When Plato died in 347 bc, Aristotle moved to Assos, a city in Asia Minor, where a friend of his, Hermias (died 345 bc), was ruler. There he counseled Hermias and married his niece and adopted daughter, Pythias. After Hermias was captured and executed by the Persians, Aristotle went to Pella, the Macedonian capital, where he became the tutor of the king's young son Alexander, later known as Alexander the Great. In 335, when Alexander became king, Aristotle returned to Athens and established his own school, the Lyceum. Because much of the discussion in his school took place while teachers and students were walking about the Lyceum grounds, Aristotle's school came to be known as the Peripatetic ("walking" or "strolling") school. Upon the death of Alexander in 323 bc, strong anti-Macedonian feeling developed in Athens, and Aristotle retired to a family estate in Euboea. He died there the following year.

Works

Aristotle, like Plato, made regular use of the dialogue in his earliest years at the Academy, but lacking Plato's imaginative gifts, he probably never found the form congenial. Apart from a few fragments in the works of later writers, his dialogues have been wholly lost. Aristotle also wrote some short technical notes, such as a dictionary of philosophic terms and a summary of the doctrines of Pythagoras. Of these, only a few brief excerpts have survived. Still extant, however, are Aristotle's lecture notes for carefully outlined courses treating almost every branch of knowledge and art. The texts on which Aristotle's reputation rests are largely based on these lecture notes, which were collected and arranged by later editors.

Among the texts are treatises on logic, called Organon ("instrument"), because they provide the means by which positive knowledge is to be attained. His works on natural science include Physics, which gives a vast amount of information on astronomy, meteorology, plants, and animals. His writings on the nature, scope, and properties of being, which Aristotle called First Philosophy (Protè philosophia), were given the title Metaphysics in the first published edition of his works (circa 60 bc), because in that edition they followed Physics. His treatment of the Prime Mover, or first cause, as pure intellect, perfect in unity, immutable, and, as he said, "the thought of thought," is given in the Metaphysics. To his son Nicomachus he dedicated his work on ethics, called the Nicomachean Ethics. Other essential works include his Rhetoric, his Poetics (which survives in incomplete form), and his Politics (also incomplete).

Methods

Perhaps because of the influence of his father's medical profession, Aristotle's philosophy laid its principal stress on biology, in contrast to Plato's emphasis on mathematics. Aristotle regarded the world as made up of individuals (substances) occurring in fixed natural kinds (species). Each individual has its built-in specific pattern of development and grows toward proper self-realization as a specimen of its type. Growth, purpose, and direction are thus built into nature. Although science studies general kinds, according to Aristotle, these kinds find their existence in particular individuals. Science and philosophy must therefore balance, not simply choose between, the claims of empiricism (observation and sense experience) and formalism (rational deduction).

One of the most distinctive of Aristotle's philosophic contributions was a new notion of causality. Each thing or event, he thought, has more than one "reason" that helps to explain what, why, and where it is. Earlier Greek thinkers had tended to assume that only one sort of cause can be really explanatory; Aristotle proposed four. (The word Aristotle uses, aition, "a responsible, explanatory factor" is not

synonymous with the word cause in its modern sense.)

These four causes are the material cause, the matter out of which a thing is made; the efficient cause, the source of motion, generation, or change; the formal cause, which is the species, kind, or type; and the final cause, the goal, or full development, of an individual, or the intended function of a construction or invention. Thus, a young lion is made up of tissues and organs, its material cause; the efficient cause is its parents, who generated it; the formal cause is its species, lion; and its final cause is its built-in drive toward becoming a mature specimen. In different contexts, while the causes are the same four, they apply analogically. Thus, the material cause of a statue is the marble from which it was carved; the efficient cause is the sculptor; the formal cause is the shape the sculptor realized-Hermes, perhaps, or Aphrodite; and the final cause is its function, to be a work of fine art.

In each context, Aristotle insists that something can be better understood when its causes can be stated in specific terms rather than in general terms. Thus, it is more informative to know that a "sculptor" made the statue than to know that an "artist" made it; and even more informative to know that "Polycleitus" chiseled it rather than simply that a "sculptor" did so.

Aristotle thought his causal pattern was the ideal key for organizing knowledge. His lecture notes present impressive evidence of the power of this scheme.

Doctrines

Some of the principal aspects of Aristotle's thought can be seen in the following summary of his doctrines, or theories.

Physics, or Natural Philosophy

In astronomy, Aristotle proposed a finite, spherical universe, with the earth at its center. The central region is made up of four elements: earth, air, fire, and water. In Aristotle's physics, each of these four elements has a proper place, determined by its relative heaviness, its "specific gravity." Each moves naturally in a straight line-earth down, fire up-toward its proper place, where it will be at rest. Thus, terrestrial motion is always linear and always comes to a halt. The heavens, however, move naturally and endlessly in a complex circular motion. The heavens, therefore, must be made of a fifth, and different element, which he called aither. A superior element, aither is incapable of any change other than change of place in a circular movement. Aristotle's theory that linear motion always takes place through a resisting medium is in fact valid for all observable terrestrial motions. He also held that heavier bodies of a given material fall faster than lighter ones when their shapes are the same, a mistaken view that was accepted as fact until Galileo and his experiment with weights dropped from the Leaning Tower of Pisa.

Biology

In zoology, Aristotle proposed a fixed set of natural kinds ("species"), each reproducing true to type. An exception occurs, Aristotle thought, when some "very low" worms and flies come from rotting fruit or manure by "spontaneous generation." The typical life cycles are epicycles: The same pattern repeats, but through a linear succession of individuals. These processes are therefore intermediate between the changeless circles of the heavens and the simple linear movements of the terrestrial elements. The species form a scale from simple (worms and flies at the bottom) to complex (human beings at the top), but evolution is not possible.

Aristotelian Psychology

For Aristotle, psychology was a study of the soul. Insisting that form (the essence, or unchanging characteristic element in an object) and matter (the common undifferentiated substratum of things) always exist together, Aristotle defined a soul as a "kind of functioning of a body organized so that it can support vital functions." In considering the soul as essentially associated with the body, he challenged the Pythagorean doctrine that the soul is a spiritual entity imprisoned in the body. Aristotle's doctrine is a synthesis of the earlier notion that the soul does not exist apart from the body and of the Platonic notion of a soul as a separate, nonphysical entity. Whether any part of the human soul is immortal, and, if so, whether its immortality is personal, are not entirely clear in his treatise On the Soul.

Through the functioning of the soul, the moral and intellectual aspects of humanity are developed. Aristotle argued that human insight in its highest form (nous poetikos, "active mind") is not reducible to a mechanical physical process. Such insight, however, presupposes an individual "passive mind" that does not appear to transcend physical nature. Aristotle clearly stated the relationship between human insight and the senses in what has become a slogan of empiricism-the view that knowledge is grounded in sense experience. "There is nothing in the intellect," he wrote, "that was not first in the senses."

Ethics

It seemed to Aristotle that the individual's freedom of choice made an absolutely accurate analysis of human affairs impossible. "Practical science," then, such as politics or ethics, was called science only by courtesy and analogy. The inherent limitations on practical science are made clear in Aristotle's concepts of human nature and self-realization. Human nature certainly involves, for everyone, a capacity for forming habits; but the habits that a particular individual forms depend on that individual's culture and repeated personal choices. All human beings want "happiness," an active, engaged realization of their innate capacities, but this goal can be achieved in a multiplicity of ways.

Aristotle's Nicomachean Ethics is an analysis of character and intelligence as they relate to happiness. Aristotle distinguished two kinds of "virtue," or human excellence: moral and intellectual. Moral virtue is an expression of character, formed by habits reflecting repeated choices. A moral virtue is always a mean between two less desirable extremes. Courage, for example, is a mean between cowardice and thoughtless rashness; generosity, between extravagance and parsimony. Intellectual virtues are not subject to this doctrine of the mean. Aristotle argued for an elitist ethics: Full excellence can be realized only by the mature male adult of the upper class, not by women, or children, or barbarians (non-Greeks), or salaried "mechanics" (manual workers) from whom, indeed, Aristotle proposed to take away voting rights.

In politics, many forms of human association can obviously be found; which one is suitable depends on circumstances, such as the natural resources, cultural traditions, industry, and literacy of each community. Aristotle did not regard politics as a study of ideal states in some abstract form, but rather as an examination of the way in which ideals, laws, customs, and property interrelate in actual cases. He thus approved the contemporary institution of slavery but tempered his acceptance by insisting that masters should not abuse their authority, inasmuch as the interests of master and slave are the same. The Lyceum library contained a collection of 158 constitutions of the Greek and other states. Aristotle himself wrote the Constitution of Athens as part of the collection, and after being lost, this description was rediscovered in a papyrus copy in 1890. Historians have found the work of great value in reconstructing many phases of the history of Athens.

Logic

In logic, Aristotle developed rules for chains of reasoning that would, if followed, never lead from true premises to false conclusions (validity rules). In reasoning, the basic links are syllogisms: pairs of propositions that, taken together, give a new conclusion. For example, "All humans are mortal" and "All Greeks are humans" yield the valid conclusion "All Greeks are mortal." Science results from constructing more complex systems of reasoning. In his logic, Aristotle distinguished between dialectic and analytic. Dialectic, he held, only tests opinions for their logical consistency; analytic works deductively from principles resting on experience and precise observation. This is clearly an intended break with Plato's Academy, where dialectic was supposed to be the only proper method for science and philosophy alike.

Metaphysics

In his metaphysics, Aristotle argued for the existence of a divine being, described as the Prime Mover, who is responsible for the unity and purposefulness of nature. God is perfect and therefore the aspiration of all things in the world, because all things desire to share perfection. Other movers exist as well-the intelligent movers of the planets and stars (Aristotle suggested that the number of these is "either 55 or 47"). The Prime Mover, or God, described by Aristotle is not very suitable for religious purposes, as many later philosophers and theologians have observed. Aristotle limited his "theology," however, to what he believed science requires and can establish.

Influence

Aristotle's works were lost in the West after the decline of Rome. During the 9th century ad, Arab scholars introduced Aristotle, in Arabic translation, to the Islamic world. The 12th-century Spanish-Arab philosopher Averroës is the best known of the Arabic scholars who studied and commented on Aristotle. In the 13th century, the Latin West renewed its interest in Aristotle's work, and St. Thomas Aquinas found in it a philosophical foundation for Christian thought. Church officials at first questioned Aquinas's use of Aristotle; in the early stages of its rediscovery, Aristotle's philosophy was regarded with some suspicion, largely because his teachings were thought to lead to a materialistic view of the world. Nevertheless, the work of Aquinas was accepted, and the later philosophy of scholasticism continued the philosophical tradition based on Aquinas's adaptation of Aristotelian thought.

The influence of Aristotle's philosophy has been pervasive; it has even helped to shape modern language and common sense. His doctrine of the Prime Mover as final cause played an important role in theology. Until the 20th century, logic meant Aristotle's logic. Until the Renaissance, and even later, astronomers and poets alike admired his concept of the universe. Zoology rested on Aristotle's work until Charles Darwin modified the doctrine of the changelessness of species in the 19th century. In the 20th century a new appreciation has developed of Aristotle's method and its relevance to education, literary criticism, the analysis of human action, and political analysis.

Not only the discipline of zoology, but the world of learning as a whole, seems to amply justify Darwin's remark that the intellectual heroes of his own time "were mere schoolboys compared to old Aristotle."