



# A System of Knowledge

Aristotle

## BOOK I

1. All instruction given or received by way of argument proceeds from pre-existent knowledge. This becomes evident upon a survey of all the species of such instruction. The mathematical sciences and all other speculative disciplines are acquired in this way, and so are the two forms of dialectical reasoning, syllogistic and inductive; for each of these latter make use of old knowledge to impart new, the syllogism assuming an audience that accepts its premisses, induction exhibiting the universal as implicit in the clearly known particular. Again, the persuasion exerted by rhetorical arguments is in principle the same, since they use either example, a kind of induction, or enthymeme, a form of syllogism.

The pre-existent knowledge required is of two kinds. In some cases admission of the fact must be assumed, in others comprehension of the meaning of the term used, and sometimes both assumptions are essential. Thus, we assume that every predicate can be either truly affirmed or truly denied of any subject, and that 'triangle' means so and so; as regards 'unit' we have to make the double assumption of the meaning of the word and the existence of the thing. The reason is that these several objects are not equally obvious to us. Recognition of a truth may in some cases contain as factors both previous knowledge and also knowledge acquired simultaneously with that recognition-knowledge, this latter, of the particulars actually falling under the universal and therein already virtually known. For example, the student knew beforehand that the angles of every triangle are equal to two right angles; but it was only at the actual moment at which he was being led on to recognize this as true in the instance before him that he came to know 'this figure inscribed in the semicircle' to be a triangle. For some things (viz. the singulars finally reached which are not predicable of anything else as subject) are only learnt in this way, i.e. there is here no recognition through a middle of a minor term as subject to a major. Before he was led on to recognition or before he actually drew a conclusion, we should perhaps say that in a manner he knew, in a manner not.

If he did not in an unqualified sense of the term know the existence of this triangle, how could he know without qualification that its angles were equal to two right angles? No: clearly he knows not without qualification but only in the sense that he knows universally. If this distinction is not drawn, we are faced with the dilemma in the Meno: either a man will learn nothing or what he already knows; for we cannot accept the solution which some people offer. A man is asked, 'Do you, or do you not, know that every pair is even?' He says he does know it. The questioner then produces a particular pair, of the existence, and so a fortiori of the evenness, of which he was unaware. The solution which some people offer is to assert that they do not know that every pair is even, but only that everything which they know to be a pair is even: yet what they know to be even is that of which they have demonstrated evenness, i.e. what they made the subject of their premiss, viz. not merely every triangle or number which they know to be such, but any and every number or triangle without reservation. For no premiss is ever couched in the form 'every number which you know to be such', or 'every rectilinear figure which you know to be such': the predicate is always construed as applicable to any and every instance of the thing. On the other hand, I imagine there is nothing to prevent a man in

one sense knowing what he is learning, in another not knowing it. The strange thing would be, not if in some sense he knew what he was learning, but if he were to know it in that precise sense and manner in which he was learning it.

2. We suppose ourselves to possess unqualified scientific knowledge of a thing, as opposed to knowing it in the accidental way in which the sophist knows, when we think that we know the cause on which the fact depends, as the cause of that fact and of no other, and, further, that the fact could not be other than it is. Now that scientific knowing is something of this sort is evident-witness both those who falsely claim it and those who actually possess it, since the former merely imagine themselves to be, while the latter are also actually, in the condition described. Consequently the proper object of unqualified scientific knowledge is something which cannot be other than it is.

There may be another manner of knowing as well-that will be discussed later. What I now assert is that at all events we do know by demonstration. By demonstration I mean a syllogism productive of scientific knowledge, a syllogism, that is, the grasp of which is *eo ipso* such knowledge. Assuming then that my thesis as to the nature of scientific knowing is correct, the premisses of demonstrated knowledge must be true, primary, immediate, better known than and prior to the conclusion, which is further related to them as effect to cause. Unless these conditions are satisfied, the basic truths will not be 'appropriate' to the conclusion. Syllogism there may indeed be without these conditions, but such syllogism, not being productive of scientific knowledge, will not be demonstration. The premisses must be true: for that which is non-existent cannot be known-we cannot know, e.g. that the diagonal of a square is commensurate with its side. The premisses must be primary and indemonstrable; otherwise they will require demonstration in order to be known, since to have knowledge, if it be not accidental knowledge, of things which are demonstrable, means precisely to have a demonstration of them. The premisses must be the causes of the conclusion, better known than it, and prior to it; its causes, since we possess scientific knowledge of a thing only when we know its cause; prior, in order to be causes; antecedently known, this antecedent knowledge being not our mere understanding of the meaning, but knowledge of the fact as well. Now 'prior' and 'better known' are ambiguous terms, for there is a difference between what is prior and better known in the order of being and what is prior and better known to man. I mean that objects nearer to sense are prior and better known to man; objects without qualification prior and better known are those further from sense. Now the most universal causes are furthest from sense and particular causes are nearest to sense, and they are thus exactly opposed to one another. In saying that the premisses of demonstrated knowledge must be primary, I mean that they must be the 'appropriate' basic truths, for I identify primary premiss and basic truth. A 'basic truth' in a demonstration is an immediate proposition. An immediate proposition is one which has no other proposition prior to it. A proposition is either part of an enunciation, i.e. it predicates a single attribute of a single subject. If a proposition is dialectical, it assumes either part indifferently; if it is demonstrative, it lays down one part to the definite exclusion of the other because that part is true. The term 'enunciation' denotes either part of a contradiction indifferently. A contradiction is an opposition which of its own nature excludes a middle. The part of a contradiction which conjoins a predicate with a subject is an affirmation; the part disjoining them is a negation. I call an immediate basic truth of syllogism a 'thesis' when, though it is not susceptible of proof by the teacher, yet ignorance of it does not constitute a total bar to progress on the part of the pupil: one which the pupil must know if he is to learn anything whatever is an axiom. I call it an axiom because there are such truths and we give them the name of axioms *par excellence*. If a thesis assumes one part or the other of an enunciation, i.e. asserts either the existence or the non-existence of a subject, it is a hypothesis; if it does not so assert, it is a definition. Definition is a 'thesis' or a 'laying something down', since the arithmetician lays it down that to be a unit is to be quantitatively indivisible; but it is not a hypothesis, for to define what a unit is is not the same as to affirm its existence.

Now since the required ground of our knowledge-i.e. of our conviction-of a fact is the possession of such a syllogism as we call demonstration, and the ground of the syllogism is the

facts constituting its premisses, we must not only know the primary premisses-some if not all of them-beforehand, but know them better than the conclusion: for the cause of an attribute's inherence in a subject always itself inheres in the subject more firmly than that attribute; e.g. the cause of our loving anything is dearer to us than the object of our love. So since the primary premisses are the cause of our knowledge-i.e. of our conviction-it follows that we know them better-that is, are more convinced of them-than their consequences, precisely because of our knowledge of the latter is the effect of our knowledge of the premisses. Now a man cannot believe in anything more than in the things he knows, unless he has either actual knowledge of it or something better than actual knowledge. But we are faced with this paradox if a student whose belief rests on demonstration has not prior knowledge; a man must believe in some, if not in all, of the basic truths more than in the conclusion. Moreover, if a man sets out to acquire the scientific knowledge that comes through demonstration, he must not only have a better knowledge of the basic truths and a firmer conviction of them than of the connexion which is being demonstrated: more than this, nothing must be more certain or better known to him than these basic truths in their character as contradicting the fundamental premisses which lead to the opposed and erroneous conclusion. For indeed the conviction of pure science must be unshakable.

3. Some hold that, owing to the necessity of knowing the primary premisses, there is no scientific knowledge. Others think there is, but that all truths are demonstrable. Neither doctrine is either true or a necessary deduction from the premisses. The first school, assuming that there is no way of knowing other than by demonstration, maintain that an infinite regress is involved, on the ground that if behind the prior stands no primary, we could not know the posterior through the prior (wherein they are right, for one cannot traverse an infinite series): if on the other hand-they say-the series terminates and there are primary premisses, yet these are unknowable because incapable of demonstration, which according to them is the only form of knowledge. And since thus one cannot know the primary premisses, knowledge of the conclusions which follow from them is not pure scientific knowledge nor properly knowing at all, but rests on the mere supposition that the premisses are true. The other party agree with them as regards knowing, holding that it is only possible by demonstration, but they see no difficulty in holding that all truths are demonstrated, on the ground that demonstration may be circular and reciprocal.

Our own doctrine is that not all knowledge is demonstrative: on the contrary, knowledge of the immediate premisses is independent of demonstration. (The necessity of this is obvious; for since we must know the prior premisses from which the demonstration is drawn, and since the regress must end in immediate truths, those truths must be indemonstrable.) Such, then, is our doctrine, and in addition we maintain that besides scientific knowledge there is its originative source which enables us to recognize the definitions.

Now demonstration must be based on premisses prior to and better known than the conclusion; and the same things cannot simultaneously be both prior and posterior to one another: so circular demonstration is clearly not possible in the unqualified sense of 'demonstration', but only possible if 'demonstration' be extended to include that other method of argument which rests on a distinction between truths prior to us and truths without qualification prior, i.e. the method by which induction produces knowledge. But if we accept this extension of its meaning, our definition of unqualified knowledge will prove faulty; for there seem to be two kinds of it. Perhaps, however, the second form of demonstration, that which proceeds from truths better known to us, is not demonstration in the unqualified sense of the term.

The advocates of circular demonstration are not only faced with the difficulty we have just stated: in addition their theory reduces to the mere statement that if a thing exists, then it does exist-an easy way of proving anything. That this is so can be clearly shown by taking three terms, for to constitute the circle it makes no difference whether many terms or few or even only two are taken. Thus by direct proof, if A is, B must be; if B is, C must be; therefore if A is, C must be. Since then-by the circular proof-if A is, B must be, and if B is, A must be, A may be substituted for C above. Then 'if B is, A must be'='if B is, C must be', which above gave the

conclusion 'if A is, C must be': but C and A have been identified. Consequently the upholders of circular demonstration are in the position of saying that if A is, A must be—a simple way of proving anything. Moreover, even such circular demonstration is impossible except in the case of attributes that imply one another, viz. 'peculiar' properties.

Now, it has been shown that the positing of one thing-be it one term or one premiss—never involves a necessary consequent: two premisses constitute the first and smallest foundation for drawing a conclusion at all and therefore a fortiori for the demonstrative syllogism of science. If, then, A is implied in B and C, and B and C are reciprocally implied in one another and in A, it is possible, as has been shown in my writings on the syllogism, to prove all the assumptions on which the original conclusion rested, by circular demonstration in the first figure. But it has also been shown that in the other figures either no conclusion is possible, or at least none which proves both the original premisses. Propositions the terms of which are not convertible cannot be circularly demonstrated at all, and since convertible terms occur rarely in actual demonstrations, it is clearly frivolous and impossible to say that demonstration is reciprocal and that therefore everything can be demonstrated.

## BOOK II

19. As regards syllogism and demonstration, the definition of, and the conditions required to produce each of them, are now clear, and with that also the definition of, and the conditions required to produce, demonstrative knowledge, since it is the same as demonstration. As to the basic premisses, how they become known and what is the developed state of knowledge of them is made clear by raising some preliminary problems.

We have already said that scientific knowledge through demonstration is impossible unless a man knows the primary immediate premisses. But there are questions which might be raised in respect of the apprehension of these immediate premisses: one might not only ask whether it is of the same kind as the apprehension of the conclusions, but also whether there is or is not scientific knowledge of both; or scientific knowledge of the latter, and of the former a different kind of knowledge; and, further, whether the developed states of knowledge are not innate but come to be in us, or are innate but at first unnoticed. Now it is strange if we possess them from birth; for it means that we possess apprehensions more accurate than demonstration and fail to notice them. If on the other hand we acquire them and do not previously possess them, how could we apprehend and learn without a basis of pre-existent knowledge? For that is impossible, as we used to find in the case of demonstration. So it emerges that neither can we possess them from birth, nor can they come to be in us if we are without knowledge of them to the extent of having no such developed state at all. Therefore we must possess a capacity of some sort, but not such as to rank higher in accuracy than these developed states. And this at least is an obvious characteristic of all animals, for they possess a congenital discriminative capacity which is called sense-perception. But though sense-perception is innate in all animals, in some the sense-impression comes to persist, in others it does not. So animals in which this persistence does not come to be have either no knowledge at all outside the act of perceiving, or no knowledge of objects of which no impression persists; animals in which it does come into being have perception and can continue to retain the sense-impression in the soul: and when such persistence is frequently repeated a further distinction at once arises between those which out of the persistence of such sense-impressions develop a power of systematizing them and those which do not. So out of sense-perception comes to be what we call memory, and out of frequently repeated memories of the same thing develops experience; for a number of memories constitute a single experience. From experience again—i.e. from the universal now stabilized in its entirety within the soul, the one beside the many which is a single identity within them all—originate the skill of the craftsman and the knowledge of the man of science, skill in the sphere of coming to be and science in the sphere of being.

We conclude that these states of knowledge are neither innate in a determinate form, nor

developed from other higher states of knowledge, but from sense-perception. It is like a rout in battle stopped by first one man making a stand and then another, until the original formation has been restored. The soul is so constituted as to be capable of this process.

Let us now restate the account given already, though with insufficient clearness. When one of a number of logically indiscriminable particulars has made a stand, the earliest universal is present in the soul: for though the act of sense-perception is of the particular, its content is universal-is man, for example, not the man Callias. A fresh stand is made among these rudimentary universals, and the process does not cease until the indivisible concepts, the true universals, are established: e.g. such and such a species of animal is a step towards the genus animal, which by the same process is a step towards a further generalization.

Thus it is clear that we must get to know the primary premisses by induction; for the method by which even sense-perception implants the universal is inductive. Now of the thinking states by which we grasp truth, some are unfailingly true, others admit of error-opinion, for instance, and calculation, whereas scientific knowing and intuition are always true: further, no other kind of thought except intuition is more accurate than scientific knowledge, whereas primary premisses are more knowable than demonstrations, and all scientific knowledge is discursive. From these considerations it follows that there will be no scientific knowledge of the primary premisses, and since except intuition nothing can be truer than scientific knowledge, it will be intuition that apprehends the primary premisses-a result which also follows from the fact that demonstration cannot be the originative source of demonstration, nor, consequently, scientific knowledge of scientific knowledge. If, therefore, it is the only other kind of true thinking except scientific knowing, intuition will be the originative source of scientific knowledge. And the originative source of science grasps the original basic premiss, while science as a whole is similarly related as originative source to the whole body of fact.

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Aristotle. *Posterior Analytics*. 1.1-3; 2.19. Trans. G.R.G. More. Oxford: Oxford University Press, 1928.

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