LETTERS

OF

[L.] EULER

ON DIFFERENT SUBJECTS

IN

PHYSICS AND PHILOSOPHY.

ADDRESSED TO

A GERMAN PRINCESS.

TRANSLATED FROM THE FRENCH BY

HENRY HUNTER, D. D.

WITH

ORIGINAL NOTES,

And a Glossary of Foreign and Scientific Terms.

Second Edition.

IN TWO VOLUMES.

VOL. I.

London:

PRINTED FOR MURRAY AND HIGHLEY; J. CUTHELL; VERNOR AND HOOD; LONGMAN AND REES; WYNN AND SCHOLEY; G. CAWTHORN; J. HARDING; AND J. MAWMAN.

1802.

cited in the mind, on hearing the particle *and* or *also* pronounced? It is readily seen, that these words import a species of connection, but take what pains you please to describe this connection, you will find yourself under the necessity of employing other words, whose signification it would be equally difficult to explain; and if I were to attempt an explanation of the import of the particle *and*, I must make frequent use of that very particle.

You are now enabled to judge of what advantage language is to direct our thoughts; and that, without language, we should hardly be in a condition to think at all.

10th February, 1760.

LETTER CII.

Of the Perfections of a Language. Judgments and Nature of Propositions, affirmative and negative; universal, or particular.

I HAVE been endeavouring to shew you, how necessary language is to man, not only for the mutual communication of sentiment and thought, but, likewise, for the improvement of the mind, and the extension of knowledge.

These signs, or words, represent, then, general notions, each of which is applicable to an infinite number of objects: as, for instance, the idea of hot, and of heat, to every individual object which is hot; and the

the idea, or general notion of *tree*, is applicable to every individual tree in a garden, or a foreſt, whether cherries, pears, oaks, or firs, &c.

Hence you muſt be ſenſible how one language may be more perfect than another. A language always is ſo, in proportion as it is in a condition to expreſs a greater number of general notions, formed by abſtraction. It is with reſpect to theſe notions that we muſt eſtimate the perfection of a language.

Formerly there was no word in the Ruſſian language to expreſs what we call *juſtice*. This was certainly a very great defect; as the idea of juſtice is of very great importance in a great number of our judgments and reaſonings, and as it is ſcarcely poſſible to think of the thing itſelf without a term expreſſive of it. They have, accordingly, ſupplied this defect, by introducing into that language a word which conveys the notion of juſtice.

Theſe general notions, formed by abſtraction, are the ſource of all our judgments and of all our reaſonings. A *judgment* is nothing elſe but the affirmation, or negation, that a notion is applicable, or inapplicable; and when ſuch judgment is expreſſed in words, we call it a *propoſition*. To give an example: *All men are mortal*, is a propoſition which contains two notions; the firſt, that of men in general; and the ſecond, that of mortality, which comprehends whatever is mortal. The judgment conſiſts in pronouncing and affirming, *that the notion of mortality is applicable to all men*. This is a judgment, and, being expreſſed in words, it is a propoſition; and, becauſe

it

it affirms, we call it an *an affirmative propofition.* If it denied, we would call it *negative*, fuch as this, *no man is righteous.* Thefe two *propofitions*, which I have introduced as examples, are *univerfal*, becaufe the one affirms of *all* men, that they are mortal, and the other denies that they are righteous.

There are likewife *particular propofitions*, both negative and affirmative; as, *fome men are learned*, and *fome men are not wife.* What is here affirmed, and denied, is not applicable to all men, but to *fome* of them.

Hence we derive four fpecies of propofitions. The firft is that of *affirmative and univerfal propofitions*, the form of which in general is:

Every A is B.

The fecond fpecies contains *negative and univerfal propofitions*, the form of which in general is:

No A is B.

The third is, that of *affirmative propofitions*, but *particular*, contained in this form:

Some A is B.

And, finally, the fourth is that of *negative* and *particular propofitions*, of which the form is:

Some A is not B.

All thefe propofitions contain, effentially, two notions, A and B, which are called the *terms of the propofition:* the firft of which affirms or denies fome thing; and this we call the *fubject*; and the fecond, which we fay is applicable, or inapplicable, to the firft, is the *attribute.* Thus, in the propofition, *All men are mortal*, the word *man*, or *men*, is the fubject, and the word *mortal* the attribute; thefe words are much

much uſed in logic, which teaches the rules of juſt reaſoning.

Theſe four ſpecies of propoſitions may likewiſe be repreſented by figures, ſo as to exhibit their nature to the eye. This muſt be a great aſſiſtance toward comprehending more diſtinctly wherein the accuracy of a chain of reaſoning conſiſts.

As a general notion contains an infinite number of individual objects, we may conſider it as a ſpace in which they are all contained. Thus for the notion of *man* we form a ſpace (*plate* I. *fig.* 1.) in which we conceive all men to be comprehended. For the notion of *mortal*, we form another, (*fig.* 2.) in which we conceive every thing mortal to be comprehended. And when I affirm, *all men are mortal*, it is the ſame thing with affirming, that the firſt figure is contained in the ſecond.

I. Hence it follows, that the repreſentation of an affirmative univerſal propoſition is that in which the ſpace A, (*fig.* 3.) which repreſents the *ſubject* of the propoſition, is wholly contained in the ſpace B, which is the *attribute*.

II. As to negative univerſal propoſitions, the two ſpaces A and B, of which A always denotes the *ſubject*, and B the *attribute*, will be repreſented thus, (*fig.* 4.) the one ſeparated from the other; becauſe we ſay, *no A is B*, or that nothing comprehended in the notion A, is in the notion B.

III. In affirmative particular propoſitions, as, *ſome A is B*, a part of the ſpace A will be comprehended in the ſpace B: (*fig.* 5.) as we ſee here, that ſomething

thing comprehended in the notion A, is likewiſe in B.

IV. For negative particular propoſitions, as, *ſome A is not B*; a part of the ſpace A muſt be out of the ſpace B, (*fig.* 6.) This figure reſembles the preceding; but we here remark, principally, that there is ſomething in the notion A, which is not comprehended in the notion B, or which is out of it.

14th February, 1761.

LETTER CIII.

Of Syllogiſms, and their different Forms, when the firſt Propoſition is univerſal.

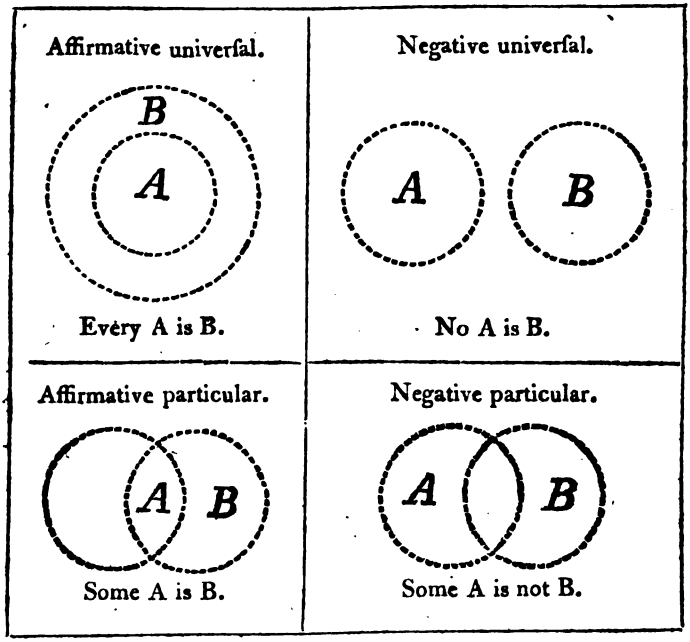
THESE circles, or rather theſe ſpaces, for it is of no importance of what figure they are of, are extremely commodious for facilitating our reflections on this ſubject, and for unfolding all the boaſted myſteries of logic, which that art finds it ſo difficult to explain; whereas, by means of theſe ſigns, the whole is rendered ſenſible to the eye. We may employ, then, ſpaces formed at pleaſure to repreſent every general notion, and mark the ſubject of a propoſition, by a ſpace containing A, and the attribute, by another which contains B. The nature of the propoſition itſelf always imports either that the ſpace of A is wholly contained in the ſpace B, or that it is partly contained in that ſpace; or that a part, at leaſt,

leaſt, is out of the ſpace B; or, finally, that the ſpace A is wholly out of B.*

The two laſt caſes, which repreſent particular propoſitions, ſeem to contain a doubt, as it is not decided, whether it be a great part of A which is contained, or not contained, in B. It is even poſſible,

* Mr. Euler, who is ever minutely exact in all his details, ſubjoins here the following diagram, with this ſhort introduction: "I ſhall once more give you a viſible repreſentation of theſe figures "or emblems of the four ſpecies of propoſitions."

Emblems of the four Species of Propoſitions.



The omiſſion of this ſcheme, in the Paris edition, is the more unaccountable, that the very next paragraph immediately refers to it, and is lame and inconcluſive without it.—*E. E.*

in

in the caſe of a particular propoſition, that the notion A may contain the notion B entirely, as in *plate* I. *fig.* 7; and that, at the ſame time, as is clear from the figure, a part of the ſpace A may be in the ſpace B, and that a part of A may no tbe in B. Now, if A were, for example, the idea of *tree* in general, and B that of *oak*, which is contained wholly in the firſt, the following propoſitions might be formed:

I. All oaks are trees.
II. Some trees are oaks.
III. Some trees are not oaks.

In like manner, if of two ſpaces one is entirely out of the other, as in *plate* I. *fig.* 4. I can as well ſay, *no A is B*, as *no B is A;* as if I were to ſay: no man is a tree, and no tree is a man.

In the third caſe, where the two notions have a part in common, as in *plate* I. *fig.* 5. it may be ſaid:

I. Some A is B.
II. Some B is A.
III. Some A is not B.
IV. Some B is not A.

This may ſuffice to ſhew you how all propoſitions may be repreſented by figures: but their greateſt utility is manifeſt in reaſonings which, when expreſſed in words, are called *ſyllogiſms*, and of which the object is to draw a juſt concluſion from certain given propoſitions. This method will diſcover to us the true forms of all ſyllogiſms.

Let us begin by an affirmative univerſal propoſition: Every A is B, (*plate* I. *fig.* 3.) where the ſpace A is wholly in the ſpace B, and let us ſee how a third notion

notion C, muſt be referred to each of the other two notions A and B, in order to draw a fair concluſion. It is evident in the following caſes.

I. If the notion C is entirely contained in the notion A, it will be ſo, likewiſe, in the notion B: (*plate* I. *fig.* 8.) hence reſults this form of ſyllogiſm:

Every A is B:
But Every C is A:
Therefore Every C is B.

Which is the concluſion.

Let the notion A, for example, comprehend all trees; the notion B every thing that has roots, and the notion C all oaks, and then our ſyllogiſm will run thus:

Every tree has roots:
But Every oak is a tree:
Therefore Every oak has roots.

II. If the notion C has a part contained in A, that part will likewiſe be ſo in B, becauſe the notion A is wholly included in the notion B, (*plate* I. *fig.* 9 and 10.)

Hence reſults the ſecond form of ſyllogiſm:

Every A is B:
But Some C is A:
Therefore Some C is B.

[illegible] notion C were entirely out of the notion A, [illegible] would follow with reſpect to the notion B: [illegible] happen that notion C ſhould be entirely out [illegible] *fig.* 11.) or wholly in B, (*fig.* 12.) or partly [illegible] B, (*fig.* 13.) ſo that no concluſion could be

III. But

III. But if notion C were wholly out of notion B, it would likewise be wholly out of notion A, as we see in *fig.* 11. Hence results this form of syllogism:

Every A is B:

But No C is B, or no B is C:

Therefore No C is A.

IV. If the notion C has a part out of the uotion B, that same part will certainly likewise be out of the notion A, because this last is wholly in the notion B, (*fig.* 14.) Hence this form of syllogism:

Every A is B:

But Some C is not B:

Therefore Some C is not A.

V. If the notion C contains the whole of notion B, part of notion C will certainly fall into notion A: (*fig.* 15.) Hence this form of syllogism.

Every A is B:

But Every B is C:

Therefore Some C is A.

No other form is possible, while the first proposition is affirmative and universal.

Let us now suppose the first proposition to be negative and universal; namely,

No A is B.

It is represented in *fig.* 4. where the notion A is entirely out of notion B; and the following cases will furnish conclusions.

I. If notion C is entirely in notion B, it must likewise be entirely out of notion A, (*fig.* 16.) Hence this form of syllogism:

No A is B:
But Every C is B:
Therefore No C is A.

II. If notion C is entirely comprehended in notion A, it muſt alſo be entirely excluded from notion B, (*fig.* 17.) Hence a ſyllogiſm of this form:

No A is B:
But Every C is A:
Therefore No C is B.

III. If notion C has a part contained in notion A, that part muſt certainly be out of notion B; as in *fig.* 18. or in *fig.* 19. and 20. Hence a ſyllogiſm of this form:

No A is B:
But Some C is A, or ſome A is C:
Therefore Some C is not B.

IV. In like manner, if notion C has a part contained in B, that part will certainly be out of A: as in *fig.* 21. as alſo *fig.* 22. and 23. Hence the following ſyllogiſm:

No A is B:
But Some C is B, or ſome B is C:
Therefore Some C is not A.

As to the other forms, in which the firſt propoſition is particular, affirmative, or negative; I ſhall ſhew, in another letter, how they may be repreſented by figures.

17th February, 1761.

LETTER

LETTER CIV.

Different Forms of Syllogisms, whose first Proposition is particular.

IN the preceding letter I have presented you with the different forms of syllogisms, or simple reasonings, which derive their origin from the first proposition, when it is universal, affirmative, or negative. It still remains that I lay before you those syllogisms, whose first proposition is particular, affirmative, or negative, in order to have all possible forms of syllogism that lead to a fair conclusion.

Let, then, the first proposition, affirmative, and particular, be expressed in this general form.

Some A is B. (*Plate* I. *fig.* 5.)

in which a part of the notion A is contained in the notion B.

Let us introduce a third notion C, which, being referred to notion A, will either be contained in notion A, as in *fig.* 24, 25, and 26; or will have a part in the notion A, as in *fig.* 27, 28, and 29; or will be entirely out of notion A, as in *fig.* 1, 2, and 3, of *plate* II. No conclusion can be drawn in any of these cases; as it might be possible for notion C to be entirely within notion B, or in part, or not at all.

But if notion C contains, in itself, notion A, it is certain, that it will likewise contain a part of notion B: as in *fig.* 4 and 5, of *plate* II. Hence results this form of syllogism:

 Some

Some A is B: But Every A is C:
Therefore Some C is B.

It is the ſame when we compare notion C with notion B: we can draw no concluſion unleſs notion C contains notion B entirely; (ſee *fig.* 6 and 7.) for in that caſe, as notion A has a part contained in notion B, the ſame part will then certainly be contained, likewiſe, in C: hence we obtain this form of ſyllogiſm:

Some A is B:
But Every B is C:
Therefore Some C is A.

Let us finally ſuppoſe, that the firſt propoſition is negative and particular, namely,

Some A is not B.

It is repreſented in *plate* II. *fig.* 8. in which part of notion A is out of notion B.

In this caſe, if the third notion C contains notion A entirely, it will certainly alſo have a part out of notion B, as in *fig.* 9 and 10: which gives this ſyllogiſm:

Some A is not B:
But Every A is C:
Therefore Some C is not B.

Again, if notion C is wholly included in notion B, as A has a part out of B, that ſame part will likewiſe certainly be out of C, (ſee *fig.* 11 and 12.) Hence this form of ſyllogiſm:

Some A is not B:
But Every C is B:
Therefore Some A is not C.

It may be of uſe to collect all theſe forms of ſyllogiſm into one table, in order to conſider them at a ſingle glance.

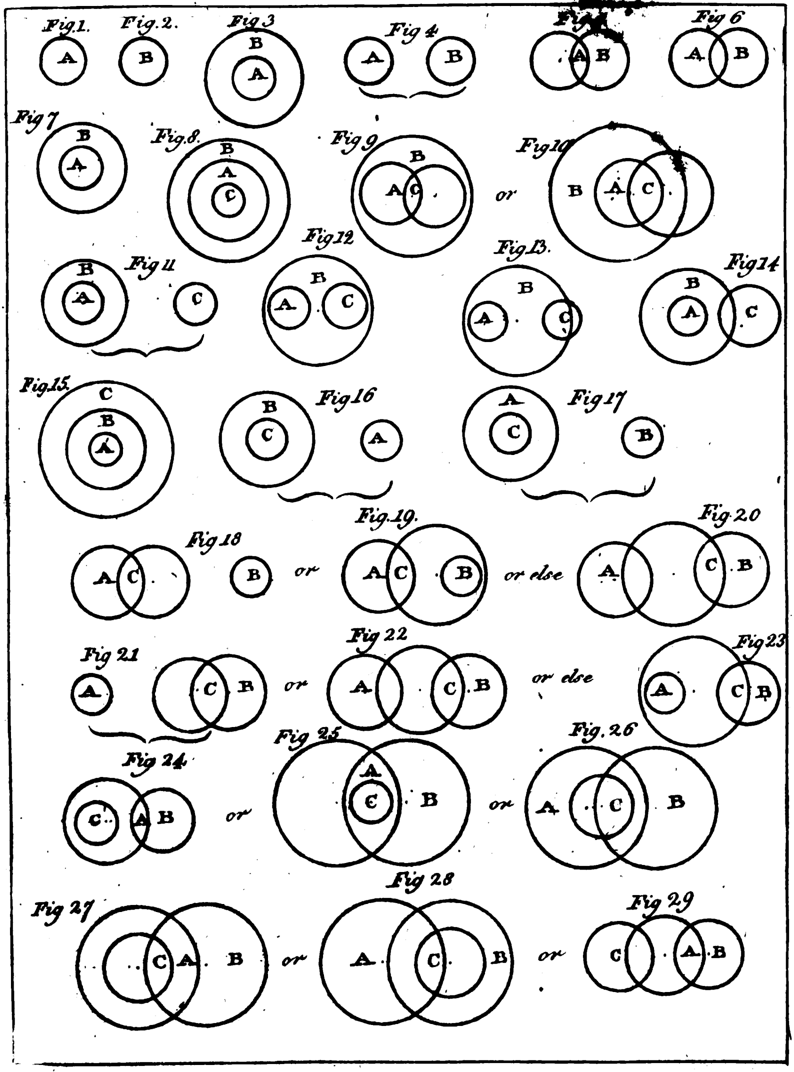


Fig 1.
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Fig 18
or
Fig. 19.
or else
Fig. 20
Fig 21
or
Fig 22
or else
Fig 23
Fig 24
or
Fig 25
or
Fig. 26
Fig 27
or
Fig 28
or
Fig 29

I. Every A is B: But Every C is A: Therefore Every C is B.	XI. No A is B: But Some C is B: Therefore Some C is not A.
II. Every A is B: But Some C is A: Therefore Some C is B.	XII. No A is B: But Some B is C: Therefore Some C is not A.
III. Every A is B: But No C is B: Therefore No C is A.	XIII. Some A is B: But Every A is C: Therefore Some C is B.
IV. Every A is B: But No B is C: Therefore No C is A.	XIV. Some A is B: But Every B is C: Therefore Some C is A.
V. Every A is B: But Some C is not B: Therefore Some C is not A.	XV. Some A is not B: But Every A is C: Therefore Some C is not B.
VI. Every A is B: But Every B is C: Therefore Some C is A.	XVI. Some A is not B: But Every C is B: Therefore Some A is not C.
VII. No A is B: But Every C is A: Therefore No C is B.	XVII. Every A is B: But Some A is C: Therefore Some C is B.
VIII. No A is B: But Every C is B: Therefore No C is A.	XVIII. No A is B: But Every A is C: Therefore Some C is not B.
IX. No A is B: But Some C is A: Therefore Some C is not B.	XIX. No A is B: But Every B is C: Therefore Some C is not A.
X. No A is B: But Some A is C: Therefore Some C is not B.	XX. Every A is B: But Every A is C: Therefore Some C is B.

Of

Of these twenty forms, I remark, that XVI. is the same with V. the latter changing into the former, if you write C for A, and A for C, and begin with the second proposition: there are, accordingly, but nineteen different forms.

The foundation of all these forms is reduced to two principles, respecting the nature of *containing* and *contained.*

I. *Whatever is in the thing contained, must likewise be in the thing containing.*

II. *Whatever is out of the containing, must likewise be out of the contained.*

Thus, in the last form, where the notion A is contained entirely in notion B, it is evident, that if A is contained in the notion C, or makes a part of it, that same part of notion C will certainly be contained in notion B, so that some C is B.

Every syllogism, then, consists of three propositions, the two first of which are called the *premises*, and the third the *conclusion*. Now, the advantage of all these forms, to direct our reasonings, is this, that if the premises are both true, the conclusion, infallibly, is so.

This is, likewise, the only method of discovering unknown truths. Every truth must always be the conclusion of a syllogism, whose premises are indubitably true. Permit me only to add, that the former of the premises is called the *major* proposition, and the other the *minor*.

21st February, 1761.

LETTER

LETTER CV.

Analysis of some Syllogisms.

IF you have paid attention to all the forms of syllogism, which I have proposed, you must see, that every syllogism necessarily consists of three propositions: the two first are called premises, and the third, the conclusion. Now the force of the nineteen forms, laid down, consists in this property common to them all, that if the two first propositions, or the premises, are true, you may rest, confidently assured of the truth of the conclusion.

Let us consider, for example, the following syllogism.

NO VIRTUOUS MAN IS A SLANDERER;
But SOME SLANDERERS ARE LEARNED MEN:
Therefore SOME LEARNED MEN ARE NOT VIRTUOUS.

Whenever you allow me the two first propositions, you are obliged to allow the third, which necessarily follows from it.

This syllogism belongs to form XII. The same thing holds with regard to all the others, which I have laid down, and which the figures, whereby I have represented them, render sensible. Here we are presented with three notions: (*plate* II. *fig.* 13.) that of virtuous men, that of slanderers, and that of learned men.

Let the ſpace A repreſent the firſt, ſpace B the ſecond, and ſpace C the third. It being ſaid, in the firſt propoſition, That no virtuous man is a ſlanderer; we maintain, that nothing contained in the notion of the virtuous man, that is, in the ſpace A, is comprehended in the notion of the ſlanderer: that is, ſpace B: therefore ſpace A is wholly out of ſpace B, (ſee *plate* II. *fig.* 14.)

But it is ſaid, in the ſecond propoſition, that ſome men comprehended in notion B, are, likewiſe, contained in that of learned, that is, in ſpace C: or elſe, you may ſay, that part of ſpace B is within ſpace C; (*plate* II. *fig.* 15.) where the part of ſpace B, included in C, is marked with a *; which will be, likewiſe, part of ſpace C. Since, therefore, ſome part of ſpace C is in B, and that the whole ſpace B is out of ſpace A, it is evident, that the ſame part of ſpace C muſt, likewiſe, be out of ſpace A, that is, *ſome learned men are not virtuous.*

It muſt be carefully remarked, that this concluſion reſpects only the part * of notion C, which is comprehended in notion B: for as to the reſt, it is uncertain, whether it be likewiſe excluded from notion A, as in *plate* II. *fig.* 16, or wholly contained in it, as in *plate* II. *fig.* 17, or only in part, as in *plate* II. *fig.* 18.

Now, this being left uncertain, the remainder of ſpace C falls not at all under conſideration; the concluſion is limited to that only which is certain, that is to ſay, the ſame part of ſpace C, contained in ſpace B, is certainly out of ſpace A, for this laſt is wholly out of ſpace B.

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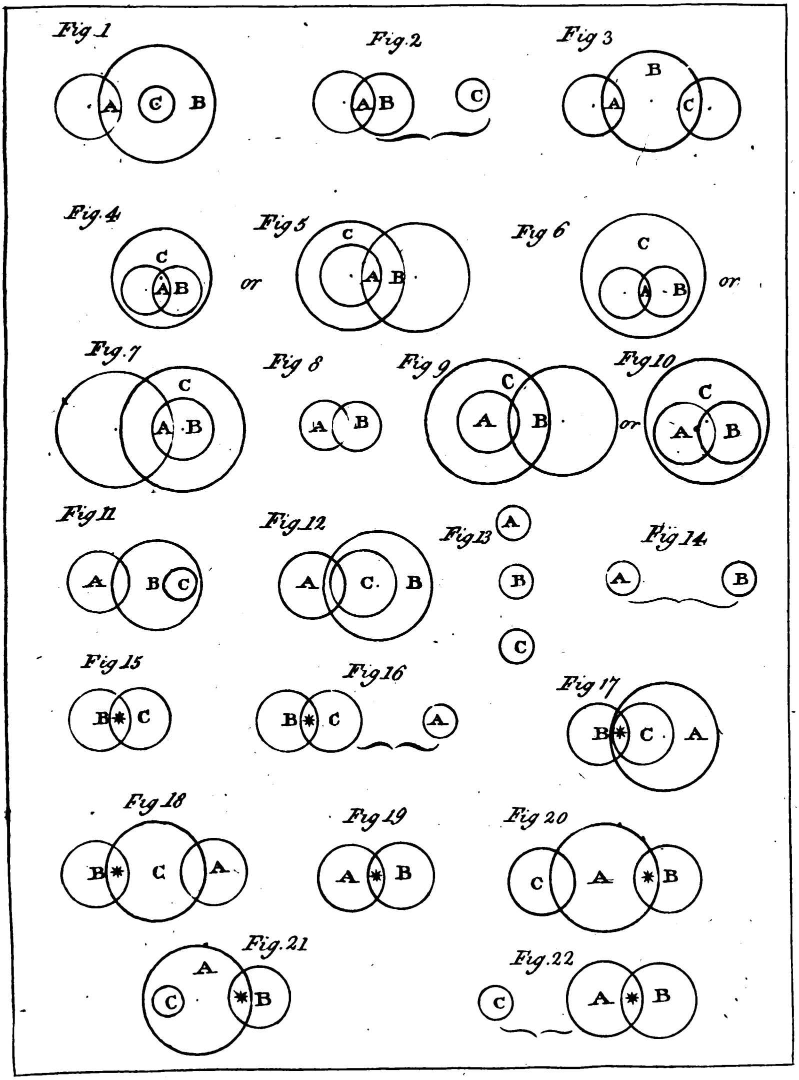
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Fig 18
Fig 19
Fig 20
Fig. 21
Fig. 22

The juſtneſs of all the other forms of ſyllogiſm may be demonſtrated in like manner; but all thoſe which deviate from the nineteen forms laid down, or which are not comprehended under them, are deſtitute of foundation, and lead to error and falſhood.

You will clearly diſcern the fault of ſuch a ſyllogiſm, by an example, not reducible to any of the nineteen forms:

SOME LEARNED MEN ARE MISERS:

But NO MISER IS VIRTUOUS:

Therefore SOME VIRTUOUS MEN ARE NOT LEARNED.

This third propoſition, may, perhaps, be true; but it does not follow from the premiſes. They too (the premiſes) may very well be true, and, in the preſent inſtance, they actually are ſo, but the third is not, for that, a fair concluſion: becauſe it is contrary to the nature of juſt ſyllogiſm, in which the concluſion always muſt be true, when the premiſes are ſo. Accordingly, the fault of the form, above propoſed, is immediately diſcovered, by caſting your eyes on *fig.* 13. of *plate* II. Let ſpace A contain all the learned; ſpace B all the avaricious; and ſpace C all the virtuous. Now, the firſt propoſition is repreſented by *fig.* 19. in which part * of ſpace A, (the learned) is contained in ſpace B, (the avaricious).

Again, in the ſecond propoſition, the whole ſpace C, (the virtuous) is out of ſpace B, (the avaricious): but it by no means follows, (*fig.* 20.) that part of ſpace C muſt be out of ſpace A.

It is even poſſible for ſpace C, to be entirely within ſpace

ſpace A, as in *fig.* 21, or entirely out of it, as in *fig.* 22. and, at the ſame time, entirely out of ſpace B.

A ſyllogiſm of this form, accordingly, is totally falſe and abſurd.

Another example will put the matter beyond a doubt:

SOME TREES ARE OAKS:
But NO OAK IS A FIR:
Therefore SOME FIRS ARE NOT TREES.

This form is, preciſely, the ſame with the preceding, and the falſhood of the concluſion is manifeſt, though the premiſes are undoubtedly true.

But whenever a ſyllogiſm is reducible to one of the above nineteen forms, you may be aſſured, that if the two premiſes are true, the concluſion unqueſtionably always is ſo too. Hence you perceive, how, from certain known truths, you attain others before unknown; and that all the reaſonings, by which we demonſtrate ſo many truths in geometry, may be reduced to formal ſyllogiſms. It is not neceſſary, however, that our reaſonings ſhould always be propoſed in the ſyllogiſtic form, provided the fundamental principles be the ſame. In converſation, in diſcourſe, and in writing, we rather make a point of avoiding ſyllogiſm.

I muſt farther remark, that, as the truth of the premiſes brings forward that of the concluſion, it does not thence neceſſarily follow, that when one or both of the premiſes are falſe, the concluſion muſt be ſo likewiſe: but it is certain, that when the concluſion is falſe, one of the premiſes, or both, abſolutely muſt be falſe; for if they were true, it would be impoſſible that the concluſion ſhould be falſe, I have ſtill ſome farther reflections to ſubmit to you, on this ſubject, which is the foundation of the certainty of all the knowledge we acquire.

24th February, 1761.

LETTER CVI.

Different Figures and Modes of Syllogiſms.

THE reflections which I have ſtill to make on the ſubject of ſyllogiſm, may be reduced to the following articles:

I. A ſyllogiſm contains only three notions, named *terms*, in as far as they are repreſented by words. For though a ſyllogiſm contains three propoſitions, and each propoſition two notions, or terms; it muſt be conſidered, that each term is twice employed in it, as in the following example:

EVERY A is B:
But EVERY A is C:
Therefore SOME C is B.

The three notions are marked by the letters A. B. C. which are the three terms of this ſyllogiſm: of which, the term A enters into the firſt and ſecond propoſition; the term B into the firſt and third propoſition; and the term C into the ſecond and third propoſition.

II. You

II. You muſt carefully diſtinguiſh theſe three terms of every ſyllogiſm. Two of them, namely, B and C, enter into the concluſion, the one of which, C, is the *ſubject*, and the other, B, the *attribute*, or *predicate*. In logick, the ſubject of the concluſion, C, is called the *minor term*, and the *predicate* of the concluſion, B, the *major term*. But the third notion, or the term A, is found in both premiſes, and it is combined with both the other terms, in the concluſion. This term, A, is called the *mean* or *medium term*. Thus, in the following example.

NO MISER IS VIRTUOUS:
But SOME LEARNED MEN ARE MISERS:
Therefore SOME LEARNED MEN ARE NOT VIRTUOUS.

The notion *learned* is the minor term, that of *virtuous* is the major, and the notion of *miſer*, is the mean term.

III. As to the order of the propoſitions, it is a matter of indifference, whether of the premiſes is in the firſt or ſecond place, provided the concluſion holds the laſt, it being the conſequence from the premiſes. Logicians have, however, thought proper to lay down this rule:

The firſt propoſition is always that which contains the predicate of the concluſion, or the major term; for this is the reaſon that we give to this propoſition the name of the major propoſition.

The ſecond propoſition contains the minor term, or the ſubject of the concluſion, and hence it has the name of the minor propoſition.

Thus, the *major propoſition* of a ſyllogiſm contains the

the mean term, with the major term, or predicate of the conclufion; and the *minor propofition* contains the mean term, with the minor term, or fubject, of the conclufion.

IV. Syllogifms are diftinguifhed under different *figures*, according as the mean term occupies the place of *fubject*, or *attribute*, in the premifes.

Logicians have eftablifhed four figures of fyllogifms, which are thus defined:

The *firft figure* is that in which the mean term is the fubject, in the major propofition, and the predicate, in the minor.

The *fecond figure*, that in which the mean term is the predicate, in both the major propofition, and the minor.

The *third figure*, that in which the mean term is the fubject, in both the major and minor propofitions. Finally,

The *fourth figure*, is that in which the mean term is the predicate, in the major propofition, and the fubject, in the minor.

Let P be the minor term, or fubject of the conclufion: Q the major term, or predicate, of the conclufion, and M the mean term; the four figures of fyllogifm will be reprefented in the manner following:

Figure Firft.

Major Propofition	M	—	—	Q
Minor Propofition	P	—	—	M
Conclufion	P	—	—	Q

Figure

Figure Second.

Major Propofition	Q	—	—	M
Minor Propofition	P	—	—	M
Conclufion	P	—	—	Q

Figure Third.

Major Propofition	M	—	—	Q
Minor Propofition	M	—	—	P
Conclufion	P	—	—	Q

Figure Fourth.

Major Propofition	Q	—	—	M
Minor Propofition	M	—	—	P
Conclufion	P	—	—	Q

V. Again, according as the propofitions themfelves are univerfal, or particular, affirmative, or negative, each figure contains feveral forms, called *Modes*. In order, the more clearly, to reprefent thefe modes of each figure, we mark by the letter A, univerfal affirmative propofitions; by the letter E, univerfal negative propofitions; by the letter I, particular affirmative propofitions: and, finally, by the letter O, particular negative propofitions: or elfe,

A reprefents an univerfal affirmative propofition.
E reprefents an univerfal negative propofition.
I reprefents a particular affirmative propofition.
O reprefents a particular negative propofition.

VI. Hence, our nineteen forms of fyllogifm, above defcribed, are reducible to the four figures, which I have juft laid down, as in the following tables;

I. Modes

I. Modes of the Firft Figure.

1ft Mode. A. A. A. Every M is Q; But Every P is M: Therefore Every P is Q.	2d Mode. A. I. I. Every M is Q; But Some P is M: Therefore Some P is Q.
3d Mode. E. A. E. No M is Q; But Every P is M: Therefore no P is Q.	4th Mode. E. I. O. No M is Q; But Some P is M: Therefore Some P is not Q.

II. Modes of the Second Figure.

1ft Mode. A. E. E. Every Q is M; But No P is M: Therefore No P is Q.	2d Mode. A. O. O. Every Q is M; But Some P is not M: Therefore Some P is not Q.
3 Mode. E. A. E. No Q is M; But Every P is M: Therefore No P is Q.	4th Mode. E. I. O. No Q is M; But Some P is M: Therefore Some P is not Q.

III. Modes

III. Modes of the Third Figure.

1st Mode. A. A. I. Every M is Q; But Every M is P: Therefore Some P is Q.	2d Mode. I. A. I. Some M is Q; But Every M is P: Therefore Some P is Q.
3d Mode. A. I. I. Every M is Q; But Some M is P: Therefore Some P is Q.	4th Mode. E. A. O. No M is Q; But Every M is P: Therefore Some P is not Q.
5th Mode. E. I. O. No M is Q; But Some M is P: Therefore Some P is not Q.	6th Mode. O. A. O. Some M is not Q; But Every M is P: Therefore Some P is not Q.

IV. Modes of the Fourth Figure.

1st Mode. A. A. I. Every Q is M; But Every M is P: Therefore Some P is Q.	2d Mode. I. A. I. Some Q is M; But every M is P: Therefore Some P is Q.
3d Mode. A. E. E. Every Q is M; But No M is P: Therefore No P is Q.	4th Mode. E. A. O. No Q is M; But Every M is P: Therefore Some P is not Q.

5th Mode.
E. I. O.
No Q is M:
But Some M is P:
Therefore Some P is not Q.

You

You ſee, then, that the firſt figure has four modes; the ſecond four; the third ſix; the fourth five; ſo that the whole of theſe modes, together, is *nineteen*, being preciſely the ſame forms which I have above explained, and have juſt now diſpoſed in the four figures. In other reſpects, the juſtneſs of each of theſe modes has been already demonſtrated, by the ſpaces which I employed, to mark the notions. The only difference conſiſts in this, that here I make uſe of the letters, P, Q, M, inſtead of A, B, C.

28*th February*, 1761.

LETTER CVII.

Obſervations and Reflections, on the different Modes of Syllogiſm.

I FLATTER myſelf, that the following reflections will contribute, not a little, to place the nature of ſyllogiſms in a clearer light. You muſt pay particular attention to the ſpecies of the propoſitions which compoſe the ſyllogiſms, of each of our four figures, that is to ſay, whether they are,

1. Univerſal affirmative, the ſign of which is A; or
2. Univerſal negative, the ſign of which is E; or
3. Particular affirmative, the ſign of which is I; or, finally,
4. Particular negative, the ſign of which is O; and you will readily admit the juſtneſs of the following reflections: