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Logic

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EXERCISES IN LOGIC.

EXERCISES IN LOGIC:

DESIGNED FOR THE

USE OF STUDENTS IN COLLEGES.

BY

J. T. GRAY, Ph. D.

"Syllogismus assensum constringit."—*Bacon.*

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PREFACE.

The following little work makes no pretensions to any other originality than that of *plan*. It has been prepared under the conviction, elsewhere expressed by the author, that *a practical skill in logic can only be attained by a practical acquaintance with its rules*, and that the means of a more progressive application of these, than has yet been furnished in works on the subject, was still a *desideratum*.

Of the examples given under the various exercises, the author has supplied a considerable proportion himself; but for, perhaps, the majority he is indebted to preceding writers. His obligations to Archbishop Whateley in particular, in this, as well as in other respects, are of an extent to claim special acknowledgment. From the views of this distinguished logician, on one or two points, the student will

perceive, as he proceeds, that dissent is freely expressed. Occasional strictures on other writers of celebrity, both ancient and modern, will also be found interspersed in the notes.

The concluding chapters on the different *kinds of argument* scarcely amount, the author is aware, even to a sketch of a subject inferior neither in interest nor utility to any part of the science. Should the present publication be judged seasonable, he may hereafter expand these chapters into a separate treatise. Next to the ever-recurring ambiguity of language, there is no more prolific source, he is satisfied, of confusion in reasoning than indistinct conceptions on the topics which they embrace.

It only remains to be noticed, that the observations and examples which have a ¶ prefixed to them, are designed for the especial use of *theological* students.

10, South Crescent, Bedford Square,
July 15*th*, 1845.

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EXERCISES IN LOGIC.

CHAPTER I.

ON TERMS.

WHATEVER we can make an object of separate contemplation is, when expressed in language, a Term.

Of such objects some are 'Substances,' and some 'Attributes,' the latter term being intended to include what by some are made a third class, 'Relations.' (The above division embraces three of the ten* categories of Aristotle: the remaining seven may be considered either as conditions of the existence of substances, or as heads to which attributes may be referred.) It is the peculiarity of substances that they do not admit of degrees; that they are susceptible of contrary states, but have themselves no contraries. One main distinction of them is into *material* and *spiritual;* iron and the other metals

* The names of these categories, as enumerated by Aristotle, are :— Substance, Quantity, Quality, Relation, Place, Time, Situation, Habitude, Action, Passion. How unphilosophical this analysis is, it is needless to remark; 'action' and 'passion, are plainly modes of 'relation'—and 'situation' nothing but a mode of 'place.'

being instances of the one, and every human mind of the other. Attributes follow the same division, and there is besides a class belonging to the common notion of 'Being,' under which both 'Substance' and 'Attribute' are comprehended, and which may be termed '*metaphysical.*' We may instance 'Dark' as an attribute of the first class, 'Suspicious' of the second, and 'Variable' of the third.

Another division of Substances and Attributes (consequently of Terms) is into *simple* and *complex;* butthe following distinctions will (to the logical student) be of more frequent recurrence:

1	2	3
{City London}	{Father Son}	{Wise Wisdom}

4	5
{Wise Foolish—Unwise}	{Wise Foolish—Wealthy}

1. Names* which stand for a class of things are termed 'Common;' those which represent a single thing only 'Singular;' or they may be termed substantively, 'Individuals.'

* This division corresponds with that of the author of the categories into *primary* and *secondary* substances, the 'Singulars' being those which he denominates *primary;* it is only this class of substances, he justly remarks, which have a real existence.

2. Terms * expressive of objects, of which one as 'Father,' implies the existence of the other, are styled 'Correlatives.'

3. Terms which represent qualities as they inhere in some subjects, as 'Wise,' are denominated 'Concrete;' 'Abstract' terms, such as 'Wisdom,' represent the qualities as existing by themselves.

4. Of the terms here coupled together, the former of those in the lower line, 'Foolish,' is styled the 'Contrary' of that above; the latter its 'Contradictory;'† this is a direct negative of the upper term,

Foolish negative of Wise

* Aristotle, in his κατηγορίαι, ch. v., has some sentences to show that this mutual implication is not invariable; but his reasoning on the subject is vitiated by a latent ambiguity. The instances, which he alleges, in proof of his position, are ἐπιστητὸν and ἐπιστήμη; the former of which may signify either an *object of actual knowledge*, or *an object of possible knowledge;* and the latter accordingly. Now it seems as certain as any metaphysical truth can be, that as an object of actual knowledge implies actual knowledge, so does an object of possible knowledge, possible; and *vice versa.*

† In popular usage perhaps the term 'Unwise' has as much a positive as a negative meaning; but we wish it to be taken in its etymological import as Not-wise, as denoting, i. e. all to which the epithet 'Wise' is not applicable. Terms with the negative prefix thus before them (whether expressly or virtually) are sometimes called 'Indefinite,' (*termina infinita*) as not restricting the view to any class or individual, but simply excluding one, and taken in connection with the corresponding definite term, must be considered as exhausting the possibilities of existence, in any given respect. Every thing whatever must be either 'organized,' or 'not-organized' 'corporeal,' or 'incorporeal.' On this account the following sentence from a writer usually luminous and accurate seems open to objection:—

"The most considerable discovery of Mr. Grey was that all material substances might be reduced, in reference to electrical phenomena, to

and is applicable to objects not in the same class, while the other simply denotes the most widely different objects of any in the class.

5. The distinction here noticed is that of 'Opposite' and 'Compatible' terms; the same person cannot be at the same time 'Wise' and 'Foolish,' but may be at the same time both 'Wise' and 'Wealthy.

Exercise.

Explain the distinctions between the subjoined pairs of Terms:—

{Mortal / Mortality} {King / Subject} {Corporeal / Spiritual}

{Corporeal / Incorporeal} {River / Thames} {Preceptor / Pupil}

{Hard / Soft} {Hard / Cold} {Beauty / Beautiful} {Giving / Receiving}

{Right / Obligation} {Secure / Dangerous} {Secure / Insecure}

{Horse / Bucephalus} {Attract / Repel} {Ferocious / Ferocity}

two classes, *electrics* and *non-electrics*."—*Lardner's Electricity, Vol.* 1, *p.* 7.

A division, which it was competent to any logical student acquainted with the term 'electrics' to make, could not be a 'discovery.'

CHAPTER II.

ON THE PREDICABLES.

WINE is a juice		1.
———————	extracted from grapes	2.
———————	inebriating	3.
———————	sweet	4.

In the above lines is exhibited a succinct example of what the Schools have termed the "Five Predicables," i. e., of the five things, one or other of which must be affirmed, whenever any thing is affirmed concerning another thing.

1. 'Wine' and 'juice' are said to be related to each other as 'Species' and 'Genus,' that is to say, 'juice' is a 'Genus,' (or class) in which 'wine' is included as a 'Species' (or subordinate class.)

2. The quality which distinguishes 'wine' from all other 'species' of juice, is its being 'extracted from grapes;' the logical name for a quality of this kind is the 'Difference.'

3. A quality which belongs universally to a species, (as that of 'inebriating' to 'wine,') without being its distinguishing quality is termed a 'Property' of it.

4. A quality which does not belong thus universally to a species, but is present only in some of the individuals which compose it, is termed an 'Accident:' thus some kinds of wine only are 'sweet,' others not so.

Exercise.

Specify which of the above relations the lower terms of the subjoined pairs sustain to the upper.

{Rose / Flower}	{Gold / Heavy}	{Bird / Winged}
{Dictionary / Book}	{Dictionary / Alphabetical}	{Winter / Cold}
{Plough / Implement}	{Poetry / Rhyme}	{Science / Geometry}
{Square / Rectangular}	{River / Swift}	{Blood / Red}
{Man / Civilized}	{House / Cottage}	{Inspired writers / Apostles}

CHAPTER III.

ON GENUS AND SPECIES.

The most important of the distinctions noticed in the preceding chapter is, beyond all comparison, that of 'Genus and Species;' it is a distinction which will meet us continually in subsequent parts of these exercises, and claims, therefore, a separate and fuller consideration.

We have seen that 'wine' is a *species* of 'juice,' which is said to be its *genus;* now 'wine' may be regarded as itself a 'genus' having under it the subordinate *species*, 'port,' 'claret,' 'champagne,' &c., and similarly 'juice' may be itself referred to a higher genus 'liquor.' In distinguishing the two kinds of species from each other, we should call 'wine' the *proximate* species of 'juice,' and 'port,' &c., *remote* species; and similarly with the genera.

A genus which is not itself a species of any thing, is called *its highest genus*, a species which is not a genus of anything, *its lowest species;* in enumerations,* it is improper to rank higher and lower species together; thus e. g. to speak of flowers as being 'roses,' 'lilies,' 'waterlilies,' 'violets,' &c., would be illogical, the third article being manifestly included in the second.

* It would be unreasonable to expect that this law of co-ordination should be observed very strictly in animated composition, but where we may assume that it has been observed, we shall sometimes be enabled to decide between two meanings of a word, otherwise equally eligible. Thus in Hebrews, xi, 37, where it is said of the ancient worthies, that, "They were stoned, they were sawn asunder, they were *tempted*, they were slain with the sword:" unless we may interpret the third verb employed "seduced by promises of favour," we shall have a *genus* mixed up in the enumeration with three of its *species*. A similar observation will apply to a passage in the Corinthians, 1 Cor. i, 30: Who (i. e. Christ) of God is made unto us wisdom, righteousness, sanctification and redemption. *Redemption*, in Scripture, is sometimes put for the blessings of salvation generally, sometimes specifically for the resurrection of the human body. It is only on the supposition that the *latter* is the kind of redemption intended here, that the enumeration will be one of co-ordinate items.

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Exercise 1.

Name the intermediate species between the following terms.

Animal	Mastiff
Instrument	Sword
Vessel	Frigate
Word	Adverb
Action	Perjury
Coin	Shilling
Rite	Baptism
Afflicted	Paralytic

Exercise 2.

In the following enumerations specify the illogical items.

Animals are	Horses, Lions, Dogs, Spaniels, Hares, &c.
Colours are	White, Red, Crimson, Black, Green, &c.
Compositions are	Histories, Poems, Odes, Orations, Essays, &c.
Subjects are	Artisans, Manufacturers, Seamen, Sailors, Peasants, &c.
Virtues are	Temperance, Integrity, Honesty, Gratitude, &c.
Diseases are	Consumptions, Nervous Fevers, Fevers, Dropsies, &c.

CHAPTER IV.

ON GENERALIZATION.

"WHEN in contemplating several objects, and finding that they agree in certain points, we abstract the circumstances of agreement, disregarding the differences, and give to all and each of these objects a name applicable to them in respect of this agreement" —when, in other words, to adopt the technical language employed in the preceding chapters, we refer two or more *species* to a common *genus*—we are said to 'generalize.' The process of generalization is one of the first importance in reasoning, and in every branch of inquiry after truth. The power of employing it at pleasure has been regarded, and perhaps with good reason, as the characteristic distinction of the human mind. As examples of the process, we may quote from the preceding chapter the reference of the species 'port,' 'sherry,' 'claret,' &c., to the *genus* 'wine,' or that of the species 'rose,' 'lily,' 'violet,' &c., to *genus* 'flower.'

EXERCISE.

Refer the subjoined groups of terms to suitable genera.

{Weaver / Cutler} {Captain / Colonel} {Fencing / Dancing}

{Sickness / Health} {Adversity / Prosperity} {Gluttony / Ebriety}

{Diseases / Accidents} {Colours / Odours} {Tragedy / Comedy}

{Kingdom / Republic} {Love / Hatred} {Acquittal / Condemnation}

¶ {Miracles / Prophecies} {Faith / Hope} {Knowledge* / Love}

{Inflation* / Edification}

CHAPTER V.

ON DIVISION.

LOGICAL division is the exact opposite of generalization, consisting in the distribution of a 'genus'

* See 1 Cor. viii, 2. As a further exercise the theological student may set himself to generalize the particulars enumerated in Rom. ix, 3, 5: viz. from the 'adoption' to the ancestry of Christ. This will be found sufficiently easy. A more perplexing group is that which occurs in another epistle of the same writer, Heb. xii, 21—25. "We are come to Mount Zion, &c." It is scarcely necessary to say that the difficult items to a logician in this enumeration, are the last and the last but three, the former on account of its apparent tautology, the latter from its adaptation to excite solemn rather than cheerful emotion.

into its several species: e. g., we divide the genus 'flower' into the species 'rose,' 'lily,' 'violet,' &c.

[* This kind of division must be carefully distinguished from physical division, which is the separation of a whole into its component parts, thus—

Logically, 'fruit' is divided into 'orange,' 'peach,' 'nectarine,' &c.]

Physically, 'fruit' is divided into 'peel,' 'pulp,' 'kernel,' 'stalk,' &c.

There may be often two or more logical divisions of the same genus, according to theprinciple on which we proceed in dividing; e.g., a book would be divided, according to its contents, into 'poetical,' 'historical,' &c.; according to its size, into 'folio,' 'quarto,' &c. In enumerating the members of a division, care must be taken that these different species are not intermixed with each other, which is styled 'cross division.'† The rule by which it is usually sought to obviate this error, is, that the parts enumerated must be *opposed to each other*, as 'folio,' e.g. is to 'quarto,' *not contained in each other.*

* A single consideration will suffice to show the importance of this distinction:

What is true of a 'logical whole' is true of each of its parts.

What is true of a 'physical whole' by no means so.

† In the following sentence from Burke (Reflec. on Fr. Rev. p. 208, ed. Dodsley, 1790) there seems, at least, an approach to an offence against this rule.

"History," he says, "consists for the greater part of the miseries brought upon the world by pride, ambition, avarice, revenge, lust,

Exercise 1.

Explain whether the subjoined divisions are logical or physical.

1. 'Oratory' may be divided into—'deliberative,' 'forensic', 'demonstrative.'—*Aristotle.*

2. 'Grammar' may be divided into—'Orthography, 'Etymology,' 'Syntax,' and 'Prosody.'

3. 'Goodness of memory' may be divided into—'susceptibility', 'retentiveness,' 'readiness.'—*Dugald Stewart.*

4. 'Virtue' may be divided into—'justice, 'temperance,' 'fortitude,' and 'prudence.'

5. 'Repentance' may be divided into—'confession,' 'contrition,' and 'amendment.'

6. 'Consummate generalship' consists in 'military skill,' 'valour,' 'authority,' and 'good fortune.'—*Cicero.*

7. Happiness consists in—

The exercise of the social affections:

The exercise of our faculties in the pursuit of some engaging end:

sedition, hypocrisy, ungoverned zeal, and all the train of disorderly appetites, &c."

Here the inclusion of 'sedition' and 'hypocrisy,' in an enumeration of active principles of our nature, seems illogical, neither of them being such a principle, but rather the effect of other principles, *appearing in the conduct.*

The prudent constitution of the habits:
Health.—*Paley.*

Exercise 2.

Distinguish by * proper conjunctions the cross divisions in the following enumerations.

1. Men are—merchants, farmers, lawyers, negroes, whites, Pagans, Christians.
2. Substantives—are masculine, feminine, proper, common, &c.
3. Triangles are—isosceles, scalene, right-, obtuse-, acute-angled.

CHAPTER VI.

ON DEFINITION.

To prevent the confusion which arises in reasoning from the indistinct or variable use of terms,

* [Sc. the conjunctions 'either' and 'or'] A slight attention to the punctuation of a sentence will often remove the confusion occasioned by an apparent cross division. So, in Romans viii, 38, 39:

"For I am persuaded that neither death nor life; neither angels, nor principalities, nor powers; neither things present, nor things to come; neither height, nor depth, nor any other creature shall be able," &c.

It is superfluous to inform the classical student that the substitution which we have thrice made in the above version of 'neither' for 'nor,' would not be necessary in the original text, οὔτε being the term used in each instance.

recourse is usually had to 'definition.' 'Logical definition' (with which alone we are here concerned) is effected by the specification of the 'genus' and 'difference,' of a term, the former serving to mark the points in which it *agrees* with other terms of the same kind, the latter those in which it *differs* from them. Thus, if 'logic' were defined to be 'The Art of Reasoning,' we should explain this definition to consist in the enunciation of its '*genus*' as an 'art,' and of its '*difference*' as the art 'of reasoning.' Similarly, we might define the 'scriptures' to be '*The Writings* of the Old and New Testament,' that part of the definition which is in italics being the '*genus*' of the term and the remaining part its '*difference*.'*

It is matter of indifference whether in a definition we enunciate the 'genus' or the 'difference' first; thus if 'virtue' were defined to be 'moral excellence,'

* It follows from this account of the nature of logical definition, that there are some terms which are incapable of being defined. Such are alike those which have no 'genus' (or none which is not purely metaphysical) and those which have no *single* or no *assignable* 'difference.' Under the first head will fall necessarily the 'summa genera' in the various departments of the objects of thought. Take, as an instance, the genus 'Motion.' To define this (as has been done) 'the act of a being in power, in so far as it is in power' is to resort for an explanation of a term in Physics to the nomenclature of Ontology. Watts's definition of it, 'a change of place,' lies open to the same censure; for besides that such change is rather the result of motion than the process itself, the term *change* is a 'metaphysical' (or ontological) term, and therefore inapplicable to the elucidation of one which is purely 'physical.'

Examples of the two cases of want of a 'difference' in terms which we have noticed may be derived from almost any of the simple sub-

the genus to which it is here referred would be the latter of the two terms.

In some cases, the mention of the 'genus' is omitted as being too obvious to need enunciation. Thus, when 'wisdom' has been defined to be 'the adaptation of good means to good ends' we are to consider the whole of this expression as constituting the '*difference*' of the term, the '*genus*,' which, if the reference be to divine wisdom, is such a term as 'perfection' or 'attribute,' being understood.

Exercise 1.

Analyze into their respective 'genera' and 'differences' the following definitions of terms.

A meadow is	a field devoted to pasturage
A pension is	an allowance for past services
Rhetoric is	the art of speaking persuasively
Honesty is	uprightness in pecuniary transactions
Slavery is	compulsory subjection to a master

stances in nature, or of the sensible qualities which belong to them. There is no single property which distinguishes 'gold' from other metals, nor could any mere words convey an idea of the 'difference' which distinguishes 'white' from other colours. (See Locke on the Understanding, book iii, ch. § 4.) Little inconvenience, however, is sustained from this, as it is precisely the terms which are unsusceptible of definition *which do not, in general, require it.* Where any doubt could exist as to the sense they might suggest, it may be sufficiently precluded commonly, by mentioning their contraries, or by specifying some of their concrete combinations; as, e. g., 'white' might be explained to be the opposite of 'black' or the colour of 'snow.'

Poetry * is	metrical composition
Bigotry is	exclusive attachment to a party
Modesty is	self-esteem not greater than what is becoming
Bashfulness is	self-esteem less than what is so
Conscience is	the faculty by which we judge of right and wrong
Sin is	the transgression of the law

Exercise 2.

Define by 'genus' and 'difference' the following terms.

An island	Patriotism	Courage
A garden	Prejudice	Politeness
A chair	Gratitude	Pride

CHAPTER VII.

ON PROPOSITIONS.

When two terms are compared together, with a view to judge of their agreement or disagreement, the sentence expressing the decision arrived at, is called a 'proposition.' Defined logically therefore,

* The accuracy of this definition will doubtless be questioned by many, and exceptions will perhaps be taken against other of the examples, (there being no fixed standard to which the terms are referable) but their utility as exercises will remain.

a proposition is 'a sentence assertive'* i. e. affirming or denying, the term 'sentence' in this definition being the *genus*, and 'assertive' the *difference*. In every proposition there will be accordingly *two* (and only two) terms, of which one will be always predicated, i. e. affirmed or denied of the other. These terms are named the 'Subject' and the 'Predicate,' the Subject being that *which is predicated or spoken of*, the Predicate *that which is predicated of it*. Thus, in the sentence, 'a stone is hard,' 'a stone' is the subject, (being the thing spoken of) and 'hard' the predicate (being the thing spoken of it;) the substantive verb † 'is' which expresses the predicability, is called the 'Copula.' It follows from this account of a proposition, that sentences expressing a wish, or conveying a command, or interrogative ones which ask for *information* do not come under the name; the subjoined may serve as further specimens of real propositions.

1. Terms are [either abstract or concrete]
2. Who would be [insane enough without a hope

* Whateley says 'indicative,' but it may be doubted whether this epithet would now convey to any one the ideas of affirmation and denial.

† According to some writers, (see Whateley, p. 62) the substantive verb is the only one which Logic can recognize. This is too strong, as the distinction of the copula is often one rather of convenience than necessity. When we come to speak of arguments, we shall see that in various classes of propositions, the copula may be dispensed with.

of future recompense to undertake constant labours?]

3. Gold [surpasses all metals in brilliancy]

[Note, the Predicates in each of these propositions are indicated by brackets.]

Observations.

1 is a specimen of a compound proposition, of which more in a subsequent chapter.

[It is plain from this No. as also from 2 and 3, that a term may consist of several words.]

2. Questions of *appeal* are implied propositions, being plainly equivalent either to affirmative or negative ones; thus the above question is evidently tantamount to 'No one would be, &c.'

3. Propositions which do not explicitly contain the Copula may be easily resolved into those which do; thus, we might state 3, 'Gold is superior to all metals in brilliancy.'

Exercise.

Express the following propositions in strict logical form, making the Copula (where necessary) apparent, and distinguishing the Subject and Predicate.

1. Are such abilities as the human made for no purpose?

2. Remorse follows disobedience.

3. Exercise promotes health.
4. A philosopher should understand geometry.
5. Friendship has no tendency to secure veracity.
6. Who is pleased to have his all neglected?

CHAPTER VIII.

ON SUBJECT AND PREDICATE.

THE following examples will illustrate some of the varieties in the form or in the mutual relation of the Subject and Predicate of a Proposition to which it is desirable to attend.

1. [To tell all that we think] is inexpedient.
   [Rising early] is healthful.
2. "Better [to reign in hell than serve in heaven."]
   It is unlawful [to kill an innocent man.]
3. There is [no such thing as witchcraft.]
4. [The less] is blessed by the better=[He who is blessed] is less than (i. e. is inferior in dignity to) him who blesses.

[Note, the Subjects in the above propositions are bracketed.]

OBSERVATIONS.

1. As in Grammar, an infinitive-, participial-, or other clause may be used instead of a noun, as the Subject of a proposition.

2. The Subject will sometimes succeed the Predicate, though its common order is to precede it. In this case it is often represented at the beginning of the sentence by the pronoun 'it.'

3. Where the substantive verb is introduced by the adverb *there*, it is itself both Copula and Predicate, being equivalent to '*exist*.'

4. The apparent Subject and Predicate of a proposition are not always the real ones.*

Exercise.

Distinguish the Subject and Predicate in the following propositions.

1. There can be no natural desire of artificial good.

2. Men are governed by affection rather than by reason.

3. Leading vanquished enemies in triumph is a barbarous custom.

4. "The wise for cure on exercise depend."

5. Of good things even the signs are good.

6. Whatever is undertaken should be gone through with.

7. "Sweet is the breath of morn."

8. ¶ That the soul be without knowledge is not good. (Prov. xix, 21.)

* No general rule will supersede the use of practical dexterity in discovering the true analysis of a sentence. For another explained example see Chap. 15, Note.

9. Pure religion and undefiled is this—to visit the fatherless, &c. (James i, 27.)

10. In the mouth of three witnesses shall every word be established. (Matt. xviii, 16.)

11. God is not the God of the dead, but of the living. (Matt. xxii, 32.)

CHAPTER IX.

PROPOSITIONS CLASSIFIED AND SYMBOLIZED.

PROPOSITIONS may differ both as to their *quantity* and *quality*. According to the former, they are either *universal* or *particular;* according to the latter, either *affirmative* or *negative*. With any given subject and predicate then we may (leaving, for the present, the truth or falsity of the predication out of consideration) form four distinct propositions, viz:

1. A universal affirmative:
2. A universal negative:
3. A particular affirmative:
4. A particular negative: e.g.

1. *All* cowards are cruel.
2. *No* cowards are cruel.
3. *Some* cowards are cruel.
4. *Some* cowards are *not* cruel.

The above kinds of propositions have, for convenience' sake, been denoted by logicians by the symbols A, E, I, O, respectively, so that

A=Universal affirmative.
E=Universal negative.
I =Particular affirmative.
O=Particular negative .

Propositions are often met with which have no sign of quantity before them; as if, e. g., the first of the propositions above had simply been 'Cowards are cruel;' we must judge, in each such case, by the import of the proposition, whether it be universal or particular.

It is evident that in the last of the propositions the sense would be the same, if the expression were '*All* cowards are not cruel;' the words 'all' 'every' therefore when prefixed to negative propositions are not to be considered as signs of universality.

'Singular' propositions i. e. those which have a *singular* subject e. g. 'Dionysius was cruel,' belong properly neither to universals nor particulars; but as the principal rules for universals will * apply to them, they are, generally speaking, correctly denoted by the symbols, A, E.

* The reason usually given for classing these propositions with universals, viz. *that their subjects are to be taken in their whole extent,* when, properly speaking, they have no extent, is little better than an absurdity. The true ground of the arrangement is that, as with universals, *their application necessarily remains unchanged.*

It is sometimes necessary, in apparently negative propositions, to observe whether the negation attaches strictly to the *copula* or the *predicate;* if the latter be the case, as in the proposition, 'Sin is no-trifle,'* we are to consider such propositions as really affirmative.

Exercise.

Distinguish by their appropriate symbols the following propositions.

1. No one is gratuitously wicked.
2. Whoever is capable of deliberate crime is responsible.
3. All that glitters is not gold.
4. Cicero was no unskilful orator.
5. An enslaved people is not happy.
6. All the accused were not guilty.
7. Beasts have four feet.
8. Some blacks are civilized.
9. All philosophers are not wise.

* ¶ We have a singular instance of this usage of the negative in Isaiah x, 15. (See Lowth's version.)

"Shall the axe boast itself against him that heweth therewith?
Or shall the saw magnify itself against him that shaketh it?
As if the rod should shake itself against him that lifteth it up.
Or as if the staff should lift up itself against *no wood*, i. e. as Lowth explains it, 'against its master.'"

CHAPTER X.

ON DISTRIBUTION.

When a term is taken in its whole extent, so as to stand for all which can be signified by it, it is said to be 'distributed.' In applying this to the parts of a proposition, there are two rules which it will be important to bear in mind.

1. All *universal* propositions distribute the *subject.*
2. All *negative* propositions distribute the *predicate.*

The necessity of the latter rule (respecting which alone there can be any hesitation,) will appear, if we consider that, if, in such a proposition as 'No vice is useful,' any kind of utility could be predicated of vice, the proposition could not be affirmed.

[Note, some propositions, which are introduced by the sign 'all,' are not universals, but *collectives,* as e. g., 'all the rules of grammar overload the memory,' where we could not substitute for 'for all the rules,' the distributive, 'every rule;' and some propositions, viz., *exclusives,* are really negatives though not apparently so; e. g. 'the contented alone are happy'= 'none who are discontented are happy.

It is implied, of course, in the above rules, that affirmative propositions do not distribute the predi-

cate; and this will be obvious if, to take the first example of the previous chapter, 'All cowards are cruel,' we reflect that the term 'cruel' is applicable to many besides cowards.

Exercise.

Explain in which of the propositions in the preceding exercise the subject is distributed, and in which the predicate; also in which of the following propositions:—

1. All men are sinful.
2. All the angles of a triangle are equal to three right angles.
3. No human government allows absolute liberty.
4. Only the experienced are wise.

CHAPTER XI.

ON OPPOSITION.

We have seen (ch. ix) that, considered as to quantity and quality, there are four principal kinds of propositions, A, E, I, and O, of which the following may be regarded as the respective forms:—

A 1. Every X is Y.* I 3. Some X are Y.
E 2. No X is Y. O 4. Some X are not Y.

Now as it regards the relations of such propositions to each other, logicians have distinguished various kinds of opposition, e. g.

The pairs which differ both in quantity and quality, viz. A, O; and E, I; are termed † 'Contradictories.'

* We here introduce for the first time *symbols* instead of terms, which we shall continue at times to do in the explanatory examples of succeeding chapters. The utility of the substitution will be abundantly intelligible to all who are in any degree conversant with algebra.

† In subjects which admit of quantity this amounts to the same thing as determining 'contradiction' by the presence or absence of the negative particle from the predicate, agreeably to the account given of contradictory terms in chapter i. Thus, the proposition 'every X is Y, would be fitly contradicted by the proposition 'every X is not Y,' this being equivalent (as we have seen in chapter ix,) to the proposition 'some X is not Y.' The opposition therefore between the pairs A, O; E, I; should be regarded *solely as specific cases of contradiction*, (not as its exclusive forms.) This is important to notice because by those who derive their view of contradiction from the present cases, a difficulty has been supposed to lie in the contradiction of 'singulars.' But surely of the proposition

A Brutus deserved well of his country,

both the logical and real 'contradictory' must be,

E Brutus did *not* deserve well of his country,

and carrying out the explanation given in chap. i, of contraries, the 'contrary,' must be

E

A Brutus deserved *ill* of his country. or "Brutus deserved no good

Archbishop Whateley, in the remarks which he makes on the contradiction of singulars, seems half inclined to give up their universality, contending, (see Logic, p. 71.) that it is only by the insertion of some modifying particle, such as 'occasionally' that their contradiction is

Those which differ in quantity only, viz. A, I; and E, O; 'Subalterns.'

The two universals, A, E; are said to be 'Contraries.'

The two particulars, I, O; 'Subcontraries.'

And it will be quite evident, on consideration, that of the 'contraries' on any subject both propositions may be false, but both can never be true; of the 'subcontraries,' *vice versa;* that of the 'contradictories' one will, of necessity, be always true and the other false; that in 'subalterns' the truth of the particular will follow from that of the universal, and the falsity of the universal from that of the particular, &c.

Exercise.

Name the respective contraries and contradictories to the propositions in chapter ix.

CHAPTER XII.

ON CONVERSION.

It is sometimes convenient to *transpose* the terms of a proposition, i. e. to make the predicate the subject

possible. It must surely be thought extraordinary that a formal definition of 'contradiction' given at the outset in the account of 'terms, should afterwards be laid aside as altogether useless.

and the subject the predicate; such transposition is called * 'conversion,' which, of course, is then only legitimate (or illative) when the truth of the proposition remains unaltered. Now this can only be the case when no term is distributed in the converse form of the proposition which was not distributed in its original form, and this proviso limits the species of illative conversion to three, examples of which, with the necessary explanatory observations, now follow:—

1.

E .. If no X is Y, *then* No Y is X; also .. E

I .. If some X are Y, *then* some Y are X. .. I

2.

A .. If every X is Y, *then* some Y are X. .. I

E If no X is Y, then some Y are not X. O.

3.

O .. If some X is not Y=not-Y, *then* some

I .. =(something) not-Y is X; also I

* What is commonly called the 'converse' of a proposition is simply the transposition of any two of its parts which are antithetically related to each other, whether that relation be the one of subject and predicate or not. Such a transposition can, of course, have no logical force otherwise than by accident. The following illustrative anecdote is told by Lambe:—

"'I like Wrench,' a friend was saying to Elliston one day, 'because he is the same natural easy creature *on* the stage that he is *off*.' 'My case exactly,' retorted Elliston, 'I am the same person *off* the stage that I am *on*.' The inference at first sight seems identical, but examine it a little and it confesses only that the one performer was *never* and the other *always acting*."—*Essays of Elia.*—*Ellistoniana.*

A. If every X is Y, i. e. (if no X is not-Y,)
E. . *then,* no=(nothing) not-Y is X. . . .

1. The first kind of conversion exhibited above is termed '*simple,*' and may always be applied to propositions of the forms E and I.

2. This conversion is said to be, '*by limitation,*' (per accidens;) it is instanced in a proposition of the form A, to which simple conversion would be inapplicable; for if we were to infer 'every Y is X,' we should be distributing a term Y, which had not been previously distributed; E may also be thus converted.

3. Neither of the above modes of conversion is admissible in propositions of the form O; but if we consider the negative in these propositions as attached to the predicate, we may then convert them as we do those of the I form; this latter conversion (which is applicable to A as well as to O,) is said to be '*by negation,*' (or 'contraposition.')

The following mnemonical lines may assist the student in remembering the above rules.

Simpliciter fEcI, convertitur EvA, per accid: at O per contra, sic fit conversio tota.

[Note, in the mnemonical words in these lines the consonants are insignificant]

Exercise.

Convert illatively the propositions given as examples in chapter 9, and also the following:—

1. Some professors of religion are hypocrites.
2. Some sceptics are not vicious.
3. Nothing morally wrong can be politically right.
4. "Never rebel was to arts a friend."—*Dryden.*
5. Every poet is a man of genius. (by negation.)

¶ 6. He that is not with me is against me. (Matt. xii, 30.*)

CHAPTER XIII.

ON THE COPULA.

We have seen (chap. vii.) that the simple verb of existence (termed logically the 'copula') may be used to connect the subject and predicate of any proposition whatever. The kind of predicability which it most properly expresses is that of '*comprehension;*' whenever the relation of the predicate to the subject is

* In this example we have an instance of the logical fact that *contraries* and *contradictories* are sometimes identical. We are accordingly prepared for the converse aphorism which was uttered by the same divine speaker on another occasion "He that is not against us is on our part, (Mark ix, 40.) It appears not an unfair generalization of the comparative purport of the two sentences which Bacon somewhere makes, that the former is the principle to guide our judgments in *fundamental* matters of religion, the latter in *indifferent* ones.

either that of 'genus,' 'difference,' 'property,' or 'accident,' the latter term may be said to comprehend the former in its meaning, and this *comprehension* it is which is expressed by the substantive word. In its popular use, however, it is often the sign of a different kind of relation e. g.* of '*coexistence*,' '*resemblance*,' '*causation*,' and this variety in its import, it is necessary to be aware of, to prevent mistakes in inferences. The following three sentences will illustrate its applicability to the expression of the ideas just enumerated, viz., those of 'coexistence,' &c. :—

1. Knowledge is power.
2. Society is a pyramid.
3. Intemperance is the death of thousands.

In each of these sentences the form of expression may be said to be rhetorical, and, if translated into logical language, would exhibit the three sorts of relations between terms above noticed. The proposition, e. g., 'knowledge is power,' implies that power

* "Existence, Coexistence, Sequence, Causation, Resemblance: one or other is asserted (or denied) in every proposition without exception. This fivefold division is an exhaustive classification of matters of fact; of all things that can be believed or tendered for belief, of all questions that can be propounded, and all answers that can be returned to them."—*Mills' Logic*, Vol. 1, p. 139.

We have not included in our own enumeration the first of the items above, because it is never expressed by the copula *as copula;* it will not be difficult to see that the third is resolvable into either the preceding or succeeding one.

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invariably *coexists* with knowledge, and the others similarly convey the notions of *resemblance* and *causation* respectively.

Exercise.

State which of the relations above enumerated is denoted by the copula in the following sentences:—

1. Union is strength.
2. Virtue is happiness.
3. Truth and justice are points.*
4. Seeing is believing.
5. Commodity (i. e. interest) is the bias of the world.—*Shakspere: King John.*
6. Anger is short madness.

¶ 7. All flesh is grass. (Isaiah xl. 6.)

8. I am the resurrection and the life. (John xl. 25.)
9. This is my body.† (Matthew xxvi. 26.)
10. Love is the fulfilling of the law. (Rom xiii. 10.)

* "La justice et la vérité sont deux pointes si subtiles, que nos instruments sont trop émoussés pour y toucher exactement. S'ils y arrivent ils en ecachent la pointe et appuient tout autour, plus sur le faux que sur le vrai."—*Pascal, Pensées,* Part 1, Art vi, sec. 16.

† It is felicitously remarked by Gibbon somewhere, in relation to the Romish interpretation of this passage, that transubstantiation is nothing but *rhetoric turned into logic.* The hypercalvinism of those who so overstrain the scripture metaphor of a *ransom* for sin as to make the forgiveness of the elect a debt which they may even claim of divine justice is a similar perversion of language.

CHAPTER XIV.

ON TRIFLING PROPOSITIONS.

THE junction of a Subject and Predicate by means of Copula is not of itself sufficient to constitute a Proposition; the nature of the connection between the parts joined may be such as to render the proposition a trifling one, if we should not rather say, a seeming one only. Under the head of such propositions we may class (1) all* identical propositions, those i. e., in which the predicate is the *same* as the subject, (2) those in which it is a *synonym* of it, and (3) those in which (without professing to define) it contains only parts of the *definition* of the subject, whether[1] the *genus* or [2] the *difference*. The propositions which follow will be examples of these in order:—

1. A triangle is a triangle.
2. To pardon is to forgive.
3. Gold is a metal.
4. Gold is fusible.

* An exception ought to be made perhaps in favour of such in this class as carry an emphasis in the copula. It is quite evident by such an example, as the familiar proverb, 'Home is home,' i. e. '*There is no* place like home,' that enunciations of forcible truth are often conveyed by preference in the form of identical propositions. Such a course is sometimes pursued, when it is meant to insist on things being

To this list some would be inclined to add such propositions as 'merit gains esteem' belonging to the class usually denominated, 'Truisms;'* but as that may not be a truism to one which is so to another it would be scarcely correct to make this a fourth instance.

Exerise 1.

State on what grounds the following propositions may be considered trifling.

1. Parsimony is frugality.
2. Poetry is metrical.
3. A palfrey is a horse.
4. There's ne'er a villain dwelling in all Denmark
   But he's an arrant knave.
5. Man is rational.

Exercise 2.

Resolve the following seemingly identical propositions into others which are not so:—

called by their right names, it being a common artifice of the unprincipled to gloss over their villany by specious phrases. Thus, in Shakspere, we find one of the tribe saying,

Steal! a fico for the phrase; *convey* the wise it call.

* Much damage has been done to the repute of Logic by a selection of propositions of this class for the illustration of its rules. A whole stock of such sentences may be found ready made in the papers usually set before youths for writing copies.

1.* Sensation is sensation.

2. What I have written I have written. (John xix, 22.)

† 3. I am that which I am. (Exodus iii, 14.)

CHAPTER XV.

ON COMPOUND PROPOSITIONS.

COMPOUND Propositions are those which are made up of two or more subjects or predicates, or both; they are either *conjunctive* or *disjunctive*, according as the connection subsisting between these different subjects or predicates is of a copulative or disjunctive character, e. g.

1. 'For,' is both a preposition and an adverb [*Conjunctive.*]

* This is one of the many 'dicta' of Johnson which Boswell has preserved. The circumstances which occasioned it are thus related by him in his 'Tour to the Hebrides:'

"I was weary of the day, and began to think wishfully of being again in motion. I fancied Dr. Johnson quite satisfied. But he owned to me that he was fatigued and teased by Sir Alexander's doing too much to entertain him. I said it was all kindness.—JOHNSON.—True, Sir, but sensation is sensation.—BOSWELL.—It is so, we feel pain equally from the surgeon's knife as from the sword of the foe.

† As a further exercise in the resolution of such propositions, we may refer the theological student to Prov. xiv, 24; Rom. vi, 16. The help of biblical criticism will probably be thought necessary to the elucidation of the former passage.

2. Every action is either good or bad [*Disjunctive.*]

We must carefully distinguish from compound proposition the following sorts,* which are so only in appearance:—

1. Bodies, which are transparent, have pores.
2. Two and three make five.
3. A poet is *born* not *made.*†

With regard to such propositions as these we may observe that,

1 Is the kind of proposition called 'Complex.' It is a proposition which includes an incidental or subordinate proposition in its structure; but, although in such propositions there is more than one subject, they are not subjects of the same assertion.

2. We have here a specimen of a 'Collective' proposition. The copulative particle 'and' is evidently equivalent to the mathematical sign + It scarcely needs pointing out that the parts connected by this copulative, form together but one subject, to which, *as a whole,* the predicate is referred.

3. This species of proposition is sometimes called 'Discretive.' The predicate is not really a double one

* We do not think it necessary to give instances of all the kinds of propositions, viz., *causals, relatives,* &c., which are commonly noticed by logicians in treating of compounds. What are called causal propositions, e. g., 'Logic is useful, since it helps us to reason,' are really nothing but condensed arguments. In relatives, such as the scriptural sentence, "Where your treasure is, there will your heart be also;" that there is but a single subject and predicate is evident; e. g., ('The place) where your treasure is (is the place where) your heart will be.'

† In apparent contrast with this proposition, it is finely remarked by Tertullian in his Apology, "Christianus *fit* non *nascitur.*"

but a single one, expressed in a double manner, i.e., by both a *positive and a negative term.

Exercise.

Distinguish the really compound propositions among those subjoined, from such as are compound in appearance only; state which of the former are *conjunctive* and which *disjunctive;* and point out the *complex.*

1. Friendship either finds or makes men equal.

2. He who voluntarily lives quite alone, must be either more or less than a man.

3. The doctrine, which places the chief good in pleasure, is unworthy of a philosopher.

4. It is not the cross, but the cause, which makes the martyr.

5. Alike the subject and predicate are distributed in universal negatives.

6. The sun, moon, and stars, cannot all be seen at once.

7. "Syllogismus assensum constringit non rem."

8. "Rex est qui metuit nihil."

9. "Cœlum non animum mutant qui trans mare currunt."

¶ 10. "Either this man has sinned or his parents." (John ix, 2.)

11. Extreme riches and poverty are alike to be deprecated. (Prov. xxx, 6.)

* See Note 1, chapter vi.

CHAPTER XVI.

RECAPITULATORY EXERCISE.

1.

EXPLAIN the relation of the subjoined pairs of terms to each other.

{Repast / Dinner}

{Debtor / Creditor}

{Joy / Sorrow}

{Condition / Miserable}

{Possible / Impossible}

{Sublime / Sublimity}

{Quadruped / Lion}

¶ {Sower* / Eater}

* See Isaiah lv, 10. "For as the rain cometh down and the snow from heaven and returneth not thither again, but watereth the earth, and maketh it bring forth and bud, that it may give seed to the *sower*, and bread to the *eater*.

The modern terms for the classes exhibited thus antithetically by the the sacred writer are those of 'producer' and 'consumer,' technical terms in political economy. The occurrence of the distinction in the prophet is not a solitary instance of the anticipation by Scripture of the generalisations of modern science.

2.

Specify the illogical items in the following enumerations.

1. Words are—Nouns, Verbs, Prepositions, Particles, Pronouns.

2. Relatives are—Parents, Children, Brothers, Sisters, Sons.

3. Figures are—Triangular, Square, Round, Circular.

4. Poems are—Dramatic, Epic, Tragic, Lyric, Didactic.

3.

Distinguish the 'Genus' and 'Difference' in the following Definitions.

1. A Mirror is—a surface so polished as to reflect images.

2. Demonstration is—certain proof.

3. Punishment is—the infliction of suffering on an offender for the sake of others.

4. Correction is—the infliction of suffering on an offender for his own sake.

5. Shame is—the passion felt when reputation is supposed to be lost.—*Johnson.*

4.

Define by Genus and Difference the terms 'Envy,' 'Emulation,' 'Persecution,' 'A Heretic.'

5.

Point out the Subject and Predicate in the following Propositions.

1. Whatever is expedient is right.*—*Paley.*

2. A mining speculation is no trifling business.

3. To gild refined gold, to paint the lily,
   Is wasteful and ridiculous excess.

4. Where there is no property, there can be no injustice.

5. "To be or not to be, that is the question."

¶ 6. Without faith it is impossible to please God. (Heb. xi, 6.)

6.

State the respective 'Contraries' and 'Contradictories' of Propositions 1 and 2 above, also of the following.

1. Christianity is of divine origin.

2. It is impossible to overstate the evils of versatility.

3. Where weariness begins, devotion ends.

* It has been justly observed by some one that this proposition, to be worthy of a place in an ethical treatise should be converted, sc. "Whatever is right is expedient." It would thus become an affirmation of our faith in the wisdom and rectitude of God's moral administration; the sentiment which it expresses, with its present subject and predicate, is alike pernicious and beggarly.

7.

Convert by negation the first two of the following propositions, by limitation the second two.

1. Whatever has had a beginning has had a cause.
2. Every human mind is fallible.
3. All squares are parallelograms.
4. Products, which arise from the multiplication of negative quanties by negative, are themselves positive.

CHAPTER XVII.

ON ARGUMENTS.

An argument is an expression in which from something assumed or taken for granted, something else is deduced or inferred. Thus the following are formulæ of argument leading respectively to affirmative and negative conclusions.

1.	2.
Every X is Y :*	No Y is Z:
Therefore every X is Z.	Therefore no X is Z.

* It will be desirable that the student should accustom himself henceforward to the use of Symbols as representations of the terms in argument; should there be any who would be perplexed by the employment of them in this stage of the exercises they may consider in

Formula 1.	Formula 2.
X=Human mind.	X=A covetous person.
Y=Immaterial.	Y=A person in habitual fear.
Z=Immortal.	Z=Happy.

In these formulæ of argument it will be perceived that *one of the terms of the lower proposition (or conclusion) viz., either the subject or the predicate, is in the upper proposition compared with another term to which it also stands in the relation either of subject or predicate. The new term thus introduced is, of course, one the relation of which to each of the other terms is supposed to be better known than their relation to each other; from its serving as a medium of comparison, it is called by logicians the *middle term.* The other two terms, which form sc. the subject and predicate of the conclusion, have received the technical designations of the *minor* and *major* terms respectively; e. g. in the conclusions above, X is the *minor,* and Z the *major* term.

[Note, it is the proper order in an argument that the conclusion should be the final proposition, as above; but this order is not essential to the argument, for the proposition to be proved may be stated first, and the proposition proving it follow, as its *reason,* being introduced by some causal particle, such as †'because,' 'for.' Thus the affirmative formula of argument above might have been expressed—

Every X is Z:

* In point of fact both are, there being still another proposition implicitly assumed, as we shall see in the following chapter. Arguments which are stated in the form above i. e. without the third proposition, are styled Enthymemes.

† The modes of transition from one of the propositions to the other

For every X is Y.]

Exercise.

Point out the middle and major terms in each of the following arguments.

1.

An infant has no moral power:
Therefore it has no reponsibility.

2.

Sheep are ruminant animals:
Therefore they are not predacious.

3.

Religion is of a highly solemn character:
Therefore it is not suited to poetry.—*Johnson.*

4.

Kings have no friends:
For they have no equals.

5.

Yonder star twinkles:
Therefore it is fixed.

are indeed almost endless. The simple succession of one to the other will sometimes have an illative force. Thus the observation or rather observations of the Jews to our Lord, (John viii, 13,) are plainly equivalent to an argument,

"Thou bearest witness of thyself:
[Therefore] thy witness is not true."

The student in logic will often be reminded of the fine remark of Bacon. "Subtilitas naturæ subtilitatem humani ingenii longe exsuperat."

6.

¶ With many of them God was not well pleased:
For they were overthrown in the wilderness.
(1 Cor. x, 5.)

CHAPTER XVIII.

ON SYLLOGISMS.

In each of the arguments brought forward, whether as explanatory examples or as exercises in the preceding chapter, a little reflection will shew that another proposition besides the two exhibited was really implied. Thus the argument (No. 1) that 'an infant has no responsibility because it has no moral power' could not be sustained unless we were at liberty to assume that 'whoever is without moral power is without responsibility.' Similarly, in the symbolical formula of argument, it would not follow that every X was Z because every X was Y unless we could take it for granted that 'every Y was Z.' When this implied assertion is formally introduced, the argument will be found to consist of three propositions, and is styled a 'Syllogism.' As may be inferred from the examples already commented on, one, at least, of the propositions which compose a Syllogism will be of a general nature (an

exposition of the principle or law of the case;) it is commonly this proposition which is suppressed when the argument is enthymematic. According as the general statement referred to is made in an absolute or hypothetical manner the syllogism will be a 'Categorical' or 'Hypothetical' one; thus of the subjoined syllogisms, leading to the same conclusion, the former is of the *categorical*, the latter of the *hypothetical kind.*

1.	2.
Every Y is Z:	If X is Y, it is also Z:
Every X is Y:	X is Y:
Therefore every X is Z.	Therefore it is Z.

The difference between the two forms of statement in the above syllogisms is sufficiently obvious of itself. In the former it is *explicitly* asserted that Z is universally predicable of Y; in the latter, *implicitly* i. e. it is assumed. It is in the option of a reasoner to put any argument which he may have occasion to use in either of these forms.

Exercise.

Draw out the arguments given in the preceding Exercise as regular Syllogisms.

1.

As Categorical Syllogisms.

2.

As Hypothetical Syllogisms.

CHAPTER XIX.

ON CATEGORICAL SYLLOGISMS.

1.	2.
Every Y is Z:	No Y is Z:
Every X is Y:	Every X is Y:
Therefore every X is Z.	Therefore no X is Z.

Taking the above formulæ as specimens of regular categorical syllogisms, each consisting, as explained in the preceding chapter, of three propositions, we have next to notice the relations of these propositions to each other. It has already been remarked (see chap. xvii) that the final proposition in every argument is termed the *conclusion.* Relatively to it, the two preceding propositions in a regular syllogism are designated, similarly, *the premises.* They are distinguished among themselves as the *major* and the *minor premiss.* The *major premiss* is that in which *the middle term is compared with the major term;* that in which *the minor and middle are compared* is the *minor premiss.* These denomination are given them irrespectively of the order in which they may be ranged. Thus, in syllogism .1. above, the premiss, 'Every Y is Z' would not be the less the *major premiss,* though the order of the propositions should be as follows,

Every X is Y:
Every Y is Z:
Therefore every X is Z.

because it is the premiss in which the major term Z, is compared with the middle Y. It is important that the logical student should ground himself well in these technicalities.

Exercise.

In the following Categorical Syllogisms point out the *major* and *minor* premises.

1.

No predacious animals are ruminant:
The lion is a predacious animal:
Therefore the lion is not ruminant.

2.

Some who are learned are much addicted to prejudice:
None who are much addicted to prejudice are of powerful mind:
Therefore some who are learned are not of powerful mind.

3.

Things which cannot be enumerated do not exist:
Innate ideas cannot be enumerated:
Innate ideas do not exist.—*Locke.*

4.

¶ Those who are not subject to the law of God cannot please him:
Those who are in the flesh are not subject to the law of God:
Those therefore who are in the flesh cannot please God. (Romans, viii, 8.)

CHAPTER XX.

ON THE CANONS OF SYLLOGISMS.

STILL considering the two symbolical syllogisms which head the preceding chapter, as specimens of regular categorical syllogisms, the former, i. e. of an affirmative one, the latter of a negative, we may explain the respective validity of each by the following canons.

1.

Two terms, which agree with one and the same third term, agree with one another.

2.

Two terms of which one agrees and the other disagrees with a third term, disagree with each other.

The practical violations of these canons into which reasoners most commonly fall may be learnt from the following (explained) examples of faulty syllogisms:

1.	2.	3.
Every X is Y:	No X is Y:	Every Y is Z:
Every Z is Y:	No Z is Y:	No X is Y:
Every X* ∴ is Z.	No X ∴ is Z.	No X ∴ is Z.

4.	5.
Every Y is Z:	Light† is contrary to darkness:
Every Y is X:	Feathers are light:
Every X ∴ is Z.	Feathers are contrary to darkness.

Of the preceding logical formulæ, none are really syllogistic, because,

1. The middle term is here undistributed; it is therefore possible that the major may have been compared with one part of this term, and the minor with another part; the two, consequently, not with the same middle.

2. Here, both premises being negative, the middle term is not said to agree with either of the other terms.

3. Here it will be perceived that the major term is distributed in the conclusion, when it had not been

* This symbol, which is the known geometrical one for 'therefore' will be most conveniently employed henceforward in symbolical syllogisms: in others, the sign of inference will be occasionally omitted.

† The reason of our recurring to verbal terms in this example will be sufficiently evident from the nature of it.

previously in the major premiss. [This is called *an illicit process of the major.*] The negation therefore in the conclusion is more absolute than is warranted.

4. A fault the counterpart, so to speak, of the last is here committed i. e. the minor term in the conclusion is taken distributively, without warrant from the premises. [This is called an *illicit process of the minor.*] The only just inference would have been 'Some X is Z.'

5. Here the middle term is *ambiguous;* and therefore, as in No. 1, the other two terms cannot be said to be compared with *one and the same third term.**

Exercise.

Explain on which of the above grounds the following (apparent) Syllogisms are faulty.

1.

A.. Every rational agent is accountable:
E.. Brutes are not rational agents:
E.. Brutes are not accountable.

* It is an obvious corollary from the above observations that *no conclusion can be logically drawn from two particular premises*, such premises either involving an undistributed middle or leading inevitably to an illicit process.

It is further evident, on the same grounds, that if one of the premises be *particular*, the conclusion must be *particular;* and if *negative, negative.*

2.

A. The innocent should be protected from punishment:
A. This person should be protected from punishment:
A. This person therefore is innocent.

3.

E. A fish is not a quadruped:
E. A bird is not a quadruped:
E. A fish is not a bird.

4.

E. No evil should be allowed that good may come of it:
A. All punishment is an evil:
E. No punishment should be allowed that good may come of it.

5.

A. All wise legislators suit their laws to the genius of their nation:
A. Solon did this:
A. Solon was therefore a wise legislator.

6.

A. All who fight bravely deserve reward:
I. Some soldiers fight bravely:
(A). Soldiers therefore deserve reward.

[State what conclusion is deducible from the premises in this last syllogism.]

CHAPTER XXI.

ON THE MOODS OF SYLLOGISMS.

RECURRING to the notation of propositions explained in chapter x, we shall perceive that the (apparent) syllogisms given as an exercise in the preceding chapter may be represented by the following ternary forms; AEE, AAA, EEE, EAE, AAA, AIA, where the *order* of the letters indicates the order in which the respective propositions of the syllogisms follow each other. Such varieties in the succession of propositions in an argument are termed its *Moods*. As far as the mere arithmetical law of variation is concerned, the number of such moods which can be obtained is* 64: but of these the majority are inadmissible from their violating some one or other of the rules (already explained) to which syllogisms are subject: and of the rest several are practically useless from their being superfluous, i. e., virtually included in others. Thus of the eleven legitimate moods, viz., AAA, *AAI*, AEE, *AEO*, AII, AOO, EAE,

* "For there are four kinds of propositions, any one of which may be the major premiss; of these four majors each may have four different minors, and of these sixteen pairs of premises, each may have four different conclusions: $4 \times 4 (= 16) \times 4 = 64$."

EAO, EIO, IAI, OAO, those which appear in italics are really supernumerary, being contained in the moods which respectively precede them.

Exercise 1.

Name the moods of the Syllogisms, both symbolical and verbal, given in the preceding chapter.

Exercise 2.

Explain on what grounds the following Moods are inadmissible.

IAA	EEA	OEO	EII
IAE	EEE	AIA	IIA
OAA	IEA	AIO	III
OAE	IEE	EIA	AOA
AEA	OEA	EIE	AOE

CHAPTER XXII.

ON FIGURES.

If we revert to the arguments given as examples in the Exercises on chapters xix and xx, we shall

perceive that the middle term does not stand in the same position to the other two terms in each of these arguments. For instance, in chapter xix, the middle term, in the first of the examples given, is the subject of the first premiss, and the predicate of the second; in the second, it is the subject of both premises. This variation in the disposition of the middle term in a syllogism, is called its Figure. There are usually reckoned in Logic, * three Figures. In the first, as in the first example noticed above, the middle term is

* The mere possibilities of position would give us still another Figure; viz., one in which the middle term should be the predicate of the major premiss, and the subject of the minor: but this figure is not recognised by Aristotle, nor are its intrinsic merits such as to recommend its addition to the preceding three. Logicians who use it, allow that it is awkward and unnatural: in the following specimen of it by Whateley, it will be seen that the awkwardness consists in the statement of the *converse* of a proposition instead of the proposition itself.

What is expedient is conformable to nature:
What is conformable to nature is not hurtful to society:
What is hurtful to society is not expedient:

Here, it is evident, if we convert the conclusion, nothing will be wanting but an alteration of the order of the premises to make the syllogism one of the first Figure, in which form its superior concinnity and force must be readily apparent.

Lambert, a German author, attempts to show (Neues Organon) that the fourth figure is specially appropriate to the proof of a reciprocal conclusion; but he produces no example of reciprocity which would not be better elicited by the ordinary laws of conversion. According to this Figure, e. g., he says, it appears that 'if no M is B,' then 'no B is this or that M;' butt his latter proposition is plainly only a subaltern of the larger conclusion, which simple conversion would lead to., viz., that no 'B is M.' The employment therefore of a second proposition in the proof is altogether superfluous.

the subject of the major premiss, and predicate of the minor; in the second, it is the predicate of both premises; in the third, the subject of both. The following formulæ may serve as specimens of a negative syllogism in each Figure.

Fig. 1.	Fig. 2.	Fig. 3.
No Y is Z:	No Z is Y:	No Y is Z:
Every X is Y:	Every X is Y:	Every Y is X:
No X is Z.	No X is Z.	Some X is not Z.

Exercise.

State in what Figure the following Syllogisms respectively are.

1.

Every candid person will refrain from condemning a book which he has not read:

Some reviewers do not refrain from this:

Some reviewers are therefore not candid.

2.

No one who lives on terms of confidence with another is justified in killing him:

Brutus lived on terms of confidence with Cæsar:

Brutus was then not justified in killing Cæsar.

3.

The appointments of nature are invariable:

The principles of justice are variable:

The principles of justice are no appointments of nature.

4.

Every true patriot is a friend to religion:
Some great statesmen are not friends to religion:
Some great statesmen are not true patriots.

5.

A just governor will make a difference between the good and the evil:
God is a just governor:
God will therefore make a difference between the good and the evil.

CHAPTER XXIII.

ON FIGURES (CONTINUED.)

A VERY brief examination will suffice to show that all the Moods spoken of in chapter xxi, as legitimate in themselves, are not admissible in each figure. For instance, IAI is an allowable mood in the third Figure; but in the first, it would have an *undistributed middle.* So AEE would in the first figure have an *illicit process of the Major,* but is allowable in the second; and AAA, which in the first figure is allowable, would, in the third, have an *illicit process of*

the Minor, as may be easily seen. The following are the Moods which alone are admissible in the respective Figures.

1. AAA, EAE, AII, EIO:
2. EAE, AEE, EIO, AOO:
3. AAI, EAO, IAI, AII, OAO & EIO.*

These results have been embodied in the subjoined mnemonical lines, which it will be requisite to commit to memory. It need scarcely be observed that the vowels in the mnemonical words denote the moods; the selection of consonants has been made with a view to other uses, some of which may be hereafter noticed.

1. Barbarā, Celarent, Darii, Ferioque ('prioris:')
2. Cesarē, Camestres, Festino, Baroko, ('secundæ:')
3. ('Tertia') Darapti ('sibi vindicat atque') Felapton:
   ('Adjungens') Disamis, Datisi, Bocardo, Ferison.

* Similarly, the Moods of the fourth Figure are:—AAI, AEE, IAI, EAO, EIO;—the technical words embodying them.

4. . . . Bramantip, Camenes, Dimaris, Fesapo, Fresison.

According to Lambert, the respective uses of these moods are as follows: of Bramantip and Dimaris to find *species* to a *genus*; of Fesapo and Fresison to show that the *species* does not exhaust the *genus*; and of Camenes to deny the *species* of that which is denied of the *genus*. We forbear any comment on this distinction. The notice of it would be, perhaps, more suitably inserted in the following chapter; but we were willing to prevent the necessity of a recurrence to the Figure.

(See Lambert Neu. Org., Vol. I, p. 139.)

It will sufficiently illustrate the use of these lines to remark that the first of the syllogisms in the preceding exercise is said to be in Baroco.

Exercise.

Distinguish by their appropriate mnemonical word the Mood and Figure of the other syllogisms in the above exercise, and also of the syllogisms which follow.

1.

The connection of soul and body can neither be comprehended nor explained:
This connection must be believed:
Something then must be believed which can neither be comprehended nor explained.

2.

Matter cannot think:
Mind does think:
Mind then is not matter.

3.

Ivory is hard:
Ivory is elastic:
Therefore some hard substances are elastic:

¶ 4.

Ordinary priests are made without an oath:
Jesus was not made priest without an oath:
Jesus is no ordinary priest. (Hebrews vii, 12.)

CHAPTER XXIV.

ON FIGURES. *(Continued.)*

By a reinspection of the mnemonical lines which exhibit the Moods admissible in each of the three Figures it will be evident *that universal affirmative conclusions can be proved only in the first Figure. The second Figure can be used only for negative conclusions,* but both universals and particulars of this sort can be proved by it. The first Figure will also prove any kind of negative; in judging which of the two Figures is the more eligible, in any given instance, for such proof, it will be well to consider whether the middle term to be employed is more naturally regarded as a *genus* or as a *property.* Particular conclusions only can be proved in the *third Figure,* and on this account it is best appropriated to *contingent matter;*—to reasonings, i. e. by which it is sought to foreclose a universal statement. The following enthymeme, e. g., will be best exhibited in a Third Figure syllogism.*

* It is not pretended that these observations will enable a reasoner to determine infallibly in each case the most proper Figure for an argument; but, like the rules in Greek respecting accents, they will be found useful as far as they go.

Universal belief of a doctrine does not prove its truth, the sun having formerly been universally believed to move round the earth.

This naturally falls into Felapton; e. g.

* The sun does not move round the earth:
The sun was once universally believed so to move:
What then is universally regarded as a fact may yet not be so.

Exercise.

Decide in what Figure the following Enthymemes will be most appropriately drawn out as Syllogisms, and draw them out.

1.

The Epicureans cannot be regarded as true philosophers; for they did not reckon virtue a good in itself.

2.

As we may see in the case of Porson, great scholars are not always virtuous men.

* In this and similar syllogisms, unless the two premises can be regarded as *universal* propositions, the middle term will appear undistributed. It was, in all probability, a perception of this difficulty which led logical writers to refer *singulars* to the class of universals. But we must in such cases *ascend from the rule to the principle.* The necessity for the distribution of the middle arises from the necessity of *preserving the identity of the standard of comparison* for the other terms. If then this identity can be secured by other means, the question of distribution may be disregarded. Now it is of the very nature of singular terms that their reference cannot vary, and consequently the evil which would follow the non-distribution of the middle cannot arise in their use, i e., as Whateley explains, the comparison of one extreme with one class of objects, and the other with another.

3.

A B and C D are each of them equal to E F: they are therefore equal to one another.

4.

Dreams which appear to comprise the events of hours may yet occupy no more than a minute; for persons who have been asleep only a minute have been known to have such dreams.*—*Brougham.*

(¶)

5.

Predictions form no warrant for conduct; for the death of Christ was predicted as necessary while yet it is imputed as criminal.

6.

"How can ye believe who receive honour one of another?"—John v, 44.

* The accomplished author (in his "Natural Theology") attempts to deduce from the above fact, an inference as to the *actual* length of dreams; but the contingent conclusion drawn is evidently all which the premises will justify.

CHAPTER XXV.

ON COMPOUND SYLLOGISMS.

1.	2.
As well C as D is B:*	Neither C nor D is B:
A is either C or D:	A is either C or D:
A ∴ is B.	A ∴ is not B.

3.

Either C or D is B:
A is as well C as D:
A ∴ is B.

In the above formulæ are exhibited specimens of *compound syllogisms.* The forms given are among the most simple of the sort, the conclusion containing a single subject and predicate only, and the composition being therefore confined to the middle term. Three kinds of such composition may be remarked, the middle term being of the form

As well C as D, *or*
Either C or D, *or*
Neither C nor D,

* Or "Both C and D are B." We have, for convenience sake, in these examples made the composite terms *bimembral* only; but it will be understood that they *may be plurimembral* to any extent.

corresponding to the *universal affirmative*, *particular affirmative*, and *universal negative* of simple syllogisms respectively. It is to be observed that not every combination of two such propositions as the above will constitute a compound syllogism. Two compound *conjunctive* propositions, e. g., will not do so. The symbolical syllogism, for example,

As well C as D is B:
A is as well C as D:
Therefore A is B:

will differ in no respect from a conjunction of two simple syllogisms. It is evident that in either premiss either of the symbols C or D may be omitted without in the least damaging the conclusion. There is therefore a cumbrous superfluity of proof. Again, in the syllogism,

B is as well C as D:
A is neither C nor D:
A ∴ is not B.

the same objection is applicable. The addition of the symbol D contributes nothing to the force of the argument. In every valid compound syllogism then there must be, it will be found, one disjunctive premiss. The principal valid combinations of compound propositions which can be united in a syllogism on this condition are six. They have received the technical names

Caspida, Serpide, Dispaca, Diprepe, Perdipe, Diprese,

in which the significance of the vowels is the same as in the mnemonical lines of chapter xxiii substantially, the consonants C, R, and D, correspond in force with the respective first three vowels, and the letters S and P stand for subject and predicate. The symbolical syllogisms which head the chapter are examples of the former three, viz., Caspida, Serpide, and Dispaca respectively; we subjoin similar examples in order of the others.

1.

B is either C or D:
A is neither C nor D:
A ∴ is not B.

2.

B is neither C nor D:
A is either C or D:
A ∴ is not B.

3.

B is either C or D:
Neither C nor D is A:
A ∴ is not B.

A single verbal exemplification of these moods may suffice. Take then the following in Perdipe:

A problem is neither affirmative nor negative:
Every proposition is either affirmative or negative:
A problem is not a proposition.

Exercise.

Give the technical designation of each of the following compound Syllogisms.

1.

Mercury, Venus, the Earth, Mars, &c., move in elliptical orbits:*

All planets are either Mercury, Venus, the Earth, Mars, &c.:

All planets therefore move in elliptical orbits.

2.

We ought to fret neither about evils which we *can* help, nor about those which we *cannot:*

There are no evils which we either can or cannot help:

There are no evils which we ought to fret about.

3.

† Alike the heart, the blood, the brain, breath, fire, will (though in different ways) perish:

The human soul is (according to vulgar philosophy) either heart, blood, brain, breath, &c.:

* i.e., as Whateley well explains the diction, "All planets *are adequately represented* by Mercury, Venus, &c. The example is a specimen of the ancient mode of stating an argument from *Induction;* the more eligible mode recommended by Whateley we shall have occasion to notice in a subsequent chapter.

† See Tuscul. Disput. I, §. 10. In the following section the different ways of possible destruction are enumerated:

'Si cor aut sanguis aut cerebrum est animus; certe quoniam est corpus, interibit cum reliquo corpore; si anima est, fortasse dissipabitur; si ignis, extinguetur; [si est Aristoxeni harmonia, dissolvetur.]

The human soul (according to vulgar philosophy) will perish.

¶

4.

There is neither divine nor human law against goodness, faith, &c.:

Every law is either human or divine:

There is no law against goodness, faith, &c.—See Galatians v, 22.

5.

Temptations to lie proceed ordinarily either from shame or fear :

The Almighty is liable neither to shame nor to fear:

It is impossible for the Almighty to lie.

CHAPTER XXVI.

ON SORITES.

It will sometimes occur that the premises which establish a conclusion are not self-evident propositions, but themselves conclusions deduced from preceding premises, which are again perhaps dependent on premises still preceding. A series of arguments of this description may be conveniently thrown into the form of a Sorites. The following is a specimen of what

we intend. We take two consecutive (symbolical) syllogisms to prove, say, that A is D: e.g.

1.	2.
B is C:	C is D:
A is B:	A is C:
A is C.	A is D.

Now we may represent this twofold argument in an abbreviated form thus:

* A is B:
B is C:
C is D:
A ∴ is D.

The conclusiveness of the process is as little liable to dispute in the latter case as in the former, and it may evidently be extended to any number of arguments whatever.† If we now examine the nature of

* For the above symbols the student may, if he pleases, substitute as follows:

The Epicurean deities are without action:
Without action there is no virtue:
Without virtue there is no happiness:
The Epicurean deities are without happiness.

† Care must be taken however, not needlessly to lengthen the chain by introducing propositions which are not really links in progression. This is a fault into which Cicero (with whom the Sorites seems to have been a favourite mode of argument) not unfrequently falls: witness, e.g., the following specimens from the Tusculan Disputations:

the abbreviation, it will be seen that only one minor premiss, viz. the first, is expressed, with which the Sorites commences;* that no conclusion also is stated till the final one. The intermediate propositions are therefore all major premises. As the scheme is in the first figure, it will also follow necessarily that only one of the premises viz. the first, can be particular, and only one, viz. the last, negative; [a negative

1.

Necesse est, qui fortis sit, eundem esse magni animi:
Qui magni animi sit, invictum:
Qui invictus sit, eum res humanas despicere:
Despicere autem nemo potest eas res, propter quas ægritudine affici potest:
Efficitur ∴ fortem virum ægritudine numquam affici. Tus. Dis. iii. § 7.

2.

Quicquid est, quod bonum sit, id expetendum est:
Quod autem expetendum, id certe approbandum:
Quod vero approbaris, id gratum, acceptumque habendum:
Ergo etiam dignitas ei tribuenda est:
Quod si ita est, laudabile sit necesse est:
Bonum ∴ omne laudabile: Tus: Dis. § 15.

In the above two formulæ of argument (to omit other objections) not either, it is plain, of the first couple of middle terms conduces any thing to the progression. There is as little difficulty in admitting that *whatever is good is acceptable* as in admitting that it should be *pursued* or *approved.*

* The other Minor premises are assumed from the preceding conclusions.

intermediate premiss would involve the consequence of a negative minor, which the first figure will not admit,] each of the intermediate propositions must therefore be universal affirmatives.*

Exercise.

I. Draw out the two following Sorites into consecutive regular Syllogisms.

1.

Wilkes was a favourite with the populace:
He who is a favourite with the populace must know how to manage them:
He who knows how to manage them must well understand their character:
He who well understands their character must hold them in contempt:
Wilkes therefore must have held the populace in contempt.

* It may be thought at first that the verbal Sorites given in a former note (see preceding page) is faulty on this ground; but its validity may easily be secured by attaching the negative (see chap xii) to the predicate: e.g.

The Epicurean deities are inactive:
All who are inactive must be without virtue:
All who are without virtue must be without happiness:
The Epicurean deities must be, &c.

2.

Onesimus* was a servant of Philemon:
Philemon was a hearer of Archippus:
Archippus was a minister at Colosse:
Onesimus was therefore a resident at Colosse.

Paley's Horæ Paulinæ.

II. Digest into the form of a Sorites the two following arguments.

1.

He who inculcates benevolence, humility, gentleness, &c. is prescribing the sure preparatives for friendship:

The Author of the gospel inculcated benevolence, humility, &c.:

The Author of the gospel therefore prescribed the sure preparatives for friendship.

2.

He who prescribes the sure preparatives for friendship virtually inculcates friendship itself:

* In the present form of this Sorites, a difficulty may be found in the application of the rules above laid down; this will disappear if in each proposition the implied truth is formally brought out and stated; e.g. in the first,

Onesimus resided where Philemon did.

The argument of the apostle (Heb. vii, 10) *as far as it is meant to be an argument,* may be conveniently exhibited as a Sorites; e.g.

What Abraham did (ὡς ἔπος εἰπεῖν) Isaac did:
What Isaac did, Jacob did:
What Jacob did, Levi did:
Abraham paid tithes to Melchisedek:
Levi paid tithes to Melchisedek.

The Author of the gospel prescribed the sure preparatives for friendship:

The Author of the gospel therefore virtually inculcated friendship itself.*

III. Arrange the propositions of the following Sorites in their regular order, and explain which of them are logically faulty and why.

The Scriptures are confessedly agreeable to truth:

The Church of England is conformable to the Scriptures:

A. B. is a divine of the Church of England:

This opinion is in accordance with A. B's sentiments:

This opinion may be presumed to be true.

IV. Throw the Scriptural statement (Rom. viii, 30) into the form of a Sorites, making 'predestinated' and 'glorified' respectively the minor and major terms.

* "Let it be admitted that our Lord did not formally prescribe the cultivation of friendship and what then? He prescribed the virtues out of which it will naturally grow: he prescribed the cultivation of benevolence in all its diversified modes of operation. In his personal ministry, and in that of his apostles he enjoined humility, forbearance, gentleness, kindness, and the most tender sympathy with the distresses and infirmities of our fellow creatures, and his whole life was a perfect transcript of these virtues. But these, in the ordinary course of events, and under the usual arrangements of providence, are the best preparatives for friendship, as well as the surest guarantee for the discharge of its duties and the observation of its rights." Hall's Works, vol 1, p. 373.

CHAPTER XXVII.

RECAPITULATORY EXERCISE.

I.

Of the following Syllogisms, state which are irregular in form only, and which are really faulty; of the latter class, explain for what reason each is so; reduce * the irregular ones to regular form, and name

* *Reduction*, in its more technical signification, is applied to the conversion of a syllogism, in either of the two latter figures, into a corresponding one of the first figure. The consonants which are found in the mnemonical words, chap. xxiii, are intended to suggest rules for this conversion. Thus, the initial consonant of a mnemonical word in either of the last two figures, suggests the mood in the first figure into which the conversion should take place: e. g., Cesare and Camestres should be reduced to Celarent, Darapti to Darii, and so on. In the process of reduction, a transposition of premises will sometimes be necessary: the consonant employed to indicate this is 'm.' The consonants 's' and 'p' are meant to denote that the proposition indicated by the vowel preceding should be converted, 's' simply, 'p' by limitation. Other uses belong to the remaining ones. We will exemplify the manner of applying the rules by the reduction of the following syllogism in Camestres to one in Celarent.

A . . All true philosophers account virtue a good in itself:
E . . The advocates of pleasure do not thus account virtue: Camest
E . . The advocates of pleasure are not true philosophers.

Here the 'm' in Camestres reminds us that the premises should be transposed, and the former of the 's's,' that the second premiss should

their Mood and Figure; also those of the regular ones.

1.

Some who are learned are much addicted to prejudice:

None who are much addicted to prejudice are men of powerful minds:

Some who are learned are not men of powerful minds.

2.

An enslaved people is not happy:

The English are not enslaved:

The English are happy.

be converted. Let this be done, and we shall have at once the following new syllogism:—

E ..Those who account virtue a good in itself are not advocates of pleasure:

A ..All true philosophers account virtue a good in itself:

from which follows regularly the conclusion,

E ..No true philosophers are advocates of pleasure.

And this is plainly the regular converse of the former conclusion which the final 's' prepared us to expect. We have not thought it necessary to devote a chapter to the explanation of this reduction, because the conclusiveness of an argument is often as evident in one figure as it is in another; indeed, we have seen in chap. xxiv, that different figures are appropriate to different arguments. The reduction called for in the following exercise is simply such as has relation either to the present order of the propositions in some of the examples, or to the present form of some of the propositions.

3.

No irrational agent could produce a work which manifests design:

The universe is a work which manifests design:

No irrational agent then could have produced the universe.

4.

A sensualist wishes to enjoy perpetual gratification without satiety:

It is impossible to enjoy perpetual gratification without satiety:

It is impossible for a sensualist to realize his wishes.

5.

No trifling business will enrich those engaged in it:

A mining speculation is no trifling business:

A mining speculation will enrich those engaged in it.

6.

All diamonds consist of carbon:

All carbon is combustible:

Some combustible substances are diamonds.

7.

A desire to gain by another's loss is a violation of the tenth commandment:

Gaming implies a desire to gain by another's loss:

Gaming involves a breach of the tenth commandment.

8.

A man who deliberately devotes himself to a life of sensuality is deserving of strong reprobation:

Those who are hurried into excess by the impulse of passion do not thus devote themselves:

Those who are hurried into excess by the impulse of passion are not deserving of strong reprobation.

¶

9.

He* that is of God heareth my words:

Ye are not of God:

Ye therefore hear not my words: see John viii, 47.

10

The less is blessed by the better:†

Abraham was blessed by Melchisedek:

Abraham was less than Melchisedek.

11.

Without faith it is impossible to please God:

Enoch did please God (for he had a testimony to this effect:‡)

Enoch therefore must have possessed faith.

* Before deciding on the validity of this syllogism, the student must first suppose such a word as 'only' to be understood before the major premiss, that premiss being, in fact, a convertible proposition. The convertibility of similar propositions in other parts of scripture is express and manifest; see, e.g., 1 John, iv, 6.

He that knoweth God heareth us:
He that is not of God heareth not us.

† See example viii, chap. 4.

‡ A premiss of this nature, i.e., which carries with it its own

II.

Convert the following Enthymemes into Syllogisms of appropriate Mood and Figure.

1.

"Possunt, quia posse videntur."

2.

Shame is not a virtue; for it is more a passion than a habit.

3.

These invalids cannot be suffering from fever; for they are not thirsty.

4.

Not every species of resistance to law is to be condemned; for no one condemns the resistance of the clergy who refused to read the Book of Sports.

5.

Jesus could not be an impostor; for he warned his followers to expect persecution.

evidence, and is itself expressed as a conclusion is sometimes termed, an enthymematic sentence; the use of such sentences as premises, it is plain, detracts only from the *symmetry* of the argument.

CHAPTER XXVIII.

ON HYPOTHETICAL SYLLOGISMS.

In chapter xviii, it was stated that the dependence of one proposition on another might be exhibited in a hypothetical, as well as in a categorical manner. A specimen of a syllogism of the hypothetical kind was there given. Where the terms of a syllogism are (as they often are) entire propositions, this form is on every account the preferable one; the appearance e. g. of the two syllogisms subjoined in a categorical form would evidently be cumbrous and inelegant.

1.	2.
If A is B, C is D:	If A were B, C would be D:
A is B:	C is not D:
C ∴ is D.	A ∴ is not B.

With regard to the parts of syllogisms such as the above, we may remark that the member of the major premiss which has the hypothetical particle is termed the *antecedent;** the other member, *the consequent.*

* This term must not be considered as implying that the proposition so characterized is always stated first in order.

The syllogisms themselves are either *conjunctive* or disjunctive;* in the former, the coexistence of two (or more) facts being asserted, in the latter, the certainty of *one of two* (or more.) The following may serve as specimens of the form of *disjunctive hypotheticals*, those already given being of the *conjunctive* class.

1.	2.
If A is not B, C is D:	Either A is B, or C is D:
A is not B:	C is not D:
C then is not D.	A then is B.

It is to be observed that a syllogism does not become hypothetical by having a hypothetical premiss in it, for this hypothesis may be transferred to the conclusion, in which case it is to be regarded as part of a term, and the reasoning becomes categorical. For example, such a syllogism as the following must be referred to the class of categoricals.

Every A is B:

If C is D, it is A:

If C $\therefore$ is D, it is B.

* We have purposely substituted this term for the term '*conditional*, employed by Whateley, because disjunctives are really a species of conditionals, as Whateley himself allows. (Logic, page 114.) To oppose disjunctives to conditionals is, in fact, to be guilty *of a cross division.*

Exercise.

Explain which of the subjoined syllogisms are real hypotheticals; of these, state which are conjunctive and which disjunctive, distinguishing in each the consequent and antecedent.

1.

If virtue is voluntary, vice is voluntary:
Virtue is voluntary:
Vice is voluntary.

2.

If excommunication occasions no civil wrong, it should incur no civil penalty:
It occasions no civil wrong:
It should then incur no civil penalty.

3.

Logic deserves to be neglected, if it is useless:
It is not useless:
It does not deserve to be neglected.

4.

If the Pope is infallible, it must be from his being inspired:
He is not inspired:
He* cannot then be infallible.

* Supposing the position here contended for to be the fallibility of the Pope, we must regard the argument adduced as an indirect method

5.

The worshippers of images are idolaters:
If the Papists worship a crucifix, they worship an image:
If the Papists worship a crucifix, they are idolaters.

of proving it. It is, in fact, the '*reductio ad impossibile*' or *absurdum*,' stated in its most concise form. The 'reductio ad absurdum' is a mode of proof used, when it is proposed to show not that a given proposition is true, but (which is the same thing) that it cannot be false. It is considered properly that this is done if some absurdity or impossibility can be proved to follow from the denial of the proposition. For example, let it be objected by a Romish controversialist to admit as above that the Pope is fallible; his Protestant antagonist would then argue thus—

Whoever is infallible must be inspired:
The Pope (according to you) is infallible:
The Pope then (according to you) must be inspired.

It is presumed that the Romanist would not maintain this conclusion. Unless then he is prepared to challenge the accuracy of the reasoning which has led to it, he is of necessity driven from his original position, i. e., from the present minor premiss, and the contradictory of that premiss may be assumed as proved. We have not however given any exercises on this reduction, as the hypothetical mode of stating the argument is so obviously the more eligible one. In the following chapter it will be seen that this hypothetical is always of the *destructive* kind, to use the technical designation. Whateley, in his Logic, confines his account of the argument to the case in which the disputed point is the conclusiveness of a syllogism in the second or third figure; but this is a needlessly scholastic view of its use, and more befitting an exclusive advocate of the first figure. For some valuable observations on the respective advantages of the categorical and hypothetical forms of it, see the Rhetoric of Whateley, pp. 140—146.

6.

If penal laws against Papists were enforced, they would be aggrieved:

Penal laws against them are not enforced:

They are therefore not aggrieved.

7.

The adoration of images is forbidden to Christians, if the Mosaic law was not designed for Israelites alone:

The Mosaic law was designed for the Israelites alone:

The adoration of images is not forbidden to Christians.

CHAPTER XXIX.

ON CONJUNCTIVE HYPOTHETICALS.

CONJUNCTIVE Hypotheticals are either *constructive* or *destructive*, the former being those used when an *affirmative* conclusion has to be proved, the latter when a *negative*. We have given a specimen of each sort towards the commencement of the preceding chapter. The common rule respecting constructives is, that the truth of the consequent is inferrible from

the truth of the antecedent; in destructives, the falsity of the antecedent is inferred from that of the consequent. It is evident that the reverse inferences to these would not be valid. For example, it would not follow if A were not B, (to recur to the first of the formulæ already noticed,) that C was not D, there being many other cases supposable in which it might be so; the falsity of the consequent therefore will not follow from that of the antecedent, nor the truth of the antecedent from that of the consequent.

A number of hypothetical syllogisms* may be abridged into the form of a Sorites, as readily as of categorical ones. It is easy to discover, e.g., the simple conjunctive hypotheticals of which the following formula is made up:

If A is B, C is D; if C is D, E is F; if E is F, G is H; but A is B; therefore G is H.

The laws which obtain with regard to such hypothetical Sorites are similar to those which govern categorical. All minors, e.g., but one are suppressed; and it is only in the last stage that we can introduce a *negative* premiss. Thus it would be competent to

* Because of this possibility, Whateley would have the consideration of Sorites postponed till hypotheticals have been treated of; but this reason would equally call for the postponement of the consideration of syllogisms altogether; for we have seen chap. xviii, and Whateley himself allows, that every categorical syllogism may be stated hypothetically. The 'injudicious arrangement' therefore for which the distinguished author censures Aldrich and others, is in this instance his own.

us to make the above Sorites a destructive one, by closing: "but G is not H, therefore A is not B."

Exercise 1.

Explain to which class the conjunctives in the preceding exercise belongs, whether *constructive* or *destructive*, and in which of these the respective rules are observed or neglected.

Exercise 2.

State which of the following Scriptural hypotheticals are of the *constructive* and which of the *destructive* kind.

¶

1.

If Jehovah had known any one greater than himself, he would not have sworn by himself:

He did swear by himself:

Therefore he could not have known any one greater than himself. (Heb. vi, 13.)

2.

If Abraham had been justified by works, he would have had whereof to glory before God:

Not any one can have whereof to glory before God:

Abraham could not therefore have been justified by works. (Rom. iv, 2.)

3.

If* you were blind (morally) you would have no sin.

You are not blind (according to your own showing:)

You therefore have sin. (John ix, 41.)

4.

If the Jews had known the hidden wisdom, they would not have crucified the Lord of glory:

They did crucify him:

They could not have known the hidden wisdom. (1 Cor. ii, 6.)

Exercise 3.

Decompose the following hypothetical Sorites into their constituent syllogisms.

1.

If the Scriptures are the word of God, they should be well explained:

If they are to be well explained, they should be diligently studied:

If they are to be diligently studied, an order of men should be set apart to study them.

The Scriptures are the word of God:

An order of men should then be set apart to study them.

* This proposition like the one numbered nine in chapter xxvii, must be considered *ex* as well as *in-clusive.*

2.

If any are to be saved, they must first call on the Saviour:

If they are to call on the Saviour, they must first hear about him:

If* they are to hear about him, preachers must be sent to tell them:

If any then are to be saved, preachers must be sent, &c. (Rom. x. 13, 15.)

CHAPTER XXX.

HYPOTHETICALS REDUCED.

On an analysis of a conjunctive hypothetical syllogism, it will be found, that two of the propositions composing it, viz., the conclusion and preceding premiss, are the same as would appear in an equivalent categorical, the first proposition being simply an expression of the connection subsisting between the

* In this proposition we have, as the biblical student will readily perceive, condensed two of the original premises into one.

two others. To reduce* a hypothetical then to a categorical form, nothing more is necessary than the supplying an additional categorical premiss, and, in any given instance, it only needs to be considered which is wanting. The premiss which is most commonly retained in Hypothetical syllogisms is the Minor, but that this is not necessary will be evident from the first example in chapter xxviii, in which it is the Major that appears, the following being the form which the example would take if reduced to a categorical:

Virtue is voluntary:
† Vice is virtue:
Vice is voluntary.

In reducing a hypothetical, consider whether it is the *subject* or *predicate* of the conclusion which occurs twice as a term in the latter propositions; if the former, supply a *Major* premiss; if the latter a *Minor*.

Exercise.

Reduce examples 2 and 3 in chapter xxvii to categorical syllogisms; also examples 1, 2, and 4 in preceding chapter.

* We here confine our attention to those hypotheticals of which the first, i. e. the hypothetical premiss, has the subject of its *antecedent* and *consequent* the same; because as it is acknowledged on all hands, no practical advantage attends the categorical reduction of the others.

† This sounds a little paradoxical; but it is, of course, the *metaphysical* properties of virtue alone which are here the subject of predication.

CHAPTER XXXI.

ON DISJUNCTIVES.

A DISJUNCTIVE syllogism is one in which, of two or more predicates assignable to a certain subject, the present predicability of one may be assumed; all the other predicates then being negatived, the applicability of the remaining one is inferred. To the validity of this inference it is necessary, of course, that all the predicates really supposable* should be comprehended; otherwise, the omitted one may be the predicate which should be assigned. Such a syllogism, e. g., as the following:—

* On this ground the following disjunctive, taken from a modern logical treatise, must be pronounced vicious:

The cause of the sufferings of infants must be either,

1. Sins before their birth, *or*
2. A want of power } in their Creator, *or*
3. A want of justice }
4. Original sin:

It cannot be either 1, 2, or 3:

It must therefore be 4.

Here the two intermediate theories must be put 'out of court' at once as, under the light of Christianity, not even supposable; and that the other two cases do not exhaust the conceivable alternatives, an attentive consideration of the sufferings of many irrational creatures may evince.

This proposition is either A, E, or I:
It is not A or I:
It must then be E.

would be vicious, because in the enumeration in the Major premiss, the class of propositions O was left out. Where disjunctive syllogisms are defective, it is chiefly from this incomplete enumeration at their commencement; care must be taken then that such enumeration be made *exhaustive*, i. e. that all the supposable cases be embraced.

It will be seen by a reference to chapter xxviii, that such a disjunctive as the above may be stated in a more directly hypothetical form: e. g.

If this proposition be not A or I, it must be E:
It is not A nor I:
It must then be E.

Exercise.

Reduce to hypotheticals of a similar form the following disjunctives, and *vice versa*.

1.

This idea is derived either from sensation or reflection:
It is not derived from sensation:
It must then be derived from reflection.

2.

The earth is either eternal, or the effect of chance, or the work of an intelligent being:

It is neither eternal nor the effect of chance:

It must then be the work of an intelligent being.

3.

If this conjunctive hypothetical be not a constructive, it must be a destructive:

It is not a constructive:

It must then be a destructive.

4.

A tumult is either peace or war:

It is not peace:

It must then be war.—*Cicero*, Philipp. vii.

5.

The side A B must be either equal to, less, or greater than A C:

It is neither equal to nor less than it:

It must then be greater than it.—*Euclid*, book 1, Prop. xix.

CHAPTER XXXII.

ON DILEMMAS.

A DILEMMA properly signifies *a double antecedent.* If we have two (or more) antecedents with either the same or several consequents: then if, in the minor premiss, we disjunctively grant the antecedents, we may either absolutely or disjunctively infer the consequents; also, if we have two (or more) consequents with either the same or several antecedents, then if we disjunctively deny the consequents we may either absolutely or disjunctively deny the antecedents. The former is a case of the *constructive,* the latter of the *destructive* Dilemma; what is common to both, and characteristic of the Dilemma, is *the disjunctive minor premiss.* The following are symbolical representations of a Dilemma of each description.

1.

If A is B, C is D: and if E is F, G is H:
Either A is B, or E is F:
Therefore either C is D, or G is H.

2.

If A is B, C is D: and if E is F, G is H:
Either C is not D, or G is not H:
Therefore either A is not B, or E is not F.

It should be observed that the minor premiss, although (as in categorical syllogisms) properly placed after the major, does not always stand in that order; this is immaterial to the validity of the Dilemma.

Exercise 1.

Supply the requisite conclusion to the premises of the subjoined Dilemmas.

1.

If Œschines joined in the public rejoicings, he is inconsistent: if he did not, he is unpatriotic:
Either he did join or did not:
Therefore

2.

If the taking of Oczakoff was an adequate motive for hostilities, the war ought to be *continued;* if not, it ought not to have been *commenced:*
Either it was an adequate motive or it was not:
Therefore

3.

If this man were wise, he would not speak irreverently of the Scriptures in jest; if good, he would not do so in earnest:
He does so either in jest or in earnest:
Therefore

4.

If the blest in heaven have no desires, they will be perfectly content; they will be equally so, if their desires are fully gratified:

Either they will have no desires, or their desires will be fully gratified:

Therefore

5.

If Jepthah included rational beings in the intention of his vow, he was wantonly inhuman in the formation of it; if he did not, he was needlessly scrupulous as to its execution:

Either he must or must not have so included rational beings:

Therefore

Exercise 2.

Interpose the *premiss requisite to the completeness of the following Dilemmas:—

* The most common fault of Dilemmas, as of Disjunctives, is found in the precipitate, not to say arbitrary, assumption of this premiss. It is seldom, in actual life, that the different cases of possibility are either so few or so precisely definable as this part of Logic would persuade us. Our business is at present rather with the *sequence* than the *truth* of arguments; or we might fairly impeach the validity of some of the examples given above on this ground. A great part of the well-known classical dilemmas have no farther value than as indifferent jests. Let the following specimen suffice, in illustration:—

Si uxor ducenda formosa sit, zelotypiam inducet; si deformis, fastidium: Nulla ergo ducenda est.

The assumption which is here contained in the omitted premiss, viz., that every 'uxor' will be either *formosa* or *deformis* is obviously as little consonant to truth as it is to gallantry.

1.

A person who is able to endure pain, will be likely to utter falsehood under torture; he will be equally so, who is not able:

A person therefore under torture will be likely to utter falsehood.—*Quintilian.*

2.

For those who are bent on cultivating their minds by diligent study, the incitement of academical honours is unnecessary; for the idle and such as are indifferent to mental improvement, it is ineffectual:

The incitement of academical honours therefore is either unnecessary or ineffectual.

(¶)

3.

If we shall say that the baptism of John was from heaven, he will reproach us for not believing him; if from men, we shall be in danger from the people:

Either therefore we shall be reproached by him, or be in danger from the people.

CHAPTER XXXIII.

RECAPITULATORY EXERCISE.

STATE the nature of the following Hypotheticals, whether conjunctive or disjunctive, whether constructive or destructive, &c.; explain also which are logically faulty and why:—

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1.

If the earth had a beginning, it had a cause:
It had a beginning:
It had therefore a cause.

2.

Government is either a property or a trust:
It is not a property:
It must therefore be a trust.

3.

If the fourth commandment is obligatory, we are bound to set apart one day in seven for religious purposes:
We are bound to set apart one day in seven:
The fourth commandment is therefore obligatory.

4.

If a king of Spain has a right to alter the law of succession, Carlos has no claim; equally, if a king of Spain has not that right, Carlos has no claim:
A king of Spain either has or has not the right:
Carlos therefore has no claim.

5.

If there were no divine providence, no human governments could long subsist:
Various human governments have subsisted long:
There must then be a divine providence.—*Grotius.*

6.

If the British constitution were perfect, we should enjoy liberty:

We do enjoy liberty:

The British constitution is therefore perfect.

¶

7.

Divine favour will be bestowed hereafter with respect either to men's persons or to their conduct:

It will not be bestowed with respect to their persons: (for see Romans ii, 11.)

It will be then with respect to their conduct.

8.

Justification must be either of debt or of grace:

It cannot be of debt:

It must then be of grace: (Romans iv.)

9.

If expiatory sacrifices were appointed before the Mosaic law, they must have been expiatory, not of ceremonial, but of moral guilt:

If so, the Levitical sacrifices must have had like efficacy:

If so, these sacrifices would have been able to make the offerers 'perfect:'

They were not able to make the offerers perfect:

No expiatory sacrifices therefore were appointed before the Mosaic law.—*Davison.*

CHAPTER XXXIV.

ON PROBABLE ARGUMENTS.

THE syllogisms which we have hitherto given as examples have consisted almost entirely of one or other of the four propositions which fall under the especial cognizance of logic, viz. A, E, I, O; the majority of them of the universals A, E. But it is not always that conclusions of this absolute universality can be established. In truth which, like political and moral truth, has relation to human interests and passions, a high probability, is, for the most part, all which can belong to propositions—the sole universality* that of general rules. According to the probability of the premises, in each such case, will, of course, be the probability of the conclusion. A

¶ * It is especially this sort of universality which must be attributed to *maxims, proverbs, and observations on character.* The Psalmist accordingly, (Psalm cxvi, 11,) acknowledged himself to have spoken in haste when he censured *all* men as liars. Surprise has been sometimes expressed at the occasional failure of efforts of religious training, as if the divine declaration (Prov. xxii, 6) was thereby discredited. The true light, we need scarcely say, in which this declaration should be considered and interpreted is rather as a *maxim* than a *promise.*

syllogism of this nature may, e. g., have one only of its premises probable, or it may have both; in the latter case, the aid of arithmetic must be called in to estimate the probability of the conclusion. We subjoin an example of each kind, with the explanatory comment requisite.

1.

Most Y's are Z:
Every X is Y:
Most X's are Z.

[If we suppose the proportion of the cases in which Y is Z, as predicated in the first premiss, to be 4 out of 5, the same proportion will be the measure of the probability with which we may predicate, in the conclusion, that X is Z, i. e. out of every 5 X's, we may conclude that 4 are Z.]

2.

Most Y's are Z:
Most X's are Y:

[Suppose that $\frac{8}{9}$ is the measure of the preponderance in the first premiss, and $\frac{3}{5}$ in the second, then, compounding these fractions, we shall have $\frac{8}{9} \times \frac{3}{5} = \frac{24}{45} = \frac{8}{15}$ as the degree in which we may conclude that —

Most X's are Z:

i. e. out of every 15 X's, we may infer with safety that 8 are Z.]

Exercise.

Determine the probability of the respective conclusions deducible from the following premises, supplying those conclusions.

1.

The reports which this author heard are probably true:

[Suppose 5 out of 7 of the reports to be so.]

This which he records is probably a report which he heard:

[Suppose his accounts of reports in 2 cases out of 3 to be accurate.]

2.

A theory will, if false, be probably soon exploded, which appeals to the evidence of observation and experiment:

[Suppose the probability here stated to be $\frac{7}{10}$.]

Phrenology appeals to the evidence of observation and experiment:

3.

A person infected with the plague will probably die:

[Suppose 3 in 5 of the infected die.]

This person is probably infected with the plague:

[Suppose it an even chance.]

CHAPTER XXXV.

ON CUMULATIVE ARGUMENTS.

In probable* reasoning there will often be a variety of arguments all tending to the same point, i. e. to establish the same conclusion. In this case, although the logical force of each separate argument may be inadequate to conviction, their collective strength may amount to the fullest certainty. The estimation of the probability of each item in such a cumulation must belong, of course, to the particular science from which it is derived; the computation of their collective probability is the business of arithmetic. For example, let there be the two subjoined arguments to prove that X is Z:

* There may be a similar plurality of arguments in demonstrative reasoning, the united force of which will, of course, amount to more than certainty. Thus, in astronomy, the rotundity of the earth's figure is proved alike from the voyages of navigators around it; from the appearance invariably presented by the visible horizon, when seen from any considerable elevation; from the phenomena of vessels approaching or receding from a shore; from the shadow of the earth in eclipses, &c. We have, however, thought it the less necessary to dwell on this kind of aggregation, as it is common for reasoners, when they have an argu-

1.	2.
Most Y's are Z:	Most W's are Z:
Every X is Y:	Every X is W:
Most X's are Z.	Most X's are Z.

Here let us suppose the probability of the first conclusion to be $\frac{3}{4}$ and of the second $\frac{3}{5}$; then, by the common rule for the addition of fractions, the combined probability will be $\frac{15}{20}+\frac{12}{20}=\frac{27}{20}$ i. e. that X is Z may be considered as more than established.

In many instances it will happen that there will be items on the *debtor* side, so to speak, as well as on the *creditor*, i. e. there will be arguments tending to *disprove* a given conclusion, as well as arguments to *prove* it. When this is the case, a balance must, of course, be struck. Suppose, for example, to recur to the above specimen of cumulation, that there were considerations which went to show that X was *not* Z; an argument, e.g. which exhibited the probability of this being the case, as no more than $\frac{8}{21}$; it would then be requisite to deduct this fraction $\frac{8}{21}$ from the proportion previously obtained: thus $\frac{27}{20}-\frac{8}{21}=\frac{567}{420}-\frac{160}{420}=\frac{407}{420}$, or less than a unit, making the whole result to be now below absolute certainty.

ment confessedly convincing to bring forward, voluntarily to waive the production of others. The anecdote is well known of the parliamentary orator, who had proposed to assign several reasons for the absence of a fellow member, but was excused by the Speaker from proceeding after he had given the first, viz., that the member in question had died a week ago.

Exercise 1.

Compute the *cumulative force of the following arguments.

1.

From identity of features may be inferred identity of person:
This person's features are those of A. B:
We may conclude therefore that he is A. B.

2.

From identity of gait may be inferred identity of person:
This person's gait is that of A. B:
We may conclude therefore that he is A. B.

* The argument called 'Sorites' is *etymologically* a cumulative one, but its nature and effect are very different from those of the cumulatives noticed in the present chapter. In a Sorites, except in absolutely demonstrative reasoning, the more links or premisses there are, the less is the probability of the conclusion, and, as in a material chain the whole is not stronger than its weakest part, if there be a single proposition in the series which is less probable than the contrary, the whole argument is vitiated. It would be an amusing problem, to calculate the degree of probability belonging to some of the chains of arguments by which so-called medical discoveries are commended to the public. The following is the Morisonian (pills) Sorites:

All diseases proceed from one source:
All must be cured by one medicine:
This medicine must be a vegetable cathartic:
This cathartic is found only in Morison's pills.

[Given, for argument's sake, the probability of each proposition in this series $\frac{3}{5}$; what is the probability of the conclusion?]

3.

From identity of dress may be inferred identity of person:
This person's dress is that of A. B:
We may conclude therefore that he is A. B:

[Let the probability of the first conclusion be $\frac{4}{7}$, of the second $\frac{2}{3}$, of the third $\frac{2}{5}$.]

¶.

EXERCISE 2.

Express the series of interrogations (2 Cor. vi, 15) as so many cumulative arguments.

CHAPTER XXXVI.

ON THE 'A FORTIORI' ARGUMENT.

1.

Y is Z:
X is more than Y:
X is therefore more than Z.

2.

Y is greater than Z:
X is greater than Y:
Much more then is X greater than Z.

The above are specimens of the forms into which

arguments designed to prove that a given predicate belongs in a greater degree to one subject than another may be conveniently thrown. The technical name by which such arguments are known is *à fortiori*. It is not necessary to subject them to the tests of ordinary syllogisms, as their conclusiveness is *self-evident. Formulæ of the kind will be familiar to the mathematical student; but, except in form, the reasoning is as common to other descriptions of subjects as to mathematics; it abounds in the Scrip-

* Professor de Morgan (First Notions of Logic, pp. 24, 25, &c.) has devoted two or three pages to the discussion of eligible formulæ for exhibiting such arguments in the regular syllogistic form. The following, e. g., are representations which he would propose to give of premises like those in No. 2 above:

Every Y is Z, and there are Z's which are not Y:
Every X is Y, and there are Y's which are not X:

or

The Y's contain all the Z's and more:
The X's contain all the Y's and more:

or

All the Z's make up part (and part only) of the Y's:
All the Y's make up part (and part only) of the X's:

from which he would draw, as conclusions, in the first instance. "Every X is Z, and there are X's which are not Z," and so on. Such experiments as these appear, we confess, to our own minds very much like attempts to '*smooth the ice.*' Nothing would be gained, we apprehend, to the elucidation of Euclid's *second* axiom by an endeavour to evolve it from the 'idea' of the *first*, and we can discern as little utility in the proposed application to the present argument of the *dictum* of Aristotle. The particular case of the argument where *individuals* rather than *classes* are compared together, the Professor takes no account of.

tures. We may illustrate by the two following extracts, the first from a well-known passage in Virgil, the mode of its occurrence.

1.

Pallas exurere classem
Argivûm atque ipsas potuit submergere ponti:
Ast ego, quæ Divûm incedo regina, Jovisque
Et soror et conjux, una cum gente tot annos
Bella gero; et quisquam numen Junonis adoret:
Præterea, aut supplex aris imponat honorem!

We may represent the reasoning of this passage in an *à fortiori* form, as follows:

Minerva was able to avenge her wrongs:
I (Juno) am greater than Minerva:
Much more then ought I to be able to avenge my wrongs.

2.

"Had we assurance that after a very limited, though uncertain period, we should be called to migrate into a distant land, whence we were never to return . . . . . much of our attention would be occupied in preparing for our departure . . . How strange is it then that with the certainty we all possess of shortly entering into another world, we avert our eyes as much as possible from the prospect, &c., &c."—Hall's Works, Vol. i, pp. 346, 347.

(In this passage, the following *à fortiori* argument is also evidently contained.)

A journey from one country to another demands suitable preparation:

The journey we take at death is far greater than that from one country to another:

Much more then does this journey demand suitable preparation.

* Exercise.

¶

Draw out, with regular premises and conclusion, the following *à fortiori* arguments from *Scripture.

"Behold the fowls of the air; for they sow not, neither do they reap nor gather into barns: yet your heavenly Father feedeth them: are ye not much better than they?" (Matthew vi, 26.)

2.

We have had fathers of our flesh who corrected us, and we gave them reverence; shall we not much rather be in subjection unto the Father of spirits and live? (Hebrews xii, 9.)

3.

If thou hast run with the footmen and they have wearied thee, then how canst thou contend with horses? (Jeremiah xii, 5.)

* The general student will find an example of this argument among those given as an exercise in the following chapter.

4.

*If the righteous scarcely be saved, where shall the ungodly and the sinner appear? (1 Peter, iv, 18.)

CHAPTER XXXVII.

ON SUBJECTS OF ARGUMENTS.

It can scarcely have escaped notice that the specimens of syllogisms which we have given in preceding chapters have embraced all varieties of subject matter. The syllogism is, in fact, a form of argument applicable to all subjects, and the like may be said of the à fortiori argument just noticed. Were it not that many have distinguished between syllogistic and mathematical, &c., arguments, it might suffice to state this as a self-evident truth. To remove such misapprehensions of this kind as may remain in any minds, we propose, in this chapter, to adduce a few syllogisms on a selected diversity of subjects. The student, who is already satisfied of the universal applicability of the syllogism, will find his account in determining the Figure, &c., in which each example is.

* That this (and by consequence, the preceding) is but an *à fortiori* argument disguised, the student may easily satisfy himself by an examition of the parallel passage. (Proverbs xi, 31.)

Exercise.

Distinguish by their appropriate mnemonical name the various categorical syllogisms following.

1.

Whatever is associated with pain in the contemplation of it is a source of the sublime:
Objects of great height are associated with pain in the contemplation:
Objects of great height are a source of the sublime.

2.

The three angles of every triangle are equal to two adjacent angles:
Two adjacent angles are equal to two right angles:
The three angles of every triangle are equal to two right angles.

3.

'Except' is a preposition:
'Except' was originally an imperative verb:
Some prepositions were originally verbs.

4.

Lias lies above Red Sandstone:
Red Sandstone lies above Coal:
Lias lies above Coal.

5.

No person can serve both God and Mammon: (Matt. vi, 24.)
The covetous person serves Mammon:
He cannot therefore serve God.

6.

Trade, to be properly advantageous, should seek frequent returns and a near market:
The colonial trade does not offer either frequent returns or a near market:
The colonial trade is not properly advantageous.

7.

Revenge, Robbery, Adultery, Infanticide, &c., have been countenanced by public opinion in various countries:
All crimes are made up of Revenge, Robbery, Adultery, Infanticide, &c.:
All crimes have been countenanced by public opinion in various countries.

CHAPTER XXXVIII.

ON FALLACIES.

FALLACIES have been defined to be "*deceptive* or *apparent* arguments by which a man is himself convinced, or endeavours to convince others, of something which is not really proved." The most common division of fallacies is into **verbal* and *material* fallacies;

* Under the former of these heads are placed by Aristotle, who is the original author of the distinction, six varieties, and under the latter, seven. They are respectively as follows:—

Fallacies in the diction.	Fallacies not in the diction.
1. Æquivocationis.	1. Accidentis.
2. Amphiboliæ.	2. A dicto simpliciter ad dictum secundum quid.
3. Compositionis.	3. Ignorationis elenchi.
4. Divisionis.	4. A non causa ut causa.
5. Prosodiæ.	5. Consequentis.
6. Figuræ dictionis.	6. Petitionis principii.
	7. Secundum plures interrogationes ut unam.

We shall not think it necessary to take up each of these particulars for illustration. Some of the species enumerated are resolvable into what would now be termed *puns*, and others such as none but a professed sophist would condescend to. Bishop Sanderson, from whom we have borrowed the Latin designations of the species, speaks of the enumeration as 'non incommoda;' but in this epithet, qualified as it is, more of the *compiler*, we cannot but think, than of the *independent thinker*, appears.

—to use the language of the schools—fallacies *in dictione* and fallacies *extra dictionem.* This division, which is sufficiently intelligible and convenient, we shall adopt. Of the former class of fallacies, viz., those which are faulty in the diction we have already had occasion to speak in the chapter on the canons of syllogisms; they are chiefly *undistributed middle* and *illicit process* either of the *major* or *minor* term. (see chapter xx.) Fallacies of this sort are alike capable of detection, whether the reasoning be conducted by words or symbols. In the exhibition of *material* fallacies, on the contrary, symbols are less applicable;—consideration must be generally had of the nature of the *subject-matter;* of the truth or falsity of the propositions used as premises. The following argument, e. g. is fallacious, because the major premiss is unduly assumed—is, in fact, as a universal, false:—

Events recorded in the Chinese annals have really happened:
Such an eclipse is recorded in the Chinese annals:
Such an eclipse really happened.

The most frequent fallacy in practice is, perhaps, one which may be said to belong indifferently to each of the classes above distinguished, sc. that which is founded on the ambiguity of language in reasoning and termed 'Equivocation'—a principal term being used in one sense in one part of the argument and in quite a different sense in another. This fallacy has been sometimes characterised as *semi-logical;* it will

demand a separate consideration. In the following exercises it is to be assumed that the conclusion is unwarranted and it will be required of the student to determine to which of the two classes of fallacies the argument is referable.

Exercise 1.

Determine whether the subjoined categorical syllogisms are Verbal or Material Fallacies.

1.

None but Whites are civilized:
The ancient Germans were Whites:
The ancient Germans were civilized.

2.

Every change is agreeable:
Death is a change:
Death therefore is agreeable.

3.

Warm countries alone produce wine:
Spain is a warm country:
Spain produces wine.

4.

§ "One symptom of the plague is a fever:

§ The examples with this mark before them are taken from Chillingworth's "Religion of Protestants."

Such a man has a fever:
Therefore he has the plague."

5.

§ "He that obeys God in all things is innocent:
Titius obeys God in some things:
Therefore he is innocent."

6.

Whoever is visited with severe affliction is to be presumed wicked:
Thou (Job) art visited with severe affliction:
Thou art therefore to be presumed wicked.

Exercise 2.

Determine whether the subjoined hypothetical syllogisms are Verbal or Material Fallacies.

1.

If all testimony to miracles is to be admitted, the popish legends are to be believed:
The popish legends are not to be believed:
No testimony to miracles is then to be admitted.

2.

§ "Either the Roman Church was the true visible church, or Protestants can name and prove some other that was, or they must say that there was no visible church:

They will not say that there was no church and they can name or prove no other:

The Roman Church must therefore have been the true visible church."

3.

If I denied the being of a God, I should be impious:

I do not deny the being of a God:

I am not therefore impious.

4.

If any objection that could be urged would justify a change of established laws, no laws could reasonably be maintained:

Some laws can reasonably be maintained:

No objection therefore that can be urged will justify a change of established laws.

CHAPTER XXXIX.

ON MATERIAL FALLACIES.

THE two principal material fallacies which require notice are those which are termed by Aristotle (see

note, chap. xxxviii) 'ignoratio elenchi,' and 'petitio principii.' The former has been happily *generalised by Whately into the fallacy of *irrelevant conclusion*, and is committed, whenever the premises adduced prove not the point in dispute, but one resembling it, and likely to be mistaken for it. In illustration of this, it has been well remarked, that a reasoner,† "instead of proving 'that a prisoner has committed an atrocious fraud,' will prove 'that the fraud he is accused of is atrocious;' instead of proving 'that a man has not the right to educate his children in the way he thinks best,' will show 'that the way in which he educates them is not the best;' instead of

* *Elenchus* properly signifies the contradictory of an opponent's position, which is, of course, in disputation the thing to be proved; but the supposition of an opponent and a disputation is needlessly circuitous and savours a little too much of the times when Logic was considered as an 'art of wrangling.' It is every way preferable to examine the conclusiveness of an argument in itself. The fallacy now before us is of very frequent occurrence, being the one which is complained of whenever the remark (so often heard in conversation) is made, 'that is not the question.' It is evident, however, that this fallacy can only be exemplified by a previous stating, in each instance, what the question is; and for this reason no separate exercises on it have been given in the present chapter. One very common case of it, that, sc. in which a universal conclusion is substituted for a particular, and a contradiction faulty in quantity thus made, belongs rather to the class of *verbal* fallacies; many instances of it have been inserted, without remark, in previous exercises.

† This and the following sentence are taken, in substance, from a little work entitled 'Easy Lessons in Reasoning,' (pp. 138, 139,) which, though anonymous, is commonly attributed, not without good apparent reason, to the eminent writer already named.

proving 'that the poor ought to be relieved in this way rather than in that,' will prove 'that the poor ought to be relieved, &c. &c.'" The reasoner then proceeds to assume as premises, conclusions different from those which have really been established.

The fallacy 'petitio principii' answers very much to what is popularly called in English 'begging the question.' It is the fallacy which is committed whenever either of the premises on which a conclusion rests is unduly assumed. This undue assumption may take place in several ways. Sometimes the premiss which is employed is substantially identical with the conclusion, the terms in which it is expressed being only so varied as to conceal the sameness. Great facility is afforded to this disguise in English, by the mixed derivation of the language, and the number of interchangeable terms which it consequently affords. Thus it is assigned as a reason by a writer of some merit why *reputation* is desirable that it procures us *esteem.* Sometimes the only difference between the conclusion and premiss will be, that a truth is expressed in *popular* phraseology in the one, and in *philosophical* in the other. A fact has in this manner often been assigned as a *cause for itself, as

* Taken in this view, the present fallacy will be seen evidently to include that of 'non causa pro causa,' the intermediate one in Aristotle's list of material fallacies, as exhibited in the previous chapter. The fallacy of 'non causa' is sometimes subdivided into the two species of 'non vera pro vera' and 'non talis pro tali,' the former being equivalent to the falsity of a *major* premiss, the latter of a *minor;* but the truth and falsity of propositions being matters of opinion, it is plain that no exercises on this branch of the subject could be usefully given.

when, e.g, the magnet's drawing iron to itself has been ascribed to its *attractive* properties. Sometimes the premiss used will be absolutely unauthorised and without evidence, not to say false, as in the instance quoted in a previous chapter of the authenticity of the Chinese annals. Lastly, a premiss is sometimes made dependent for its evidence on the conclusion, and the conclusion and premiss are thus proved alternately from each other. This is technically called arguing in a circle, and the larger the circle, the more difficult is it of detection. We may exhibit this fallacy by means of symbols. A reasoner will perhaps prove that A is B, because C is D, and that C is D, because E is F, and so on,—finally proving the last premiss, say, that M is N, because A is B. The most notable instance of this procedure is that of the Romanists who first prove the Scripture to be the Word of God, by the infallible testimony of their church, and then, when evidence is called for of the infallible authority of their church, proceed to prove it by the Scripture. * This absurdity is the same, as if, of two correlative terms, we should make each in turn the other.

* The absurdity of a circle is not confined to *argument;* it may attach equally to *definition;* in short, it is committed whenever two correlates are made alternately to represent each other. It is accordingly justly remarked by Mackintosh (Ethical Philosophy, page 212) that the moralist who should first explain the criterion of right actions to be that they are approved and commanded by conscience, and afterwards define conscience to be the faculty which approves and commands right actions would be treading a vicious circle. In the following

Exercise 1.

Show which of the fallacies given in the preceding chapter belong respectively to the two classes explained in this chapter.

Exercise 2.

Explain on what grounds the enthymemes subjoined involve the fallacy 'petitionis principii.'

1.

This country is distressed; therefore it is misgoverned.

2.

Pleasure is not the chief good:
The philosophers therefore who held it to be so were mistaken.

anecdote given from Campbell, (Eccles. History, p. 384, ed. 1824,) an explanation and thing explained will be seen thus to reciprocate.

"Implicit faith has been sometimes ludicrously styled '*fides carbonaria*' from the noted story of one who, examinining an ignorant collier on his religious principles, asked him what it was that he believed. He answered 'I believe what the church believes.' The other rejoined 'What then does the church believe.' He replied readily, 'The church believes what I believe.' The other, desirous, if possible, to bring him to particulars, once more resumed his inquiry, 'Tell me then I pray you, what it is that you and the church both believe.' The only answer the collier could give was, 'Why, truly, Sir, the church and I both believe the same thing.'"

3.

Poppies have a soporific tendency; therefore they induce drowsiness.

4.

A negro is a man; he therefore who murders a negro murders a man.

5.

The soul has a contrariety to death; therefore it is immortal.

6.

I think; therefore I am.

7.

Nature abhors a vacuum; therefore water rises in a pump.

CHAPTER XL.

ON AMBIGUOUS MIDDLE.

By far the most frequent class of fallacies is that which is constituted by the unavoidable ambiguity

attending the use of terms in argument; no less than eight of the thirteen kinds enumerated by Aristotle being referrible to this class. We have already remarked that such fallacies may be regarded as of a *mixed* character, attention to the sense of the terms employed being necessary to discover the ambiguity, but, this once ascertained, the invalidity of the argument being evident from logical rules. One instance, accordingly, of such fallacy was given in the classification of vicious syllogisms, chapter xxi, (as also one in the exercise appended,) but the importance of the subject is such as to call for a more extended illustration. 'Ambiguous middle' has been divided by logical writers into various species; the names and nature of the principal of these will be best understood by a succession of examples, which we now subjoin with the necessary comments.

1.

Communications conveying a double sense are inconsistent with moral uprightness:

The Scripture contains communications (viz. predictions) conveying a double sense:

The Scripture contains communications inconsistent with moral uprightness.

2.

The heart (in the animal body) may be too large:

A metropolis is the heart of a country:

A metropolis may be too large.

Copleston, as quoted by Whately, Rhetoric, p. 435.

3.

The testimony of *this* witness is insufficient to prove the fact alleged—so is the testimony of *that* witness—and so of *the other:*

We believe the fact on the testimony of this, that, and the other witness:

We believe the fact therefore on insufficient testimony.

4.

We are forbidden to kill:

Using capital punishment is killing:

We are forbidden to use capital punishment.

OBSERVATIONS.

1. We have, in this example, an instance of the fallacy of 'Equivocation,' the principal term, '*double,*' being used equivocally. The duplicity remarked on in the major premiss intends undoubtedly two mutually *inconsistent* senses; but no other duplicity is ascribed by Christian expositor, to passages in prophetical Scripture, than that of two senses perfectly * *accordant with each other.*

* We may illustrate this accordancy by that of two concentric circles, of which, though one is necessarily larger than, and indeed embraces the other, there is yet a parallelism of relation extending throughout.

2. This example may illustrate the fallacious use of 'Analogy' and 'Metaphor.' It is a common expression that metaphors *do not run on all fours;* i. e., the resemblance which they indicate seldom obtains in more than a single point. In the above apparent-argument, the point of similitude in the two things compared is that of a '*centre of communication;* no warrant is found in this analogy for the inference, that every affection of the one will be an affection of the other.

3. We have here a specimen of what is termed by Aristotle, the fallacy of * 'Division' and 'Composition.' The insufficiency predicated in the major premiss of the testimonies noticed, can only be understood of them, *separately taken;* in the conclusion, however, it is stated as belonging to *their collective force.*

The secondary sense of a passage may thus be contained in, and (so to speak) enveloped by the primary and more obvious sense. Whether a twofold significance of this kind be allowed to Scripture predictions or not, it must be manifest that it has nothing in common with that other kind of double sense by which a speaker may *palter with* his hearers:

> May keep a word of promise to the ear,
> But break it to the hope.

* The mention of division leads us to notice a fallacy which frequently results from a non-observation of the laws of division; the fallacy, sc. of *omission.* It will be recollected that in an early chapter (see chap. v) we noticed the difference between *logical* and *physical* division, remarking that in the former only, that which was true of the *whole* was true also of the *parts.* Now, it is not uncommon in actual argument, where a term entering into a conclusion is a complex one, to apply a predication which might be made of the term *as a whole,* to

4. From this example we may take occasion to explain the nature of the fallacies which, in the Aristotelian list, bear the designation of 'Accidentis,' and of 'a dicto secundum quid ad dictum simpliciter.' The cases which these technical descriptions contemplate are, (1,) when that which is true of a thing *absolutely* is assumed to be true of it *under certain circumstances;* or, (2,) *vice versa,* when that which may be predicated of it *under certain circumstances,* is predicated of it *absolutely;* or, (3,) when that which is true, and may be predicated of it *under some circumstances,* is assumed to be true of it, *under other (perhaps quite different,) circumstances.* A little reflection will shew, in the above example, that the violence against human life, which the divine command prohibits, is *private* (not *public and judicial)* violence; yet is the inference drawn from one to the other.

It is sometimes a matter of option to what class we

an incomplete combination of its parts. As if, to recur to example 6, exercise 1 in the above chapter, any one should claim the praise of 'consummate generalship,' for an individual, on the grounds of his 'valour,' 'authority', and 'good fortune' alone. The absence, it is evident, alike of one or more ingredients necessary to the integrity of a composition, will preclude all predication respecting it. Such omission, it is only candid to believe, is in most instances undesigned, being the effect rather of a partial view of the subject, than of any mental dishonesty; it is, however, the flaw in most fallacious *trains of argument.* For a fine instance (in parvo) of the recognition and successive proof of the several parts of an argument, the theological student is referred to a discourse by the late R. Hall, (See Works, Vol 1, pp. 487—524.) on 'Substitution.'

will refer any particular fallacy; thus the one last noticed might, without impropriety, be considered as exemplifying the '*equivocation*' of the first class. The classification of ambiguities is only of use as it may assist in their detection.

Exercise.

Point out the ambiguity latent in the following (apparent) syllogisms, referring each to its proper head.

1.

Testimony is a kind of evidence very likely to be false:

The evidence on which pyramids are believed to exist in Egypt, is testimony:

The evidence on which pyramids are believed to exist, in Egypt, is very likely to be false.

2.

A monopoly of the sugar refining business, is beneficial to sugar refiners; of the corn trade, to corn growers; of the silk manufacture, to silk weavers, &c., &c.:

All these classes of men make up the community:

A system of restrictions is therefore beneficial to the community.

3.

Children owe subordination to their parents:

Colonies are the children of the original countries to which they belonged:

Colonies owe subordination to their original countries.

4.

A miracle is an impossibility:

No one can possess power to perform impossibilities:

No one can possess power to perform a miracle.

5.

No man ought to withhold his property from another:

A sword may be the property of a madman:

No one ought to withhold his sword from a madman.

¶

6.

What is possible of one miracle of Scripture is possible of others:

The miracle now in question may have been the effect of legerdemain:

All the miracles of Scripture may have been the effect of legerdemain.

7.

We are forbidden to commit murder:

Suicide is (self) murder:

We are forbidden to commit suicide.

8.

He who has received a full ransom for any one has no further claim on him:

The Almighty (through Jesus) has received a full ransom for the elect:

The Almighty has no further claim on the elect.

CHAPTER XLI.

ON KINDS OF ARGUMENT.

THE preceding chapters have been devoted chiefly to the exhibition of different *forms* of argument, irrespectively of the relation which, in any case, the *subject-matter* of the premises may bear to that of the conclusion. A brief notice of this latter topic must not be omitted. A very important distinction of arguments, considered apart from their form, is into those which simply *evince* the truth or probability of a conclusion, and those which also *explain* it. While the latter class may be said to furnish us with a reason *for the conclusion itself*, the former affords one solely for *our belief of it*. Into one or other of these classes the examples of arguments given in previous chapters may be readily distributed. Thus, to recur to the instances of enthymemes (chap xvii), when we infer the absence of *responsibility* in infants from their want of *moral power*, it is felt at once that we have

not only *proved* the fact in question, but *accounted for* it: when, on the contrary, we argue the divine displeasure against the Israelites from their overthrow in the wilderness, no information, it is evident, is given us as to the *reason* of the displeasure, but simply the *fact* ascertained. Such an argument may be conveniently designated by the term 'Sign;' the former would be spoken of as an argument from 'Cause,'* [where however by 'cause' we are not to understand solely or chiefly *physical* cause, but often what in moral reasoning is commonly denominated *principle.*] Thus understood, the one class of arguments will be, in its nature, *from cause to consequence;* the other *from consequence to cause.*† A little reflection will easily show that the one class is more applicable in *matters of opinion,* the other in *matters of fact.*

* Whateley (Rhetoric p. 48) would denominate the former class of arguments 'a priori,' but without sufficient authority, as it appears to us, either from *etymology* or *philosophical usage.* The literal meaning of the phrase 'a priori' is undoubtedly, as explained by himself farther on, (see page 53,) *from an antecedent;* it is therefore properly applicable to argument *from antecedent probability,* which, whether it has necessarily any explanatory or illustrative force, a glance at the third of the subjoined examples may show. In the ordinary use of writers, 'a priori' evidence is opposed to that of *observation* and *experiment;* and this, we think, is the correct view to take of it. For some acute remarks on its distinctive nature and value, see Wardlaw's Christian Ethics, Note N, p. 428, ed. iii.

† According to Whateley, from consequent to *condition,* it not being necessary that the antecedent proved should be strictly a *cause;* but as a condition of a phenomenon may be regarded as, so to speak, a *negative* cause of it, we have preferred retaining the more symmetrical term.

Exercise 1.

Of the following enthymematic sentences state in which the proof from 'cause,' and in which the other proof is employed.

1. Sensuality is destructive to health: therefore it is to be shunned.
2. The clothes of this person are bloody; he is therefore probably the murderer.
3. The influences of light, heat, &c. decrease as the square of the distance increases; therefore probably that of electricity does.
4. 'Lac habet; ergo parturivit.'
5. The volumes of Nature and Providence have each their inexplicable mysteries; therefore (not incredibly,) that of Revelation has.
6. It thundered just now; it must therefore have lightened.
7. 'Ἀθάνατον ὀργὴν μὴ φύλαττε, θνητὸς ὤν.'

Exercise 2.

In the following combinations* of argument to prove the same conclusion, explain which of the arguments are referable to the class 'Cause,' and which to the opposite class.

* When more than one argument of either of these sorts is used in reasoning, together with other arguments, it is important that the two classes of proofs should be ranged by themselves, and not mixed up promiscuously. In the essay of Channing, from which our

1.

Position. That a man cannot lawfully be held as property.

1. We have a plain recognition of this principle in the universal indignation excited towards a man who has made another his property.
2. A man cannot be seized and held as property because he is a rational, moral, immortal being.

Channing.

2.

Position. That a luxurious nation is likely to lose its liberties.

1. A luxurious nation cannot resist temptations to barter away its liberties.
2. A luxurious nation wants the hardihood to defend its liberties.
3. The Romans, soon after their becoming luxurious, lost their liberties.

3.

Position. It is absurd to choose a general by lot.

first example is taken, the argument from 'sign' against slavery is very illogically alike preceded and followed by one from 'cause.' ¶ This is the chief defect, it strikes the writer, in a work otherwise not undeservedly praised, "Fuller's Calvinism and Socinianism compared." While in some of the chapters both kinds of proof are employed to establish the position laid down, in others one kind only, and that from 'sign' or 'consequent' is resorted to. This virtually amounts to a confession that evidence of the other kind is not to be had, and where it is not less accessible than in other branches of the subject is peculiarly unfortunate.

1. No one chooses a pilot, or a musician, or an architect, or a physician by lot.
2. It is absurd to choose by lot an officer in whom skill is needed.

¶.

4.

Position. Affliction is morally beneficial.

1. The Scriptures frequently assert the moral benefit of affliction.
2. Affliction disposes to serious reflection, checks pride, &c.

5.

Position. Sin is offensive to the divine nature.

1. Sin is a 'transgression of the divine law.'
2. The destruction of the world by water was the expression of the divine displeasure against sin.
3. The death of Christ was occasioned by the necessity of expiating sin.

6.

Position. The baptism of John was a different institute from Christian baptism.

1. Christian baptism involved an explicit profession of faith in Jesus as the Messiah: that of John did not.
2. Various disciples (some at Ephesus particularly, see Acts xix, 1—5) who had received John's baptism were afterwards rebaptized.

CHAPTER XLII.

ON KINDS OF ARGUMENTS. *(Continued.)*

ANOTHER division of arguments important to be noticed is into *Deductive* and *Inductive;* into arguments, i. e. in which the reasoning is *from generals to particulars,* and in which *from particulars to generals.* A third sort nearly allied to the latter, viz., *from particulars to particulars* is commonly denominated 'Example.'

We may conveniently illustrate the respective peculiarities of these three arguments, by a recurrence to the third of the examples given in the preceding exercise. According as we vary in the following methods the premises and conclusion of that No. we shall have a specimen of 'Deductive' reasoning, of 'Inductive,' and of reasoning from 'Example.'

I. DEDUCTIVE.

It is absurd to choose by lot an officer in whom skill is needed:

It is therefore absurd to choose a general by lot.

II. INDUCTIVE.

It is absurd to choose by lot a musician, architect, pilot, or physician:

It is therefore absurd to choose by lot an officer in whom skill is needed.

III. Example.

It is absurd to choose a pilot by lot:
It is therefore absurd to choose a general by lot.

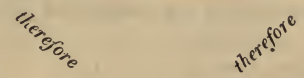
When we compare* the last of these arguments with the two preceding ones, it may seem to be a compounded† expression of their joint force, and there can be no doubt that its conclusiveness does depend on the sub-intellection of the general principle found in the other arguments. The first of Aristotle's instances is the following:

Pisistratus, when he requested a body guard, contemplated a tyranny:
Dionysius therefore, in requesting a body guard, contemplates a tyranny.

* In the relation of the two former enthymemes to each other, (as it would be obviously competent in the conclusion of the first to substitute 'musician,' or 'pilot,' for 'general,') some have discovered a fallacious circle; but we must consider the propriety and validity of the two arguments relatively to different classes of minds. The difficulty, it is clear, with some might be to apprehend or admit *the general principle;* with others, the *referribility to the principle of the particular case.* The *inductive* enthymeme would then be the argument applicable to the one state of mind; the *deductive* to the other.

† This composition is represented in an ingenious mode by Whately. (Rhetoric, page 75.) e. g.

It is absurd to choose a pilot by lot | It is absurd to choose a general by lot



It it absurd to choose by lot an officer in whom skill is required.

An argument like the above may be styled *doubly-enthymematic.*

Here every one must see at a glance that the illation would be nugatory, unless the general principle were inferrible, that *whoever* requested a body guard contemplated tyranny.

There is then a general premiss to be understood in every 'Example' argument, and there is no less one in every 'Inductive;' the two arguments agree with one another, (and with the argument from Testimony,*) in this, that the suppressed premiss may be represented in a form applicable to every particular instance. In an instance of the former argument, e. g., the general premiss to be assumed will be much of the following nature:

What† is predicable of one individual (of a class) is predicable of another:

In the latter, somewhat as follows:

What is predicable of this, that, and the other individual of a class is predicable of the whole class:

The reasoning in the first case being from one individual to another individual, in the second from several individuals to a class. Of course, the nature of the predication will be determined in each case by the scope of the argument; in most instances 'predicable,' will be equivalent to 'true;' in others, the epithets 'good,' 'fit,' 'just,' &c. will be convenient‡ synonyms for it.

* For a further account of the nature of this argument see following chapter.

† For some acute remarks on this topic, see "Eclectic Review," September 1844, page 273.

‡ The argument from 'example' will generally be most satisfactory when simple *possibility* or *credibility* is the idea predicated, i. e. when it

Exercise 1.

Decide which of the following arguments are respectively 'Deductive,' 'Inductive,' or from 'Example,' drawing out each in a syllogistic form; of those of the former class give the mnemonical name, stating the latter also in a doubly-enthymematic form.

1.

Astronomy was decried at its first introduction as adverse to religion:

Geology is therefore likely to be so decried.

2.

Philip, Alexander, Julius Cæsar, Napoleon, were all reckless of human life:

All great conquerors will be found reckless of human life.

3.

Agriculture might have been invented by man without a superhuman instructor; so might the working of metals; so might medicine; so might navigation, &c., &c.:

There is no art therefore which might not have been invented without a superhuman instructor.

4.

A diamond is carbon:

A diamond is therefore combustible.

is used for *contingent* conclusions. Except in physical inquiries, it is seldom that a single instance will suffice to establish a general principle.

5.

The Athenian, the Spartan, and the Roman constitutions degenerated:

The British constitution will therefore (probably) degenerate.

6.

No ruler is infallible:

No ruler therefore should persecute.

¶

7.

Wherefore approached ye so nigh to the city when ye did fight; knew ye not that they would shoot from the wall? Who smote Abimelech the son of Jerubbesheth; did not a woman cast a piece of a millstone upon him from the wall? 2 Samuel xi, 20, 21.

CHAPTER XLIII.

ON KINDS OF ARGUMENTS (CONCLUDED.)

"* The objections which may be brought against a conclusion are fourfold; they are derived either

* Αἱ ἐνστάσεις φέρονται τετραχῶς· ἢ γὰρ ἐξ ἑαυτοῦ, ἢ ἐκ τοῦ ὁμοίου, ἢ ἐκ τοῦ ἐναντίου, ἢ ἐκ τῶν κεκριμένων.

Αριστοτέλους Ρητορικὴ, Β. Κεφ. κζ.

from the subject itself, or from a similar subject, or from an opposite subject, or from decisions upon it."

In the above extract from the Rhetoric of Aristotle, we have a fair specimen of the looseness of classification in which that eminent writer sometimes allows himself. It is evident from the examples which he adduces, that the second and third members of his enumeration are identical, the illustration given of the second presenting only *a similarity of relation*, but *with opposition of subjects*, which is precisely and solely the kind of opposition by which he illustrates the third. Making this exception, however, we may find in the account he gives of objections another division of arguments suggested not unimportant. The technical name for the intermediate class of proofs which he notices, is plainly that of 'Analogy'; the term 'Authority' expresses the last.

'Authority,' in matters of opinion, may be considered as coincident with 'Testimony' in matters of fact. We have an instance of it in No. 5 of the examples given in chap. xli. As intimated in the preceding chapter, there is in every such argument an understood premiss to be supplied. Its general form will be

Whatever is asserted by is true

where the blank must, of course, be filled up variously according to the * author cited. 'Analogy' may be

* If the authority be *human* only, this argument will answer pretty nearly to what has been termed '*argumentum ad verecundiam.*' Similar designations of other kinds of reasoning are 'argumentum ad *homi*.

regarded as a branch of the 'a priori' argument. It is otherwise known by the designations 'Parity of reasoning,' reasoning from 'Parallel cases,' &c. We may regard the 'example' argument in the preceding chapter from the case of a 'pilot' to that of a 'general,' as Analogical reasoning.

It scarcely requires to be remarked, that arguments from 'Analogy' and 'Authority' may be sophistical as well as other arguments. The former kind of fallacy is what is intended when we object that *the case is not parallel*, the objection being to the soundness of the *minor* premiss. We may cite the alleged parallellism between 'colonies' and 'children,' as an illustration of such fallacy. The obligation of *children* to obey their parents rests, it is obvious, on the ground, mainly, of the *dependence* of the former on the latter; this dependence may or may not obtain in the case of *colonies*.

In regard to objections, we may advert further to an expression which we often hear applied to an argument, viz., that *it proves too much*. This objection will be commonly found, in distinction from the preceding, to lie against the *major* premiss. Thus, if it should be attempted, (as has frequently been done,) to account for the greatness of the gospel salvation (see Hebrews ii, 3) by alleging the greatness of its

nem or *ex concessis*,' '*argumentum ad ignorantiam*,' &c. Of the first of these, which sufficiently explains itself to be '*an argument addressed to the professed principles of an opponent*,' various instances have been inserted incidentally in preceding chapters. See, e.g., chap. xxv, example 3.

author, this consideration would clearly prove the meanest insect to be a great production, its authorship being equally divine.

Exercise 1.

Explain which of the subjoined examples are 'Analogical' arguments, and which arguments from 'Authority.'

1.

Lord Bacon contends against stocking a colony with the refuse of jails:

Such colonisation is therefore doubtless improper.

2.

For crimes committed in intoxication Pittacus imposed severer penalties:

Such crimes should therefore be punished more severely.

3.

The dependence of a husbandman on the influences of heaven does not supersede his own efforts:

The dependence of a Christian therefore on divine influences does not supersede his own efforts.

5.

The insensibility of a chrysalis is only temporary:
The insensibility therefore of a human body (at death) may be only temporary.

6.

Those who have received benefits do not always love:
Those who have received injuries do not therefore always hate.

¶

7.

David describeth the blessedness of the man to whom God imputeth righteousness without works, saying, 'Blessed is the man, &c.:' Rom. iv, 67.

Exercise 2.

Of the following fallacies, state in which *the cases are not parallel* and in which the argument *proves too much.*

1.

Human bodies as they grow old decay:
Political bodies therefore as they grow old will decay.

2.

The reading of the Scriptures is liable to abuse:
The reading of the Scriptures should therefore be discouraged.

3.

In every (first figure) Syllogism there is an assumption of the conclusion:

A (first figure) Syllogism is therefore useless for proving a conclusion.

¶

4

Stones cannot hew themselves:

Christians therefore (who are spiritual stones, see 1 Peter ii, 5.) cannot renew themselves.

APPENDIX.

LOGICAL PUZZLES.

We have purposely abstained from introducing into the exercises given in past chapters any arguments which would be seen at first inspection to be futile or fallacious. It has been the employment of logical formulæ for the (apparent) proof of manifest absurdities, which has been very much the cause of bringing the science into that disrepute in which it is at present held by many. Not a few of the examples given even by good writers in their discussion of fallacies fall under the merited censure thus conveyed. The following is a common instance, e.g. usually adduced under the head of 'Fallacies of *composition* and *division*.'

> Three and two are even and odd:
> Three and two are five:
> Five is therefore even and odd.

Our own chapters on 'Fallacies' have been the shorter, from our unwillingness to occupy space in unravelling equivocations thus gross. There can, however, be no objection, when this part of logic has been treated in a serious manner, to put together a few of the more amusing sophisms of the kind, as an exer-

cise for the student's acumen. A brief collection of such we, accordingly, here subjoin. In going through them we need scarcely say, that the student's business will be not to decide on the *fact* of their absurdity, but to analyse its *nature.*

Exercise.

Explain what are the logical rules violated by the following Sophisms.

1.

Methodists are Christians:
Quakers are Christians:
Quakers are Methodists.

2.

Hector slew Patroclus:
Achilles slew Hector:
Achilles slew Patroclus.

3.

Meat and drink are necessaries of life:
The revenues of Vitellius were spent on meat and drink:
The revenues of Vitellius were spent on the necessaries of life.

4.

He who calls you a man speaks truly:
He who calls you a fool calls you a man:
He who calls you a fool speaks truly.

5.

Opium is a poison:

Physicians advise some of their patients to take opium:

Physicians advise some of their patients to take poison.

6.

The musical instruments in the Jewish temple made a noble concert:

The harp was a musical instrument in the Jewish temple:

The harp made a noble concert.

7.

What I am you are not:

I am a man:

You are not a man.

8.

Nothing is heavier than Platina:

Feathers are heavier than nothing:

Feathers are heavier than Platina.

9.

Those who work hard deserve reward:

Those who work on the treadmill work hard:

Those who work on the treadmill deserve reward.

10.

Whatever body is in motion must move either in the place where it is, or in the place where it is not:

Neither of these is possible:
No such thing as motion is possible.

11.

He who is most hungry eats most:
He who eats least is most hungry:
He who eats least eats most.

12.

Animal food may be entirely dispensed with, (as is shown by the practice of the Brahmins,) and vegetable food may be, (as is plain from the example of the Esquimaux:)
All food consists of animal and vegetable food:
All food may be dispensed with.

13.

The child of Themistocles governed his mother:
The mother governed Themistocles:
Themistocles governed Athens:
Athens governed Greece:
Greece governed the world:
The child of Themistocles governed the world.

14.

* If the hour hand of a clock be any distance, (sup-

* Not quite consistently, we think, with his repeated statement that all arguments are but varieties of the syllogism, Archbishop Whateley denies the possibility of exhibiting the above apparent-argument in a syllogistic form. To us it appears plainly a condensed syllogism in

pose a foot) before the minute hand, this last, though moving twelve times faster, can never overtake the other; for while the minute hand is moving over those twelve inches, the hour hand will have moved over one inch: so that they will then be an inch apart; and while the minute hand is moving over that one inch, the hour hand will have moved over $\frac{1}{12}$ inch, so that it will be still ahead; and again, while the minute hand is passing over that space of $\frac{1}{12}$ inch, the hour hand will pass over $\frac{1}{144}$ inch; so that it will be still ahead: and this, it is plain, may go on for ever:

The minute hand can therefore never overtake the hour hand.

'Barbara,' the major and minor premiss of which will run in somewhat, the following manner:

"Of any two moving bodies, having different velocities, if the slower body shall be any distance in advance of the more rapid one, it will be impossible for the latter to overtake the former: for &c. &c.

The hour and minute hand of a clock are two such bodies:

Therefore, &c."

J. S. Mill (System of Logic, Vol. ii,) refers the fallacy to the class of those which are occasioned by ambiguous language, conceiving the difficulty to lie in the words 'for ever.' He accordingly dilates on the difference between 'any length of time' and 'any number of subdivisions of time' between what is 'infinite' and what is 'infinitely divisible' fortifying his solution with the authority of Hobbes. But this refinement seems to us beside the mark. In the reasoning of the example there is a plain 'petitio principii,' viz. that the unit of movement of the quicker body may become an *infinitesimal* quantity, whereas it is clearly a *fixed* one. The fallacy is therefore of the 'extra dictionem' or *material* kind.

¶.

15.

The divine law bids us obey secular magistrates:
Bishops are not secular magistrates:
The divine law does not bid us obey bishops.

16.

No man can serve God and Mammon:
The spendthrift does not serve Mammon:
He therefore serves God.

17.

All the miracles of Jesus would fill more books than the world could contain:

The things related by the evangelists are the miracles of Jesus:

The things related by the evangelists would fill more books than the world could contain.

18.

We ought to believe Scripture:
Tradition is not Scripture:
We ought not to believe tradition.

19.

If Judas was not rightly made an apostle, he deserved rejection:

He was rightly made an apostle:
He did not deserve rejection.

20.

If Abraham was justified, it must have been either by faith or by works:

He was not justified by faith (according to James,) nor by works (according to Paul:)

Abraham therefore was not justified.

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* The references of these indices, it should be stated, extend no farther than to the *notes;* it is presumed that the table of contents at the commencement will be found a sufficient guide to the main points in the text.

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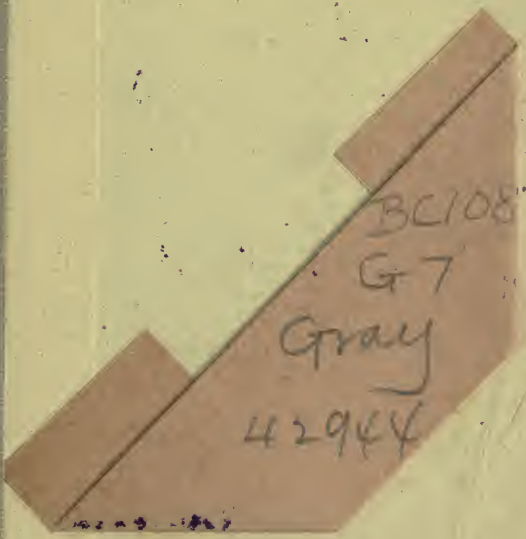
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