTRATION FROM ARITHMETIC

We begin this section with examples from mathematics, because these are always simpler and clearer than in other sciences. We give one from arithmetic which is so simple as to appear entirely trivial, but it illustrates a method which is the same for every arithmetical or algebraic proof, no matter how complicated it may be.

Theorem: *Any odd number minus 1 is equal to some even number.*

Proof:

The sum of two equal numbers is an even number.

And: every odd number minus 1 is the sum of two equal numbers.

Therefore:

every odd number minus 1 is an even number.

Proof of 1.:* This is an **axiom** (it means the same is, "If equals are subtracted from equals, the remainders are equal).

Proof 2.:*

4*. Remainders of a plus c, and b plus c, each minus c are remainders of equals minus equals.

5*. And: vertical angles a and b are the remainders of a plus c, and b plus c, each minus c.

2*. Therefore: vertical angles a and b are remainders of equals minus equals.

Proof of 4.:* It is evident that angle c is "equal" to itself, but it remains to be proved that a plus c, and b plus c, are equal.

6.* Every straight angle is equal to every other.

7.* And: a plus b and b plus c are straight angles.

4.* Therefore: a plus b and b plus c are equal.

6.* This is a previous theorem, namely, that "The angles which one straight line makes with another straight line on one side of it are equal to two right angles (i.e., a straight angle). We omit this proof.

Proof of 5:* This is evident from the definition of vertical angles.

This also is a strict proof, because:

1. It is in correct syllogistic form.
2. The ultimate premises are all axioms, definitions, or postulates (except 6*, which can also be proved by these same axioms, definitions, and postulates).
3. It is through the **proper reason**, because the middle term in the first syllogism is "the remainders of equals minus equals" which is the *cause* of a and b being equal, since their size is determined by the overlapping of two straight angles of which they are remainders.

III. SCIENTIFIC DEMONSTRATION: LOGIC PROVES ITS OWN RULES

In this handbook we have studied logic as an art, learning its rules and practicing their application to various kinds of materials. How do we know that these rules themselves are true? Logic is not only an art, but it is also a science which *proves its own rules*.

The following demonstration taken from Aristotle's *Posterior Analytics* is the most important rule of all of logic, since it tells us how to form a scientific demonstration. Aristotle explains this demonstration at great length, and we give it here only in abbreviated form. The various premises which require to be proved are numbered in order with an asterisk, thus 1*.

- 1*. An argument giving us knowledge of the cause on which some fact depends as its proper cause so that the fact cannot be otherwise
- is a syllogism whose premises contain a real essential definition (or its equivalent) of the subject as cause of its properties.
2. **And:** a scientific demonstration
- is an argument giving us knowledge of, etc.

Therefore:

- a scientific demonstration
- is a syllogism whose premises contain a real essential definition (or its equivalent) of the subject as cause of its properties.

Proof of 1:* Two parts.

- a. It is a syllogism, because an argument is either an induction or a syllogism. But only a syllogism has a universal middle term, and hence only a syllogism can give the *necessary* cause why a fact cannot be other than it is.

That a syllogism is valid is shown below, page 570.

- b.
- 3* Premises which are true, primary, indemonstrable, and also prior to, more known than, and the cause of the conclusion are ones which contain a real essential definition (or its equivalent) of a subject as the cause of its properties.
- 4* an argument giving us knowledge of the cause on which some fact depends as its proper cause so that the fact cannot be otherwise is one whose premises are true, primary, etc.
- 1.* **Therefore:** an argument giving us knowledge of the cause on which some fact depends as its proper cause so that the facts cannot be otherwise is one whose premises contain a real essential definition of a subject as the cause of its properties.

Proof of 3:* A statement is seen to be true, primary, and indemonstrable when it is evidently true from the very meaning of the terms, where no intermediate term is needed nor possible. This is the case only when the one term is the essential definition of the other, or so closely connected with it as to be equivalent to a definition. But if this is to give scientific knowledge it must also be a *real* definition. Furthermore, it is only this nature which is prior to and the cause of the properties of the thing. We arrive at the nature by definition, and this is found by observation and classification, not by demonstration. Hence in itself the definition is better known than the properties.

Proof of 4:* A scientific demonstration must have premises which satisfy these six conditions, for the following reasons: They must be:

- 1) *true*, since only a true premise could cause true knowledge.
- 2) *primary*, since otherwise they would depend on previous truths.

- 3) *indemonstrable*, because eventually we must get to immediately evident truths.
- 4) *prior*, since the conclusion depends on them.
- 5) *better known than the conclusion*, since through them we know the conclusion.
- 6) *cause of the conclusion*, since science is perfect knowledge, and we have this only when we know both the fact and its proper cause.

We have assumed in the above argument (1.*a) that a syllogism is a valid argument, and in fact we had to use a syllogism in order to prove the above conclusion. Hence we must be sure that the syllogism is valid. This cannot be demonstrated, since it would be circular to prove that a syllogism is valid by using a syllogism.

Aristotle in the *Prior Analytics* shows how we can establish the validity of the syllogism in the First Figure, not by a demonstration, but by showing it is an application of the principle of contradiction. Then we can establish the validity of the other forms of the syllogism by *reducing* them to the First Figure:

A. There are eight general laws of the valid syllogism, as follows:

1. There can only be three terms.
2. The middle term must be a distributive universal at least once (see page 75).
3. Both premises cannot be negative.
4. Both premises cannot be particular.

Reason: These rules follow from the **definition** of the syllogism, since if there are more than three terms, or if the extremes are not connected by the middle term, this definition is violated.

5. The conclusion cannot be wider in extension than the premises.
6. The middle cannot be in the conclusion.
7. The conclusion cannot be stronger than the weakest premise.
8. Affirmatives cannot give a negative conclusion.

Reason: These rules are based on the **axiom**, common to all sciences, that *a cause must contain its effect*, since if any of these rules are violated the conclusion of the syllogism, which is an effect of the premises, will contain something that the premises do not contain.

B. There are three possible figures of the syllogism:

1. First Figure in which the *middle term* is once a predicate and once a subject in the premises.
2. Second Figure in which the *middle term* is a predicate in both premises.

3. Third Figure in which the *middle term* is a subject in both premises.

C. Each of these figures has special laws, based on the general laws above, as follows:

(NOTE: To understand the following proofs, we must recall that in *affirmative* statements the predicate is taken *particularly*, while in *negative* statements it is taken *universally*. Thus when we say "Every man is an animal," we do not imply that "Every animal is a man"; but when we say "No man is an angel" we do imply that "Every angel is not a man.")

1. Law of First Figure: *The major must be universal and the minor affirmative.*

Proof:

- 1) Minor must be affirmative, for if it were negative, then
 - a) Either the major would also be negative and this violates general law 3 above;
 - b) Or the major would be affirmative, and then the major term being in predicate position in this figure would be particular, while in the conclusion it would be universal, because the conclusion would be negative (general law 7), and this would violate general law 5.

(2) Major must always be universal. Since we have just proved that the minor is affirmative, its predicate is particular; this predicate is the middle term, which is thus undistributed in the minor premise. Since the middle term must be distributed in one premise (general law 2), it must be distributed in the major premise, where it is the subject. Hence the major premise must be universal.

2. Law of the Second Figure: *The major must be universal and one premise negative.*

Proof:

- 1) If both premises were affirmative, the middle would not be distributed since it is in the predicate place in both premises and is therefore particular.
- 2) The major must be universal since we have just proved that one premise is negative, and hence that the conclusion is negative (general law 7); hence the major term is universal in the conclusion and must be universal in the premises (general law 5).

3. Law of the Third Figure: *The minor must be affirmative and one premise universal.*

Proof:

- 1) One premise must be universal (general law 4).

2) The minor must be affirmative. If it were negative, then the conclusion must be negative (general law 7), and its predicate, which is the major term, will be universal; hence it will also be universal as the predicate of the major premise (general law 5). Then this major premise must be negative, and both premises would be negative, which violates general law 3. Hence the minor must be affirmative.

D. Using these special laws we may now *eliminate* many possible forms of the syllogism as invalid, as follows:

There are four possible kinds of statements, A,E,I,O (see page 70), and there are three possible figures, as we have just shown. Hence we can have $4 \times 4 \times 3$, or 48, possible combinations of premises. The following table shows why some forms are invalid. The names given to the possibly valid forms are memory words chosen so that the *vowels* indicate the kinds of propositions which make up the premises and the conclusion. Thus "Barbara" is the name of a syllogism made of three A propositions; "Celarent" is the name of a syllogism made of EAE propositions; etc.

FIRST FIGURE: Rule: *Major must be universal, minor affirmative.*

| | | | |
|-------|------------------|--------|----------------------------------|
| 1. AA | <i>Barbara</i> | 10. IE | major particular, minor negative |
| 2. AE | minor negative | 11. II | major particular |
| 3. AI | <i>Darii</i> | 12. IO | major particular, minor negative |
| 4. AO | minor negative | 13. OA | major particular |
| 5. EA | <i>Celarent</i> | 14. OE | major particular, minor negative |
| 6. EE | minor negative | 15. OI | major particular |
| 7. EI | <i>Ferio</i> | 16. OO | major particular, minor negative |
| 8. EO | minor negative | | |
| 9. IA | major particular | | |

SECOND FIGURE: Rule: *Major must be universal, one premise negative.*

| | | | |
|--------|---------------------------|--------|------------------------------------|
| 17. AA | both premises affirmative | 25. IA | major particular, both affirmative |
| 18. AE | <i>Camestres</i> | 26. IE | major particular |
| 19. AI | both premises affirmative | 27. II | major particular, both affirmative |
| 20. AO | <i>Baroco</i> | 28. IO | major particular |
| 21. EA | <i>Cesare</i> | 29. OA | major particular |
| 22. EE | both premises negative | 30. OE | major particular, both negative |
| 23. EI | <i>Festino</i> | 31. OI | major particular |
| 24. EO | both premises negative | 32. OO | major particular, both negative |

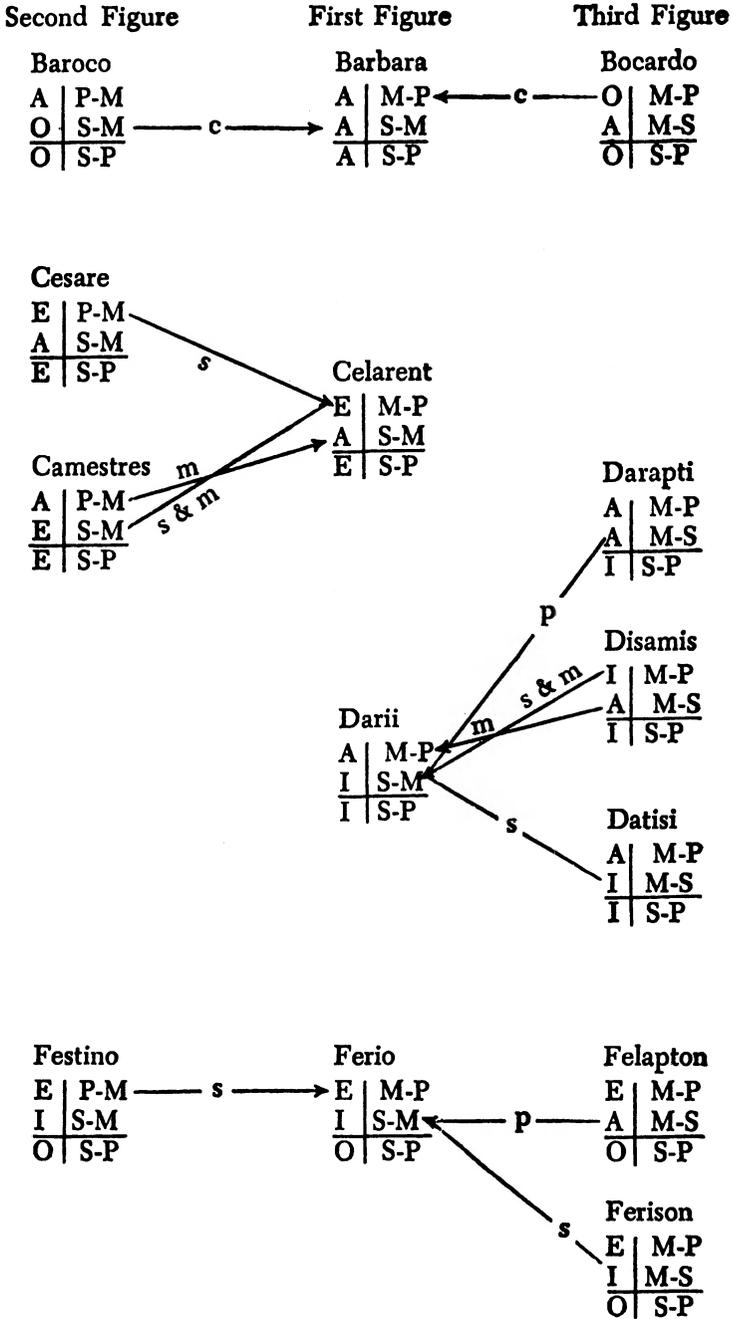
THIRD FIGURE: Rule: *Minor must be affirmative, one premise universal.*

| | | | |
|--------|-----------------|--------|---------------------------------|
| 33. AA | <i>Darapti</i> | 42. IE | minor negative |
| 34. AE | minor negative | 43. II | both particular |
| 35. AI | <i>Datisi</i> | 44. IO | minor negative, both particular |
| 36. AO | minor negative | 45. OA | <i>Bocardo</i> |
| 37. EA | <i>Felapton</i> | 46. OE | minor negative |
| 38. EE | minor negative | 47. OI | both particular |
| 39. EI | <i>Ferison</i> | 48. OO | minor negative, both particular |
| 40. EO | minor negative | | |
| 41. IA | <i>Disamis</i> | | |

E. Next we show that these syllogisms in the Third and Second Figure are equivalent to ones in the First Figure, by *reducing* them. We can do this by the following operations:

- 1) We can *simply convert* (symbolized by *s*) E and I propositions. This means simply to exchange the subject and predicate. We can do this because in E and I propositions the predicate is *no wider* in extension than the subject. If it were, then conversion would change the truth of the statement. We cannot convert "Every man is an animal" (A) but we can convert "Some man is an animal" (I), without changing the truth of the statement.
- 2) We can convert and make particular (symbolized by *p*) an A proposition.
- 3) We can exchange (symbolized by *m* for "mutate") the premises, since this makes no essential difference to an argument.
- 4) We can prove by reducing to absurdity the *contradiction* of a conclusion (symbolized by *c*). Thus we can take the conclusion of the syllogism whose validity we wish to establish, and then *contradict* it. Using this contradiction as a major (or minor) premise, and taking the other premise of the original syllogism, we can form a new syllogism, whose conclusion will be the contradictory of the original major premise. Thus it is absurd to deny the validity of the original syllogism, since such a denial leads to a contradiction of the original premises.

If we apply these four processes to the syllogisms left over from D, we find that they can all be reduced to syllogisms in the first figure. The *consonants* in the memory-names tell us how to do this. Those which begin with B can be reduced to *Barbara*, those beginning with C to *Celarent*, etc., if we perform the operation on a proposition symbolized by the consonant which follows it. Thus in *Cesare* we take the first E proposition and *simply convert* it (*c E s* are). Consonants other than the ones given above have no significance.



F. Now how can we be sure that the four syllogisms in the First Figure, namely, *Barbara*, *Celarent*, *Darii*, and *Ferio*, are valid?

1. Obviously *Darii* and *Ferio* are valid if *Barbara* and *Celarent* are valid, since they are respectively only weaker forms of the latter.

2. Proof that *Barbara* and *Celarent* are valid:

a. These two modes are a simple application of the following principle (called in Latin the *dictum de omni et de nullo*, "what is said of all and of none"):

Whatever (P) is universally distributively affirmed of some subject (M) ought to be affirmed of everything contained under its extension (S); and whatever is universally distributively denied of some subject ought to be denied of everything contained under its extension.

b. And this principle is only a special case of the broader principle (called the *principle of agreement and disagreement*):

Whenever two things are the same as one third thing they are the same as each other; and whenever of two things one is the same as a third thing, and the other is not the same as this third thing, they are not the same as each other.

c. This principle of agreement and disagreement must be true, because if we assume its *contradictory*, we violate the *principle of contradiction* (namely, that a thing cannot both be and not be at the same time and in the same respect), as follows:

If two things were the same as a third thing, and not the same as each other, then they would *be* X (the third thing) and *not* be X (since each is the same as X, but they are not the same as each other) at the same time, and in the same respect (with respect to X).

d. The *principle of contradiction* is true, because it is the first principle of all knowledge, which men cannot doubt in their minds, although they may say they doubt it.

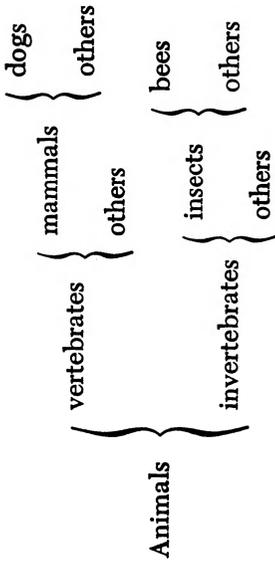
Thus we have reduced the valid forms of the syllogism to the most solid possible basis. If these forms are not valid, then the principle of contradiction is not valid, and all knowledge is impossible.

G. The following are examples of the valid forms of the syllogism. It will be noted that:

1. The First Figure in *Barbara* alone can give *universal affirmative* conclusions. Hence only *Barbara* can give us a perfect scientific demonstration.

2. The Second Figure is useful for *refuting* others because it always yields a *negative* conclusion.

3. The Third Figure is also useful in refutation by proving an exception to a statement, since it always ends *particularly*.



Strong moods

Subalternate moods

FIRST FIGURE

(Middle once predicate and once subject)

Barbara

A Every *mammal*
 A Every dog
 A Every dog

is a vertebrate. E No *insect*
 is a *mammal*. A Every bee
 is a vertebrate. E No bee

Ceiant

is a vertebrate.
 is an *insect*.
 is a vertebrate.

Darii

A Every *mammal*
 I Some dogs
 I Some dogs

is a vertebrate. E No *insect*
 are *mammals*. I Some bees
 are vertebrates. O Some bee

Ferio

is a vertebrate.
 are *insects*.
 is not a vertebrate

SECOND FIGURE
(Middle twice predicate)

| | | | | | |
|---------------|-------------|------------|----------------|----------------|------------------|
| <i>Cesare</i> | E No insect | a mammal. | E No insect | <i>Festino</i> | is a mammal. |
| | A Every dog | a mammal. | I Some dogs | | are mammals. |
| | E No dog | an insect. | O Some dogs | | are not insects. |
| | | | | <i>Baroco</i> | |
| | A Every dog | a mammal. | A Every dog | | is a mammal. |
| | E No insect | a mammal. | O Some insects | | are not mammals. |
| | E No insect | a dog. | O Some insects | | are not dogs. |

THIRD FIGURE
(Middle twice subject)

| | | | | | |
|-----------------|----------------|-----------------|----------------|----------------|-------------------|
| <i>Darapti</i> | A Every dog | a vertebrate. | A Every dog | <i>Datisi</i> | is a vertebrate. |
| | A Every dog | a mammal. | I Some dog | | is a mammal. |
| | I Some mammals | vertebrates. | I Some mammals | | are vertebrates. |
| | | | | <i>Disamis</i> | |
| | | | I Some dog | | is a vertebrate. |
| | | | A Every dog | | is a mammal. |
| | | | I Some mammals | | are vertebrates. |
| | | | | <i>Ferison</i> | |
| <i>Felapton</i> | E No dog | an insect. | E No dog | | is an insect. |
| | A Every dog | a mammal. | I Some dogs | | are mammals. |
| | O Some mammals | are not insects | O Some mammals | | are not insects. |
| | | | | <i>Bocardo</i> | |
| | | | O Some dog | | is not an insect. |
| | | | A Every dog | | is a mammal. |
| | | | O Some mammals | | are not insects. |

IV. A SCIENTIFIC DEMONSTRATION
FROM PHYSICS:
BENJAMIN FRANKLIN AND THE
NATURE OF LIGHTNING

The following is from a letter of Franklin to John Lining, written in 1755:

“Your question, how I came first to think of proposing the experiment of drawing down the lightning, in order to ascertain its sameness with the electric fluid, I cannot answer better than by giving you an extract from the minutes I used to keep of the experiments I made, with memorandums of such as I proposed to make, the reasons for making them, and the observations that arose upon them, from which minutes my letters were afterwards drawn. By this extract you will see, that the thought was not so much “an out-of-the-way one,” but that it might have occurred to any electrician.

November 7, 1749. Electrical fluid agrees with lightning in these particulars. (1) Giving light. (2) Colour of the light. (3) Crooked direction (4) Swift motion. (5) Being conducted by metals. (6) Crack or noise in exploding. (7) Subsisting in water or ice. (8) Rending bodies it passes through. (9) Destroying animals. (10) Melting metals. (11) Firing inflammable substances. (12) Sulphurous smell. The electric fluid is attracted by points. We do not know whether this property is in lightning. But since they agree in all particulars wherein we can already compare them, is it not probable they agree likewise in this? Let the experiment be made. . . .”

The following is from a letter to Peter Collinson, written earlier in 1752:

“As frequent mention is made in public papers from Europe of the success of the Philadelphia experiment for drawing the electric fire from the clouds by means of pointed rods of iron erected on high buildings, and it may be agreeable to the curious to be informed that the same experiment has succeeded in Philadelphia, though made in a different and more easy manner, which is as follows:*

Make a small cross of two light strips of cedar, the arms so long as to reach the four corners of a large thin handkerchief when extended; tie the corners of the handkerchief to the extremities of the cross, so you have the body of a kite; which being properly accommodated with a tail, loop, and string, will rise in the air, like those made of paper; but this being of silk, is fitter to bear the wet and

* Franklin was lucky in his experiments. *Many people have been killed trying to reduplicate these experiments. No student should attempt them, as they are extremely dangerous.*

wind of a thundergust without tearing. To the top of the upright stick of the cross is to be fixed a very sharp pointed wire, rising a foot or more above the wood. To the end of the twine, next the hand, is to be tied a silk ribbon, so that where the silk and twine join, a key may be fastened. This kite is to be raised when a thundergust appears to be coming on, and the person who holds the string must stand within a door or window or under some cover, so that the silk ribbon may not be wet; and care must be taken that the twine does not touch the frame of the door or window. As soon as any of the under-clouds come over the kite, the pointed wire will draw the electric fire from them, and the kite, with all the twine, will be electrified, and the loose filaments of the twine will stand out every way, and be attracted by an approaching finger. And when the rain has wet the kite and twine, so that it can conduct the electric fire freely, you will find it stream out plentifully from the key on the approach of your knuckle. At this key the phial may be charged; and from the electric fire thus obtained, spirits may be kindled, and all the other electric experiments performed, which are usually done by the help of a rubbed glass rod or tube, and thereby the sameness of the electric matter with that of lightning completely demonstrated.”

Analysis:

A. The first quotation is an excellent example of *dialectical* reasoning in which Franklin is seeking a **definition** of lightning in terms of its *material* cause by comparing it (similarities and differences) with something better known, namely, the “electrical fluid” used in laboratory experiments.

1. He lists 12 similarities. Notice that they relate to **qualities** (light, color, shape, sound, smell), to its **motion**, and its **action** (passes through metals and ice, rends bodies, kindles fuels, melts metals).

2. He notes one possible difference, not yet tested: “electric fluid” is attracted by points. (When it had been established that this was true also of lightning, the way was opened to the invention of the lightning rod).

Since the identity of the two things seems *probable*, Franklin frames a hypothesis: *Lightning is composed of electric fluid*. This is a tentative definition of lightning in terms of its material cause.

B. This hypothesis now has to be tested:

Franklin carefully describes his apparatus and the manner of performing the experiment. Although this apparatus was quite

crude, nevertheless his description makes it possible to repeat his experiment and thereby to generalize (*induction*) from its result.

In this case the experiment did not merely confirm the hypothesis as *probable*, but rendered it truly *certain*, since once lightning had been "captured" in this way it became possible to test it repeatedly for all the characteristic properties of "electrical fluid" and therefore to be sure that they are identical. Here we have an example of how dialectical reasoning prepares the way for an **observation** from which a **real definition** (not merely a tentative one) can be obtained. Such a definition is certain, not from demonstration, but from immediate evidence.

C. Once this real definition had been established by Franklin, then it became possible to demonstrate some of the properties of lightning with certitude. For example, we might form the following demonstration, as Franklin actually did in inventing the lightning rod:

| | |
|-----------------------------|--|
| An electrical discharge | tends to pass more easily through a pointed metal conductor. |
| And: lightning | is an electrical discharge. |
| Therefore: lightning | tends to pass more easily through a pointed metal conductor. |

Major: This had already been shown by laboratory experiments with electrical fluid.

Minor: This is what Franklin had first guessed at dialectically, and then established with certitude from observation. It is a definition, although an incomplete one, of lightning.

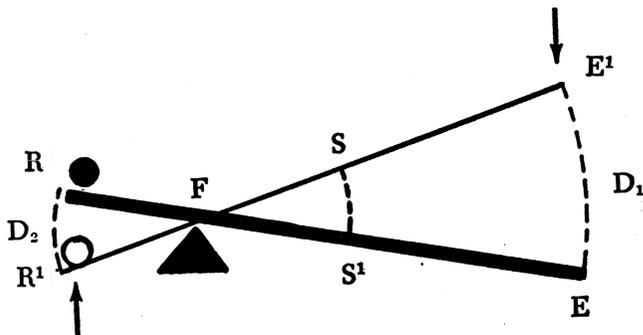
V. SCIENTIFIC DEMONSTRATION FROM MATHEMATICAL PHYSICS: THE LAW OF LEVERS

The following is a typical practical problem which can be solved by elementary mechanics:

Problem: A log 11 feet long is used as a first-class lever (see diagram) to lift the wheel of an automobile out of the mud. The wheel is supporting 1500 pounds weight. The fulcrum of the lever is placed 1

foot from the axle, and the axle is at the end of the log. A man stands on the other end of the log. How heavy must he be to lift the wheel?

RF: resistance arm
 EF: effort arm
 D1: distance moved by applied effort
 D2: distance moved by weight to be lifted



Answer:

1: ideal mechanical advantage $M = \frac{EF}{RF} = \frac{10 \text{ feet}}{1 \text{ foot}} = 10$

2. ideal effort required $E = \frac{\text{resistance } R}{\text{ideal } M} = \frac{1500}{10} = 150 \text{ lbs. (the man's weight)}$.

The problem is only an individual case of a general law, namely:

$$\text{ideal } M = \frac{D1}{D2} = \frac{EF}{RF}$$

The student is likely merely to learn such a formula and apply it to problems in a routine fashion. A scientist however is not so much concerned with working problems as understanding the reason why.

How do we know that this law is true?

The law as a general fact: This law of the first class lever can be tested experimentally and found to be *approximately* true. That is why we say "ideal mechanical advantage" because in actual experimentation various factors interfere with its being perfectly realized, and the lever is found not to be quite as effective as the law would predict. However, we can be sure that the law is true in every case within very narrow limits, and by removing disturbing factors we can make this accuracy greater and greater.

The reason for this fact: This can be stated in syllogistic form as follows:

The ratio of arcs RR' and EE' is equal to the ratio of the distances EF and RF

And: in a lever the ideal mechanical advantage is equal to ratio of the distances moved by the effort and the resistance, i.e., the ratio of arcs RR' and EE'

Therefore: in a lever the ideal mechanical advantage is equal to the ratio of the distances EF and RF , i.e., to the ratio of the effort and the resistance arm.

Major: This is a theorem which can be proved in geometry. It applies in the present case, because the angles RFR' and EFE' are equal (they are vertical angles). Hence it is possible to lay off the distance FS and FS' equal to FR and FR' and then the arc SS' will be equivalent to the arc RR' . Then it is easy to prove that the arcs within this segment of a circle have the same ratio as their radii, namely, that $SS' : EE' : : FS : FE'$.

Minor: This is a nominal definition of "mechanical advantage" and is based on the physical fact that a small amount of energy will move a large body through a small distance.

It will be noticed that in this proof the major premise is purely mathematical and rests on mathematical axioms and postulates. The minor, on the other hand, is purely physical, since it deals with the characteristics of moving bodies. The middle term is common to both. In the major premise it is taken in the sense of a relation between **abstract quantities**, in the minor premise as a measurement of **concrete or physical quantities**, since the distances spoken of are physical distances through which physical bodies are moved by physical forces. The *application* of mathematics to physics takes place in the *conclusion*, which states a physical law in mathematical terms.

This demonstration is through a **proper cause** from the mathematical point of view, since the proper cause for this equality of proportion is the *equal angle* of the arcs.

VI. A SCIENTIFIC DEMONSTRATION
FROM BIOLOGY:
HARVEY'S PROOF OF THE CIRCULATION
OF THE BLOOD

William Harvey (1578-1657) corrected the most serious mistake of Greek and medieval biology, the wrong conception of the function of the heart. His proof that the true function of the heart is to circulate the blood opened the way to the whole modern development of physiology, which is the basic part of biology. Consequently, Harvey is sometimes pictured as a scientific revolutionary. In fact the opposite is the case; his work is a proof of the continuity between ancient and modern biology, since Harvey was a thorough Aristotelian. He had learned the Aristotelian method of accurate observation and acute reasoning during his studies at the University of Padua, the stronghold of Aristotelian science in Europe, and this method is beautifully exemplified in his great work, *An Anatomical Disquisition on the Motion of the Heart and the Blood in Animals*.

The student who wishes to understand the scientific method should study this work carefully. He will find that it is a very clear example of a complete exposition, as the following outline indicates (compare with pages 185 ff).

A. Statement of the question:

1. *Introduction*: Reviewing opinions of previous writers about the pulse and function of the arteries and the heart, Harvey shows that these opinions leave serious problems unsolved.

CHAPTER I: Why the author is writing; the difficulty of the subject, etc.

Harvey uses his introduction, which is quite lengthy, to give a *historical* account of the opinions held before his time. Then he uses Chapter I to give a *rhetorical* introduction in which he wins the favor, attention, and interest of his reader. We might have expected the reverse order, but Harvey well realized that nothing would better establish himself with his readers, who were professional medical men and biologists, than to show his thorough acquaintance with the whole history of the problem. Only after this does he then attempt a more formal beginning. This is an example of the way in which the form of a complete exposition can be varied and adapted to different circumstances.

2. *Search for a definition of the heart:*

CHAPTER II: The motion of the heart as observed in animal experiments.

CHAPTER III: The motion of the arteries as observed in animal experiments.

CHAPTER IV. The motion, action, and function of the heart: a summary of what has been shown in the preceding chapters. The definition of the heart arrived at is as follows:

“The chief function of the heart is the transmission and pumping of blood through the arteries to the extremities of the body. Thus the pulse which we feel in the arteries is nothing else than the impact of blood from the heart.”

This still pertains to the state of the question, because it consists in stating the **principle** by which a solution to the problem can be reached, namely, a definition of the heart. Definitions are not demonstrated, but can be arrived at only by an analysis of experience; hence Harvey carefully prepares the way for his definition by a series of beautiful experiments in which false definitions are eliminated, and the true one exposed. The definition arrived at is in terms of the *four* causes, since (as the student can verify from the text of Harvey's work) he establishes the composition, structure, and function of the heart (i.e., its material, formal, and final causes). The efficient cause of the heart is not treated in detail in this work, as it is a problem of embryology which Harvey develops in another famous book. Furthermore, Harvey makes clear that he does not suppose his definition to be complete, since he is not sure whether the heart is only a pump, or whether in addition to this it acts on the blood chemically. This latter problem he leaves for further study, and indeed it can not be solved until much later when the nature of oxidation has been discovered by chemists. He has defined the heart as a pump, but he has not yet proved that it is a property of the pump to *circulate* the blood.

B. The Demonstration:

CHAPTER VI: The course by which the blood is carried from the *vena cava* into the arteries, or from the right into the left ventricle of the heart.

CHAPTER VII: The blood percolates through the substance of the lungs from the right ventricle of the heart into the pulmonary veins and the left ventricle.

CHAPTER VIII: How Harvey came to discover the circulation of the blood.

CHAPTER IX: The formal demonstration of the circulation of the blood.

CHAPTER X: The first proposition presupposed in this proof freed from objections and confirmed by experiments. Here Harvey shows that the heart pumps too much blood into the arteries for this blood to be newly made.

CHAPTER XI: The second proposition presupposed is defined. Here Harvey shows that the blood in the arteries is too great to have been newly made.

CHAPTER XII: Shows that, from the forgoing two premises, circulation is a necessary conclusion.

CHAPTER XIII: A third proposition implied in the proof, namely, the veins bring the blood back to the heart.

CHAPTER XIV: Final statement of his conclusion, namely, that *circulation* is proper to the blood and the heart.

C. Confirmation of the demonstration:

CHAPTER XV: The proof is confirmed by plausible arguments.

CHAPTER XVI: The proof is confirmed by comparative anatomy.

It will be noticed that in giving his demonstration Harvey first gives a *dialectical* preparation for it in Chapters VI-VIII. The first two of these chapters remove the chief difficulty to understanding his proof, namely, certain mistaken ideas about the relation of the lungs to the heart. Chapter VIII tells how Harvey hit on the idea of circulation, namely, from the analogy between the vascular system and cyclical processes in non-living nature.

Next Harvey gives his proof in short form in Chapter IX, and then proceeds to establish the premises on which the proof is based. The major premise is immediately evident, but the minor premise presupposes three other statements, and these Harvey establishes in Chapters X to XIII. Then in Chapter XIV he actually puts together his complete proof, as follows:

CHAPTER VIX

(*in the translation from Latin of Robert Willis*)

And now I may be allowed to give in brief my view of the circulation of the blood, and to propose it for general adoption.

Since all things, both argument and ocular experience, show that the blood passes through the lungs and heart by the action of the ventricles, and is sent for distribution to all parts of the body, where it makes its way into the veins and pores of the flesh, and then flows by the veins from the circumference on every side to the center, from the lesser to the greater veins, and is by them finally discharged into the vena cava and right auricle of the heart, and this in a quantity or in such flux and reflux thither by the arteries, hither by the veins, as cannot possibly be supplied by the ingested food, and is much greater than can be required for mere purposes

of nutrition; it is necessary to conclude that the blood in the animal body is impelled in a circle, and is in a state of ceaseless motion; that this is the act or function which the heart performs by means of its pulse; and that it is the sole and only end of the motion and contraction of the heart.

We may formulate this demonstration of Harvey's in the following syllogism:

An organ which pumps to
the body a much greater
quantity of blood than can
be supplied by the food
eaten

is a pump to circulate the blood.

And: the heart

is such an organ.

Therefore: the heart

is a pump to circulate the blood.

Major: This is evident from the general principles of physics, which show that there are only two simple types of motion, that in a straight line, and that in a circle, or closed line.

Minor: That the heart is such an organ can be establish from three propositions:

1. Too much blood leaves the heart to be produced from food in a single day. This can be seen from the capacity of the heart, the number of beats per minute and its structure as a pump.
2. Too much blood leaves the arteries to be produced from food in a single day; shown in a similar way.
3. The same amount of blood is returned by the veins to the heart.

It will be noticed that this proof depends on the **quantity** of blood, but nevertheless is not a mathematical-physical proof, since what is involved is not an exact quantity, nor any special property of quantity, but merely a rough *proportion*, as can be seen from the very round figures which Harvey uses.

Harvey does not give a special section of his exposition to *answering objections* because he finds it more convenient to take up these objections chapter by chapter, but he does confirm his proof by a series of arguments which are plausible, but which do not give the **proper reason** for his conclusion. In his main proof the proper reason assigned is from the *material cause* (the quantity of blood), but it also involves the *formal cause*, since Harvey has already established that the **structure** of the heart is obviously *pump-like*.

VII. A DEMONSTRATION FROM SOCIAL SCIENCE: LEO XIII ON THE RIGHT OF PRIVATE PROPERTY

The following is part of the argument for the natural right of private property given by Leo XIII in his great encyclical, *Rerum Novarum* (1891), in which he refutes the theories of socialism and proposes the Christian doctrine on the rights of labor.

For every man has by nature the right to possess property as his own. This is one of the chief points of distinction between man and the animal creation. For the brute has no power of self-direction, but is governed by two chief instincts, which keep his powers alert, move him to use his strength, and determine him to action without the power of choice. These instincts are self-preservation and the propagation of the species. Both can attain their purpose by means of things which are close at hand; beyond their surroundings the brute creation cannot go, for they are moved to action by sensibility alone, and by the things which sense perceives. But with man it is different indeed. He possesses, on the one hand, the full perfection of animal nature, and therefore he enjoys, at least as much as the rest of the animal race, the fruition of the things of the body. But animality, however perfect, is far from being the whole of humanity, and is indeed humanity's humble handmaid, made to serve and obey. It is the mind, or the reason, which is the chief thing in us who are human beings; it is this which makes a human being human, and distinguishes him essentially and completely from the brute. And on this account—viz., that man alone among animals possesses reason—it must be within his right to have things not merely for temporary and momentary use, as other living beings have them, but in stable and permanent possession; he must have not only things which perish in the using, but also those which, though used, remain for use in the future.

This becomes still more clearly evident if we consider man's nature a little more deeply. For man, comprehending by the power of his reason, things innumerable, and joining the future with the present—being, moreover, the master of his own acts—governs himself by the foresights of his counsel, under the eternal law and the power of God, whose Providence governs all things. Wherefore it is in his power to exercise his choice not only on things which regard his present welfare, but also on those which will be for his advantage in time to come. Hence man not only can possess the fruits of the earth, but also the earth itself; for of the products of the earth he

can make provision for the future. Man's needs do not die out, but recur; satisfied today, they demand new supplies tomorrow. Nature, therefore, owes to man a storehouse that shall never fail, the daily supply of his daily wants. And this he finds only in the inexhaustible fertility of the earth.

Nor must we, at this stage, have recourse to the State. Man is older than the State and he holds the right of providing for the life of his body prior to the formation of any State.

And to say that God has given the earth to the use and enjoyment of the universal human race is not to deny that there can be private property. For God has granted the earth to mankind in general; not in the sense that all without distinction can deal with it as they please, but rather that no part of it has been assigned to any one in particular, and that the limits of private possession have been left to be fixed by man's own industry and the laws of individual peoples. Moreover, the earth, though divided among private owners, ceases not thereby to minister to the needs of all; for there is no one who does not live on what the land brings forth. Those who do not possess the soil, contribute their labor; so that it may be truly said that all human subsistence is derived either from labor on one's own land, or from some laborious industry which is paid either in the produce of the land itself or in that which is exchanged for what the land brings forth.

Here, again, we have another proof that private ownership is according to nature's law. For that which is required for the preservation of life and for life's well being, is produced in great abundance by the earth, but not until man has brought it into cultivation and lavished upon it his care and skill. Now, when man thus spends the industry of his mind and the strength of his body in procuring the fruits of nature, by that act he makes his own that portion of nature's field which he cultivates—that portion on which he leaves, as it were, the impress of his own personality; and it cannot but be just that he should possess that portion as his own, and should have a right to keep it without molestation. . . .

The principal argument of this selection may be formulated as follows:

| | | |
|-----------------------|----|---|
| A rational animal | is | endowed by nature with the right to possess permanent private property. |
| And: man | is | a rational animal. |
| Therefore: man | is | endowed by nature with the right to possess permanent private property. |

Proof of Major:

An animal which must deliberately provide for its future material needs is endowed by nature with the right to possess permanent private property.

And: a rational animal is an animal which must deliberately provide for its future material needs.

Therefore: a rational animal is endowed by nature with the right to possess permanent private property.

Major: Nature does nothing in vain, hence if a creature cannot live without material things and must get those by its own planning, it has a right to get them and keep them for use.

Minor: Other animals live by instinct, but a rational animal lives by deliberate planning for the future.

Proof of Minor: This is the definition of man established by the science of psychology.

Objection: The state can provide man with his material needs.

Answer: Man's duty and right to provide for himself is prior to the state, and cannot be taken away by the state.

Another objection: Man may have a right to what he produces, but not the land.

Answer: Since man has a right to what he produces from the land, he must also have a right to keep the land in order to produce from it.

In the above demonstration the student will note that Leo XIII argues from the following principles:

1. Man is a rational animal. This is a definition which comes from the theoretical science of **psychology**.
2. Man has a moral right to those things which are necessary for him to live a good human life. This is a basic principle of **ethics**.
3. Man's need for permanent possession of material things, and his ability to acquire them by labor, is prior to the state. This is a basic principle of **politics**.

Leo XIII's proof is certainly scientific and leads to a necessary conclusion. However, as he himself indicates when he points out that the laws of individual society limit this right, this general conclusion has to be applied to the particular circumstances of each society. It is not wrong for the state to take over ownership of certain

kinds of property if this is necessary for the common good, as long as it does not violate the basic right of the individual to own what he needs. The conclusions of the social sciences usually admit of such modifications in practice according to differing circumstances, except in cases where what is involved is intrinsically evil and contrary to nature, in which case the action is always wrong, whatever the circumstances.

VIII. A SCIENTIFIC DEMONSTRATION IN THEOLOGY: ST. THOMAS AQUINAS AND THE MATERNITY OF OUR LADY

The following is from the *Summa Theologiae*, Part III, Question 35, Article 4.*

Whether the Blessed Virgin Should Be Called the Mother of God?
We proceed thus to the fourth article:

Objection 1. It would seem that the Blessed Virgin should not be called the Mother of God. For in the divine mysteries we should not make any assertion that is not taken from Holy Scripture. But we read nowhere in Holy Scripture that she is the mother or parent of God, but that she is the *mother of Christ* or of *the Child*, as may be seen in Matthew 1:18. Therefore we should not say that the Blessed Virgin is the Mother of God.

Objection 2: Further, Christ is called God in respect of his divine nature. But the divine nature did not first originate from the Virgin. Therefore the Blessed Virgin should not be called the Mother of God.

Objection 3: Moreover, the word God is predicated in common of Father, Son, and Holy Ghost. If, therefore, the Blessed Virgin is Mother of God, it seems to follow that she was the Mother of Father, Son, and Holy Ghost, which cannot be allowed. Therefore the Blessed Virgin should not be called Mother of God.

On the contrary, in the chapters of Cyril, approved in the Council of Ephesus, he read: "If anyone confess not that Emmanuel is truly God, and that for this reason the Holy Virgin is the Mother of God, since she begot of her flesh the Word of God made flesh, let him be anathema."

I answer that, as stated above (Question 16, Article 1), every word that signifies a nature in the concrete can stand for any hypostasis** of that nature. Now, since the union of the Incarnation took place in the hypostasis as above stated (Question 2, Article 3), it is mani-

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** Technical term used by the Greek Fathers equivalent to *substance*.

fest that this word *God* can stand for the hypostasis, having a human nature and a divine nature. Therefore, whatever belongs to the divine and to the human nature can be attributed to that Person: both when a word is employed to stand for it, signifying the divine nature, and when a word is used signifying the human nature. Now conception and birth are attributed to the person and hypostasis in respect of that nature in which it is conceived and born. Since, therefore, the human nature was taken by the divine Person in the very beginning of the conception, as stated above (Question 33, Article 3), it follows that it can truly be said that God was conceived and born of the Virgin. Now from this is a woman called a man's mother, that she conceived him and gave birth to him. Therefore the Blessed Virgin is truly called the Mother of God. For the only way in which it could be denied that the Blessed Virgin is the Mother of God would be either if the humanity were first subject to conception and birth, before this man were the Son of God, as Photinus said; or if the humanity were not assumed unto unity of the Person or hypostasis of the Word of God, as Nestorius maintained. But both of these are erroneous. Therefore it is heretical to deny that the Blessed Virgin is the Mother of God.

Reply to Objection 1. This was the argument of Nestorius, and it is solved by saying that, although we do not find it said expressly in Scripture that the Blessed Virgin is the Mother of God, yet we do find it expressly said in Scripture that "Jesus Christ is true God" (as may be seen, I John, 5:20) and that the Blessed Virgin is the Mother of Jesus Christ, which is clearly expressed in Matthew 1:18. Therefore, from the words of Scripture it follows of necessity that she is the Mother of God.

Again it is written (Romans 9:5) that Christ is of the Jews "according to the flesh, who is over all things, God blessed forever." But he is not of the Jews except through the Blessed Virgin. Therefore he who is "above all things, God blessed forever" is truly born of the Blessed Virgin as of His mother.

Reply to Objection 2: This was an argument of Nestorius. But Cyril, in a letter against Nestorius, answers it thus: "Just as when a man's soul is born with its body, they are considered as one being; and if anyone wish to say that the mother of the flesh is not the mother of the soul, he says too much. Something like this may be perceived in the generation of Christ. For the Word of God was born of the substance of God the Father: but because he took flesh, we must of necessity confess that in the flesh he was born of a woman." Consequently, we must say that the Blessed Virgin is called the Mother of God, not as though she were the Mother of the Godhead,

but because she is the mother, according to his human nature, of the Person who has both the divine and the human nature.

Reply to Objection 3: Although the name *God* is common to the three Persons, yet sometimes it stands for the Person of the Father alone, sometimes only for the Person of the Son or of the Holy Ghost, as was stated above (Question 16, Article 1). So that when we say, "The Blessed Virgin is the Mother of God," this word *God* stands only for the Incarnate Person of the Son.

In the body of this article St. Thomas states his proof positively and negatively:

A. Positive demonstration:

The mother of a divine
Person according to his
human nature

is rightly called the Mother of God,

And: Mary

is the mother of a divine Person
according to his human nature.

Therefore: Mary

is rightly called the Mother of God.

Major: Because a name is given with respect to what is *personal* (proved in Question 16, Article 1).

Minor: Mary is the Mother of Christ, who is a divine Person having a divine nature from all eternity and a human nature taken from Mary (Question 33, Article 3).

Notice that the major here rests on a philosophical truth (namely, the right way to give names) while the minor is a *revealed article of faith*. This is typical of theological reasoning, that frequently one premise is taken from faith and one from reason, although sometimes both are taken from faith.

B. Negative demonstration:

If one holds that Mary should not be called the Mother of God, this must logically be because he holds either that:

1. Christ only became the son of God *after* he was born of Mary.
2. Or that in him there was not one single divine Person, but a divine and a human person.

But: both of these positions have been condemned by the Councils as heresy.

Therefore: to deny that Mary is to be called the Mother of God is equivalent to heresy.

The objections and their answers:

We can briefly formulate these objections and the distinctions by which St. Thomas answers them as follows:

1. A woman who is not given this title in Holy Scriptures is wrongly called the Mother of God.
- And:** Mary is a woman who is not given this title in Holy Scriptures.
- Therefore:** Mary is wrongly called the Mother of God.

Answer: distinguish the major: who is not given this title *implicitly*, I concede. who is not given it *explicitly*, I deny.

Contradistinguish the minor: Deny that the conclusion follows.

2. A woman who is not the origin of Christ's divine nature is wrongly called the Mother of God.
- And:** Mary is a woman who is not the origin of Christ's divine nature.
- Therefore:** Mary is wrongly called the Mother of God.

Answer: distinguish the major: wrongly called the Mother of God as if she gave him his divine nature, I concede. wrongly called the Mother of God as the Mother of a divine Person with regard to his human nature, I deny.

Distinguish the minor: And **distinguish** the conclusion.

3. One who is not the Mother of the Blessed Trinity is wrongly called the Mother of God.
- And:** Mary is not the Mother of the Blessed Trinity.
- Therefore:** Mary is wrongly called the Mother of God.

Answer: distinguish the major: "Mother of God" if "God" is used to mean the Three Persons in common, I concede. But if "God" is used to signify the Second Person, I deny.

Distinguish the minor.

Distinguish the conclusion.

BIBLIOGRAPHY

The teacher and student will find the *Great Books of the Western World*, edited by Robert Maynard Hutchins (Encyclopaedia Britannica, Inc., Chicago, 1952), an invaluable collection for the further study of the liberal arts. The second and third volume of this set are called *The Great Ideas, A Syntopicon*, edited by Mortimer J. Adler and William Gorman. This contains very valuable bibliographies of the classical, ancient, and modern works on the liberal arts, and useful articles outlining the main problems and topics of controversy concerning them. Especially recommended are the following articles: ART, ASTRONOMY, BEAUTY, DEFINITION, DIALECTIC, INDUCTION, INFINITY, JUDGMENT, KNOWLEDGE, LANGUAGE, LOGIC, MATHEMATICS, MECHANICS, POETRY, QUALITY, QUANTITY, REASONING, RHETORIC, SIGN AND SYMBOL. In using this work, however, it must be remembered that some of the "great books" in this collection are forbidden by the *Index* or by Canon Law and cannot be read by students, or by teachers, without a dispensation of the Bishop, because they argue against the natural law or the Christian Faith in a sophistical manner. The very fact that they are the work of very clever and gifted writers make them dangerous for any except those with adequate theological and philosophical training, since these writers lead man from truth by appealing to the weaknesses of human appetite, especially intellectual pride and intellectual despair.

It is also important that a teacher or student of the liberal arts should be acquainted with educational history. For this purpose the following are recommended:

1. Kane, William T., S.J., *A History of Education, considered chiefly in its development in the Western World* (Chicago, 1954). This book, which contains good bibliographies and which shows a good acquaintance with original sources, will serve as a brief introductory picture to the history of education.
2. Brickman, William W., *Guide to Research in Educational History* (New York: University Bookstore, 1949). This contains extensive bibliographies of works on the history of education.

The last item lists the many lines of approach to the history of education which may be taken. I would like to recommend only

that the teacher make an acquaintance with the following books, as a beginning to recovery of the liberal arts tradition:

1. Marrou, Henri I., *History of Education in Antiquity*; translated by George Lamb (Sheed and Ward, 1956).
2. Hight, Gilbert, *The Classical Tradition, Greek and Roman Influence on Western Literature* (Oxford University Press, 1953).
3. Marriquet, Pierre, S.J., *History of Christian Education*; 3 vols. (Fordham University Press, 1924-32).
4. Rashdall, Hastings, *The Universities of Europe in the Middle Ages*; revised by F. M. Powicke and A. B. Emden, 3 vols. (Oxford University Press, 1936).
5. Abelson, Paul, *The Seven Liberal Arts*, (Teachers College, Columbia University, 1906).
- 6 Ganss, George Edward, *St. Ignatius' Ideal of a Jesuit University* (Marquette University Press, 1954).

This study of the history of the liberal arts, however, cannot in way substitute for direct acquaintance with the classical works in these fields. *The Syntopicon* (see above) contains excellent bibliographies on these arts. In the following the basic classical work on the subject, and one or more modern works which will introduce student or teacher to modern conceptions of the art are suggested.

A. Logic:

1. The classical works are Aristotle's *Organon*, *Rhetoric*, and *Poetics*. They are on the whole very superior to subsequent works on the subject, both in their completeness and their scientific method. They are available complete in translation in the *Great Books*, Vol. 8, and in the Oxford translation published by the Oxford University Press, and edited by W. D. Ross. A good selection is included in *The Basic Works of Aristotle*, edited by R. P. McKeon (Random House, 1941). The *Poetics* and *Rhetoric* are available in handy form in the "Modern Library." The Greek texts with English translation are available in part in the "Loeb Classical Library" (the *Organon* is not yet complete).

2. The *Poetics* and *Rhetoric* are quite easy even for the beginner. The *Organon* is difficult for even the most advanced. Hence it is recommended that the beginner start with a simple textbook in logic written from a genuinely Aristotelian point of view. Many of the so-called "traditional logics," even those claiming to be Thomistic or scholastic, actually present a very degenerated "tradition." The following two books are sound:

Oesterle, John A., *Logic—The Art of Defining and Reasoning*, (Prentice-Hall, 1935).

Vincent E. Smith, *Elements of Logic* (Bruce, 1957).

3. For advanced students in Aristotelian logic the commentaries of St. Albert the Great on the whole of the *Organon*, of St. Thomas Aquinas on parts of it, and the summary of Sylvester Maurus on the whole are indispensable. However these have not yet been translated into English, with the exception of St. Thomas Aquinas, *Commentary on the Posterior Analytics of Aristotle* (mimeographed edition); translated by Pierre Conway, O.P. (Doyon, Laval, Quebec 1956).

Also useful are the commentaries which reflect a sound Aristotelianism in doctrine, but not in their manner of ordering the subject.

John of St. Thomas, *Outlines of Formal Logic*; translated by F. C. Wade, S.J. (Marquette University, 1955).

John of St. Thomas, *The Material Logic of John St. Thomas*; translated by Yves Simon and John Glanville (University of Chicago Press, 1956).

4. Logic underwent marked changes in the period of latter scholasticism and then entered into a long period in which the "traditional logic" was taught in a very poor form and without any extensive research. In the middle of the 19th century interest began to revive in the form of *symbolic* or *mathematical logic*. To begin a study of this subject the following are recommended:

The articles on LOGIC; LOGIC, HISTORY OF; LOGICAL POSITIVISM in the *Encyclopaedia Britannica*, 1957. These articles are by some of the leading authorities in the field.

Stebbing, S., *A Modern Introduction to Logic* (Thomas Y. Crowell, Co).

Copi, Irving M., *Symbolic Logic* (Macmillan, 1953). This is an elementary text.

Quine, W. Van Orman, *Mathematical Logic* (Harvard, 1947). An advanced text by an outstanding authority.

Veatch, H., *Intentional Logic* (Yale, 1952). This is a criticism of modern logic by an author who shows its nominalistic implications.

In beginning the study of modern logic the student should note that it is essentially a *calculus*, related to Aristotelian logic in much the same way that algebra is related to the classical arithmetic. Hence it cannot stand by itself. Unless it is an instrument of logic in Aristotle's sense, it becomes a merely arbitrary system of marks on paper, a kind of parlor game. Used as an instrument of logic it is undoubtedly useful, although to date it has actually been shown to be of use only in mathematics. It cannot substitute for Aristotelian logic, because it does not solve the basic problems of

logic which have to do, not with the manipulation of signs, but with mental relations, founded on the nature of the mind and of things.

B. Rhetoric and Poetics, and the Fine Arts

1. Basic to the study of these arts is the study of language. Mario Pei, *The Story of Language* (J. P. Lippincott Co., 1949), will serve as an initial introduction to the problems of language. *The Syn-topicon*, articles on Language, and Sign and Symbol will furnish an introduction and bibliographies to more philosophical problems of language. Otto Jespersen, *Growth and Structure of the English Language* (Doubleday Anchor Book, 1955), will show how these problems are found in our own tongue.

2. Crane, Ronald and Olsen, Elder, *Critics and Criticism, Ancient and Modern* (University of Chicago). This work, and especially the historical articles by Richard P. McKeon, distinguish and trace the various strands of opinion on the subject of these arts.

Crane, Ronald, *The Language of Criticism and the Structure of Poetics* (University of Toronto, 1953), is the most accurate analysis of the poetics and an excellent confrontation between it and the contemporary revival of interest in critical theory.

The "Chicago school of criticism" represented by these two books is undoubtedly the most authentically Aristotelian. Its chief defect is that, in anxiety to distinguish poetry accurately from rhetoric and other disciplines, it has not taken care to show how it can be integrated with the other intellectual and moral virtues. Consequently, these critics somewhat exaggerate the autonomy of the work of art, fearing to explain "imitation" in a way that subordinates the work of art to its object, and also fearing to show the subordination of poetics and fine art to prudence.

3. Wellek, René and Warren, Austin, *Theory of Literature* (Harvest Harcourt Brace, 1956). This work, which has very good bibliographies, lacks sound theoretical principles, but is an excellent introduction to the problems and opinions of literary criticism.

4. Brook, Cleanth and Warren, Robert Penn, *Modern Rhetoric* (Harcourt Brace, 1950). This textbook, which contains excellent readings, serves to show the state of modern rhetoric. It will be noted that it also lacks the solid theoretical foundation of Aristotle's work.

5. The teacher should also become acquainted with modern propaganda and advertising techniques. The popular book of Vance Packard, *Hidden Persuaders* (McKay, 1957), will serve as an introduction.

6. The general problems of esthetics are well listed in Jarret, James L., *The Quest for Beauty*, (Prentice-Hall, 1957).
7. The field of theoretical writing on music is very extensive. Such a text as David D. Boyden, *An Introduction to Music* (Alfred A. Knopf, 1956), will serve to show the scope of the present study of music, and the bibliographies will lead into the field.

There is no really classical work on musical theory, because such works as Boethius, *De Musica*, treated only of the mathematical theory of music and left its imitative character untouched. Herbert T. Schwartz in a doctrinal dissertation, *An Aristotelian Analysis of the Elements, Principles and Causes of the Art of Music* (Columbia University; published in Cleveland, Ohio, 1936), showed how the principles of Aristotle's *Poetics* can be applied to music as regards its mathematical structure. He has not published a detailed analysis of its manner of imitating the emotions.

The little work of Percy Goetschius, *The Structure of Music*, (Theodore Presser Co., 1934), can be recommended for its clear presentation of the basic principles of music, and the brilliant series of six lectures by Igor Stravinsky, *Poetics of Music* (Vintage Books, 1956), for its explanation of the present state of the art. Stravinsky emphatically denies that music is "imitative," but this must be taken in the sense that music does not imitate particular objects, but the emotions.

8. Writing on the plastic arts is also very extensive, and most of the "explanations" or defenses of "modern art" contain very much the same arguments. For the problem of Christian art the work of Anton Henze and Theodor Filthaut, *Contemporary Church Art*, translated by Cecily Hastings and edited by Maurice Lavanoux, (Sheed and Ward, 1956), is excellent.

C. Mathematics

1. Struik, Dirk., *A Concise History of Mathematics* (Dover, 1948).
2. Newman, James R., ed., *The World of Mathematics*, 4 vols. (Simon and Schuster, 1955), is an excellent collection of material which will give the beginner a very good notion both of the scope and the problems of modern mathematical thought although containing serious philosophical errors.
3. Waismann, Friedrich, *Introduction to Mathematical Thinking, The Formation of Concepts in Modern Mathematics*; Foreword by Karl Menger; translated by Theodore J. Benac (Frederick Ungar Publishing Co., 1951). This is a very clear presentation and analysis of modern mathematical procedure.

4. Black, Max, *The Nature of Mathematics* (Humanities Press, 1950), presents the controversies on the foundations of mathematics. Also recommended is the article MATHEMATICS, FOUNDATIONS OF, in the *Encyclopaedia Britannica*, Vol. 15, p. 82, by S. C. Kleene.
 5. Aristotle did not leave a treatise on mathematics, but his thought is very well reconstructed by Hippocrates George Apostle, *Aristotle's Philosophy of Mathematics*, (University of Chicago Press, 1952). It might be noted that the "general mathematics" of which Apostle speaks is probably the metaphysics of quantity, rather than a distinct mathematical science, like geometry and arithmetic.
 6. The student and teacher should become familiar with the classical works of Euclid, Apollonius, Archimedes, Nicomachus, and Ptolemy contained in *Great Books*, Vols. 11 and 16.
- D. In addition I would recommend to the teacher who is looking for easy materials in natural science:
1. Robinson, Edward M., and George Polk, *Science: How? Why? Wherefore* (The Priory Press, Dubuque, Iowa, 1957).
 2. Kane, William H., and collaborators, *Science in Synthesis* (The Priory Press, Dubuque, Iowa, 1957).
 3. *Scientific American Books* (Simon and Schuster, New York). These are paperbound reprints of the excellent articles from the *Scientific American Magazine*.

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