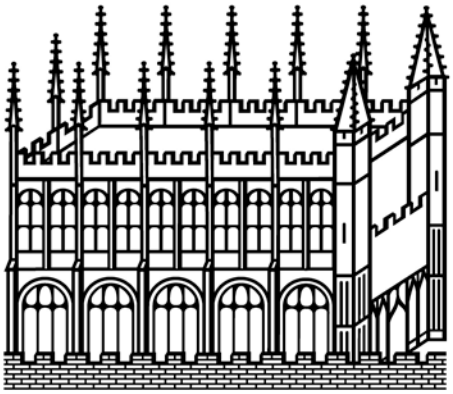

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Catechism of Logic;

WRITTEN IN

AN EASY AND FAMILIAR STYLE,

INTENDED

FOR YOUNG PEOPLE,

AND ADAPTED TO

THE USE OF SCHOOLS AND PRIVATE TEACHING.

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PREFACE.

As it is confessed by all, that reason is the noblest faculty which the Creator has bestowed on man, and the only real distinction between him and the brute: that art which teaches the right use of so incalculable a gift, must rank high in the scale of importance. Logic, however, has hitherto been so incumbered with subtleties, and the jargon of the schools, as to render it repulsive rather than alluring; and totally above the comprehension of juvenile students. The present humble attempt to simplify it, will, it is hoped, afford a clearer idea of its value, and inspire a taste for a more intimate acquaintance with that art whose professed object is the discovery of TRUTH.

CATECHISM

OF

LOGIC.

CHAPTER I.

Introductory.

Q. What is Logic?

A. Logic is the art of reasoning well, it teaches us to explain the nature of the human mind, and the proper manner of conducting its several powers, in order to the attainment of truth and knowledge.

Q. Into how many parts is it usually divided?

A. It is usually divided into four parts; viz. Perception, Judgment, Reasoning, and Method or Disposition.

Q. What is Perception?

A. Perception is the simple contemplation of things which present themselves to our minds;

thus, we think of a ship, a house, motion, rest, &c. these perceptions, when treasured up in the mind, as the materials of thinking and knowledge, are called ideas.

Q. What is Judgment?

A. Judgment is the first and simplest operation of the mind, by which it joins two or more ideas together, and by comparing them one with another, discovers whether they agree or disagree; by this faculty we perceive that two and two are equal to four; that white is not black, &c.

Q. What is Reasoning?

A. Reasoning or argumentation is that more *complex* operation of the mind, by which it draws inferences from propositions that are laid down, and thus renders that certain, which was before unknown, dark or doubtful: thus, Matter cannot think, is one proposition; The mind of man does think, is another proposition; and the inference drawn by reasoning is—Therefore the mind of man is not matter.

Q. What is Disposition or Method?

A. Disposition or Method, is that operation of the mind by which it arranges its ideas, propositions and arguments in such a manner as shall

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Complex, *a.* made up of many parts.

best conduce towards a clear understanding of them both by itself and others.

Q. What advantages arise from the study of Logic?

A. Logic not only assists our conceptions, but gives us a large and comprehensive view of the subjects that engage our attention, as well as a clear and distinct knowledge of them; it strips off the outward disguise of things, and enables us to behold and judge of them in their own nature.

CHAP. II.

Of Perception.

Q. INTO how many parts may perception be divided?

A. Into two; Simple Apprehension and Reflection.

Q. What is meant by Simple Apprehension?

A. Simple Apprehension is that impression which the mind receives from contemplating external objects, or from the agency of our senses, and when this impression is pictured in the mind, it is denominated an idea.

Q. Give an example.

A. If I feel hunger, thirst, cold or heat; if I see a horse, a tree, or a man; if I hear a human voice, or any sound, I am conscious of these things: and this is that branch of perception, called simple apprehension.

Q. Explain what is meant by an Idea.

A. That picture or notion which we form in the mind respecting any thing we have seen, heard, felt or been conscious of, is called an idea; thus we can form to ourselves the idea of a house, a tree, a river; or of hunger, thirst, &c.

Q. What other appellation is given to this branch of Perception?

A. This great source and inlet of knowledge is commonly distinguished by the name of *sensation,* as the notices thus conveyed to the mind originate with the senses of seeing, hearing, smelling, &c.

Q. What is Reflection?

A. Reflection is that act of the mind, by which, turning inwards upon itself, it takes a view of the perceptions that are lodged there; thus it is that we get ideas of thinking, believing, doubting, &c.

Q. Can a man whose senses are imperfect, form correct ideas?

A. No: a man born blind can form no ideas of

light and colours; and one born deaf is incapable of an idea of sound.

Q. Are simple ideas all that the mind can form?

A. No: though the mind cannot add one idea to its stock beyond the materials furnished to it by the senses and consciousness, yet it has a power of *combining, modifying,* and enlarging them, in all the different ways in which they can be put together.

Q. Give an example.

A. All numbers are made up from unity, by continually adding it to itself; yet what bounds can be set to its progress. In what an infinite variety of shapes and forms may the single idea of *extension* be viewed; if to these we add those numberless other combinations which result from variously compounding and comparing the rest of our simple ideas, how greatly may the exercise of the human faculties be extended; what treasures of knowledge may be laid up in the mind.

Q. Into how many kinds may these Complex Ideas be divided?

A. Complex Ideas are of two kinds: those

Combi'ning, *part.* joining together.
Mo'difying, *part.* changing.
Exten'sion, *s.* increased length, or breadth.

which are suggested to the mind from without, by different objects affecting perception; and those which are formed by the mind itself, variously combining its simple ideas in a way that seems most proper to answer the end it has in view.

Q. What are Complex Ideas suggested from without?

A. Complex Ideas suggested from without are those ideas which we form of substances: as of an angel, a man, a ship, gold, silver, &c.

Q. What are Complex Ideas formed by the mind itself?

A. Complex Ideas formed by the mind itself, are those ideas which we form of things that have no certain standard in nature, but which are invented for the purpose of adding to the conveniences of life, or of assisting in the pursuit of knowledge.

Q. Give examples of these.

A. The ideas we entertain of the measures of length, whether of duration or space, as hours, months, yards, miles, &c. or of some human actions, as treason, man-slaughter, &c. are of this kind; because they have no fixed standard in nature, but vary according to the customs and manners of different countries.

CHAP. III.

Of our Ideas of Substances.

Q. WHAT is the definition of a Substance?

A. A Substance is defined by logicians to be, something that can subsist by itself without dependence on any other created being.

Q. What farther may be observed of Substances?

A. Substances possess certain properties or qualities which serve to distinguish them from one another: these qualities are called modes.

Q. How are modes distinguished?

A. Modes are distinguished into essential and accidental; the former are such as are inseparable from the subject to which they belong; the latter are not absolutely necessary to the being of a thing, as the subject may be without it, and yet remain of the same nature that it was before.

Q. Illustrate this by an example.

A. Extension and solidity are essential modes of a stone, for a stone must have both magnitude and a degree of hardness to constitute it a stone; but its shape is an accidental mode, for that may be varied at pleasure, and yet it is still a stone.

Q. Can Substance be *annihilated*?

Anni'hilated, *v.* blotted out of existence.

A. No: by human power: changes may take place in the nature of substance, but self-subsistence still continues. Fuel, by the application of fire may be converted into smoke, ashes, &c. but smoke and ashes are still substances. An animal may die and moulder into dust, but that dust is still a substance.

Q. How many kinds of Substances are there?

A. Substances are of two kinds, material and immaterial.

Q. What are Material Substances?

A. Material Substances are such as are capable of making an impression on our external senses of sight, smelling, touch, &c. and include the idea of solid, *cohering* and extended parts.

Q. What are Immaterial Substances?

A. Immaterial Substances do not consist of solid, extended parts, nor are they capable of making any impression on our senses; such is the mind or soul of man.

Q. By what names are they severally distinguished?

A. Material Substances, or, as they are sometimes called, *corpo'real* substances, are called matter; and

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Cohe'ring, *part.* joining together.
Corpo'real, *a.* bodily.

immaterial or incorporeal substances are called spirit.

Q. Can we form any *adequate* idea of Spirit?

A. No: by our senses we are informed of the existence of material substances, possessing solidity and extension, and by reflexion we know that there are thinking, conscious ones; but we can form no better idea of the latter, than a man born blind can of colours.

CHAP. IV.

Of Ideas framed by the Mind.

Q. WHAT are we to understand by Ideas framed by the Mind?

A. By Ideas framed by the Mind, we understand, those arbitrary collections of different ideas which we on many occasions bring together, by that power which we find in ourselves of uniting, comparing, and diversifying our notices of things.

Q. How do these differ from Simple Ideas?

A. Simple Ideas impress themselves on the mind without any effort on the part of the latter,

A'dequate, *a.* just, equal.

but in entertaining complex ideas, the mind acts voluntarily and by choice: it alters and changes them at pleasure, retaining some and rejecting others, as may best suit its purpose.

Q. In what different ways does the mind thus act?

A. The mind acts in this respect in three different ways; by Composition, by Abstraction, and by Comparison.

Q. What is meant by Composition?

A. Composition is, when the mind joining many simple ideas together, forms of them but one whole; thus the idea of female beauty comprehends the simple ideas of stature, complexion, &c. by adding the simple idea of a unit, we arrive at the several combinations of numbers, as ten, twenty, a thousand, &c.

Q. What is Abstraction?

A. Abstraction is that operation of the mind, by which we separate from any of our conceptions, those circumstances which render them particular; thus when we see a figure whose circumference is in every part at an equal distance from its centre, we pronounce it to be a circle, without any reference to its magnitude; a circle therefore is a universal term common to all figures of that par-

ticular shape, and the idea it conveys to the mind is a general idea, and representative of all the kind.

Q. What is Comparison?

A. Comparison is that operation of the mind by which it compares one idea with another, and discovers their respective relations to each other; by this act it discovers that one thing is larger or smaller, stronger or weaker, older or younger, &c. than another.

Q. Are not Abstract Ideas subdivided?

A. Yes: into Genus, Species, and Individual.

Q. What is meant by Genus, Species, and Individual?

A. Genus comprehends all those individuals that possess some property in common; thus, animals are a genus of beings that possess life: species denotes that class of beings which resemble each other in every essential particular; thus, the horse is a species of animals, because one horse bears a general resemblance to another horse: an individual is one only of a species.

Q. What advantages arise from thus arranging Ideas into classes?

A. It is the readiest way to obtain knowledge, and to preserve that due order and connexion of

our thoughts, which lead to great attainments in science.

CHAP. V.

Of Words and their Use.

Q. What are Words?

A. Words are certain sounds or marks, by which the ideas that arise in our minds can be communicated to others, or preserved to any future period.

Q. Have Words any natural connexion with ideas?

A. Words, whether spoken or written, have no natural connexion with the ideas they are intended to signify, but are mere arbitrary signs invented by men to communicate their thoughts to one another: men therefore who agree to express the same ideas by the same words, are said to speak the same language.

Q. Exemplify this.

A. By the *tacit* consent of all the inhabitants of England, the idea of a particular colour is conveyed by the word *red*; but the word *red* has no natural connexion with the idea of that particular

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Tacit, *a.* silent, implied.

colour, for it would convey no such idea to the inhabitant of any other country, unacquainted with the English language.

Q. Do all Words exactly convey the idea they were meant to communicate?

A. By no means; for if they did, we should be seldom liable to mistake. From the imperfection of languages, different simple ideas are sometimes expressed by the same word, and to this cause may be attributed some of the *obscurity* and error arising from words.

Q. How are Words distinguished?

A. Into those that are not, and those that are *definable*.

Q. What Words are not definable?

A. Those Words are not definable by which we denote simple ideas; for simple ideas being generated in the mind purely by the medium of the senses or by reflection, can be acquired only by experience from the several objects of nature proper to produce these perceptions in us.

Q. How do you demonstrate this?

A. The Word *white* conveys the simple idea of a colour which is familiar to every one that can

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Obscurity, *s.* darkness.
Definable, *a.* that may be explained.

see, but the most *elaborate* attempt at a definition of the word, would convey no idea to the mind of a man born blind; let him, however, by any means, have the power of seeing imparted to him, on being shewn the colour, and told it is white, a simple idea connected with that word will be formed in his mind, and will be recalled to it every time the word is used.

Q. What Words are definable?

A. Words that serve to express complex ideas are definable; that is, they may be reduced into ideas less complex, and these again into simple ideas.

Q. Give an example.

A. The idea of a Rainbow is a complex idea, made up of the less complex idea of a semi-circle and the simple idea of colours; to him then who has never seen this meteor, but who has already the ideas of a semicircle and of colours, an explanation of the manner in which those colours are arranged, will give a perfect idea of a Rainbow.

CHAP. VI.

Of the several kinds of Definitions.

Q. WHAT is meant by Definitions?

Elaborate, *a.* formed with great labour and skill.

A. By Definition, as has already been observed, we mean an enumeration of all those simple ideas, of which a complex word or idea consists.

Q. How many kinds of Definitions are there?

A. There are two kinds of Definitions; Definitions of the Name, and Definitions of the Thing.

Q. What is meant by Definitions of the Name?

A. The Definition of the Name, signifies such an explanation of the meaning of any term, that the same complex idea may be excited in the mind of the hearer, as exists in that of the speaker.

Q. Give an example.

A. Suppose I wish to convey to another what I mean by the word square. I tell him that it is a figure bounded by four equal sides, joined together at right angles; by this definition, he forms the same idea of a square that I do myself.

Q. What rules are necessary to be observed in Definitions of the Name?

A. Many important ones might be laid down would our limits permit; the following are the principal—

1. In words usually considered as *synonimous*, observe whether there be not some nice differences of meaning, and use that which most exactly

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Synonimous, *a.* of the same meaning.

conveys the intended idea; thus, genius and ability are frequently considered as synonimous; but, as the former expresses the natural strength and talents of the mind, and the latter those that are acquired, they should, by no means be used *promiscuously* for each other.

2. Avoid as much as possible, using words that have a doubtful meaning, or such words as have two or three senses; but when such words must necessarily be used, be careful to define exactly, the idea you intend they should convey.

Q. What is meant by Definition of the Thing?

A. A Definition of the Thing explains the nature of that thing; this is done by finding its genus or general nature, and its essential or specific difference, and these added together make up the definition of the thing.

Q. How may the Genus or general nature of a thing be discovered?

A. Compare the thing to be defined with other things that are most like itself, and see wherein its essence or nature agrees with them; this agreement is its genus: for example, compare wine with other things like itself, as cyder, perry, &c. and

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Promiscuously, *ad.* indiscriminately, without choice.

you will find that it agrees essentially with them in this, that it is a sort of juice.

Q. How may its essential or specific Difference be discovered ?

A. Consider the most remarkable attribute, property, or idea, wherein this thing differs from those other things that are most like it, and that is its essential or specific difference; thus wine differs from cyder and perry, in that it is pressed from grapes; this may be called its specific nature, which distinguishes it from other juices.

Q. How may a Definition be made from these materials ?

A. Join the Genus and the Difference together, and these make up the definition of the thing; thus, the juice of the grape is the definition of wine.

Q. What rules must be observed in framing a Definition ?

A. 1. A Definition must be universal; thus, the juice of the grape agrees with all proper wines.*

2. It must be proper and peculiar to the thing defined, and agree with that alone; so the juice of the grape agrees with no substance, no liquid but wine.

3. It must be clear and plain.

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* Those liquors which go under the denomination of gooseberry wine, raspberry wine, &c. are not *proper* wines.

4. It must be short, with no *tautology* or *superfluous* words.

CHAP. VII.

Of Judgment.

Q. WHAT is the next grand operation of the mind?

A. When the mind has acquired a stock of ideas, its next operation is to compare these ideas together, and to judge of their agreement or disagreement. This act of the mind is therefore called Judgment.

Q. On what is Judgment founded?

A. Judgment is founded, either on Intuition,* Experience, or Testimony.

Q. How does the mind form a Judgment by Intuition?

A. A Judgment is said to be intuitive, when it is formed by a mere attention to the ideas compared; thus, it requires nothing more to convince us, that the whole is greater than any of its parts, than an attention to the ideas of whole and part.

Tautology, *s.* repetition of the same word.
Superfluous, *a.* more than are necessary.

* From intuor, to behold or look upon.

Q. Of what branch of knowledge is Intuition the ground-work?

A. Intuition is the foundation of that species of reasoning which Logicians call Demonstration. Hence the knowledge obtained in this manner is termed science,* because it leads to eternal, necessary, and *immutable* truths.

Q. What is meant by Judgment formed from Experience?

A. Judgment formed from Experience, is that knowledge which we derive wholly from the senses, by ascribing to bodies such qualities as are answerable to the perceptions they excite in us; thus, we say that ice is cold, sugar is sweet, &c.

Q. Why are these Judgments said to be founded on Experience?

A. They are said to be founded on Experience, because, being totally unable to trace any connexion between the structure of those bodies, and the sensations they produce, we are evidently obliged to build our judgment altogether upon observation.

Q. What farther proves this?

A. The fact, that most of the important inven-

Immutable, *a.* unchangeable.

* From Scio, to know.

tions in human life owe their origin to chance, is a decisive proof; the knowledge that the magnetic needle possesses the property of pointing to the poles of the world could never have been attained by the profoundest reasoning; we owe it to observation and experience.

Q. What may be inferred from this?

A. From this it is evident that, as Intuition is the foundation of scientifical, so is Experience of natural knowledge; for this latter being wholly taken up with objects of sense, the properties of those objects can be discovered only by observation, trial and experiment.

Q. What is Judgment founded on Testimony?

A. As it is impossible, from the limited faculties of man, that he can extend his observations to all the operations of nature, or that he can witness every thing that happens or has happened throughout the universe; in many cases his judgment must be founded on the testimony of others.

CHAP. VIII.

Of Propositions.

Q. What are Propositions?

A. A Proposition is a sentence expressing some

judgment of the mind, whereby two or more ideas are affirmed to agree or disagree.

Q. Of how many parts is a Proposition constituted?

A. Every Proposition consists of a subject, a predicate and a copula.

Q. Explain this.

A. In the Proposition—The earth is globular; *The earth* is the *subject; globular* the *predicate,* or thing affirmed of the earth; and *is* the *copula* or form of the proposition.

Q. How can this be the case in Propositions containing only one or two words?

A. Because the copula is often included in the term of the predicate, thus; *he loves*—is exactly of the same meaning with, *he is loving*.

Q. How many kinds of Propositions are there?

A. There are several kinds of Propositions; Affirmative and Negative, Universal and Particular, Absolute and Conditional, Simple and Compound, Self-evident and Demonstrable.

Q. What is an Affirmative Proposition?

A. An Affirmative Proposition is when the idea of the predicate is supposed to agree with the idea of the subject, and is joined by the word *is,* or some one of its inflections—as, Man is mortal.

Q. What is a Negative Proposition?

A. A Negative Proposition is when the predicate is supposed not to agree with the subject; and this disagreement is expressed by the particle *not* added to the copula, as, Gold is not green.

Q. What is a Universal Proposition?

A. A Universal Proposition is that wherein the subject is some general term, including every individual of a species or every species of a genus; the words all, every, no, none, &c. are the proper signs of this universality; as, All animals have the power of commencing motion. This is a universal proposition, as from the word *all* prefixed to the subject *animal* we know that birds, quadrupeds, insects and every thing that has animal life are included in it.

Q. What is a Particular Proposition?

A. A Particular Proposition has some general term for its subject which implies limitation, such are some, many, &c.—thus, *Some men* have astonishing memories.; in this proposition, the subject, *some men* implies only a certain number of individuals and not the whole species.

Q. What is an Absolute Proposition?

A. An Absolute Proposition is that in which we affirm some property inseparable from the idea of the subject—Man is frail; for frailty is a quality inseparable from humanity.

Q. What is a Conditional Proposition?

A. A Conditional Proposition is that in which the predicate is not necessarily but only conditionally connected with the subject—thus, If the weather be fine, the harvest will soon be finished.

Q. Is this an important division of Propositions?

A. There is not any thing of greater importance in philosophy than a due attention to the division of propositions into absolute and conditional; it is owing to the exact observance of this rule that mathematicians have been able so clearly to demonstrate the truth of their discoveries.

Q. What are Simple Propositions?

A. Simple Propositions are those where only two ideas are compared; they are called simple, because having only one subject and one predicate, they are the effect of a simple judgment, that admits of no division.

Q. What are Compound Propositions?

A. Compound Propositions are those in which we affirm the same thing of different objects, or different things of the same object. They are called compound, because they may be resolved into as many simple propositions as there are subjects and predicates in them.

Q. Give an example.

A. The man is just and benevolent; here then are two predicates, *justice* and *benevolence,* both affirmed of the same subject; and this proposition may be resolved into two simple ones, thus—The man is just and the man is benevolent.

Q. Are not Compound Propositions again subdivided?

A. Yes; Compound Propositions may be subdivided into Copulative and Disjunctive.

Q. What is a Copulative Proposition?

A. A Copulative Proposition is that which has more subjects or more predicates than one connected by affirmative or negative conjunctions, so that what is affirmed or denied of one, may be affirmed or denied of each.

Q. Give an example.

A. Gold and silver are more valuable than lead. In this proposition there are two subjects, and one predicate that may be affirmed of each, as—Gold is more valuable than lead, and silver is more valuable than lead. Health is preferable to riches and honours. Here we have one subject, and two predicates, each of which is affirmed of it; thus—Health is preferable to riches, and health is preferable to honours.

Q. What is a Disjunctive Proposition?

A. A Disjunctive Proposition is that in which

several predicates are compared with the same subject, though one only can be affirmed of it; this is effected by means of disjunctive particles.

Q. Give an example.

A. Riches prove either a blessing or a curse. In this proposition, the predicates, *blessing* and *curse,* cannot both belong to the subject under the same circumstances; but as the proposition leaves it uncertain, it is called a Disjunctive Proposition.

Q. What is the nature of a Disjunctive Proposition?

A. It is the nature of a Disjunctive Proposition, that when one predicate is established, the rest must be rejected; thus, in the example before given, if it be allowed that riches are a blessing, we must remove the latter predicate, as they cannot, under the same circumstances, be a curse likewise.

Q. What is a Self-evident Proposition?

A. A Self-evident Proposition is that of which the truth may be instantly perceived; it admits not of proof, because it is not possible to advance any thing of greater certainty by way of confirmation. The whole is greater than a part, is a self-evident proposition, to which the mind in-

stantly assents, without requiring any illustration or proof.

Q. What is a Demonstrable Proposition?

A. A Demonstrable Proposition is that of which the truth does not so readily appear, but requires a regular series of proofs to demonstrate the agreement of the ideas; thus—The earth revolves on its axis, is a true proposition; but as it is contrary to the evidence of our senses, it requires proofs to insure our assent.

Q. What general observations are necessary on this head?

A. 1. When the subject, the copula, and the predicate of a proposition are not distinctly expressed, they are all understood; thus, *I eat,* signifies *I am eating.*

2. The words *am, art, is,* &c. when they are used without any other predicate, include both the copula and predicate; thus, *Troja fuit,* (Troy was) that is, *Troy was in existence.*

3. The predicate does not always follow the subject in a proposition; when this is the case, it must be discovered by reflecting on the sense of the words, and the intention of the speaker or writer, thus—In my father's house there are many mansions; that is, many mansions are existent in my Father's house; *many mansions,* is

the subject, and, *existent in my father's house,* the predicate.

3. The subject and predicate of a proposition must always be two different ideas or different terms: for when both the terms and ideas are the same, it is called an Identical Proposition, and conveys no knowledge to the mind; thus, a horse is a horse, or a blind man is a blind man, is a mere waste of words from which we gain no information.

CHAP. IX.

Of false Judgment or Prejudices.

Q. Is human Judgment liable to err?

A. Yes; from a variety of causes, and these causes are by Logicians called Prejudices.

Q. How many kinds of Prejudices are there?

A. They may be comprehended under four heads; Prejudices arising from things; Prejudices arising from words; Prejudices arising from ourselves; and Prejudices arising from others.

Q. How do Prejudices arise from things?

A. 1. The obscurity of some truths, and the difficulty of searching them out, is one occasion of rash and mistaken judgment; thus, it being difficult to discover that the earth turns on its

own axis and revolves round the sun, men rashly concluded that it was immoveable.

Q. How may this kind of Prejudice be removed?

A. This kind of Prejudice may be removed by patient and diligent inquiry and reasoning, and by a suspension of judgment, till we have attained some proper mediums of knowledge, by means hereafter explained, and till we see sufficient evidence of the truth.

Q. What is the next cause of Prejudice or False Judgment?

A. The appearance of things in disguise, like the fabled fruits offered to Tantalus, which appeared lovely to the eye, but when bitten, filled the mouth with bitter ashes.

Q. How may this kind of Prejudice be removed?

A. This kind of Prejudice may be removed by resolving never to form a judgment of things from their outward appearance, but to endeavour to discover their just value from more certain *criteria*.

Q. What is a third source of Prejudice arising from things?

Crite'ria, *s.* plural of criterion; the standard by which we judge of the goodness or badness of things.

A. A mixture of different qualities in the same thing, is a third source of prejudice; thus, if we hear that a writer has advanced deistical or atheistical notions in some of his works, we are apt to reject the whole of his writings, though perhaps they contain matter of the utmost importance, by which, under other circumstances, we might have been both profited and delighted; on the other hand, when we admire a man for his virtues, we are apt to think even his weaknesses, amiable.

Q. How may this source of Prejudice be removed?

A. By carefully avoiding to form a judgment of men and things by wholesale, remembering that all *sublunary* things possess a mixture of good and bad.

Q. What is a fourth source of Prejudice arising from things?

A. The different lights in which an object may be placed, and the different views in which it may appear to us, though it be uniform in its nature; thus, an erect cone appears from a great distance as a triangle, and the same figure if laid at its

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Sub'lunary, *a.* belonging to this world.

length on the ground with only its base towards us, will appear to be a circle.

Q. What is a fifth source of Prejudice arising from things?

A. The casual association of many of our ideas; thus, having always been accustomed to associate the idea of a dead body with a coffin, we should feel a great *repugnance* against having a piece of furniture made like a coffin, although that form might be most suitable to the purpose it was designed to answer.

Q. How may this Prejudice be removed?

A. By considering whether there be any natural and necessary connection between those ideas which fancy, custom, or chance has thus joined together: if there be not, let us diligently endeavour to correct the folly of our imagination, and separate these ideas again.

Q. What are Prejudices arising from words?

A. Prejudices arising from words may be classed under two general heads; those arising from single words or phrases, and such as arise from words joined in speech and composing a discourse.

Q. How may Prejudices or False Judgments arise from single words or phrases?

Repug'nance, *s.* dislike.

A. 1. When our words are insignificant and convey no ideas; 2. When they are *equivocal*, or liable to be differently interpreted; 3. When several words that are considered synonimous are used to express the same thing.

Q. How may Prejudices arise from words joined in a speech or discourse?

A. 1. When a man writes or speaks good sense, but has not a happy and engaging manner of expression, we are too apt to form a judgment from the defects of the style, and condemn the works, merely from the meanness of its dress; many pretended critics not being able to distinguish between the language and the ideas.

2. When a man of eloquence speaks or writes upon any subject, we are too ready to adopt his sentiments, from the effect which the smoothness and sweetness of his language have upon our minds. The graces of action, the music of the voice, the beauty of the style, the harmony of the periods, and the engaging airs of the speaker, have often charmed the hearers into error, and persuaded them to approve what their cooler judgment would condemn.

Equi'vocal, *a.* of uncertain meaning.

Q. How may this kind of Prejudice be removed?

A. By acquiring the skill of separating, as much as possible, our thoughts and ideas from words and phrases, by judging of things in their natural relation to one another, and by a steady resolution to hearken to nothing but truth, in whatsoever style or dress it may appear.

CHAP. X.

Of Prejudices or false Judgment (continued.)

Q. WHAT are Prejudices arising from ourselves?

A. Prejudices arising from ourselves may be classed thus; Prejudices of Infancy, Prejudices of Sense, Prejudices of Imagination, Prejudices of the Passions, Prejudices arising from Self-love, Prejudices of Temper, &c.

Q. What are Prejudices of Infancy?

A. They are such mistaken ideas as we form while we are incapable of exercising our reason respecting them; thus, perhaps we judge that books are unpleasant things, because we have been driven to them by the scourge, &c.

Q. How may this kind of Prejudice be removed

A. By endeavouring to form a right judgment of them, when reason is sufficiently matured for that purpose.

Q. What are Prejudices of Sense?

A. Prejudices of Sense are those mistaken ideas which some men entertain from the evidence of their senses; thus, many think the earth a level plain, because they cannot perceive any curvature within the bounds of their vision.

Q. How may these Prejudices be removed?

A. The exercise of reason, experience, and an application to study, are the only means by which such prejudices can be removed.

Q. What are Prejudices of Imagination?

A. Prejudices of Imagination are such as arise from the exercise of that power which the soul possesses of joining or separating the ideas received by the senses, so as to form compound ideas, which have no resemblance out of the mind: many of these we are too apt to consider as true. A thousand pretended prophecies and *freaks* of enthusiasm have been derived from this source.

Q. How may these Prejudices be cured?

Freaks, *s.* whims, silly or mad actions.

A. By resolving never to believe any thing because fancy suggests it, but to try every thing by the dictates of severe reason.

Q. What are Prejudices of the Passions?

A. The Prejudices of the Passions are too many to be enumerated; Love dresses the beloved object in perfections which it does not possess; Hatred, on the contrary, represents the hated object worse than it really is; Sorrow and melancholy occasion us to consider our circumstances worse than they are; while cheerfulness and joy, give charms to things which in themselves possess no attractions.

Q. How may we guard against such Prejudices?

A. By a continual watchfulness, that no passion may ever interpose and influence our judgment; when our affections are warmly engaged, let us abstain from judging. It is only when the passions of nature are silent, and our mind is calm and serene, that we are in a fit frame for forming a right judgment of things.

Q. What are the Prejudices of Self-love?

A. That proneness which we feel to consider every thing that has a relation to ourselves, as peculiarly excellent, gives rise to the prejudices of self-love; thus, we are apt to consider our

native country as the best in the world, merely because we were born in it; from this source proceeds that attachment to our own opinions and practices, solely because they are ours, which is common to every man.

CHAP. XI.

Of Reasoning.

Q. WHAT is the third grand operation of the mind?

A. The third grand operation of the mind, is that by which it endeavours to discover those truths which are obscure, by means of a comparison with those that are self-evident, or universally allowed. This is called Reasoning.

Q. How may this be done?

A. By means of joining and comparing several propositions together, which is called making a Syllogism *.

Q. Give an example of Syllogism.

A. Perfect beings must be happy,
Angels are perfect beings;
Therefore, angels must be happy.

Q. Of what parts does a syllogism consist?

A. Of two propositions which are called the

* The *g* in this word is pronounced like *j*.

Premises, and of a third drawn from it, denominated the Conclusion.

Q. Have these Propositions no other denomination ?

A. Yes ; that Proposition which usually comes first in a Syllogism is called the *major proposition,* the next *the minor,* and last, *the conclusion.*

Q. How can we prove the truth of the Major Proposition, when it is not self-evident, as in the example already given ?

A. By another syllogism thus :—

Sin is the cause of unhappiness,

Perfect beings cannot commit sin ;

Therefore, perfect beings cannot be unhappy.

Q. Of what are these Propositions composed ?

A. Of three terms : the *major,* the *minor,* and the *middle term.*

Q. Explain this.

A. In the syllogism.

All unrighteousness is sin.

Swearing is unrighteousness ;

Therefore, swearing is a sin.

the question to be answered is whether swearing be a sin ?—for this purpose we are obliged to have recourse to an intermediate idea, namely, all *unrighteousness,* which is therefore called the mid-

dle term; that term which is connected with the predicate of the conclusion, (*sin*) is called the major term, and the subject of the conclusion, (*swearing*) is the minor term.

Q. Why have these terms obtained the names of major and minor?

A. Because the former is generally of larger extension of meaning than the latter; thus, *sin*, the major term in the above example, is of more comprehensive meaning than *swearing*, the minor term, which is only one particular species of sin.

Q. How many kinds of Syllogisms are there?

A. Syllogisms are divided into Universal Affirmative, Universal Negative, Particular Affirmative, and Particular Negative, Single and Compound, and these again into a variety of subdivisions.

Q. What is a Universal Affirmative Syllogism?

A. In a Universal Affirmative Syllogism, one idea is proved universally to agree with another, and may be universally affirmed of it; as,

Every sin deserves death,

Every breach of the divine law is a sin; therefore,

Every breach of the divine law deserves death.

Q. What is a Universal Negative Syllogism?

A. In a Universal Negative Syllogism, one idea is proved to disagree with another idea universally, and may be thus denied of it—as,

No injustice can be pleasing to God;
All persecution for conscience sake is injustice;
therefore,
No persecution for conscience sake, can be pleasing to God.

Q. What is a Particular Affirmative Syllogism?

A. A Particular Affirmative Syllogism, is when one idea may be affirmed to agree with another only in part, and can be only partially affirmed of it; as,

Whatsoever tends to render us humble is a blessing;
Some afflictions tend to render us humble;
Therefore some afflictions are a blessing.

Q. What is a Particular Negative Syllogism?

A. A Particular Negative Syllogism, is when one idea may be denied of another only in part; as,

Whatsoever does not tend to make us wiser and better is useless;
Some studies do not tend to make us wiser and better;
Therefore some studies are useless.

Q. What are Single Syllogisms?

A. Single Syllogisms are those which contain

only three propositions; they are divided into Simple, Complex, and Conjunctive.

Q. What is a Simple Syllogism?

A. A Simple or *Categorical* Syllogism, is made up of three plain, single, or categorical propositions, wherein the middle term is evidently and regularly joined with one part of the question in the major proposition, and with the other in the minor, whence there follows a plain single conclusion; as,

Every man is mortal;
An Emperor is a man;
Therefore an Emperor is mortal.

Q. What rules are laid down for framing simple syllogisms?

A. 1. The middle term must not be taken twice particularly, but once at least universally.

2. The terms in the conclusion must never be taken more universally than they are in the premises.

3. A negative conclusion cannot be proved from two affirmative premises.

4. If one of the premises be negative, the conclusion must be negative.

5. If one of the premises be particular, the conclusion must be particular.

Categorical, *a.* positive, absolute.

6. From two negative premises, nothing can be concluded.

7. From two particular premises, nothing can be concluded.

CHAP. XII.

Of Syllogisms (continued.)

Q. How are Simple Syllogisms distinguished?

A. Simple Syllogisms are distinguished into various kinds, called Figures.

Q. What is meant by Figure?

A. By Figure, nothing more is meant than the order and disposition of the middle term in any syllogism; and, as this disposition is four-fold, so the figures of syllogisms are also four.

Q. What constitutes the first Figure?

A. To constitute the first Figure, the middle term must be the subject of the major proposition and the predicate of the minor; as,

Every pious man will be saved;

All good christians are pious men;

Therefore all good christians will be saved.

In this syllogism the middle term *every pious man,* is the subject of the major proposition, and the predicate of the second.

Q. What constitutes the second figure?

A. The second figure requires the middle term to be the predicate both of the major and minor proposition; thus,

No dishonest person is fit to be trusted;
Every good man is fit to be trusted;
Therefore no good man is dishonest.

In this syllogism, *fit to be trusted*, is the middle term, and constitutes the predicate in each of the propositions.

Q. What constitutes the third Figure?

A. In the third Figure, the middle term is the subject of the two premises; thus,

Whoever loves God shall be saved;
All the lovers of God have their imperfections;
Therefore some who have imperfections shall be saved.

Here *lovers of God*, is the middle term, which forms the subject both of the major and minor propositions.

Q. What constitutes the fourth Figure?

A. In the fourth Figure, the middle term is the predicate of the major proposition, and subject of the minor; but, as this is a mere *inversion* of the first figure, no example is necessary,

Q. Are not Figures again subdivided?

Inversion, *s.* a turning backward.

A. Yes; into moods, or a regular determination of propositions according to their quantity and quality; of these there are several in each figure, but an *exemplification* of them would occupy too much space in this elementary catechism.

Q. What is meant by Quantity and Quality?

A. By Quantity, is meant the consideration of propositions, as universal or particular; by Quality, as affirmative or negative.

CHAP. XIII.

Of Complex Syllogisms.

Q. What is meant by Complex Syllogisms?

A. Complex Syllogisms properly so called, are those in which the middle term is not connected with the whole subject, or the whole predicate, in two distinct propositions, but is intermingled and compared with them by parts.

Q. Give an example and *illustration.*

Baal was a senseless idol;
The Syrians worshipped Baal;
Therefore the Syrians worshipped a senseless idol.

Here the predicate of the conclusion is, *wor-*

Exemplification, *s.* a giving an example.
Illustration, *s.* an explanation.

shipped a senseless idol, part of which (*worshipped*) is joined with the minor, and part with the middle term (*Baal*) in the major proposition.

Q. How are Complex Syllogisms divided?

A. Into Conditional or Hypothetical, Conjunctive and Disjunctive, and Enthymemes.

Q. What are Conditional or Hypothetical Syllogisms?

A. Hypothetical Syllogisms are of two kinds, distinguished by the names of *modus ponens* and *modus tollens*

Q. What is meant by Modus Ponens?

A. In the Modus Ponens, the major is always a conditional proposition, consisting of an *antecedent* and a *consequent*; if therefore the major admit the antecedent, the conclusion must admit the consequent; this is called arguing from the admission of the antecedent, to the admission of the consequent.

Q. Give an example.

If all men are sinners, and prone to evil, they must have fallen from their first estate;
All men are sinners and prone to evil;
Therefore all men must have fallen from their first estate.

Antecedent, *s.* that which goes before.
Consequent, *s.* that which follows.

Here the antecedent, or first part of the conditional proposition in the major, is established in the minor, and the consequent or second part in the conclusion.

Q. What is the Modus Tollens?

A. In the Modus Tollens, the minor rejects the consequent, when, of course, the conclusion must reject the antecedent. This is called arguing from the removal of the consequent to the removal of the antecedent.

Q. Give an example.

If man were not a being of a social disposition, he would not be found generally associating with his species;

But he is found generally associating with his species;

Therefore man is a being of a social disposition.

In the minor, the consequent *he would not be found,* &c. is rejected, therefore, in the conclusion, the antecedent *not a being of a social disposition* is rejected also.

Q. What are Conjunctive Syllogisms?

A. Conjunctive Syllogisms, are those wherein one, or both of the premises have distinct parts, which are joined by a copulative conjunction, or some such particle of speech; of this kind is the

syllogism given as an example of the modus ponens, *if all men are sinners* &c.

Q. What are Disjunctive Syllogisms?

A. A Disjunctive Syllogism is, when the major proposition is disjunctive; as,

The sun moves round the earth, or the earth moves round the sun;

But the sun does not move round the earth;

Therefore, the earth moves round the sun.

Q. May not a Disjunctive Syllogism consist of several members?

A. Yes; as,

It is either spring, summer, autumn, or winter,

But, it is neither spring, autumn, nor winter,

Therefore, it is summer.

Q. What is necessary to be observed in this kind of Syllogism?

A. The major must be so framed, that the several parts of it cannot be true together, though one of them is evidently true.

Q. What are Enthymemes?

A. Enthymemes are apparently imperfect syllogisms, in which only the major and the conclusion are expressed, and the minor omitted.

Every man is fallible,

Therefore the bishop of Rome is fallible

Q. Is this really an Imperfect Syllogism?

A. By no means; it is really complete, only the minor, *the bishop of Rome is a man,* is omitted, as being self-evident, and consequently unnecessary to be expressed.

Q. Is there not a species of Enthymemes in which no minor seems implied.

A. Yes; thus,

Things equal to one and the same thing are equal to one another;

Therefore, two triangles, each equal to the square of a given line, are equal to one another.

Q. How is this species of reasoning denominated?

A. It is called reasoning by immediate consequence?

Q. Will not the same remark apply to this as to the foregoing Enthymemes?

A. Nearly so; for as in the former the minor was left to the invention of the mind, so in this the major is omitted for the same reason; thus,

Things equal to one and the same thing, are equal to one another; two triangles, each equal to a square, whose side is given, are also equal between themselves;

But things equal to one and the same thing, are equal to one another.

Therefore, also these triangles, &c. are equal to one another.

CHAP. XIV.

Of Sorites, Induction, Dilemma, &c.

Q. WHAT is a Sorites ?

A. That species of reasoning denominated Sorites is, when a number of propositions are so linked together, that the predicate of one becomes the subject of the next following continually, until at last a conclusion is formed, by bringing together the subject of the first proposition, and the predicate of the last.

Q. Give an example.

A. Man is a fallible being,

A fallible being is liable to continual mistakes;

A being liable to continual mistakes ought always to be on his guard ;

Therefore man ought always to be on his guard.

Q. To what extent may a Sorites be carried ?

A. Sorites may be carried to any extent we please, because it can be reduced into as many simple syllogisms as there are middle terms in it ; for example,

Man is a fallible being;

A fallible being is liable to continual mistakes;

Therefore, man is liable to continual mistakes.

and so with the other.

Q. Can a Sorites be formed of conditional propositions?

A. Yes; by making the consequent of one become the antecedent of the next continually; thus,

If we love God, we shall wish to please him,

If we wish to please him, we shall keep his commandments,

If we keep God's commandments, we shall love our fellow-creatures;

Therefore, if we love God, we shall love our fellow creatures also.

Q. What is Induction?

A. Induction is, when from several particular propositions we infer one general one; thus, if we allow that white, black, and copper-coloured men include the whole species, we may reason thus,

White men have the power of speech,

Black men have the power of speech,

Copper-coloured men have the power of speech;

Therefore, all men have the power of speech.

Q. What is a Dilemma?

A. A Dilemma is an argument by which we prove the absurdity, inconvenience, or falsehood of some proposition.

Q. How is this done?

A. To do this a conditional proposition must be assumed, the antecedent of which is the assertion to be disproved, and the consequent a disjunctive proposition, enumerating all the suppositions upon which that assertion can take place. If these suppositions must be rejected, it follows that the antecedent must be rejected also.

Q. Give an example.

If mankind in general have good hearts, their actions must consequently be good,
But the actions of mankind in general are not good;
Therefore, it is absurd to say that mankind in general have good hearts.

Q. May not a Dilemma be used to prove the truth, as well as the absurdity of a proposition?

A. Yes; thus,

In heaven, we shall either have desires or not: if we have no desires, we shall have complete satisfaction; if we have desires, they will be satisfied as fast as they arise;

Therefore, in heaven we shall be completely satisfied.

CHAP. XV.

Of Demonstration.

Q. What is meant by Demonstration?

A. Demonstration is the proof of a proposition by a syllogism or series of syllogisms, founded on definitions and self-evident propositions.

Q. How can this be done?

A. All syllogisms, whether compound, *multiform* or defective, are reducible to plain, simple syllogisms in one of the four figures already described; and syllogisms of the other figures, are reducible to syllogisms of the first figure.

Q. What may be inferred from this?

A. From this, it may be inferred that every demonstration may be resolved into a series of simple syllogisms in the first figure.

Q. How are Demonstrations divided?

A. Demonstrations are divided into demonstrations *à priori*, which prove the effect by its necessary cause: and demonstrations *à posteriori*, which infer the cause from its necessary effect.

Mul'tiform, *a.* of many forms.

Q. Give examples.

A. Demonstration *à priori* may be thus illustrated,

Because all men die, and death is the punishment of sin,

Therefore, all men have committed sin.

A posteriori thus: I infer that the ancients understood architecture, because they have left noble monuments of their skill. In the former the cause is inferred from the self-evident truth, that all men die; in the latter, the undeniable argument of the effect, proves that the ancients were skilful architects.

Q. How are Demonstrations farther divided?

A. Into Direct and Indirect Demonstrations.

Q. What are Direct Demonstrations?

A. Direct Demonstrations are, when beginning with definitions and self-evident propositions, or known and allowed truths, we form a train of syllogisms, and combine them in an orderly manner, until we arrive at a syllogism, whose conclusion is the proposition to be demonstrated.

Q. What are Indirect Demonstrations?

A. Indirect or Apological Demonstrations are, when we assume a proposition directly contradictory to that which we are to demonstrate, and

thence by direct demonstration, deducing some absurdity or manifest untruth, we conclude, by an immediate consequence, that its opposite must be true.

Q. Is Demonstration an infallible guide to truth?

A. Yes; if the propositions be laid down according to the rules of simple syllogisms; for if the premises be true, the conclusion must, in that case, necessarily be true also; and as every demonstration may be resolved into a series of simple syllogisms, all of the first figure, the conclusion of each must necessarily be true, and the conclusion of the last is the answer sought.

Q. How are we to judge of the correctness of a Demonstration?

A. To judge whether a Demonstration be correctly made, we must examine whether the definitions that enter it, are truly descriptive of the ideas they are meant to exhibit; whether the propositions are really self-evident truths: whether the syllogisms are drawn up according to rule, and whether they are combined in a just and orderly manner.

CHAP. XVI.

Of Sophisms.

Q. WHAT are Sophisms?

A. Sophisms are false conclusions drawn from premises which seem to be true.

Q. How is this possible?

A. It is possible only when there is some fault in the deduction or inference, or else when one of the premises is not true, in the sense in which it is used in the argument.

Q. How many kinds of Sophisms are there?

A. Sophisms may be classed under the following heads; Ignoratio Elenchi, Petitio Principii, Non Causâ pro Causâ, Fallacia Accidentis, those of Composition and Division, and those which arise from the abuse of the *ambiguity* of words.

Q. What is Ignoratio Elenchi?

A. Ignoratio Elenchi, or a mistake of the question, is, when something is proved which has neither any necessary connection nor consistency with the thing inquired, and consequently gives no satisfaction to the inquiry, though it may at first sight seem to determine the question.

Q. Give an example.

A. Suppose the question to be,

Ambig'uity, *s.* doubtful meaning.

Was St. Paul a Jew?

We may reason thus,

Paul was born at Tarsus in Cilicia;

Tarsus in Cilicia was not a part of Judea;

Therefore, Paul was not a Jew.

Q. Wherein does the fallacy of this conclusion consist?

A. The fallacy of this conclusion consists in keeping out of sight the fact that he was born of Jewish parents, though not in Judea, and that consequently he was a native Jew.

Q. How may this fallacy be prevented?

A. This fallacy may be prevented by keeping the mind fixed on the precise point to be determined, and not suffering ourselves to wander from it, or to substitute any thing else in its room.

Q. What is Petitio Principii?

A. Petitio Principii, or a supposition of what is not granted, is, when any proposition is attempted to be proved by the same proposition in other words, or by something that is equally uncertain and disputed.

Q. Give an example.

A. Suppose the proposition to be demonstrated be, that man is not an accountable creature, and the syllogism to be formed thus,

A creature not endowed with free will, is not accountable,

Man is not endowed with free will;

Therefore, man is not an accountable creature.

In this argument, the minor is a false assumption, and consequently the conclusion must be false.

Q. What is Non Causâ pro Causâ?

A. Non causâ pro causâ, or the assignation of a false cause sufficiently explains itself.

Q. What is Fallacia Accidentis?

A. Fallacia Accidentis is, when we pronounce concerning the nature or essential properties of any subject, from something which is merely accidental to it; thus, wine has been prohibited to the followers of Mahomet, because it sometimes induces drunkenness, quarrels, &c.

Q. What is a Sophism of Composition?

A. A Sophism of Composition is, when we infer any thing concerning ideas in a compounded sense, which is true of them only in a divided sense; thus, we say three and five are odd numbers, but were we to infer that their total (eight) must therefore be an odd number, our inference would be false, and a sophism of composition.

Q. What is a Sophism of Division?

A. A Sophism of Division is, when we infer the same thing concerning ideas in a divided, which is true of them only in a compound sense; thus, eight is an even number, but if we say that five and three, which together make eight, are even numbers, we assert what is not true, and make a sophism of division.

Q. What is a Sophism arising from our abuse of the ambiguity of words?

A. Sophisms arising from our abuse of the ambiguity of words, require no explanation, as it is easy to understand what they are; the only danger that can arise from them is, when the two senses or significations of one term, do not widely differ, and consequently are not instantly obvious.

Q. How may the truth or falsehood of all syllogisms be satisfactorily proved?

A. The truth or falsehood of all syllogisms may be satisfactorily proved, by two general methods.

1. The premises must either directly or by *implication,* contain the conclusion, or one of the premises must contain the conclusion, and the other must shew that the conclusion is contained in it.

Implica'tion, *s.* the state of being implied, not expressed.

2. As the terms in every syllogism are usually repeated, so they must be taken precisely in the same sense in both places.

CHAP. XVII.

Of Method.

Q. What is Method?

A. Method taken in its largest sense implies, the placing of several things, or the performing of several operations, in such an order as may be most convenient to attain some end proposed.

Q. What is more particularly meant by Method in Logic?

A. By Method in Logic, is meant the disposition of a variety of ideas on any subject, in such order as may best serve to find out unknown truths, to explain and confirm things that are known, and to fix them in the memory.

Q. How many kinds of Method are there in Logic?

A. In Logic there are two kinds of Method, Natural and *Arbitrary*.

Q. What is Natural Method?

A. Natural Method is that which observes the order of nature, and proceeds in such a manner as

Arbitrary, *a.* not restrained or governed by any rule.

that the knowledge of things which follow, depends greatly on those things which preceded. It is divided into the synthetic and analytic method.

Q. How may we attempt the discovery of truth by the Synthetic Method?

A. When the Synthetic Method is used, we begin with the first and most simple principles, from which we go on to demonstrate those that follow, till by degrees we establish the truth which is the object of inquiry; this is called the method of composition.

Q. What is the Analytic Method?

A. The Analytic Method endeavours to discover the truth of any proposition, by tracing it back through every intermediate degree, to its first or original principle, this is called the method of resolution.

Q. Have not these methods other denominations?

A. Yes; the Analytic Method is sometimes denominated the method of invention, and the synthetic, the method of instruction.

Q. What is meant by the Method of Invention?

A. By the Method of Invention we mean, such a disposition and arrangement of our thoughts as

follows the natural procedure of the understanding, and presents them in the order in which they succeed one another, in the investigation and discovery of truth.

Q. What is required in the exercise of invention?

A. 1. An enlarged and comprehensive understanding, able to take in the great number of particulars, which frequently come under our notice.

2. A strong habit of attention, that lets nothing remarkable escape its view, and distinguishes carefully all those circumstances which tend to illustrate and render clear the subject in hand.

Q. Are these qualifications natural or to be acquired?

A. They are undoubtedly, in some respects, natural, but may be strengthened and improved by exercise to an almost unlimited degree; for this purpose, the study of the mathematics is admirably calculated to accustom the mind to large and comprehensive views of things, and to enable it to trace the connection of the several parts without difficulty or confusion.

Q. What farther is required in the exercise of invention?

A. A judicious choice of intermediate ideas;

for, as has already been observed, in the inquiry after truth, we must lay down known and evident truths as premises, from whence we may form conclusions that shall either at once or by regular degrees establish the truth or falsehood of that which we inquire after.

Q. By what means are intermediate ideas to be obtained?

A. Though some degree of sagacity and quickness of mind, is requisite in the formation of intermediate ideas, yet this may be greatly assisted, by our making ourselves generally acquainted with the whole circle of arts and sciences, and by taking wide and extensive views of things: but above all, by endeavouring to obtain an intimate knowledge of the subject about which our inquiries are employed.

Q. What is meant by Sagacity?

A. Sagacity, in Logic, means that dexterity and address which are necessary in choosing the most proper ideas, and applying them skilfully for the discovery of truth.

Q. Are there not artificial helps by which the *investigation* of truth may be rendered easy?

A. Yes; it is one great branch of the art of

Investigation, *s.* accurate examination.

reasoning, to manage with skill the capacity of the mind, and to contrive such helps as may bring the most wide and extended objects within the compass of its natural powers.

Q. How may this be done?

A. As it often happens that in the investigation of a subject, the number of connections and relations is so great, and the *ultimate* conclusion lies at such a distance from the first proposition, as to render the whole impossible to be embraced at once by the most enlarged understanding: it is indispensably requisite that these relations should be taken account of as they come in view, and disposed in such a manner, as always to lie open to the inspection of the mind, whenever occasion may offer.

Q. What advantages will result from this practice?

A. 1. By this method, without perplexing ourselves with too many considerations at once, we have yet these relations at command, when necessary to be taken notice of in the prosecution of our discoveries; and the understanding, thus free and disengaged, can employ its whole powers on that

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Ul'timate, *a.* last.

particular part of the investigation it is at present concerned with.

2. It prevents unnecessary fatigue to the mind, and permits it to go on gradually in its investigations without perplexing itself with the consideration of the whole: thus very remote and distant truths, which lie far beyond the reach of any single effort of the mind, may, by this progressive method, be brought to light with little fatigue to the understanding; for though the whole process, when taken together, is often, much too large to come within the view of the mind at once, yet the intermediate steps of the investigation are generally very easy and manageable.

Q. Illustrate this by a familiar example.

A. Suppose in arithmetic we are required to give the product of several figures multiplied by several; to do this at once is an effort beyond the powers of the mind; but when we multiply the units, tens, &c. separately, and place them in their regular order, and afterwards add the whole in the same gradual manner, the product is obtained with ease and certainty. It is by a similar process that remote truths are gradually unveiled.

CHAP. XVIII.

Of Method (continued.)

Q. What is the Method of Instruction?

A. The Method of Doctrine or Instruction, called also the Method of Science, is that process by which we advance step by step, from first principles to the attainment of truth.

Q. What is meant by Science?

A. Science, or scientific knowledge, is that knowledge which is attained by reasoning from the ideas in our minds, and the connections and relations they have one to another: and as when these relations are set clearly and plainly before us, we cannot avoid perceiving and owning them, hence all the truths of this class produce absolute certainty in the mind.

Q. Is not knowledge acquired by the senses to be called scientific?

A. No: because our organs of sense are liable to deceive us; thus, a man in the jaundice sees all objects tinged with yellow; and phantoms that have really no existence, appear to men in dreams, or in the delirium of a fever.

Q. May not knowledge acquired by the report and testimony of others, be termed scientific.

A. No: because however probable their testimony may be, yet it is possible that the reporters

themselves may have been deceived, or that several may have conspired to impose upon others by a false relation.

Q. Cannot the Method of Science be applied in the acquirement of natural knowledge?

A. No: this can be acquired by experience only; it is impossible by the most laborious and minute investigation of its component parts, to discover what effect any unknown drug will produce on the human body; experiment alone can determine this. Our knowledge of the powers of gunpowder was not acquired by reasoning, but by means of experiment.

Q. What may we gather from these *data?*

A. From these *data* we may observe, that in scientifical knowledge, which regards wholly the abstract ideas of the mind, and those relations and connections which they have one with another, our judgments are grounded on intuition, and the manner of reasoning is by demonstration; but in natural knowledge, respecting objects which exist without us, their powers, properties and mutual operations, we reason by induction and *analogy*, while in historical knowledge which is chiefly conversant about past facts and transactions,

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Data, *s.* premises laid down.
Analogy, *s.* resemblance of one thing to another.

the testimony of others is the ground of judgment, and the only method of reasoning is by criticism and probable conjecture. (Vide chap. 7)

CHAP. XIX.

Of the Rules of Method.

Q. ARE there any rules laid down by logicians to direct us in the use of Method?

A. Yes; many, but the number may be reduced to seven of the greatest importance.

Q. What is the first rule?

A. Take care that your method be safe and secure from error.

Q. How may this be done?

A. 1. Use great care and circumspection in laying the foundation of your argument or discourse. For this purpose, the propositions which are to stand as first principles, must be accurately examined, and care must be taken that the first and more immediate consequences to be deduced from them be well drawn.

2. Having satisfied yourself that your first and most important propositions are evident and true, make yourself so thoroughly acquainted with them, that you may draw consequences from them with freedom and certainty.

3. Take care that your whole chain of rea-

soning be strong and good; one feeble link will render the whole of your arguments of no avail.

4. Draw up your propositions and arguments with such skill and caution, as, if possible, to preclude or anticipate all objections.

Q. What is the second rule?

A. Let your Method be plain and easy, that your readers or hearers may follow your reasonings with ease, and take a clear and comprehensive view of the whole plan.

Q. What particular directions are necessary for this?

A. 1. Let your first propositions be such as are most known and obvious, and proceed by regular and easy steps to those that are more difficult.

2. Make yourself perfectly master of any science before you presume to teach it, lest you become entangled in difficulties, and be compelled to retrace your steps.

3. Do not crowd too many thoughts and reasonings into one sentence or paragraph, to bewilder the understandings of your readers or hearers.

4. Endeavour to acquire a clear and easy way of expressing your conceptions; for it will be to little purpose that you have a clear conception of your own meaning, if you cannot clearly convey

those ideas to others: for this purpose take care not to use words which convey a doubtful meaning, or that may be understood in a variety of senses.

Q. What is the third rule?

A. Let your method be distinct, by avoiding every thing that is *irrelevant* to the subject on which you treat; by dividing complicated ideas into their distinct, single parts: by classing each proposition and argument according to the rules before laid down, and by taking care that the several divisions of your subject do not interfere with each other.

Q. What is the fourth rule?

A. The fourth rule is, that the method of treating a subject should be plenary or full, so that nothing be wanting; take care not to pass over any part of it that is obscure or difficult to be explained; enumerate the parts or properties of any subject, when necessary, in a complete and comprehensive manner; support and confirm every doubtful or disputable part of an argument; enter fully into the illustration of any difficult point, take care to omit no important circumstance in drawing up a narrative of facts: in the solution of difficulties consider all the various cases in which they can happen, and how they can be solved;

Irrelevant, *a.* not to the purpose.

in short, let your enumerations, your divisions, and distributions of things be so accurate, that no needful part or idea may be omitted.

Q. What is the fifth rule?

A. While the foregoing rule must be fully attended to, avoid the opposite extreme; let your method be without superfluity; avoid all needless repetitions; shun *prolixity*; do not attempt to explain that which needs no explanation; nor to prove that which needs no proof; nor to *refute* that which is evidently false: in short, take care that you do not by too much prolixity grow tiresome, or by too much brevity render the sense obscure, and the arguments feeble.

Q. What is the sixth rule?

A. Let your method be proper to the subject; every subject must not be handled in the same manner, but judgment and experience will prove better guides than rules on this head.

Q. What is the seventh rule?

A. Let the parts of an argument or discourse be well connected, so that the whole may form a regular chain, without any chasms or breaks in it.

Prolixity, *s.* tedious length. Refute, *v.* to disprove.

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