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PRIOR ANALYTICS

by Aristotle

translated by A. J. Jenkinson

Book I

1

WE must first state the subject of our inquiry and the faculty to which it belongs: its subject is demonstration and the faculty that carries it out demonstrative science. We must next define a premiss, a term, and a syllogism, and the nature of a perfect and of an imperfect syllogism; and after that, the inclusion or noninclusion of one term in another as in a whole, and what we mean by predicating one term of all, or none, of another.

A premiss then is a sentence affirming or denying one thing of another. This is either universal or particular or indefinite. By universal I mean the statement that something belongs to all or none of something else; by particular that it belongs to some or not to some or not to all; by indefinite that it does or does not belong, without any mark to show whether it is universal or particular, e.g. 'contraries are subjects of the same science', or 'pleasure is not good'. The demonstrative premiss differs from the dialectical, because the demonstrative premiss is the assertion of one of two contradictory

statements (the demonstrator does not ask for his premiss, but lays it down), whereas the dialectical premiss depends on the adversary's choice between two contradictories. But this will make no difference to the production of a syllogism in either case; for both the demonstrator and the dialectician argue syllogistically after stating that something does or does not belong to something else. Therefore a syllogistic premiss without qualification will be an affirmation or denial of something concerning something else in the way we have described; it will be demonstrative, if it is true and obtained through the first principles of its science; while a dialectical premiss is the giving of a choice between two contradictories, when a man is proceeding by question, but when he is syllogizing it is the assertion of that which is apparent and generally admitted, as has been said in the Topics. The nature then of a premiss and the difference between syllogistic, demonstrative, and dialectical premisses, may be taken as sufficiently defined by us in relation to our present need, but will be stated accurately in the sequel.

I call that a term into which the premiss is resolved, i.e. both the predicate and that of which it is predicated, 'being' being added and 'not being' removed, or vice versa.

A syllogism is discourse in which, certain things being stated, something other than what is stated follows of necessity from their

being so. I mean by the last phrase that they produce the consequence, and by this, that no further term is required from without in order to make the consequence necessary.

I call that a perfect syllogism which needs nothing other than what has been stated to make plain what necessarily follows; a syllogism is imperfect, if it needs either one or more propositions, which are indeed the necessary consequences of the terms set down, but have not been expressly stated as premisses.

That one term should be included in another as in a whole is the same as for the other to be predicated of all of the first. And we say that one term is predicated of all of another, whenever no instance of the subject can be found of which the other term cannot be asserted: 'to be predicated of none' must be understood in the same way.

2

Every premiss states that something either is or must be or may be the attribute of something else; of premisses of these three kinds some are affirmative, others negative, in respect of each of the three modes of attribution; again some affirmative and negative premisses are universal, others particular, others indefinite. It is necessary then that in universal attribution the terms of the negative premiss should be convertible, e.g. if no pleasure is good, then no good

will be pleasure; the terms of the affirmative must be convertible, not however, universally, but in part, e.g. if every pleasure is good, some good must be pleasure; the particular affirmative must convert in part (for if some pleasure is good, then some good will be pleasure); but the particular negative need not convert, for if some animal is not man, it does not follow that some man is not animal.

First then take a universal negative with the terms A and B. If no B is A, neither can any A be B. For if some A (say C) were B, it would not be true that no B is A; for C is a B. But if every B is A then some A is B. For if no A were B, then no B could be A. But we assumed that every B is A. Similarly too, if the premiss is particular. For if some B is A, then some of the As must be B. For if none were, then no B would be A. But if some B is not A, there is no necessity that some of the As should not be B; e.g. let B stand for animal and A for man. Not every animal is a man; but every man is an animal.

3

The same manner of conversion will hold good also in respect of necessary premisses. The universal negative converts universally; each of the affirmatives converts into a particular. If it is necessary that no B is A, it is necessary also that no A is B. For if it is

possible that some A is B, it would be possible also that some B is A.

If all or some B is A of necessity, it is necessary also that some A is B: for if there were no necessity, neither would some of the Bs be A necessarily. But the particular negative does not convert, for the same reason which we have already stated.

In respect of possible premisses, since possibility is used in several senses (for we say that what is necessary and what is not necessary and what is potential is possible), affirmative statements will all convert in a manner similar to those described. For if it is possible that all or some B is A, it will be possible that some A is B. For if that were not possible, then no B could possibly be A. This has been already proved. But in negative statements the case is different. Whatever is said to be possible, either because B necessarily is A, or because B is not necessarily A, admits of conversion like other negative statements, e.g. if one should say, it is possible that man is not horse, or that no garment is white. For in the former case the one term necessarily does not belong to the other; in the latter there is no necessity that it should: and the premiss converts like other negative statements. For if it is possible for no man to be a horse, it is also admissible for no horse to be a man; and if it is admissible for no garment to be white, it is also admissible for nothing white to be a garment. For if any white thing must be a garment, then some garment will necessarily be white. This

has been already proved. The particular negative also must be treated like those dealt with above. But if anything is said to be possible because it is the general rule and natural (and it is in this way we define the possible), the negative premisses can no longer be converted like the simple negatives; the universal negative premiss does not convert, and the particular does. This will be plain when we speak about the possible. At present we may take this much as clear in addition to what has been said: the statement that it is possible that no B is A or some B is not A is affirmative in form: for the expression 'is possible' ranks along with 'is', and 'is' makes an affirmation always and in every case, whatever the terms to which it is added, in predication, e.g. 'it is not-good' or 'it is not-white' or in a word 'it is not-this'. But this also will be proved in the sequel. In conversion these premisses will behave like the other affirmative propositions.

4

After these distinctions we now state by what means, when, and how every syllogism is produced; subsequently we must speak of demonstration. Syllogism should be discussed before demonstration because syllogism is the general: the demonstration is a sort of syllogism, but not every syllogism is a demonstration.

Whenever three terms are so related to one another that the last is contained in the middle as in a whole, and the middle is either contained in, or excluded from, the first as in or from a whole, the extremes must be related by a perfect syllogism. I call that term middle which is itself contained in another and contains another in itself: in position also this comes in the middle. By extremes I mean both that term which is itself contained in another and that in which another is contained. If A is predicated of all B, and B of all C, A must be predicated of all C: we have already explained what we mean by 'predicated of all'. Similarly also, if A is predicated of no B, and B of all C, it is necessary that no C will be A.

But if the first term belongs to all the middle, but the middle to none of the last term, there will be no syllogism in respect of the extremes; for nothing necessary follows from the terms being so related; for it is possible that the first should belong either to all or to none of the last, so that neither a particular nor a universal conclusion is necessary. But if there is no necessary consequence, there cannot be a syllogism by means of these premisses. As an example of a universal affirmative relation between the extremes we may take the terms animal, man, horse; of a universal negative relation, the terms animal, man, stone. Nor again can syllogism be formed when neither the first term belongs to any of the middle, nor the middle to any of the last. As an example of a positive relation between the

extremes take the terms science, line, medicine: of a negative relation science, line, unit.

If then the terms are universally related, it is clear in this figure when a syllogism will be possible and when not, and that if a syllogism is possible the terms must be related as described, and if they are so related there will be a syllogism.

But if one term is related universally, the other in part only, to its subject, there must be a perfect syllogism whenever universality is posited with reference to the major term either affirmatively or negatively, and particularity with reference to the minor term affirmatively: but whenever the universality is posited in relation to the minor term, or the terms are related in any other way, a syllogism is impossible. I call that term the major in which the middle is contained and that term the minor which comes under the middle. Let all B be A and some C be B. Then if 'predicated of all' means what was said above, it is necessary that some C is A. And if no B is A but some C is B, it is necessary that some C is not A. The meaning of 'predicated of none' has also been defined. So there will be a perfect syllogism. This holds good also if the premiss BC should be indefinite, provided that it is affirmative: for we shall have the same syllogism whether the premiss is indefinite or particular.

But if the universality is posited with respect to the minor term either affirmatively or negatively, a syllogism will not be

possible, whether the major premiss is positive or negative, indefinite or particular: e.g. if some B is or is not A, and all C is B. As an example of a positive relation between the extremes take the terms good, state, wisdom: of a negative relation, good, state, ignorance. Again if no C is B, but some B is or is not A or not every B is A, there cannot be a syllogism. Take the terms white, horse, swan: white, horse, raven. The same terms may be taken also if the premiss BA is indefinite.

Nor when the major premiss is universal, whether affirmative or negative, and the minor premiss is negative and particular, can there be a syllogism, whether the minor premiss be indefinite or particular: e.g. if all B is A and some C is not B, or if not all C is B. For the major term may be predicable both of all and of none of the minor, to some of which the middle term cannot be attributed.

Suppose the terms are animal, man, white: next take some of the white things of which man is not predicated—swan and snow: animal is predicated of all of the one, but of none of the other. Consequently there cannot be a syllogism. Again let no B be A, but let some C not be B. Take the terms inanimate, man, white: then take some white things of which man is not predicated—swan and snow: the term inanimate is predicated of all of the one, of none of the other.

Further since it is indefinite to say some C is not B, and it is true that some C is not B, whether no C is B, or not all C is B, and

since if terms are assumed such that no C is B, no syllogism follows (this has already been stated) it is clear that this arrangement of terms will not afford a syllogism: otherwise one would have been possible with a universal negative minor premiss. A similar proof may also be given if the universal premiss is negative.

Nor can there in any way be a syllogism if both the relations of subject and predicate are particular, either positively or negatively, or the one negative and the other affirmative, or one indefinite and the other definite, or both indefinite. Terms common to all the above are animal, white, horse: animal, white, stone.

It is clear then from what has been said that if there is a syllogism in this figure with a particular conclusion, the terms must be related as we have stated: if they are related otherwise, no syllogism is possible anyhow. It is evident also that all the syllogisms in this figure are perfect (for they are all completed by means of the premisses originally taken) and that all conclusions are proved by this figure, viz. universal and particular, affirmative and negative. Such a figure I call the first.

Whenever the same thing belongs to all of one subject, and to none of another, or to all of each subject or to none of either, I call

such a figure the second; by middle term in it I mean that which is predicated of both subjects, by extremes the terms of which this is said, by major extreme that which lies near the middle, by minor that which is further away from the middle. The middle term stands outside the extremes, and is first in position. A syllogism cannot be perfect anyhow in this figure, but it may be valid whether the terms are related universally or not.

If then the terms are related universally a syllogism will be possible, whenever the middle belongs to all of one subject and to none of another (it does not matter which has the negative relation), but in no other way. Let M be predicated of no N, but of all O. Since, then, the negative relation is convertible, N will belong to no M: but M was assumed to belong to all O: consequently N will belong to no O. This has already been proved. Again if M belongs to all N, but to no O, then N will belong to no O. For if M belongs to no O, O belongs to no M: but M (as was said) belongs to all N: O then will belong to no N: for the first figure has again been formed. But since the negative relation is convertible, N will belong to no O. Thus it will be the same syllogism that proves both conclusions.

It is possible to prove these results also by *reductio ad impossibile*.

It is clear then that a syllogism is formed when the terms are so

related, but not a perfect syllogism; for necessity is not perfectly established merely from the original premisses; others also are needed.

But if M is predicated of every N and O, there cannot be a syllogism. Terms to illustrate a positive relation between the extremes are substance, animal, man; a negative relation, substance, animal, number-substance being the middle term.

Nor is a syllogism possible when M is predicated neither of any N nor of any O. Terms to illustrate a positive relation are line, animal, man: a negative relation, line, animal, stone.

It is clear then that if a syllogism is formed when the terms are universally related, the terms must be related as we stated at the outset: for if they are otherwise related no necessary consequence follows.

If the middle term is related universally to one of the extremes, a particular negative syllogism must result whenever the middle term is related universally to the major whether positively or negatively, and particularly to the minor and in a manner opposite to that of the universal statement: by 'an opposite manner' I mean, if the universal statement is negative, the particular is affirmative: if the universal is affirmative, the particular is negative. For if M belongs to no N, but to some O, it is necessary that N does not belong to some O. For since the negative statement is convertible, N will

belong to no M: but M was admitted to belong to some O: therefore N will not belong to some O: for the result is reached by means of the first figure. Again if M belongs to all N, but not to some O, it is necessary that N does not belong to some O: for if N belongs to all O, and M is predicated also of all N, M must belong to all O: but we assumed that M does not belong to some O. And if M belongs to all N but not to all O, we shall conclude that N does not belong to all O: the proof is the same as the above. But if M is predicated of all O, but not of all N, there will be no syllogism. Take the terms animal, substance, raven; animal, white, raven. Nor will there be a conclusion when M is predicated of no O, but of some N. Terms to illustrate a positive relation between the extremes are animal, substance, unit: a negative relation, animal, substance, science.

If then the universal statement is opposed to the particular, we have stated when a syllogism will be possible and when not: but if the premisses are similar in form, I mean both negative or both affirmative, a syllogism will not be possible anyhow. First let them be negative, and let the major premiss be universal, e.g. let M belong to no N, and not to some O. It is possible then for N to belong either to all O or to no O. Terms to illustrate the negative relation are black, snow, animal. But it is not possible to find terms of which the extremes are related positively and universally, if M belongs to some O, and does not belong to some O. For if N belonged to all O, but

M to no N, then M would belong to no O: but we assumed that it belongs to some O. In this way then it is not admissible to take terms: our point must be proved from the indefinite nature of the particular statement. For since it is true that M does not belong to some O, even if it belongs to no O, and since if it belongs to no O a syllogism is (as we have seen) not possible, clearly it will not be possible now either.

Again let the premisses be affirmative, and let the major premiss as before be universal, e.g. let M belong to all N and to some O. It is possible then for N to belong to all O or to no O. Terms to illustrate the negative relation are white, swan, stone. But it is not possible to take terms to illustrate the universal affirmative relation, for the reason already stated: the point must be proved from the indefinite nature of the particular statement. But if the minor premiss is universal, and M belongs to no O, and not to some N, it is possible for N to belong either to all O or to no O. Terms for the positive relation are white, animal, raven: for the negative relation, white, stone, raven. If the premisses are affirmative, terms for the negative relation are white, animal, snow; for the positive relation, white, animal, swan. Evidently then, whenever the premisses are similar in form, and one is universal, the other particular, a syllogism can, not be formed anyhow. Nor is one possible if the middle term belongs to some of each of the extremes, or does

not belong to some of either, or belongs to some of the one, not to some of the other, or belongs to neither universally, or is related to them indefinitely. Common terms for all the above are white, animal, man: white, animal, inanimate.

It is clear then from what has been said that if the terms are related to one another in the way stated, a syllogism results of necessity; and if there is a syllogism, the terms must be so related. But it is evident also that all the syllogisms in this figure are imperfect: for all are made perfect by certain supplementary statements, which either are contained in the terms of necessity or are assumed as hypotheses, i.e. when we prove per impossibile. And it is evident that an affirmative conclusion is not attained by means of this figure, but all are negative, whether universal or particular.

6

But if one term belongs to all, and another to none, of a third, or if both belong to all, or to none, of it, I call such a figure the third; by middle term in it I mean that of which both the predicates are predicated, by extremes I mean the predicates, by the major extreme that which is further from the middle, by the minor that which is nearer to it. The middle term stands outside the extremes, and is last in position. A syllogism cannot be perfect in this