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INTRODUCTION

Why Aristotle?

Why for everybody?

And why is an exposition of Aristotle for everybody an introduction to common sense?

I can answer these three questions better after I have answered one other. Why philosophy? Why should everyone learn how to think philosophically—how to ask the kind of searching questions that children and philosophers ask and that philosophers sometimes answer?

I have long been of the opinion that philosophy is everybody's business—but not in order to get more information about the world, our society, and ourselves. For that purpose, it would be better to turn to the natural and the social sciences and to history. It is in another way that philosophy is useful—to help us to understand things we already know, understand them better than we now understand them. That is why I think everyone should learn how to think philosophically.

For that purpose, there is no better teacher than Aristotle. I do not hesitate to recommend him as the teacher to begin with. The only other teacher that I might have chosen is Plato, but in my judgment he is second best. Plato raised almost all the questions that everyone should face; Aristotle raised them too and, in addition, gave us clearer answers to them. Plato taught Aristotle how to think philosophically, but Aristotle learned the

lesson so well that he is the better teacher for all of us.

Since we are concerned with learning how to think the way Aristotle did, what Aristotle thought is more important than who he was or when and how he lived. The centuries and the changes that separate him from us may make the conditions of his life and the society in which he lived appear strange to us; but, as I will try to explain, they do not make either the style or the content of his thinking strange to us.

Aristotle was born in 384 B.C. in the Macedonian town of Stagira on the north coast of the Aegean Sea. His father was a physician in the court of the King of Macedonia. The King's grandson became Alexander the Great, to whom Aristotle later became both tutor and friend.

At the age of eighteen, Aristotle took up residence in Athens and enrolled in Plato's Academy as a student of philosophy. It was not long before Plato found Aristotle a troublesome student who questioned what he taught and openly disagreed with him. When Plato died, and Alexander became the ruler of Greece, Aristotle opened his own school, the Lyceum. That was in 335 B. C.

The Lyceum had a fine library, an extensive collection of maps, and a zoo in which Aristotle collected specimens of animal life. It has been said that some of these were sent to him by Alexander from the countries he conquered. When Alexander died in 323 B.C., Aristotle exiled himself from Athens to one of the Aegean islands. He died there a year later at the age of 63.

Aristotle lived in a society in which the citizens had free time to enjoy the pursuits of leisure because they had slaves to take care of their estates and to do menial work. It was also a

society in which women occupied an inferior position. Plato, in projecting the institutions of an ideal state, proposed that all political offices, except that of military leader, should be open to women, because he regarded men and women as essentially equal; but Aristotle accepted the more conventional view of his day concerning the inferiority of women.

I shall have more to say in a later chapter about Aristotle's views with regard to slavery and to women. Here I want to say at once that my use of the words "man," "men," and "mankind" in their generic sense to stand for human beings of both genders, and not just for the male portion of the population, is in no way an indication that I share Aristotle's view about women. On the contrary, with regard to this point, I am a Platonist.

There may be some persons who regard Aristotle's antiquity as a disadvantage. They may feel that it would be much better to select as a teacher someone alive today—someone acquainted with the world in which we live, someone who knows what modern science has discovered about that world. I do not agree with them.

Though Aristotle was a Greek who lived twenty-five centuries ago, he was sufficiently acquainted with the main outlines of the world in which we live to talk about it as if he were alive today. As an aid to our being able to think philosophically, Aristotle would not be a better teacher even if he were acquainted with everything that modem scientists know.

In an effort to understand nature, society, and man, Aristotle began where everyone should begin—with what he already knew in the light of his ordinary, commonplace experience.

Beginning there, his thinking used notions that all of us

possess, not because we were taught them in school, but because they are the common stock of human thought about anything and everything.

We sometimes refer to these notions as our common sense about things. They are notions that we have formed as a result of the common experience we have in the course of our daily lives—experiences we have without any effort of inquiry on our part, experiences we all have simply because we are awake and conscious. In addition, these common notions are notions we are able to express in the common words we employ in everyday speech.

Forgive me for repeating the word "common" so many times. I cannot avoid doing so, and I have to lay stress on that word because what it means lies at the heart of my argument. Not everything is common. There are many things we call our own, but there are other things that we recognize as not exclusively ours. We share them with others, such as a book that our friends have read or a motion picture some of us have enjoyed, or a house that all the members of the family share when they live in it together.

The things we share are common. There are many things that different groups of people share. There are fewer things that we all share and are common to all of us, simply because we are all human. It is in this last, all-embracing sense of the word "common" that I refer to common experiences and common notions, or common sense, as common.

Our common-sense notions are expressed by such words as "thing," "body," "mind," "change," "cause," "part," "whole," "one," "many," and so on. Most of us have been using these words and notions for a long time—since we were quite young. We started to use them in order to talk about experiences that

all of us have had—of things moving or remaining at rest, of plants growing, of animals being born and dying, of sitting down and getting up, of aches and pains, of going to sleep, dreaming, and waking up, of feeding and exercising our bodies, and of making up our minds.

I could enlarge this list of our common experiences, just as I could enlarge the list of the common words we use and the common notions we have. But even without the additions that could be made, it should be clear that the words, experiences, and notions I have mentioned are all common—not exclusively yours, or mine, or anyone else's.

In contrast, the things that scientists observe in their laboratories or that explorers observe on their expeditions are very special experiences. We may learn about them from their reports, but, as a rule, we do not experience them ourselves.

Human beings have learned a great deal since Aristotle's day, mainly through the discoveries of modern science. Applied science has created a world and a way of life very different from his world and his way of life. He did not have an automobile, could not talk on the telephone, never saw what can be seen through a microscope or a telescope, did not have a close view of the surface of the moon, and never heard a description of its surface by men walking on it. But Aristotle had the same common experiences in his day that we have in ours. The kind of thinking he did about them enabled him to understand them better than most of us do.

That and that alone is the reason he can help us to understand these common experiences better and help us to understand ourselves and our lives, as well as the world and the society in which we live, even though our way of life, our world, and our society are different from his.

Aristotle's thinking began with common sense, but it did not end there. It went much further. It added to and surrounded common sense with insights and understandings that are not common at all. His understanding of things goes deeper than ours and sometimes soars higher. It is, in a word, *uncommon* common sense.

That is his great contribution to all of us. What I am going to try to do in this book is to make his *uncommon* common sense easier to understand. If it becomes easier to understand, it might even become less uncommon.

PART ONE: MAN THE PHILOSOPHICAL ANIMAL

1. Philosophical Games

Many of us have played two games without realizing we were on the way to becoming philosophical. One is called "Animal, Vegetable, Mineral"; the other, "Twenty Questions."

Both games consist in asking questions. However, that is not what makes them philosophical games; it is what lies behind the questions—a set of categories, a scheme of classification. Classifying things, placing them in this or that category, is a familiar process. Everyone does it at one time or another—shopkeepers when they take stock of what is on their shelves, librarians when they catalogue books, secretaries when they file letters or documents. But when the objects to be classified are the contents of the physical world, or the even-larger universe that includes the physical world, then philosophy enters the picture.

The two games—"Animal, Vegetable, Mineral" and "Twenty Questions"—are sometimes played as if they were the same game. That occurs when the first of the twenty questions to be asked is "Animal, vegetable, or mineral?" in order to find out whether the object being thought of falls into one of these three large categories, or classes, of physical things. But only some of the objects we can think about are physical things. If, for example, the object decided on was a geometrical figure, such as a circle, or a number, such as the square root of minus one,

or if it happened to be one of the Greek gods, such as Zeus, Apollo, or Athena, asking whether the object in question was animal, vegetable, or mineral would not or, at least, should not get an answer.

The game of twenty questions, when it is not begun by asking "Animal, vegetable, or mineral?" is concerned with discovering any object that can be thought about by anybody. It is not limited to objects that are physical things. Of the two games, it is the more likely to engage us in philosophical thought without our being aware of it. To become aware of it, we need Aristotle's help.

Classifying was one of the skills in which Aristotle excelled. Another was his skill in asking questions. Philosophical thought began with the asking of questions—questions that can be answered on the basis of our ordinary, everyday experience and with some reflection about that experience that results in a sharpening and refinement of our common sense.

Animal, vegetable, and mineral is a rough-and-ready, three-fold division of things we find in the physical world. But we use the word "mineral" loosely when we use it to stand for all the physical things that fall on one side of the line that divides living organisms from inanimate things—rosebushes or mice from sticks or stones. All inanimate things are not minerals, such as gold or silver that we dig from deposits in the earth. Some are rock formations found on the earth's surface or in its interior; some are other forms of matter in liquid or gaseous state.

In the category of nonliving or inanimate bodies that is loosely covered by the term "mineral," Aristotle would have us distinguish between elementary and composite bodies. An elementary body, according to Aristotle, is one that consists in

a single kind of matter—gold, for example, or copper or zinc. In contrast, a composite body is one that is composed of two or more different kinds of matter, such as brass, which is a mixture of copper and zinc. But, for Aristotle, the more important distinction is the one that divides living from nonliving things.

What differentiates all living organisms from inert bodies, whether they are elementary or composite bodies? From our ordinary experience of living organisms, we know that they all have certain common characteristics. They take nourishment; they grow; they reproduce.

Among living organisms, what differentiates plants from animals? Again, from our ordinary experience, we know that animals have certain common characteristics that plants lack. They are not rooted in the earth like plants; they have the ability to move from place to place by their own means of locomotion. They do not draw their nourishment from the air and from the soil as plants do. In addition, most animals have sense organs.

The line that divides inert bodies from living organisms sometimes leaves us wondering on which side of the line a particular thing belongs. This is also true of the line that divides plants from animals. For example, some plants appear to have sensitivity even though they do not have sense organs like eyes and ears. Some animals, such as shellfish, seem to lack the power of locomotion; like plants they appear to be rooted in one spot.

In classifying physical things as inanimate bodies, plants, and animals, Aristotle was aware that his division of all physical things into these three large classes did not exclude borderline cases—things that in a certain respect appear to belong on one

side of the dividing line and that, in another respect, appear to belong on the other side. He recognized that in the world of bodies, the transition from things lifeless to living things and from plant life to animal life is gradual and not a clear-cut, all-or-none affair.

Nevertheless, Aristotle persisted in thinking that the differences between living and nonliving bodies and between plants and animals separated them into quite different kinds of things. His reason for holding this view was as follows.

If we did not, in the first place, recognize and understand the clear-cut distinction between a stone and a mouse, we would never find ourselves puzzled by whether something difficult to classify was a living or a nonliving thing. Similarly, if we did not recognize the clear-cut distinction between a rosebush and a horse, we would never wonder whether a given specimen of living organism was a plant or an animal.

Just as animals are a special kind of living organism because they perform functions that plants do not, so for a similar reason are human beings a special kind of animal. They perform certain functions that no other animals perform, such as asking general questions and seeking answers to them by observation and by thought. That is why Aristotle called human beings rational animals—questioning and thinking animals, able to engage in philosophical thought.

There may be animals that appear to straddle the borderline that divides humans from nonhumans. Porpoises and chimpanzees, it has recently been learned, have enough intelligence to engage in rudimentary forms of communication. But they do not appear to ask themselves or one another questions about the nature of things, and they do not appear to try, by one means or another, to discover the answers for

themselves. We may speak of such animals as almost human, but we do not include them as members of the human race.

Each distinct kind of thing, Aristotle thought, has a nature that distinguishes it from all the others. What differentiates one class of things from everything else defines the nature possessed by every individual thing that belongs to that class. When we speak of human nature, for example, we are simply saying that all human beings have certain characteristics and that these characteristics differentiate them from other animals, from plants, and from inanimate things.

Aristotle's scheme of classification arranged the five main classes of physical things in an ascending order. He placed elementary and composite bodies at the bottom of the scale. Each of the higher classes is higher because it possesses the characteristics of the class below and, in addition, has certain distinguishing characteristics that the class below does not have.

In the scale of natural things, the animate is a higher form of existence than the inanimate; animals are a higher form of life than plants; and human life is the highest form of life on earth.

All living organisms, like all inanimate bodies, occupy space and have weight, but in addition, as we have noted, they eat, grow, and reproduce. Because they are living organisms, animals, like plants, perform these vital functions, but they also perform certain functions that plants do not. At the top of the scale are human beings who perform all the vital functions performed by other animals and who, in addition, have the ability to seek knowledge by asking and answering questions and the ability to think philosophically.

Of course, it can be said that many of the higher animals think,

and even that computers think. Nor is it true that only humans have intelligence. Intelligence in varying degrees is to be found throughout the animal world, just as it is to be found in varying degrees in members of the human race. But the special kind of thinking that gives rise to asking and answering philosophical questions distinguishes humans from other animals. No other animal plays philosophical games.

In the world of physical things that Aristotle divides into five large classes, the word "body" names the one, all-embracing class. There is no more inclusive class of which bodies are a subclass. Every *thing* in the physical world is a *body* of one kind or another.

Can we go to the opposite extreme and find a subclass of bodies at which we must stop because we are unable to divide it any further into smaller subclasses? Is the human species such a subclass of animals?

Faced with that question, most of us probably think at once of different races or varieties of mankind—differentiated by skin color, by facial characteristics, by head shape, and so on. Why do not such characteristics divide human beings into different kinds or subclasses?

In this connection, Aristotle made an important distinction. Not all the characteristics of a thing, he said, define its nature or essence. As we have already seen, Aristotle thought man should be defined as a rational—or Philosophical—animal. Being able to ask questions about the what, the why, and the wherefore of things is what makes anyone a human being, not the skin color, the snub nose, the straight hair, or the shape of the head.

We can, of course, divide human beings into an endless variety

of subclasses—tall or short, fat or thin, white or black, strong or weak, and so on. But although such differences may be used to distinguish one subgroup of human beings from another, they cannot be used, according to Aristotle, to exclude any of these subgroups from the human race. What is even more important, it cannot be said that the members of one subgroup are more or less human than the members of another.

In other words, the differences between one subclass of human beings and another are superficial or minor, as compared with the basic or major differences that separate human beings from other animals. Aristotle called the superficial or minor differences accidental; the basic or major differences he regarded as essential.

Human beings and brute animals are essentially different; tall human beings and short ones, fat human beings and thin ones, are accidentally different. It is only in this way that one human being differs from another. We are all animals of the same kind, but one individual may have more and another individual less of this or that human characteristic. Such individual differences are much less important than the one thing that unites all men and women—their common humanity, which is the one respect in which all human beings are equal.

2. The Great Divide

Aristotle's division of physical things into inanimate bodies and living organisms, and his division of living organisms into plants, animals, and human beings, do not exhaust his scheme of classification or his set of categories.

Think, for example, of Wellington's horse at the Battle of Waterloo or of Julius Caesar crossing the Rubicon. Think of Shakespeare's Hamlet, the Loch Ness monster, or the angel Gabriel. Think of the odor of roses in full bloom, the color of a ripe tomato, Newton's theory of gravitation, or God.

None of these is a physical thing that exists now as animal, vegetable, or mineral. Wellington's horse and Julius Caesar existed in the past, but they exist no longer. Shakespeare's Hamlet is a fictitious person, not a real one. The existence of the Loch Ness monster is highly questionable. As for the odor of roses in full bloom, the angel Gabriel, Newton's theory of gravitation, and God, none of these fall under any of the headings that cover bodies that either exist or have existed in the physical world.

The universe of objects that can be thought of is much larger than the physical world—the world of bodies, either those now in existence or those that have existed in the past. It includes the world of bodies, but it also includes much else besides. The line that divides bodies from everything else is the great divide.

What is left when we put the whole physical world to one side? What belongs to the other half of the all-embracing universe of objects that we can think about? I am not going to try to give an exhaustive enumeration of the kinds of objects that are not bodies, but here at least are some of the possible kinds:

—mathematical objects, such as triangles and square roots
—imaginary or fictitious characters, such as Shakespeare's Hamlet or Mark Twain's Huckleberry Finn
—disembodied or unembodied spirits of all sorts, including ghosts and angels
—gods or God when divine beings are thought of as not having bodies
—mythological beings, such as centaurs and mermaids
—minds that are able to think up the kind of questions we have been asking
—ideas or theories that minds think with

I am fully aware that this enumeration of possible objects of thought raises many questions. Do such objects exist, in any sense of that word? If they do, how does their existence differ from the existence of bodies? What does it mean to call them possibilities? Are there any objects of thought that are impossibilities? If minds are not bodies, what is their relationship to bodies?

I will try to answer some of these questions—with Aristotle's help—in later chapters of this book. Some are difficult philosophical questions that I will postpone until the very end. For the moment, asking them serves the purpose of calling attention to the larger universe of which the physical world is but a part, even though the world of bodies may be the only one that really exists.

Staying with that world, we must consider another distinction made by Aristotle. We need it to handle the question about the odor of roses in full bloom or the color of a ripe tomato. Roses and tomatoes are bodies, they are plants, but their odor and their color are not. Considering the physical world, Aristotle drew a line that divides its constituents into two major kinds. On the one side of the line, he placed *bodies*; on the other side,

their *characteristics* or *attributes*, such as their odors or colors.

In our everyday speech, we ordinarily make the same distinction. We do not speak of the size and weight of a stone as if it were a body. I would not ask you to hand me the stone's size or weight, for I know that you must hand me the stone in order for me to feel its size or weight.

We can think of the stone's size or weight without thinking of the stone, but we cannot change the stone's size or weight without changing the stone. If the stone is lying in a pile of stones, we can take it from the pile and leave the other stones behind, but we cannot take the stone's size or weight away from it and leave the stone behind.

What belongs to a body in the way in which the stone's size or weight belongs to it is, according to Aristotle, something that has its existence in a thing (as the stone's weight exists in the stone), but does not exist in and of itself (as the stone exists).

A physical thing, a body, may belong to a collection of things from which it can be removed—as one stone can be taken from a pile of stones. But each of the stones in the pile exists in and of itself, even when it exists in a collection of stones. That is not true of the stone's size or weight. Sizes and weights do not exist in and of themselves. They are always the sizes and weights of physical things, and they cease to exist when the bodies in which they exist cease to exist.

Another way of grasping this basic distinction between physical things and their attributes is to consider how things change. A stone with a rough surface can be polished and made smooth. A stone that is almost round in shape can be made perfectly round. While we are changing a stone's attributes, we

are dealing with one and the same stone. It is not another stone, but the same stone altered.

If it did not remain the same stone while becoming different in this or that respect, it could not be said to have changed from being rough to being smooth or from being larger to being smaller. When we understand this, we understand Aristotle's reason for saying that a physical thing is that which remains what it is (this individual stone) while at the same time being subject to change in one respect or another (in size or weight, shape, color, or texture).

The attributes of bodies, unlike bodies themselves, are never subject to change. Roughness never becomes smoothness; green never becomes red. It is the rough *stone* that becomes smooth; the green *tomato* that becomes red when it ripens. Physical things, in short, are changeable. Physical attributes are not changeable; they are the respects in which physical things change.

Aristotle attempted to make a complete enumeration of the attributes that physical things have. Its completeness may be questioned, but the attributes he names are ones we are all acquainted with in common experience, especially those that are the principal respects in which things change:

—in quantity, when they increase or decrease in weight or size
—in quality, when they alter in shape, color, or texture
—in place or position, when they move from here to there

A thing has other attributes, such as the relationships in which it stands to other things, the actions it performs, the results of its being acted on, the time of its coming into existence, the duration of its existence, and the time of its ceasing to exist.

Of all the attributes that a physical thing has, the most important are those that it has throughout its existence and with respect to which it does not change as long as it exists. These permanent attributes make it the kind of thing it is. For example, it is a permanent attribute of salt that it dissolves in water; a permanent attribute of certain metals that they are conductors of electricity; a permanent attribute of mammals that they give birth to living offspring and suckle their young.

Such attributes not only make a thing the special kind of thing it is, they also differentiate one kind of thing from another. Being able to ask questions of the sort we have been asking is a permanent attribute of rational animals that differentiates us from other mammals. Rational animals are, of course, bodies. They are physical things, but not only physical things.

We recognize this fact in our use of the word "person." We call human beings persons. We do not call spiders, snakes, sharks or birds persons. When we treat our pet cat or dog as if it were a person, we treat it as if it were human—or almost human. Objects that we regard as mere things, we do not treat in the same manner.

Up to this point, the word "thing" has been used to refer to physical things—to bodies. Now the word "thing" has been used in contrast to the word "person." It is a troublesome word. Its meaning is sometimes so broad that it refers to any possible object of thought—not only to existent physical things, but also to their attributes as well, and to objects that do not exist, objects that may never have existed, and even objects that cannot possibly exist. Sometimes the word "thing" narrowly applies only to bodies that now exist in the physical world, bodies that have existed there in the past, or bodies that can exist there in the future.

Using the same word in a variety of senses is often unavoidable. In the case of the most important words we use, especially words we use in ordinary everyday speech, it is almost impossible not to do so. Aristotle frequently called attention to the different senses in which he found it necessary to use the same word. When we think about our experience as he did, we must also pay attention to the different senses of the words we use.

Human beings are physical things in one sense of that word and not in another when we call them persons, not things. As physical things, as bodies, they have the three dimensions with which we are all acquainted. As persons, they also have three dimensions, which are quite different.

3. Man's Three Dimensions

Regarding ourselves simply as bodies—or merely as physical things—I would say that our three dimensions, like the three dimensions of any other body, are length, breadth, and height. That is the way in which any body occupies space.

While, as bodies, we are physical things like all other bodies, we are, as we have just seen, the special kind of thing—the only kind of thing—that is called a person. What are our three dimensions as persons, not just as bodies?

In space, a dimension is a direction in which I can move. I can move my hand from left to right, from front to back, from up to down. Like spatial dimensions, personal dimensions are also directions—directions in which I, as a person, can act as a human being. I am sure that we have only three dimensions as physical bodies, but I cannot be as sure that we have only three dimensions as active human beings—only three directions in which our activities can take us.

However, I think that the three dimensions I shall name represent three very important directions that human activity can take. There may be others, but I doubt if there are any as important as these. The three are making, doing, and knowing.

In the first of these three dimensions, making, we have man the artist or artisan—the producer of all sorts of things: shoes, ships, and houses, books, music, and paintings. It is not just when human beings produce statues or paintings that we should call them artists. That is much too restricted a use of the word art. Anything in the world that is artificial rather than natural is a work of art something man-made.

In the second of these dimensions, doing, we have man the moral and social being—someone who can do right or wrong, someone who, by what he or she does or does not do, either achieves happiness or fails to achieve it, someone who finds it necessary to associate with other human beings in order to do what, as a human being, he or she feels impelled to do.

In the third dimension, knowing, we have man as learner, acquiring knowledge of all sorts—not only about nature, not only about the society of which human beings are a part, not only about human nature, but also about knowledge itself.

In all three of these dimensions, man is a thinker, but the kind of thinking he does in order to make things differs from the kind of thinking he does in order to act morally and socially. Both kinds of thinking differ from the kind of thinking a human being does in order just to know—to know just for the sake of knowing.

Aristotle was very much concerned with the differences that distinguish these three kinds of thinking. He used the term "productive thinking" to describe the kind of thinking that man engages in as a maker; "practical thinking" to describe the kind that he engages in as a doer; and "speculative" or "theoretical thinking" to describe the kind he engages in as a knower.

This threefold division of the kinds of thinking can be found in Aristotle's books. Some of them, such as his books on moral and political philosophy, are concerned with practical thinking and with man as a doer—as an individual living his own life and trying to make it as good as possible, and also as a member of society, associated with other human beings and cooperating with them. Some of these books, such as the ones on natural philosophy, are concerned with theoretical thinking about the

whole physical world, including man as a part of that world, and man's mind and knowledge as well.

He wrote a treatise about man as a maker, but that book deals only with man as a maker of poetry, music, and paintings. He entitled it *Poetics* because the Greek word from which we get the word "poetry" means making—making anything, not just the kind of objects that entertain us and that give us pleasure when we enjoy them. Men and women produce an extraordinary variety of useful things, things we use in our daily lives, such as the clothes we wear, the houses we live in, the furniture in those houses, and the implements needed to make such things.

The more general treatment of man as a maker, particularly man as a maker of useful physical things, we find in the books that Aristotle wrote about nature—his books of natural philosophy. In his effort to understand the phenomena of nature, Aristotle frequently resorted to comparisons between the way men produce things and the way nature works. His understanding of what is involved in human making helped him—and it will help us—to understand the workings of nature.

That is why I am going to begin, in Part II of this book, with making as a dimension of human activity. After that, in Part III, I am going to deal with the dimension of human activity in which man is a moral and social being. And finally, in Part IV, I will come to man as a knower, postponing to the last the most difficult questions that we have to consider—questions about the human mind and knowledge itself.

The most challenging words in anyone's vocabulary are three words that name the universal values that elicit respect and evoke wonder. They are truth, goodness, and beauty—or the

true, the good, and the beautiful. These three values pertain to the three dimensions of human activity.

In the sphere of making, we are concerned with beauty or, to say the least, with trying to produce things that are well made. In the sphere of doing, as individuals and as members of society, we are concerned with good and evil, right and wrong. In the sphere of knowing, we are concerned with truth.

PART TWO: MAN THE MAKER

4. Aristotle's Crusoe

If Aristotle had written the story of Robinson Crusoe, the moral of the tale would have been different.

The story most of us have read celebrates Crusoe's ingenuity in solving the problem of how to live securely and comfortably on the island where he found himself a castaway after a shipwreck. It also celebrates his virtues—his courage and his foresight. It is a story of man's conquest of nature, his mastery and control over it.

For Aristotle, the island would have represented Nature, nature with a capital *N*, nature untouched by humans. The works of nature—the seeding of trees and bushes, the growth of plants, the birth and death of animals, the shifting of sands, the wearing away of rocks, the formation of caves—had been going on long before Crusoe's arrival. Aristotle would have viewed the changes that Crusoe brought about as a way of understanding the changes that had taken place without him. For him, the story would not have been a story of man *against* nature, but an account of man *working with* nature.

When we try to understand something that is difficult to understand, a good common-sense rule is to start out with something easier to understand in order to see if that helps us overcome the difficulties. What is more understandable may throw some light on what is less understandable. Human beings

should be able to understand what goes on when they make something or change something. That is less difficult to understand than what goes on in nature when human beings are not in the picture. Understanding works of art may, therefore, help us to understand the workings of nature.

I suggested, in the preceding chapter, that in its broadest meaning the phrase "work of art" covers everything that is manmade. Let's reconsider that. Is everything produced by human beings artificial, not natural? When parents produce children, are the children artificial? Are they works of art? If you say no, as I think you should, then we have not yet succeeded in correctly drawing the line that divides the artificial from the natural.

Suppose that lightning strikes a tree in a dense forest. The tree is split in half; branches are cut off. The burning of some of them sets off a forest fire. The forest fire and all the other changes that result from the lightning's stroke are all natural, are they not?

But a person, walking through the woods, carelessly throws away a lighted cigarette. It sets the dry leaves of the underbrush on fire, and the woods are consumed in flames. That forest fire was caused by a human being, as the first one was caused by lightning. The first one was a work of nature. Was the second a work of man—something artificial, not natural?

Suppose, however, that the individual in the woods had not dropped a lighted cigarette. Suppose he had gathered dry twigs and leaves and heaped them in a mound that he surrounded with small stones. Then, lighting a match, he set fire to them in order to cook his lunch. We would ordinarily say, would we not, that he had *built* a fire. Would the fire he built be a work of

art, unlike the fire set off by the careless dropping of a lighted cigarette?

Before you answer that question too quickly, remember that fire itself is something natural. It does not need a human being to make it happen. In fact, when man does make it happen, what does he make—the fire itself or does he merely cause it to happen at a certain time and place, as the man walking through the woods caused it to happen at the spot where he decided to cook lunch?

One more example to consider: lightning split the tree and cut off some of its branches. Men can do that, too, with axes and saws; and they do it when they engage in lumbering in order to obtain the wood they need to build houses, or to make chairs and tables. You understand that the houses men build are products of art, not of nature—artificial, not natural. Building a house, then, is not quite the same as building a fire, for you cannot be quite so sure that the fire a man builds is artificial, not natural.

What is the difference between the man-made house—or the man-made chair or table—and the man-made fire? Or between the tree's branches that are cut off by lightning and the tree's branches that are cut down by lumberjacks? Or between the fire built by the picnicker in order to cook his lunch and the fire caused by the man tramping through the woods who carelessly dropped a lighted cigarette?

Let's start with the easiest question first. The fire caused by the lighted cigarette was accidental rather than intentional. It was not for a purpose that some human being had in mind. It resulted from human carelessness—even mindlessness—rather than from careful planning and foresight. The absence of any

human purpose, planning, or foresight puts it on the natural side of the line that divides the natural from the artificial.

It was man-caused but not man-made. It resulted from something that a human being did, but man is a part of nature just as much as lightning is. Not everything that results from human behavior is a human production or a work of art.

Now, what of the man-made fire, deliberately built for the purpose of cooking lunch, and the man-made house, deliberately built for the purpose of providing shelter? Here neither humanly-brought-about result is accidental. Purpose and planning are certainly involved in both. So far, at least, both belong on the artificial side of the line that divides the natural from the artificial. What, then, is the difference between them?

One difference is clear immediately. Fires happen in nature when men are not present, but houses do not. Men can help nature produce fires by lighting matches and setting dry leaves and twigs aflame. But when human beings build houses rather than fires, they are not helping nature produce them. In the one case, we said before, men do not make fire itself, but they make fires happen at a certain time and place. In the other case, men do make houses.

The house that Robinson Crusoe built after he had rescued some tools from the shipwreck was something that he and he alone produced, not something he just made happen at a certain time and place. Except for his being on the island, no houses would have ever happened, as fires might have happened as a result of bolts of lightning.

One more question remains. We have so far decided that Crusoe's house, planned and produced for a purpose, is a work

of art, not of nature, something artificial, not natural. But is it entirely artificial—wholly a human creation? The Bible tells us that before God created the world there was nothing, and that God's creation of the world brought something out of nothing. Did Crusoe bring something out of nothing when he built his house?

Hardly. He built it out of the wood he had obtained from chopping down trees with his ax, cutting off branches with his saw, and smoothing them with his plane. The wood that went into the building of the house came from nature. It was there to begin with. So, too, was the iron out of which nails had been formed, nails that Crusoe recovered along with tools in the carpenter's chest that floated ashore after the shipwreck. The house, made out of wood and nails, was indeed made by Crusoe, not by nature, but it was made out of natural materials. That is also true of all the tools that Crusoe had the good luck to be able to use.

Let's not forget the children that parents produce. We have already decided that children are natural products, not artificial—not works of art. Is that because they are sometimes accidental products rather than intentional ones?

Sometimes, we know, children are the result of carelessness or thoughtlessness, and are as unexpected as they are unplanned for. But even when children are wanted and planned for, even when some thought is involved in begetting them, and even when, with some luck, parents help nature produce children at a certain time and place, they are not like the fire that the picnicker helped nature to produce or the house that Crusoe built out of materials provided by nature.

Why not? For the time being, let us be satisfied with the answer suggested above. Children, like the offspring of other animals,

can certainly happen without any thought, planning, or purpose. That is not true of anything we would call a work of art or artificial. But just as human beings can make fires happen by knowing something about how fires happen in nature, so, too, can human beings make children happen by knowing something about how the procreation of offspring happens in nature.

When they are totally ignorant of that, then their offspring are entirely accidental. But when they have such knowledge, the having of offspring is, partly at least, the result of planning and purpose.

We have surveyed a lot of happenings and productions, and we have compared the differences between them in order to see if we can place each on one or the other side of the line that divides the natural and the artificial. Before we go on, it might be a good idea to summarize what we have learned.

First, we decided that fire itself is something entirely natural. The particular fire a man purposely builds at a certain time and place is an artificial happening—something that would not have happened had not some human being caused it to happen then and there.

Second, the artificiality of the fire the picnicker built in order to make lunch differs from the artificiality of the house that Crusoe built in order to provide himself with shelter. Though both spring from human purposes, houses, unlike fires, never occur in nature when human beings are not at work. Let us refer to the picnicker's fire as an artificial *happening* and to Crusoe's house as an artificial *product*.

Third, Crusoe's house, though an artificial product, is not something wholly artificial. It was made out of natural

materials, not out of nothing. It is, therefore, unlike the world itself that, according to the Bible, God created out of nothing. Let us always call things that men make out of natural materials their *productions* rather than their *creations*.

Fourth, we considered human children and the offspring of other animals. Do we ordinarily call them either productions or creations? No, the language we use for describing their coming to be involves such words as "reproduction" and "procreation."

Let us take that fact as significant. The results of biological reproduction or procreation are not like the fire caused by lightning—a *natural event*; nor like the fire built by man—an *artificial happening*; nor like the house that Crusoe erected—an *artificial product*; nor like the world that God created out of nothing.

However, understanding how men build houses will help us to understand how animals reproduce or procreate offspring. Understanding how men make fires happen will help us to understand how fires happen as natural events. Understanding the difference between making fires happen and building houses will help us to understand the difference between fires happening in nature and animals reproducing their kind.

Do not ask now whether understanding all this will also help us to understand how God created the world. That question must wait until we see whether our understanding of the works of nature and of art leads us back to the Bible's story of creation—a story that Aristotle never read.

5. Change and Permanence

Aristotle took a sensible attitude toward the thinkers who preceded him. He said he thought it was wise to pay attention to what they had to say in order to discover which of their opinions were correct and which were incorrect. By sifting the true from the false, some advance might be made.

Two earlier thinkers—Heraclitus and Parmenides—held very extreme views about the world. Heraclitus declared that everything, absolutely everything, was constantly changing. Nothing, absolutely nothing, ever remained the same. One of his followers, Cratylus, even went so far as to say that this made it impossible to use language to communicate, for words are constantly changing their meanings. The only way to communicate is by wiggling your finger.

At the other extreme, Parmenides declared that permanence reigns supreme. Whatever is, is; whatever is not, is not; nothing ever comes into existence or perishes; nothing at all changes, nothing moves. The appearance of change and motion, which Parmenides acknowledged as part of our daily experience, is an illusion. We are being deceived by our senses. In reality, everything always remains the same.

You may wonder how Parmenides could persuade anyone to accept so extreme a view, and one so contrary to our everyday experience. One of his followers, a man named Zeno, tried to invent arguments that would persuade us that when we perceived things moving about, we were being deceived. We were suffering an illusion.

One of these arguments ran somewhat like this: You want to hit a ball from one end of the tennis court to another. In order to get there, the ball first has to go through half the distance. It has

to reach the net. In order to get there, it first has to go through half the distance—at least to the service box. In order to get there, it first has to go through half the distance; and so on indefinitely, by a continual halving of the distances that remain. From this, if we followed the direction of Zeno's reasoning, we would be led to the conclusion that the ball could never get started—could never leave your racket.

Aristotle was acquainted with these opinions and arguments. His common sense as well as his common experience told him they were wrong. If words are always changing their meanings, how could Heraclitus and his followers repeatedly say that everything is changing and suppose, as they obviously did, that they were saying the same thing each time, not the opposite? If the motion of the heavenly bodies is an illusion, then so is the change from day to night. If nothing comes into existence or perishes, no one dies, but where are Parmenides and his friend Zeno now?

Heraclitus and Parmenides were wrong, but not all wrong. In fact, each was partly right, and the whole truth, Aristotle thought, consisted in combining two partial truths.

On the one hand, motion and change, coming to be and passing away, occur throughout the world of nature and were occurring long before human beings came on the scene. Far from being full of illusions, our common experience of nature grasps the reality of change. Things are the way they seem to be—changing.

On the other hand, not everything is always changing in every respect. In every change, there must be something permanent—something that persists or remains the same while becoming different in one respect or another. That tennis ball, for example, which you tried to hit across the court, did move from

one place to another, but when it reached your opponent's baseline, it was the same tennis ball that you propelled in that direction. If it had been a different tennis ball, conjured up by a magician standing on the sidelines, it would have been called a foul.

Motion from here to there (which Aristotle called local motion or change of place) is the most obvious of the changes in which something remains the same. The moving thing is the unchanging subject of the change that is local motion. If it was "your tennis ball" when it left your racket, it is still "your tennis ball" when your opponent hits it back—the selfsame, identical ball, not another ball.

While we are talking about local motion, let me mention a distinction that Aristotle makes between two kinds of local motion. When you accidentally drop a tennis ball, it falls to the ground because it is heavy (you and I say because of gravity, which is another word for heavy). You did not throw it down. It fell naturally. That was a natural, not an artificial, motion.

But when you hit the tennis ball with your racket, that is a man-made motion, not a natural one. The force of your stroke overcomes the natural tendency of the ball to fall because of its weight, and this force sends it on a path it would not have followed if you had not propelled it in that direction by your stroke. The same thing is true when we propel a rocket to the moon. That is not a natural motion for a heavy body like a rocket. Without the propelling force we give it, it would not naturally leave the earth's field of gravity.

From tennis balls to rockets, from elevators to cannonballs, there is a wide variety of bodies in local motion that would not be moving as they do were it not for man's interference with nature. Since they are not natural, should we call these motions

artificial? That word might be used, for they are motions brought about by men. Aristotle called them violent motions—violent in the sense that they violate the natural tendency of the bodies in question.

What other changes that occur naturally also occur artificially, or through man's having a hand in them? The heat of the sun ripens a tomato and turns it from green to red. That is not a change in place, but a change in color. It is not a local motion, but the alteration of an attribute of the tomato.

From being green at one time, the tomato has become red at another, just as the tennis ball, from being here at one time, is there at another. What is common to these two changes is time, not space. No change of place occurred in the ripening of the tomato, only a change in quality; but neither change—the change in place and the change in quality—took place without a change in time.

People paint green things red, or red things green—houses, tables, chairs, and so on. The ripening of the tomato is a natural alteration; the painting of things is an artificial alteration of them. The house, table, or chair, which was at one time green, did not become red at another time without human intervention.

In addition to local motion (or change in place) and alteration (or change in quality), there is still a third kind of change that is both natural and artificial. This time let us begin with the artificial form of it.

Take a rubber balloon and blow it up. As you do so, it changes in size as well as in shape. It gets larger, and will continue to do so as you blow air into it. And when you let air out of it, it decreases in size and returns to its original shape.

Left on the table by itself, the balloon would not have increased in size. Blown up, with its end twisted and bound, the balloon will not decrease in size. The change in size, accompanied by a change in shape, is your doing. You have caused two artificial changes to occur at the same time—a change in quality (the alteration of the balloon's shape) and a change in quantity (the increase or decrease in the balloon's size).

Changes in quantity occur naturally as well as artificially. For example, rocks on a seacoast wear away as they are continually battered by waves. They get smaller. The action of waves may also make seacoast caves larger. More familiar experiences of natural increase—in size and weight—occur in the world of living things. Plants and animals grow. Their growth involves many changes, of course, but among them are changes in quantity—increases in size and weight.

Although one aspect of the growth of a living body is certainly an increase or a change in quantity, it has a peculiar characteristic that we do not find in the increase of inanimate bodies. You build a fire and you can make it larger by adding more logs. If more and more logs are available to pile on it, there would appear to be no limit to the size of the fire you can build. If you feed carrots to a rabbit, the rabbit grows in size, but no matter how many carrots you feed the rabbit, there is a limit to the rabbit's increase in size.

You can build smaller or larger pyramids and, given enough stones and human labor, you can make one larger than any pyramid that has ever been built. But no matter what you do in the feeding of animals, you cannot make them grow to be larger than a certain size. You cannot make a house cat the size of a lion or a tiger.

The reverse is also true. The balloon you blew up decreases in size as you let the air out of it, and the decrease can go on to the point where the balloon is completely collapsed. But when animals cease to grow, they may cease to increase in size, but, they do not decrease in size to the vanishing point so long as they remain alive.

But animals and plants die. So, too, do balloons burst and cease to be balloons when you blow too much air into them. This brings us to a fourth kind of change—both natural and artificial—that is so different from the other three that Aristotle separates it sharply from the rest.

All the others, as we have seen, take time to happen. Time elapses as bodies move from here to there, alter in color or shape, get larger or smaller. But when the balloon bursts, it ceases to be a balloon instantaneously. That change would appear to take no time, certainly no appreciable amount of time. It occurs in an instant; or perhaps we should say: at one instant the balloon exists, and at the very next instant it no longer exists. All we have left are shreds or fragments of rubber, not a balloon we can blow up.

The same is true of the rabbit that dies. In one instant it is alive; at the next, it is no more. All we have left is the carcass, which, in the course of further time, will progressively decay and disintegrate.

This special kind of change (which Aristotle refers to as coming to be and passing away) is special in other ways than being instantaneous. It is so special that it raises serious problems for us.

In every change, we have been saying so far, something remains permanent and unchanging. The body or thing that

changes in place, in color, or in size remains the same body when it moves from one place or another, when it alters in color, when it increases in size. But what remains the same when the balloon bursts? What remains the same when the rabbit dies? The decaying, disintegrating carcass is not the rabbit we fed carrots to. The shreds of rubber are not the balloon we blew up.

Nevertheless, there is something permanent in this special kind of change. It is easier to see what it is in the production or destruction of things by men than it is in the birth and death of plants and animals.

Pieces of wood, nails, and glue do not come together naturally to make a chair. Men make chairs by putting these materials together in a certain way. They are the same materials *before* they were put together and shaped into a chair as they are *after* that happens, at the instant when the chair comes into existence as something you can sit on.

You find the chair uncomfortable or you have other chairs and want a table instead of this one. You probably cannot reuse all the nails or the glue, but you can take the chair apart and, using the pieces of wood and some of the nails, you can build a small table with most of the same materials. If you had not used glue in the first place, and if you had been able to extract all the nails in usable form, the materials in the chair that has ceased to be and in the table that has come into being would be identical. They would differ only in respect to how they are put together.

It would, therefore, appear to be the case that in artificial productions and destructions, what persists or remains the same throughout the change is not the thing that was produced and

destroyed, but only the materials that a person used in putting it together and the materials that are left when it is taken apart.

Something like that is also the case in the death of the rabbit. Being a living body, the rabbit is, after all, a material thing, just as the chair or table is a material thing. There is matter in its makeup. And that matter remains, not in the same form, of course, but nevertheless it remains, when the rabbit breaks up—dies, decays, disintegrates. And just as the inorganic materials of a chair may enter into the composition of a table, so the organic materials of a rabbit may enter into the composition of another living thing.

The rabbit may have been killed by a jackal and devoured for nourishment. To the extent that the jackal is able to assimilate what it eats, the organic materials of the rabbit enter into the bone, flesh, and muscle of the jackal.

Modern science has a name for what is going on here—a name that Aristotle did not use. We call it the conservation of matter. However it is referred to, the point is that something persists in the special kind of change that is coming to be and passing away. That something, in the case of artificial things such as tables and chairs, consists of the materials out of which they are made.

In man-made productions, we can usually identify what these materials are—these particular pieces of wood, these particular nails. It is not always as easy to identify the particular unit or units of matter that persist when one animal eats another or when living things die. But there can be no doubt that in all instances of coming to be and passing away, both natural and artificial, either matter itself or materials of a certain kind undergo transformation.

What is meant by "matter itself" as contrasted with "materials of a certain kind"? Human beings, in making or destroying artificial things, never work with matter itself, but only with materials of a certain kind. Does nature, unlike man, work with matter itself? If so, then that which persists or remains the subject of change in artificial production and destruction is not the same as that which persists or remains the subject of change in natural coming to be and passing away.

Similar, but not the same. The transformation of identifiable materials in human production and destruction is only like but not identical with the transformation of matter in natural coming to be and passing away. Nevertheless, the similarity or likeness may help us to understand what happens when, in nature, things come to be and pass away. We will look into this more closely in the following chapters.

6. The Four Causes

The "four causes" are the answers that Aristotle gives to four questions that can and should be asked about the changes with which we are acquainted in our common experience. They are common-sense questions, and so are the answers. Let us begin by considering them as they apply to changes brought about by human beings, especially the things they produce or make. That will help us to consider the four causes as they operate in the workings of nature.

The first question about any human production is: What is it going to be made of? If you asked this question of a shoemaker at work, the answer would be "leather." If you asked it of a jeweler, fashioning bracelets or rings out of precious metals, the answer might be "gold" or "silver." If you asked it of a gunsmith producing a rifle, the answer would probably be "wood and steel." The kind of material named in each case, on which the craftsman works and out of which he is producing a particular product, is the *material* cause of the production. It is one of four indispensable factors—factors without which the production would not and could not occur.

The second question is: Who made it? That would appear to be the easiest question of all, at least when we are dealing with human productions. It may not be so easy when we come to the changes that take place in nature and to the things produced by nature rather than by men. So far as human productions are concerned, the question has already been answered in what was said in answer to the first question: the shoemaker is the maker of the shoe, the jeweler of the bracelets or rings, the gunsmith of the gun. The maker in each case is the *efficient* cause of the production.

The third question is: What is it that is being made? On the face of it, that question is so easy that it may make you impatient to have to consider it. It is obvious, you may say, that what is being made by the shoemaker is a shoe, by the jeweler a ring, and so on. But when I tell you that Aristotle called the answer to this question the *formal* cause of the change or production, you may be puzzled by the introduction of that word "formal," though it is, as you will soon see, the precise word to pair with "material," the first of the four causes. I will return to the explanation of "formal" after we have considered the last of the four causes.

The fourth question is: What is it being made for? What purpose is it intended to fulfill? What objective or use did the maker have in mind as the end to serve? In its simplest form, the question is: Why is it being made? And the answer, with regard to the productions we have been talking about, comes quickly. We all know what shoes and rings and guns are for—what function they perform or what purpose they serve.

This fourth factor in human productions Aristotle called the *final* cause, calling it that because the factor being referred to is an *end* in view. When you or I make anything, the end we have in mind is something that we achieve last or finally. We must finish making it before we can put it to use for the purpose we had in mind.

I said earlier that the four causes are indispensable factors that must be present and operative whenever men produce anything. To call them indispensable is to say that, taken together, they are that without which the production could not have taken place. Each of the four factors, taken by itself, is necessary, but none by itself is sufficient.

All four must be present together and operate in relation to one another in a certain way. The workman must have material to work on and must actually work on it. By doing so, he must transform it into something that the materials in hand can be made to become. And what has been made must be of some use to the person making it. In other words, he must have had a reason for making it, for without that, he would probably not have expended the effort to make it.

You may question the last of these statements. You may wonder whether the final cause—the reason for making something—must always be present and operating. Isn't it possible for someone to produce something without having a reason for doing so—without having in mind, in advance, a deliberate purpose that he wishes to serve?

That question is not easy to answer with certainty, though you must admit that, for the most part, human beings do make the effort to produce things because they need or want the things they are engaged in producing. Yet they may also, on occasion, fiddle around with materials and, as a result, produce something unexpected—aimlessly or, shall we say, playfully.

When this happens, there would appear to be no final cause, no end result being aimed at. A purpose for the object produced, a function for it to perform, may be thought up after the production is completed, but the producer of it did not have it in mind in advance. It could, therefore, hardly have been an indispensable factor, or a cause, of what occurred.

When we turn from human productions to the workings of nature, the question about the presence and operation of final causes becomes more insistent. We cannot avoid facing it squarely, for we should certainly be uneasy about saying that nature has this or that in mind as the end result that it aims at.

Perhaps, when I am able to explain why Aristotle calls the third of the four causes the *formal* cause, I will also be able to answer the question about the operation of final causes in the workings of nature.

Before I do so, let me summarize the four causes by describing them in the simplest terms possible. Because these statements about the four causes are so very simple, they may also be difficult to understand. We must pay close attention to the key words that are *italicized* in each statement.

1. Material cause: that *out of which* something is made.
2. Efficient cause: that *by which* something is made.
3. Formal cause: that *into which* something is made.
4. Final cause: that *for the sake of which* something is made.

What do we mean when we say "that into which something is made"? The leather out of which the shoe was made by the shoemaker was not a shoe before the shoemaker went to work on it. It became a shoe or got turned into a shoe by the work he did, which transformed it from being merely a piece of leather into being a shoe made out of leather. That, which at an earlier time was leather not having the form of a shoe, is now at a later time leather formed into a shoe. That is why Aristotle says that "shoeness" is the formal cause in the production of shoes.

The introduction of that word "shoeness" will help us to avoid the worst error we can make in dealing with formal causes. We might be tempted, very naturally, to think of the form of a thing as its shape—something we are able to sketch on a piece of paper. But shoes come in a wide variety of shapes, as well as colors and sizes. If you stood in front of a shoe store window with sketch pad in hand, you would find it very difficult or impossible to draw what is common to the various shapes of the shoes in the window.

You can think of what is common to them, but you cannot draw it. When you do have an idea of what is common to all shoes, of every shape, size, and color, then you have grasped the form that Aristotle calls *shoeness*. Without there being such a form, shoes could never be made; the raw materials out of which shoes are made could never be transformed into shoes.

Please notice that word "transform." It contains the word "form." When you transform raw materials into something that they are not—leather into shoes, gold into bracelets, and so on—you are giving them a form that they did not previously have. A shoemaker, by working on raw materials, transforms them into something they can become but which, before he worked on them, they were not.

We can get further away from the mistake of thinking that the formal cause is the shape a thing takes by considering other kinds of change that we discussed before—changes other than the production of things such as shoes, rings, and guns.

The tennis ball you set in motion moves from your racket across the court to your opponent's baseline. You are the efficient cause of that motion, propelling the ball by the force of your stroke. The ball is the material cause—that which is being acted on. But what is the formal cause? It must be some place other than the place from which the ball started out when you hit it. Let us suppose that the ball lands on the other side of the net, is missed by your opponent, and comes to rest against the back fence. The place where it comes to rest is the formal cause of the particular motion that ended there. From having been *here*, on your side of the net, its position or place has been transformed into being over *there*, against the back fence.

The green chair that you paint red is similarly transformed in color. So, too, the balloon you blew up; it is transformed in size. *Redness* is the formal cause of the change you brought about by painting the chair, just as *overthereness* is the formal cause of the change you brought about by hitting the tennis ball. In each of these changes, you are the efficient cause. In one of them, the green chair is the material cause, that which you acted on in painting it red. In the other, the collapsed balloon is the material cause, that which you acted on when you blew it up.

The three kinds of change just considered also occur naturally, without man entering the picture as efficient cause. When we examine their natural occurrence, identifying the four causes becomes more difficult, and some new problems arise. However, what has already been said about humanly caused changes will be of some help to us.

Sunshine ripens the tomato and turns it from green to red. The rays of the sun are the efficient cause of this alteration, and the tomato itself, the subject undergoing the change, is the material cause of it. Here, as in a person's painting a green chair red, redness is the formal cause. From having been green in color, that is what the tomato becomes. But here there is no final cause distinct from the formal cause just named.

The person who painted the green chair red may have done so for the sake of having it match a set of chairs in a certain room. The purpose or end the individual had in mind was distinct from the redness that was the formal cause in the transformation of the chair's color. But we would hardly say that the sun, in shining on the tomato, wished to make it red as a sign that it had at last become edible. The end result of the tomato's ripening, so far as its surface color is concerned,

consists in its being red. Its being red is both the formal and the final cause of the change.

Much the same can be said about the rock that wears away under the battering of the waves, becoming smaller in size as a result of that process. This process may go on for a long time, but at any given moment, the size of the rock at that time is both the formal and the final cause of the change—the decrease in size that has occurred so far.

The account just given of a natural alteration in color and a natural decrease in size applies as well to a natural change of place. The tennis ball that is accidentally dropped falls to the ground and eventually comes to rest there. That local motion comes to an end at the place where the ball comes to rest, and that place is the formal as well as the final cause of the motion.

If, in this case, one were to ask about the efficient cause, the force of gravity would probably be named—an answer that most of us learned in school, but that would have puzzled Aristotle. That fact does not affect our understanding of the difference between an efficient cause, on the one hand, and material, final, and formal causes, on the other. However it is named or designated, it is always that which, in any process of change, acts upon a changeable subject or exerts an influence upon it that results in that changeable subject's becoming different in a certain respect—red, from having been green; smaller, from having been larger; there, from having been here.

Let us consider one other kind of change—the growth of a living thing that, though it involves increase in size, involves much more than this. Aristotle uses the familiar example of the acorn that falls to the ground from an oak, takes root there, is nurtured by sunshine, rain, and nutrients in the soil, and eventually develops into another full-grown oak tree.

The acorn, he tells us, is an oak in the process of becoming. What it is to be oak is both the final and the formal cause of the acorn's turning into an oak. The form that the acorn assumes when, through growth, it reaches its full development is the end that the acorn was destined to reach simply by virtue of its being an acorn.

If, instead of being an acorn, the seedling had been a kernel taken from an ear of corn, our planting it and nurturing it would have resulted in a different end product—a stalk of corn with ears on it. According to Aristotle, the end that is to be achieved and the form that is to be developed in the process of growth are somehow present at the very beginning—in the seed that, with proper nurturing, grows into the fully developed plant.

They are not present actually, he would acknowledge, for then the acorn would already be an oak, and the kernel a stalk of corn. But they are present potentially, which is simply the opposite of their being present actually. It is the difference between the potentiality that is present in the acorn, on the one hand, and the potentiality that is present in the corn kernel, on the other, which causes the one seed to develop in one way and the other seed to develop in another.

Today we have a different way of saying the same thing. Aristotle said that the "entelechy" of one seed differed from the "entelechy" of the other. All he meant by that Greek word was that each seed had in it a potentiality that destined it to reach, through growth and development, a different final form or end result. We say, when we use the language of modern science, that the genetic code in one seed gives it a set of directions for growth and development that is different from the set of directions given by the genetic code in the other seed.

We think of the genetic code as programming a living thing's growth and development from the very moment when that process starts. Aristotle thought of a living thing's inherent potentialities as guiding and controlling what it becomes in its process of growth and development. Up to a certain point, the two descriptions of what happens are almost interchangeable. The observable facts to be accounted for remain the same. Acorns never turn into cornstalks.

That this is so must be because there is something initially different in the matter that constitutes the acorn, on the one hand, and in the matter that constitutes the kernel of table corn, on the other. Calling what is there genes that program growth and development or calling them potentialities that guide and control growth and development does not make much difference to our understanding of what is going on. But, as most of us know, it does make a difference to what human beings can do to interfere with natural processes.

Our scientific knowledge of DNA (an abbreviation for a term in biochemistry) enables us to experiment with the genetic code of an organism and, perhaps, to make significant changes in the directions it gives. Aristotle's philosophical understanding of the role that potentialities play did not enable him, nor does it enable us, to interfere in the slightest way with the workings of nature.

I shall have more to say in the next chapter about potentialities and actualities, and also about matter and form, as fundamental factors in changes of all sorts, both natural and artificial. These four factors, although not identical with the four causes, are closely related to them.

To whet your appetite for what is coming next, let me ask you to consider again one more change that has already been

mentioned—the special kind of change that Aristotle called coming to be and passing away. As an example of that special kind of change, I am going to take an occurrence that is most familiar to us in our everyday life.

We sit down to dinner and, in the course of it, we eat a piece of fruit. The apple on our plate, when taken from the tree, had finished growing. But it is still a living thing, with seeds in it that can be planted to sprout more apple trees. It shows no signs of decay or rotting. We eat it, all but the core. What has become of the apple?

We have not only eaten it, chewed it up, digested it, but we also have drawn some nourishment from it, which means that it has somehow become part of us. Before we started eating it, the organic matter of that piece of fruit had the form of an apple. After we finished eating, digesting, and drawing nourishment from it, the matter, which once had the form of an apple, has somehow become fused or merged with our own matter, which has the form of a human being.

The apple has not become a human being. Rather, it would appear, matter itself has been transformed, from having the form of an apple to having the form of a human being. It ceased to be apple matter and became human matter.

What is meant by "matter itself" as opposed to "apple matter" and "human matter"? Can we say that matter itself is that which remains the permanent underlying subject of change in this remarkable kind of change that happens every day when we eat the food that nourishes us?

I hope I can throw some light on these "matters" in the next chapter.

7. To Be and Not to Be

We ordinarily think of the birth of a living organism as the coming into being of something that did not exist before. And we often refer to the death of a person as his or her passing away.

In Aristotle's thought about the changes that occur in the world of nature and the changes that human beings bring about by their effort, the special kind of change that he calls coming to be and passing away is distinguished from all other kinds of change, such as change of place, alteration in quality, and increase or decrease in quantity.

This special kind of change in nature is more difficult to understand than other kinds of change. Why? To find out, let us begin with what is easier to understand—the production or destruction of things by human beings.

When people move things from one place to another, when they alter or enlarge them, the individual thing that they move, alter, or enlarge remains the selfsame thing. It changes only with respect to its attributes—its place, its color, its size. It not only remains the same kind of thing that it was before it changed; after it has been changed, it also persists as this one, unique, individual thing.

The enduring sameness or permanence of the individual thing that undergoes these changes is clear to us from the fact that its identity can be named in the same way before and after the change occurs: *this* ball, *that* chair. It is not another ball or another chair, but this one or that one.

When someone takes raw materials, such as pieces of wood, and transforms those raw materials into a chair, an artificial

thing—something that did not exist before—comes into existence. What before were several pieces of wood have now become this particular chair. Pieces of wood becoming a chair is certainly not the same as this green chair becoming red. The reason is that when the chair has come into being, the several separate pieces of wood no longer remain, at least not as several separate pieces of wood, though this chair remains precisely this chair when it changes in color.

Before we go from artificial production to natural generation (which is just another name for the process of coming to be), it will be helpful to us if we look a little more closely at what is happening in the easier-to-understand process of artificial production. The help will come from getting some grasp of the meaning of four words that were used in the preceding chapter. They are "matter," "form," "potentiality," and "actuality." Though what they mean can be understood in the light of common experience and in common-sense terms, the words themselves are not words we use frequently in everyday speech.

Pieces of wood that are not a chair become pieces of wood that are a chair. When the pieces of wood are not a chair, their not being a chair is a lack of chairness on their part. They lack—they are deprived of—the form of a chair. Let's use the word "privation" for this lack of a certain form.

There is more in these pieces of wood than the privation of chairness. If that was all there was to it, these pieces of wood could never be made into a chair. In addition to lacking chairness, these pieces of wood must also have the capacity to acquire chairness. Their capacity is inseparably connected with their privation, for if these pieces of wood did not lack the form of a chair, they would not have the capacity for acquiring that form, since not lacking it, they would already have it. Only

when certain materials, such as pieces of wood, lack a certain form can they have the capacity for acquiring it.

Let us call that capacity a potentiality of the materials in question. Another word for *potentiality* is "can be." It makes a great deal of difference whether you say that something is a chair or *can be* a chair. These pieces of wood *are not* a chair, but they *can be* a chair. As I said a moment ago, if they were a chair, they could not become a chair.

However, it is not true to say that when certain materials lack a certain form, they always have the potentiality for acquiring it. For example, water and air lack the form of a chair, but unlike wood, water and air are materials that do not have the potentiality for acquiring the form of a chair. Although the potentiality for acquiring a certain form is never present in the materials unless that form is absent, the mere absence of the form—the lack or privation of it—does not necessarily mean that the materials have the potentiality for acquiring it. Men can make chairs out of wood, but not out of air or water.

When the pieces of wood that lack the form of a chair and also have the potentiality for acquiring that form take on that form as a result of a carpenter's skill and effort, we say that the pieces of wood that were potentially a chair have now actually become a chair. Throughout the whole process of becoming, until the very moment when the chair is finally finished, the pieces of wood, undergoing transformation, were still only potentially a chair. Not until their transformation has been completed do they actually have the form of a chair.

When the pieces of wood are actually a chair, their potentiality for becoming a chair has been *actualized*; and so, of course, it no longer remains as a potentiality. The form the pieces of wood have acquired is the actuality that removes the

potentiality that accompanied the lack of that form in the wood but did not accompany the lack of it in water or air.

We can now see how these four important words—matter, form, potentiality, and actuality—are related. Matter may have or lack a certain form. Lacking it, matter may also have the capacity for acquiring it, which is its potentiality for having that form. But it does not always have such a potentiality when it lacks a certain form, as we saw in the case of water and air as compared with wood. When it acquires the form for which it has a potentiality, that potentiality has been actualized. Having the acquired form has transformed the matter from being a potential chair into being an actual chair.

I have been using the words "matter" and "materials" interchangeably. But when we are referring to wood, on the one hand, and water, on the other, we are speaking of different kinds of matter. Wood is not just matter; it is a certain kind of matter—matter having the form of wood, which is different from matter having the form of water.

One kind of matter, wood, provides human beings with materials out of which they can make chairs; another kind, water, does not. The form the matter has, which makes it a certain kind of matter (wood), also gives it a certain potentiality (for becoming a chair). Matter in the form of water does not have that potentiality.

When we understand this simple point, a simple step of reasoning enables us to grasp another important point.

Wood can become a chair, but it cannot become an electric light bulb; water can become a fountain, but it cannot become a chair.

Matter having a certain form has a limited potentiality for acquiring other forms. This is true of every kind of matter, all the different kinds of materials that people can work on to produce things—chairs, electric light bulbs, and fountains.

Now suppose there was matter totally deprived of form—utterly formless matter. It would not actually be any kind of matter. But it would also be potentially every kind of matter; since, lacking all forms, it would have the capacity to acquire any form. It would have an unlimited potentiality for forms.

You would be quite right if, thinking about this, you were to say: "Hold on, matter without any form might have an unlimited potentiality, an unlimited capacity, for acquiring forms, but lacking all forms, it would be actually nothing. What is actually nothing does not exist. Hence to talk about formless matter is to talk about something that cannot exist." Why, then, you may ask, did I bother to mention it in the first place? What's the point in thinking about it?

Aristotle would say that, looked at in one way, you are right in thinking that pure matter, formless matter, is not actually anything or, in other words, is nothing. You are, therefore, also right in thinking that formless matter does not exist. But Aristotle would add that, although formless matter is actually nothing, it is also potentially everything. It is potentially every possible kind of thing that can be.

Still, you persist in asking, if formless matter does not exist and cannot exist, what is the point in mentioning it or thinking about it? Aristotle's answer is that there would be no need to mention it or think about it if we confined ourselves to trying to understand artificial productions and destructions—the making and unmaking of such things as chairs. But the birth and death of animals are not so easy to understand.

Let's take an animal's death first. Our pet rabbit dies—decays, disintegrates, and eventually disappears. The matter that had the form of a rabbit no longer has that form. It now has acquired another form, as would happen if the rabbit were killed and devoured by a wolf When this happens, matter that was the matter of one kind of thing (rabbit) has now become the matter of another kind of thing (wolf).

If you think about this for a moment, you will see that what has occurred here is different from what occurred when wood, which is a certain kind of matter, becomes a chair. Becoming a chair, it does not cease to be wood. It does not cease to be matter of a certain kind. A certain kind of matter has persisted throughout this change. It can be identified as the subject of the change. These pieces of wood that at one time were not actually a chair have now become actually a chair.

But in the transformation that occurred when the wolf killed and devoured the rabbit, a certain kind of matter did not persist throughout the change. The matter of a certain kind of thing (matter having the form of a rabbit) became the matter of another kind of thing (matter having the form of a wolf). The only identifiable subject of this change is matter—not matter of a certain kind, since matter of a *particular kind* does not persist throughout the change.

Let us now turn from death to birth. That pet rabbit of yours came into being as a result of sexual reproduction. Aristotle was as well acquainted with the facts of life as you and I are. The process that results in the birth of a living rabbit began when an ovum of a female rabbit was fertilized by the sperm of a male rabbit.

From the moment of fertilization, a new organism has begun to develop, though while it is still being carried in the female rabbit's uterus, it is not a separate living thing. The birth of the rabbit is just a phase in the rabbit's process of development. It has been developing within the mother rabbit before being born, and it goes on developing after it is born until it reaches full growth.

Birth is nothing but the separation of one living body from another—the baby rabbit from the mother rabbit. And that separation is a local motion, a movement of the baby rabbit from being in one place to being in another—from being inside the mother rabbit to being outside the mother rabbit.

Let us now go back to the beginning of the baby rabbit—the moment when it first came to be. Before that moment, there was the female rabbit's ovum and the male rabbit's sperm. Neither the ovum nor the sperm was actually a rabbit, though both together had the potentiality for becoming a rabbit. The actualization of that potentiality took place at the moment of fertilization, when the matter of the sperm was merged or fused with the matter of ovum.

Do the matter of the ovum and the matter of the sperm in separation from each other stand in the same relation to the matter of the baby rabbit after fertilization occurs, as the matter of the rabbit stands to the matter of the wolf after the rabbit has been killed and devoured by the wolf? If so, then something like what Aristotle had in mind when he asked us to think about formless matter is the subject of change in the coming to be and passing away of living organisms. It is that which we identify as persisting or enduring in this special kind of change.

This is as near as I can come to explaining why Aristotle thought it necessary to mention formless matter. You may

think that he went too far—that natural generation can be accounted for in the same way as artificial production. If you do think so, let me ask you to consider one more example.

The example is one that Aristotle himself considered. He said that "nature proceeds little by little from things lifeless to living things in such a way that it is impossible to determine the exact line of demarcation." He was quite capable of imagining the line between the nonliving and the living being crossed when the first living organisms on earth emerged from nonliving matter. In that coming to be of the first living organisms, can we identify the matter that is the subject of this remarkable change as being matter of a certain kind? Does it remain the same kind of matter both before and after the first living organisms came into being?

You may not want to go so far as to call it formless matter. But, on the other hand, you may find it difficult to identify it as matter of a certain kind, which would mean that it had and retained a certain form. If this is your state of mind, then you understand why Aristotle thought natural generation more difficult to explain than artificial production; and you also understand why he thought it necessary to mention and ask you to think about pure or formless matter, which, of course, does not exist.

8. Productive Ideas and Know-How

The individual who first took wood and made it into a chair—or a bed or a house—must have had some idea of what he was going to make or build before setting to work. Such an individual had to understand the form that the pieces of wood would have to acquire in order to become a chair. He could not get that idea from an experience with chairs because no chairs existed before he made this one. Perhaps, we may guess, he got it from experiences with rock formations that provided his body with support for sitting down. The first chair was thus an imitation of something its inventor had found in nature, as the first house was, perhaps, an imitation of natural cave formations that provided shelter.

Wherever or however the first chairmaker got the idea of a chair, the idea itself was not enough. As we observed in an earlier chapter, the form of a chair—chairness—is common to chairs of every size, shape, and configuration of parts. If all that the first carpenter had in his mind was an idea of chairs in general, he could not have produced an individual chair, particular in every respect in which one individual chair can differ from others. In order to transform the wood materials he worked on, by giving those materials the form of a chair, he also had to have some idea of the particular chair he was about to produce.

Productive thinking involves having what we may be tempted to call creative ideas. Since no Greek equivalent of the word "creative" was in Aristotle's vocabulary, we should resist that temptation, and speak instead of productive ideas. Productive ideas are based on some understanding of the forms that matter can take, supplemented by imaginative thinking about such details as sizes, shapes, and configurations. Without a productive idea in this full sense, the craftsman cannot

transform raw materials into this individual thing—be it a chair, a bed, a house, or anything else that can be made out of materials provided by nature.

There are two ways in which a productive idea can be expressed. The first chairmaker or housebuilder probably did not draw up a plan or blueprint of the thing he was about to produce. With a productive idea in mind, he just produced it. The materialization of that idea—its embodiment in matter—expressed the productive idea he had. If you had asked him what idea he had in mind before he made the chair or built the house, he might not have been able to tell you in so many words. But once he had brought the chair or house into existence, he could have pointed to it and said, "There, that is what I had in mind."

Much later in the history of mankind, craftsmen of all sorts became able to draw up plans for the making of things. They became able to express their productive ideas before actually materializing them by transforming matter. But even at later stages in the history of human productivity, craftsmen do not always proceed to work by first putting their productive ideas down on paper in some fashion. They still sometimes hold the idea in their mind and let it guide them in every step of the work until the finished product comes into existence and expresses the idea they had in the first place.

This distinction between two ways in which productive ideas can be expressed calls our attention to two phases in the making of things, phases that can be separated. One individual can have the idea of a particular house to be built and can draw up the plans for the building of that house. Another individual, or other individuals, can execute or carry out that plan. Nowadays we differentiate between these different contributors to the making of a house by calling one an architect and the

other a builder (or, if the builder employs other persons to engage in building the house, we call the builder a contractor).

The individual who draws up the plans in the first place is the one who has the productive idea. Those who execute the plans must have know-how. In the making of anything, whether it be a chair or a house, productive ideas are not enough. To carry them out, it is necessary to know how to deal with the raw materials in such a way that their potentiality for becoming a chair or a house is actualized. Unless that end result is reached, the productive idea will not be expressed in matter. It will not be materialized.

Of course, one and the same individual may have both the productive idea and the know-how needed for making a chair or a house. The only thing we must remember is that productive ideas and know-how are distinct factors in the making of things. What enters into the craftsman's know-how?

First of all, he must know how to choose the appropriate raw materials for making the kind of thing he has in mind, with whatever tools he has at his disposal, or with none at all, but only his bare hands. If, for example, his only tools are a hammer and saw, he cannot make a chair out of iron or steel or a house out of stones. And it should go without saying that, regardless of what tools are available, the artisan cannot make a chair or a house out of air or water.

Beyond knowing how to choose the appropriate materials to work on with the tools at his disposal, the craftsman must also know how to use those tools efficiently and how to proceed, step by step, in the construction of the thing he wishes to make. In the building of a house, laying the foundations precedes getting the frame up, as that precedes putting the roof on.

The mind, the hands, and the tools of the craftsman, taken all together, are the efficient cause of the thing that is produced. They act upon the raw materials to actualize the potentialities that such materials have for being transformed into the product that the maker had in mind.

Of these three factors (which together constitute the efficient cause), the mind is the principal factor. It is the maker's mind that has the productive idea and the know-how, without which neither hands nor tools could ever make anything. The maker's hands and his tools are merely the instruments his mind uses to put his productive idea and his know-how into the actions required to act on the raw materials and actualize their potentialities.

The human mind is the principal factor in human production. Everything else is instrumental.

To know how to make something is to have skill. Even in the simplest performances, which we sometimes call unskilled labor, there is some know-how and, therefore, some skill. From the simplest to the most complex activities in which human beings engage—from the building of toy models by children to the building of bridges, dams, and schools—the levels of know how are the levels of skill.

Another English word for "skill" is the word "technique." The person who has the know-how required for making some thing has the technique for making it. I mention this because the English word "technique" comes from the Greek word *technikos*, which Aristotle used in talking about the acquired ability that some men may have and others may not have for making things. The combining form *techno-* which means art or skill, comes from the Greek *techne*. In Latin, this becomes *ars* and in English *art*. An artist is a person who has the

technique, skill, or know-how for making things. We would call such persons creative artists if, in addition to having the know-how, they also have the productive idea that is the indispensable primary source from which comes the thing to be made.

We sometimes use the word "art" for the things produced by an artist. We use that word as short for "works of art." But since works of art cannot be produced unless someone has acquired the know-how to produce them, art in the sense of know-how must first exist in a human being before it can make itself evident in a work of art.

Although you would readily refer to cooks, dressmakers, carpenters, or shoemakers as artists or craftsmen because you recognized that they had the skill or know-how for making this or that, you would probably not refer to farmers, physicians, or teachers as artists. Aristotle, however, recognized their possession of a certain skill or know-how that would justify calling them artists. But he also pointed out how different their art is from the art of cooks, carpenters, and shoemakers.

The latter produce things—cakes, chairs, and shoes—that would never come into existence without human productive ideas, know-how, and effort. Nature does not produce such things. They are always works of art. But nature, without human know-how and effort, does produce fruits and grains. Why, then, should we refer to farmers, who raise such things as apples or corn, as artists? What have they produced?

By themselves, nothing. Farmers have merely helped nature to produce the apples and the corn that nature would have produced anyway. They have the skill or know-how to cooperate with nature in the production of fruit or grain; and, by so doing, they may be able to obtain a better supply of

nature's products than would have fallen to their hands if they had not cooperated with nature in producing them.

As farmers, having the know-how or skills that belong to agriculture, cooperate with nature in the production of fruits, grains, and vegetables, so physicians, having the know-how or skills that belong to medicine, cooperate with nature in preserving or restoring the health of a living organism. Since health, like apples and corn, is something that would exist even if there were no physicians, physicians, as well as farmers, are merely cooperative artists, not productive ones like the shoemakers and the carpenters.

So, too, are teachers. Human beings can acquire knowledge without the aid of teachers, just as apples and corn grow without the aid of farmers. But teachers can help human beings acquire knowledge, just as farmers can help apples and corn to grow in desired qualities and quantities. Teaching, like farming and healing, is a cooperative, not a productive art.

The productive arts differ in many ways. Human making turns out a wide variety of products—from chairs, shoes, and houses to paintings, statues, poems, and songs. Paintings and statues are like shoes and chairs in that they are made of materials that the maker somehow transforms. Also, like shoes and chairs, paintings and statues exist at a given place and at a given time.

On the other hand, a piece of music—a song that is sung over and over again—does not exist just at one place and at one time. It can be sung at many different places and at many different times. In addition, it takes time to sing a song or play a piece of music, as it takes time to recite a poem or tell a story. The song and the story have a beginning, a middle, and an end in a sequence of times, which is not true of a statue or a painting.

There is one further difference between a song or a story and a painting or a statue. Stories can be written down in words; songs can be written down in musical notations. The words of speech and the notations of music are symbols that can be read. The person who is able to read them can get the story that is being told by them, sing the song or hear it. But the painting and the statue must be seen directly. To enjoy the work of a painter or sculptor, you must go to the material product that he has made.

Though the painting or the statue is a material product like the shoe or the chair, it is also something to be enjoyed, like the story or the song, not something to be used, like the shoe or the chair. Of course, it is possible to use a painting to cover a spot on the wall, as it is possible to enjoy a chair by looking at it instead of sitting down on it.

Nevertheless, using and enjoying are different ways that men approach works of art. They use them when they employ them to serve some purpose. They enjoy them when they are satisfied with the pleasure they get from perceiving them in one way or another—by seeing, hearing, or reading.

The pleasure we get when we enjoy a work of art has something to do with our calling the thing we enjoy *beautiful*. But that is not all there is to it. It is also possible to call a chair, a table, or a house beautiful simply because it is well made. Its being well made is one factor that enters into the beauty of a human product, whether it is a chair or a statue. The pleasure we get from beholding it is another factor.

Aristotle's suggestion that these two factors are related appears to make good sense. The pleasure we get from looking at the statue or the house, or listening to the story or the song, is

somehow connected with its being well made. A poorly made statue, a poorly constructed house, a poorly told story would not give us as much pleasure.

We all know the difference between a piece of clothing made by a skilled tailor, or a soup made by a skilled cook, and shirts or soups made by persons with very little skill. The well-made shirt and the well-made soup are more enjoyable—give us more pleasure—than poorly made ones.

In addition, those who have the art of cooking or tailoring have the know-how by which they can judge whether a shirt or a soup is well made. We would expect skilled cooks or tailors to agree in their judgments. We would be very surprised if one skilled cook thought a soup was well made and another, having equal skill, thought it was poorly made.

We would not be so surprised if we found that, of two persons looking at a painting that skilled artists agreed was well made, one liked it and the other didn't. We do not expect individuals to enjoy the same things or enjoy them to the same extent. What gives one person pleasure may not give pleasure to another.

Just as one person may have more skill or know-how than another, so one person may have better taste than another. It would be wiser to ask a skilled person whether a certain work of art was well made than to ask that question of a person who did not know anything about how such things should be made. So it might be wiser to ask a person who had better taste about the enjoyability of a work of art. We would expect a person of better taste to like a work of art that was better—not only better made but more enjoyable.

The question whether we should all be able to agree, or whether we should all be expected to agree, about the beauty of a work of art has never been satisfactorily answered. There are some reasons for answering it by saying yes, and some reasons for answering it by saying no. If all there were to the beauty of a work of art consisted in its being well made, the question would be easier to answer. We expect those who have the know-how needed to produce a work of that sort to be able to agree that it is well made or poorly made.

Where does this all important know-how come from? How does the person of skill acquire it?

There are two answers. In the earlier stages of human production, the know-how needed was based on common-sense knowledge of nature—knowledge about the raw materials that nature provided the human producer to work on and knowledge about the use of the tools to be worked with.

In later stages, and especially in modern times, the know-how needed has been based on scientific knowledge of nature, and it now consists of what we have come to call the technology that scientific knowledge gives us. "Technology" is just another name for scientific know-how as compared with common-sense know-how.

Does Aristotle's uncommon common sense give us any useful know-how? Does philosophical thought—the understanding of natural processes that we have been considering in the preceding chapters—help us to produce things?

No, it does not. Scientific knowledge can be applied productively. Scientific knowledge, through technology, gives us the skill and power to produce things. But the philosophical reflection or understanding that improves our common-sense

grasp of the physical world in which we live gives us neither the skill nor the power to produce anything.

Remember, for example, something said in an earlier chapter. Aristotle's philosophical understanding of why acorns develop into oaks and kernels of corn develop into stalks of corn does not enable us to interfere with these natural processes in any way. But our scientific knowledge about DNA and the genetic code does enable us to alter the pattern of development by splicing the genes.

Is philosophy totally useless, then, as compared with science? Yes, it is, if we confine ourselves to the use of knowledge or understanding for the sake of producing things. Philosophy bakes no cakes and builds no bridges.

But there is a use of knowledge or understanding other than the use we put it to when we engage in the production of things. Knowledge and understanding can be used to direct our lives and manage our societies so that they are better rather than worse lives and better rather than worse societies.

That is a practical rather than a productive use of knowledge and understanding—a use for the sake of doing rather than a use for the sake of making.

In that dimension of human life, philosophy is highly useful—more useful than science.

PART III: MAN THE DOER

9. Thinking about Ends and Means

I do not have an automobile and I want one. The automobile I want costs more money than I have available. It is necessary for me to get the money needed to buy the car. There appear to be a number of ways in which I can get what is needed without violating the law. For example, I can save it, by not spending what money I have on something else; or I can try to earn additional money; or I can borrow it.

In this example—there might have been countless others of the same sort—getting the automobile is the end in view. Getting the money needed to buy the car is a means to that end; it is also itself an end to which there are, as we have seen, a number of means.

How do I choose among them? One may be easier than the others; going one way may get me my goal more quickly than going the other ways. Of the several means, each serving to attain the end in view, one would normally choose the means that seems better by virtue of being easier, quicker, more likely to succeed, and so on.

When we act this way, we act purposefully. To say that we have a purpose in what we do is to say that we are acting for some goal that we have in mind.

Sometimes we act aimlessly—like a boat just drifting on the current with no one at the wheel to steer it. When we act in that way, we are also acting thoughtlessly. We have nothing in mind that guides our acting in one direction or another. To act aimlessly requires no thinking on our part.

For the most part, however, we act purposefully, and then we cannot act without thinking first. We have to think about the goal we are aiming at—the end we are trying to achieve. We have to think about the various means that we can use to achieve it. We have to think about which is the better of alternative means and why one is better than another. And if the particular means that we choose to employ is a means we cannot use without doing something else first in order to lay our hands on it, then it is itself an end, and we must think about the means to achieving it.

Thinking of the sort I have just described is practical thinking. It is thinking about ends and means—thinking about the goal you wish to reach and thinking about what must be done to get there. It is the kind of thinking that is necessary for purposeful action.

Productive thinking, as we have seen, is thinking about things to be made. Practical thinking, in contrast, is thinking about what is to be done. To think well for the sake of making something, you have to have what we called productive ideas and know-how. To think well for the sake of getting somewhere by what you do, you have to have an idea of a goal to be reached and ideas about ways of reaching it. And you also have to think about the reasons why one way of pursuing your goal is better than another.

Productive thinking, or thinking in order to produce something, does not actually produce it. Such thinking may lead to actual

production, but production does not actually begin until the producer goes to work and acts on the raw materials to transform them in a way that will materialize the productive idea he had in mind.

So, too, practical thinking, or thinking in order to act purposefully or to do what is necessary to achieve some end or goal, falls short of actual doing. Doing begins when practical thinking is put into practice. Productive thinking may continue while production is actually going on. Practical thinking may continue during the course of purposeful action. But until making and doing actually begin, productive thinking and practical thinking bear no fruit.

Aristotle tells us that, except for the exceptional instances of aimless behavior, human beings always act with some end in view. The thinking they do in order to act purposefully begins with thinking about the goal to be achieved, but when they begin to do anything to achieve that goal, they have to start with the means for achieving it. The end comes first in the thinking that individuals do in order to act purposefully, but the means come first in what they do to accomplish their purposes.

In saying that human beings always—or usually—act with some end in view, Aristotle also says that they act for some good they wish to obtain and possess. He identifies an end being aimed at with a good that is desired.

In his view, it makes no sense at all to say that we are acting for an end that we regard as bad for us. That amounts to saying that what we are aiming at is something we do not desire. It is plain common sense that what we regard as bad for us is something we desire to avoid, not something we desire to possess.

What about the means we need to achieve the end we have in mind? To aim at an end is to seek a good that we desire. Are the means we must use to achieve the end also goods that we desire? Yes and no. The means are good, but not because we desire them for their own sake, but only because we desire them for the sake of something else.

Must we always regard means as good because they provide us with a way of getting the end we want to achieve? Certainly, means are good only if they do help us succeed in reaching our goal. But if they have other consequences, too, then they may be undesirable for reasons quite apart from achieving the end we have in mind.

Stealing would get the money that I need to buy an automobile I want, but stealing might also get me into serious trouble that I would wish to avoid. The means we use to attain the end we seek must not only be good because they get us where we want to go, but they must also not land us where we do not want to be—in jail.

To sum up: means may be an end that we have to achieve by other means, and an end may also be a means to some further end. These two observations lead to two questions that Aristotle thinks we cannot avoid. One is: Are there any means that are purely or merely means, never ends? The other is: Are there any ends that are ends and never means—what Aristotle calls ultimate or final ends because they are not means to any ends beyond themselves?

Another way of asking the first question is to ask whether there are any things that we desire only for the sake of something else, never for their own sake. And another way of asking the second question is to ask whether there are any things that we

desire only for their own sake and never for the sake of something else.

Aristotle maintained that there are means that are merely or purely means, ends that are also means to goals beyond themselves, and ends that we pursue for their own sake and not for the sake of any further good to be obtained. His reasons for thinking so are as follows.

If there were nothing that we desired for its own sake and not for the sake of something else, our practical thinking could not begin. We have already seen that practical thinking must begin with thinking about an end to be sought or pursued. Now if every end we thought about were a means to some further end, and if that further end were still a means to some end beyond itself, and so on *endlessly*, practical thinking could never begin.

We have seen that when practical thinking is put into practice, we must start with some means to whatever end we have in view. If that means is itself an end that requires us to find means for achieving it, then we cannot start our doing, or purposeful action, with it. To start doing, we must start with a means that is purely a means, and not also an end that requires other means to achieve it.

So far I have told you only *why* there must be ends that are not means and why there must be means that are not ends. Your reaction to what I have told you so far would not surprise me if it consisted in wondering how you have ever done any practical thinking without knowing what your final or ultimate end is. If practical thinking cannot begin with an end that is a means to something beyond itself, and if you do not know of any end that you seek for its own sake and not for the sake of anything else, how could you ever begin to think practically?

Since you have undoubtedly done a lot of practical thinking in the course of your life, Aristotle must be wrong when he says that practical thinking cannot begin until you have an ultimate or final end in mind.

So it would certainly seem. A distinction between two ways in which you can have an ultimate or a final end in mind will open the door to a solution of this problem. To get some understanding of the required distinction, let's start with what we learned in school about geometry—the same kind of geometry with which Aristotle was acquainted.

What are called the first principles of geometry are the starting points with which you must begin in order to demonstrate the geometrical propositions that have to be proved. In Euclid's geometry, the first principles consist of definitions, axioms, and postulates. The definitions of points, lines, straight lines, triangles, and so on are needed, and so are such axioms as "the whole is greater than any of its parts" and "things equal to the same thing are equal to each other." In addition, there are the postulates—assumptions that Euclid makes in order to prove the propositions that need proof.

The difference between the axioms and the postulates is that you cannot deny the axioms. You cannot avoid affirming them. For example, try to think that a part is greater than the whole to which it belongs. But when Euclid asks you to assume that you can draw a straight line from any point to any point, you may be willing to make that assumption, but you do not have to do so. There is nothing compelling about it as there is about the axiom concerning wholes and parts.

As axioms and postulates are different kinds of starting points in geometrical thinking, so are there different kinds of starting points in practical thinking. Just as you can assume what Euclid

asks you to take for granted in order to get his geometrical proofs started, so in your own practical thinking, you can assume that a certain goal or end is ultimate, and ask no further questions about it, *even if they can be asked*.

In other words, most of us get started in our practical thinking not by having in mind that which is absolutely our final or ultimate goal, but rather by assuming that the end we have in view can be taken—for the time being at least—*as if* it were a goal about which no further questions need be asked.

In the example we have been considering, we may take being able to drive to school or to work as the end for which having an automobile, being able to buy it, getting the money needed to buy it, and so on, are the means. Of course, you realize that you could be asked why you want to drive to school or to work, and your answer to that question might lead to a further *why* until you came to an answer about which no further *why* could be asked.

That answer, if you ever reached it, would be your grasp of the ultimate or final end, for the sake of which everything else is a means. But you do not have to have such an end in view in order to begin practical thinking or purposeful doing because you can provisionally assume that some end you have in mind is, for the time being, ultimate—something you want for its own sake.

When you do what needs to be done to get it, you may ask yourself why you wanted it, but you do not have to ask that question in order to think about the means for getting it or in order to do what needs to be done to use means for that purpose. That question can be postponed—for the time being, but not forever, not, at least, if you want to lead a well-planned, purposeful life.

10. Living and Living Well

The younger we are, the more things we do aimlessly. If not aimlessly, then at least playfully. There is a difference between acting aimlessly and acting playfully. We act aimlessly when we have no end in view, no purpose. But when we behave playfully, we do have an aim—pleasure, the fun we get out of the game or whatever it is we are playing. The pleasure we get from the activity itself is our goal. We have no ulterior purpose; that is purpose enough.

Serious activity, as contrasted with playful activity, always has some ulterior purpose. We engage in the activity to achieve some goal, for which doing this or that is a means. Having and not having an ulterior purpose is one distinction between work and play, about which I will have more to say later. We all recognize that work is a serious activity and that it is seldom as pleasant as play.

The younger we are, the less likely it is that we will have a well-worked-out plan for living. When we are young, our goals are likely to be immediate ones—things to do, things to get, things to be enjoyed today, tomorrow, or next week at the most. Having such goals is hardly a plan for living one's life as a whole. One's life as a whole is a very difficult thing to think about when one is young.

As we get older, we become more and more purposeful. We also become more serious and less playful. That is generally true, but not true of everyone. There are exceptions. Some older persons live only for pleasure and enjoyment, and when we say that about them, we are not complimenting them. On the contrary, we are criticizing them for devoting too much of their time and energies to playing and not enough to serious activities. We are saying that the grown-up person who lives

this way is not really grown-up but childish. It is all right for children to play a large part of the time, but not for mature men and women.

As we grow older and more purposeful, less playful and more serious, we try to fit all our various purposes together into a coherent scheme for living. If we don't, we should, Aristotle tells us. We should try to develop a plan for living in order to live as well as possible.

Socrates, who was Plato's teacher as Plato was Aristotle's, said that an unexamined life is not worth living. Aristotle went further and said that an unplanned life is not worth examining, for an unplanned life is one in which we do not know what we are trying to do or why, and one in which we do not know where we are trying to get or how to get there. It is a jumble, a mess. It is certainly not worth examining closely.

In addition to not being worth examining, an unplanned life is not worth living because it cannot be lived well. To plan one's life is to be thoughtful about it, and that means thinking about ends to be pursued and the means for achieving them. Living thoughtlessly is like acting aimlessly. It gets you nowhere.

But Aristotle does not think it is enough to persuade you that you must have a plan for living in order to live well. He also wishes to persuade you that you must have the right plan. One plan is not as good as another. There are lots of wrong plans, but only one right plan. If you adopt one of the wrong plans, you will end up, Aristotle thinks, not having had a good life. To end up having had a good life, you must have lived it according to the right plan.

The right plan? It may be easy for Aristotle to persuade us that we ought to have a plan for living in order to live thoughtfully

and purposefully. That's just common sense. But for Aristotle to persuade us that there is only one right plan that we ought to adopt is not so easy. If he can succeed in doing that, it will be another indication of his uncommon common sense.

What can possibly make one plan for living right and all others wrong? To that question, Aristotle thinks there can be only one answer. The right plan is the one that aims at the right ultimate end—the end that all of us ought to aim at. That may be the answer to the question, but it leaves a further question unanswered. What is the right ultimate end—the end that all of us ought to aim at? You can see at once that if there were a right ultimate end, we ought to aim at it. Just as we find it impossible to think that part of a whole is greater than the whole of which it is a part, so we find it impossible to think that a wrong end is one we ought to aim at. If a goal is wrong, we ought not try to achieve it. Only if it is right, ought we to try.

Granted, you may say, but that still leaves the important question unanswered. What is the right ultimate end? What is the one goal that all of us ought to seek?

You may think that that is a hard question to answer, but Aristotle doesn't. Perhaps I should say that one of his answers to that question is very easy for him to give. But it is not the complete answer. The complete answer is much harder to state and to grasp. Let's start with the easier, though incomplete, answer.

The right end that all of us ought to pursue is a good life. Aristotle's reasoning on this point is simple and, I think, convincing. Let me summarize it.

There are certain things we do in order just to live—such things as nourishing and caring for our bodies and keeping them healthy, for the sake of which most of us have to work to earn the money we need to buy food, clothing, and shelter.

There are other things we do in order to live well. We make the effort to get an education because we think that knowing more than is necessary just to keep alive enriches our life. We do not need certain pleasures in order to keep alive, but having them certainly makes life richer and better.

Both living and living well are ends for which we have to find the means. But living, or keeping alive, is itself a means to living well. It is impossible to live well without staying alive—as long as possible or, at least, as long as it seems desirable to do so.

Living, I have just said, is a means to living well. But what is living well a means to? There can be no answer to that question, Aristotle tells us, because living well is an end in itself, an end we seek for its own sake and not for the sake of anything else or for any ulterior purpose. Anything else that we can think of, anything else that we call good or desirable, is a means either to living or to living well.

We can think of living as a means to living well, but we cannot think of living well as a means to anything else.

Aristotle thinks that that should be obvious to all of us. He also thinks that our common experience shows that all of us do, in fact, agree about it.

The word he uses for living well (or for a good life) has usually been translated into English by the word "happiness." Happiness, Aristotle says, is that which everyone seeks. No

one, if asked whether he wants happiness, would say, "No, I want misery instead."

In addition, no one, if asked why he wants happiness, can give a reason for wanting it. The only reason for wanting it would have to be some more ultimate end, for the achievement of which happiness is a means. But no more ultimate end exists. There is nothing beyond happiness, or a good life, for which happiness can serve as a means.

I have used the word "happiness" as interchangeable with "living well" or "a good life." What has been said about happiness is not as plain and obvious if the word is used with any other meaning. I can avoid using the word "happiness" with any other meaning, but I cannot avoid using the word "happy" with many different meanings, meanings that are related to happiness in different ways.

We ask one another "Did you have a happy childhood?" We ask one another "Do you feel happy now?" We say to one another "Have a happy vacation" or "Have a happy New Year." When we use the word "happy" in these ways, we are talking about the pleasure or satisfaction that we experience when we get what we desire.

People who feel contented because they have what they want feel happy. A happy time is one filled with pleasures rather than pains, with satisfactions rather than dissatisfactions. That being so, we can be happy today and unhappy tomorrow. We can have a happy time on one occasion and an unhappy time on another. Different human beings want different things for themselves. Their desires are not alike. What one person desires, another may wish to avoid. That amounts to saying that what some persons regard as good for themselves, others may regard as bad.

We differ in our desires and, therefore, we differ in what we regard as good for us. What makes one person feel happy may do just the opposite for another.

Since different persons feel happy as the result of doing different things or as the result of getting the different things they desire, how can it be said that happiness—living well or a good life—is the one right goal or ultimate end that all human beings ought to pursue?

Aristotle may be able to persuade us that all of us want happiness. He may be able to persuade us that we all want happiness for its own sake and not for the sake of anything else. But how can he persuade us that all of us, wanting happiness for its own sake, want exactly the same thing?

Human beings, in seeking happiness, certainly appear to be seeking different things. That is a matter of common experience, which Aristotle acknowledged without hesitation. He knew from common experience, as we do, that some individuals think that achieving happiness consists in accumulating great wealth; others, that it consists in having great power or becoming famous or having lots of fun.

If happiness, like feeling happy, results from getting what you want, and if different persons want different things for themselves, then the happiness to be achieved must be different for different persons.

If that is so, then how can there be one right plan for living well? How can there be one ultimate end that everyone ought to pursue? Happiness or living well may be the ultimate end that all of us seek, but it is not the same end for all of us.

Please remember something I said earlier in this chapter. I said that there was an easy, but incomplete, answer to the question, What is the one right ultimate end that all of us should seek? The easy but incomplete answer is: happiness, living well, or a good life as a whole. To get at the complete answer, we must see if Aristotle can show us why living well, a good life, or happiness is the same for all of us.