33 Aristotelian Fundamentals of the Practice of Knowledge and Information

Dr. Stanley Sfekas, Professor of Philosophy,
Webster University Athens
9 Ipitou St., Syntagma sq., GR-10557
stanleysfekas76@webster.edu

Aristotle's theory of knowledge is best understood by examining the treatises called the Organon. The treatises in question were called the Organon because Logic was thought to be a method or discipline useful as a tool in all inquiries, whatever their subject matter. This is why in the traditional ordering of the Aristotelian corpus the Organon comes first.
Within the Organon the Categories and De Interpretatione come first followed by the Analytics. This is because the Categories deals with terms, the constituents of propositions, the De Interpretatione deals with propositions, the constituents of syllogisms, and the Analytics deals with syllogisms. The first two books of the Analytics, the Prior Analytics, study the conditions of valid deduction and in particular the syllogism. The last two books, the Posterior Analytics, study a special type of syllogism, the demonstrative syllogism, which is the form in which the sciences would ideally be expressed.
In the Prior Analytics Aristotle is concerned to develop a system to serve as a tool for science, not to theorize about that system. In the Prior Analytics Aristotle is doing logic rather than philosophy of logic. In the Posterior Analytics, on the other hand, Aristotle is not doing science but philosophy of science. The aim of the work is to analyze the concepts and the structure of the sciences. Book I is about demonstration and the demonstrative syllogism, that is, the kind of proof or explanation that conveys scientific knowledge or understanding. Book II deals with problems about definitions, their nature, their role in demonstration, and how they are to be established.
The remainder of the Organon consists of the Topics and the Sophistici Elenchi. The Topics is an exhaustive examination of dialectical arguments. A great range of both formal and informal arguments are considered and systematized. The brief Sophistici Elenchi is the source of most of the names still used for logical fallacies.

The Posterior Analytics undertakes to analyze what science is, and how to use language, logos, as an instrument, an organon, to formulate and express it. In the Posterior Analytics Aristotle thus answers the question raised in the Theatetus: What is επιστήμη, science? Aristotle's answer is we have genuine science, επιστήμη, when we can state in precise language not only that things are so, ότι, but also why they are as they are, διότι, and why they have to be that way. We possess science when we can prove and demonstrate statements about things and states of affairs by relating those statements to other statements of which they are the necessary consequences.
Science is thus for Aristotle a knowledge of the why, the διότι, the reasons for true statements. It is a knowledge of the dependence of true statements on more fundamental truths, on "first things", τα πρώτα, or causes, αιτίαι. Science, then, is like geometry in which theorems are demonstrated from initial axioms and theorems. Science is thus for Aristotle not the mere observation of facts, of the fact that, το ότι: it is not mere observation or sensing. In observing the fact that something is the case, we sense or observe, this here thing, here and now, τοδε τι. Science brushes aside what is irrelevant, extraneous and

incidental—what is “accidental” –about the particular instances observed, and states what is “essential” to being that “kind” of thing or event. Science thus states its reason why, its διότι; it states what that kind of thing really is.
Science is thus demonstration, απόδειξης. As in geometry it demonstrates the reasons why, τα διότι, things are as they are observed to be, and why they must be so, and it demonstrates these reasons why from “first things”, τα πρώτα. It demonstrates them from things that come before the conclusions, and are hence logically prior to those conclusions. It demonstrates them consequently, as stated in Latin, “a priori”. It demonstrates its conclusions from the beginnings of demonstration and of explanation, from αρχαί of demonstration. Αρχή in Greek here means “beginning” and the αρχαί of demonstration and science appeared in Latin as “principia’, or principles—the Latin term for “beginnings”. In English they mean the beginnings of understanding and intelligibility.
Hence for Aristotle every science comprises three factors:

1. that “about which” it establishes some theorem or conclusion, its περί ω: the particular and determinate subject matter about which that particular science proves conclusions. In each case that subject matter is a certain kind of thing, about which it demonstrates the properties and causes. A science contains also
2. “what it establishes as conclusions: the causes and properties of that particular kind of thing. And it exhibits
3. that from which it demonstrates its conclusions, its εξ ων: namely, its first things, or αρχαί, its principles.

The common method of proof they all have is the syllogism which Aristotle treats in the Prior Analytics. This examination is “prior” to the treatment of demonstration in the Posterior Analytics, because as Aristotle puts it:”The syllogism is the more general. The demonstration is a kind of syllogism, but not every syllogism is a demonstration.”
The proper αρχαί peculiar to a single subject matter, mark off the distinctive subject matters of the different sciences. These are distinguished in terms of their own αρχαί or principles. Thus the αρχή of nature or φύσις sets off natural things as the subject matter of Natural Philosophy or Physics, the αρχή of life or psyche sets off animate things or έμψυχα as the subject matter of biology, the αρχή of welfare or to ευ ζειν sets off the subject matter of Ethics, the αρχή of the polis sets off the subject matter of Politics, etc. Each kind of thing, natural motions, living processes, living well, the city, has αρχαί appropriate to it in terms of which it can be understood, reasons why it displays the properties and characteristics it does.
Aristotle distinguishes three different kinds of reasoning or syllogism, the dialectical, the eristic, and the demonstrative or scientific. These three different kinds of reasoning do not differ in their form; the difference between them lies in the character of the premises from which they proceed. And when Aristotle discovered the principle of the syllogism, and worked out the first three figures of the now standard four, he included all three kinds of syllogism in his formal analysis of reasoning in general, in the Prior Analytics. But he seems to have begun with dialectical reasoning, in his earliest of his three treatments of reasoning, in the Topics, or “places» for finding arguments. The Topics has been shown to be clearly earlier than the other two treatments, in the Prior and the Posterior Analytics. It was written before he discovered the principle of the syllogism.
Dialectical reasoning is the reasoning of conversation and argument, το διαλέγεσθαι, in which the participants try to agree on premises. It is the reasoning of discussion, of the Sophists, of Socrates, of the Socratic dialogues, of that whole Greek world of talk and discussion and political argument. In the Topics Aristotle conceives “dialectic” as the science

of what happens, not when we are thinking by ourselves, but when we are talking with others, and trying to convince one another. Its problem is to find good arguments to support our position. That is, its problem, like that of Socrates, is to find the premises your opponent will agree to, from which you can force him to admit the conclusion you want. Aristotle defines the syllogism: “A syllogism is an argument, in which certain things having been assumed, something other than these follows by necessity by virtue of the things being assumed. “ [Prior Analytics I, ch I: 24b 18-19] In dialectical arguments the things assumed must be “opinions that are generally accepted, ένδοξα, accepted by all, or the majority, or by the most notable and illustrious of them. [Topics I ch I: 100b 23, 24] to which you can get your opponent or the court to agree.

Dialectical arguments of this sort, clearly growing out of Socrates’ way of questioning and arguing orally, probably played an important part in instruction in Plato’s Academy. What Aristotle added to this educational practice was a systematic introduction to “dialectic” or argument in the Topics. That treatise describes its subject as “useful for intellectual training and for arguing with men on the basis of their own opinions.”[Topics I ch. 2 101a 27-33]

The problem with such dialectical reasoning is clear. The conclusion to be admitted by your opponent is there to begin with, το εν αρχή. What is sought is the question to ask, the propositions, the προτάσεις, to get him to admit. The questioner has to think backwards to the premises that will prove his point. Hence Aristotle’s first conception of what we call “logic”, in the Topics, was the dialectical syllogism that arises in conversation and argument. This conception dominates his notion of the λογικός or διαλεκτικός, as contrasted say with the φυσικός, the investigator of natural processes.

In the Topics, then, Aristotle has not yet found any general principle of valid reasoning. He gives a fourfold classification of arguments in the Topics with a large variety of forms. They all aim at the search for possible premises, starting from a conclusion desired and given. They do not seek for the conclusions that will follow from the given premises. This central problem of the dialectical syllogism is generalized in Aristotle’s treatment of reasoning or the syllogism in general, in the Prior Analytics, and is carried over into the problem of scientific reasoning, or demonstration, αποδείξεις, in the Posterior Analytics.

The demonstrative syllogism, απόδειξης, which produces genuine knowledge, science or επιστήμη, does not aim to lead from premises to a conclusion up to then unknown. On the contrary, in the demonstrative syllogism, also, the conclusion is an observed fact previously known. The scientific explanation, the reason why, the διότι, or “cause”, will when found form the premise from which that observed fact can be demonstrated as a conclusion. Thus the scientific syllogism derives facts already known through observation, from reasons why, or αρχαί. It is not a logic of the discovery of new facts, but a logic of proof, of formalizing or systematizing facts already known.

Now, if demonstration is to produce genuine knowledge, επιστήμη , certain conditions are necessary. The first things, the αρχαί, the premises of the demonstrative syllogism, or απόδειξης must be true. It is the truth of the premises or αρχαί that is what distinguishes demonstration and science from mere dialectic, in which the αρχαί are only probable and “accepted”—that is, which are what we call mere ‘postulates’. In demonstration the αρχαί must also be “prior”, in the sense that the facts in the conclusion can be logically derived from them. They must be better known and more certain than the facts being demonstrated. They must themselves be “undemonstrated” and immediate, not mediate, not themselves links in a chain of proof, but genuine starting points. And they must be causes of the facts in the conclusion, in any of Aristotle’s four senses of cause, if they are to give genuine explanations or reasons why. That is the αρχαί must possess all these characters in the

statement of a completed science, in complete proof or απόδειξης, in a formalized science like Euclidean geometry, which is Aristotle's model.
The point is that for Aristotle the syllogism is in no sense a method of investigation, but a method of proof. In our actual method and procedure of inquiry, the αρχαί of proof are not starting points at all. The establishment of just what are the αρχαί of demonstration and proof is the last step in inquiry. When found they then become the logical starting point of understanding and proof. They are logically but not methodologically prior.
In Aristotle's actual investigations his αρχαί always function very much as what we would call "hypotheses". They are relative to their subject matter and to their primary function of making it intelligible. The task of science and demonstration is to fit these observed facts into a system of knowledge. It is to formalize our observations. The αρχαί or principles emerge in this process of systematizing as the unproved premises of proof.
From where are these αρχαί derived? How do we arrive at them? Aristotle's answer to this question, obviously fundamental for his whole conception of science is that we learn them from observation of facts, of particular instances, by επαγωγή, which is usually translated into Latin as "induction". That is by experience of facts, by repeated observations, we become aware of the αρχή, the universal that is implicit in them. For Aristotle we recognize the universal the αρχή, by νους, by an intellectual seeing. Aristotle's formulation was taken over by the great scientific pioneers of the 17th century, from Galileo and Newton on. The scientist grasps the truth by νους, by intellectual intuition, by insight. Νους working with experienced facts is more certain than deductive proof, than demonstration. Science, επιστήμη, is systematized, formalized reasoning.. It is demonstration, απόδειξης from αρχαί. But those αρχαί themselves are established and validated as αρχαί, not by reasoning or demonstration, but by νους: by seeing that it is so, that this is the way in which the facts can be understood. So Aristotle concludes: "It is not science, but νους that is the αρχή of science itself." Hence science or demonstration and νους are the two necessary components of what Aristotle calls theoretical wisdom, σοφία